

The rise of Digital Challengers

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

Perspective on Slovakia



The rise of Digital Challengers

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

Perspective on
Slovakia

Jurica Novak

Marcin Purta

Tomasz Marciniak

Karol Ignatowicz

Kacper Rozenbaum

Kasper Yearwood

Dan Svoboda

Michal Skalsky

Helena Sarkanova

About McKinsey & Company

We are a global management consulting firm that serves a broad mix of private, public and social sector institutions. We help our clients make significant and lasting improvements to their performance and realise their most important goals. We have built on nearly a century of experience and added a wide range of new skills and capabilities to create a firm that is uniquely equipped for the digital future. For example, our colleagues in McKinsey Digital & Analytics work together with clients to drive technology-enabled transformations. By combining the latest innovations with deep industry, functional, and technological expertise, we help clients capture value from data and succeed in the digital age.

We are home to thousands of the world's most talented professionals across the fields of digital, analytics, and design. Our cross-functional teams enable clients to reinvent themselves through technology. From optimising core technology and automating operations to building entirely new digital businesses, we work side-by-side with our clients to prepare them to survive and thrive in a rapidly changing world.

For more information, visit mckinsey.com

About McKinsey & Company Czech Republic and Slovakia

The Prague office of McKinsey & Company is a unique blend of talented people, innovative ideas, management excellence, and a long history of relationships with leading Czech and Slovak institutions. Since 1994, we have managed to grow into a large office that keeps its entrepreneurial roots and spirit. We advise international companies, local champions and help build new businesses. We regularly do pro bono work: most recently, we looked at how to radically improve the outcomes of our primary education system. Equally importantly, we are proud to have raised and developed a number of business and society leaders in the Czech Republic and Slovakia.

For more information, visit mckinsey.cz

About the Digital Challengers research

This report is part of 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, followed by additional country reports for the Czech Republic, Hungary, Poland, Romania and Slovakia.



Czech Republic



Hungary



Poland



Romania



Slovakia

Contents

KEY FINDINGS

PAGE 4

CHAPTER 1

Digital economy in
Slovakia

PAGE 10

CHAPTER 3

Key enablers of
digitization in Slovakia

PAGE 22

CHAPTER 5

Implications for policy-
makers, business
leaders, and individuals
in Slovakia

PAGE 36

INTRODUCTION

PAGE 8

CHAPTER 2

Impact on Slovakia's
labour market

PAGE 16

CHAPTER 4

Collaboration with
other CEE countries
is key

PAGE 34

CHAPTER 6

Recap of key
messages for CEE

PAGE 48

Preface

This report constitutes a perspective on Slovakia as part of wider research analysing 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 Slovakia, alongside nine other markets in the region (Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania and Slovenia), 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 the digital economy in Slovakia 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 Slovakia 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 labour market (Chapter 2). Our discussion here covers both the shifts in society caused by the new technology and the increasingly accessible nature of the labour market as a result of the digital transformation. Following these aspects, we consider a comprehensive, yet prioritised list of digitization enablers for Slovakia, 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, emphasising the impor-

tance of capturing regional scale effects, tackling common challenges and sharing best practices in matters related to stimulating digitization across the region (Chapter 4), and examine the implications for policy-makers, companies and individuals (Chapter 5). This final section contains a list of actions for these stakeholders to capture the digital opportunity.

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

The work on this report was led by Jurica Novak, Managing Partner in Central Europe; Dan Svoboda, Managing Partner in the Czech Republic and Slovakia; Michal Skalsky, Partner and Leader of Digital McKinsey in CEE; Helena Sarkanova, Associate Partner and Leader of Digital McKinsey in the Czech Republic and Slovakia; Tomas Karakolev, Senior Expert and Leader of Strategy & Corporate Finance; with significant contributions by McKinsey Partners Marcin Purta and Tomasz Marciniak, and Associate Partner Karol Ignatowicz in Poland. Kasper Yearwood, Kacper Rozenbaum, Lucie Markova, Petr Kotesovec, Joanna Iszkowska, Milena Tkaczyk, Małgorzata Leśniewska and many others carried out the analyses and contributed to the writing of the report.

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

Slovakia as a Digital Challenger

For Slovakia, the potential economic and developmental benefits of digitization can reach up to EUR 16.1 billion p.a. in additional gross domestic product by 2025. This would lead to increased global competitiveness and prosperity for the country's 5 million people and allow Slovakia to join the most digitally advanced economies in Europe.

1 SIMILAR TO OTHER CEE MARKETS, THE CURRENT GROWTH ENGINES OF SLOVAKIA ARE LOSING MOMENTUM

Over the past 30 years, Slovakia has experienced rapid development (GDP per capita grew by 114 percent between 1996 and 2017), fuelled by traditional industries, dynamic exports, investments from abroad, a growing workforce combined with labour-cost advantages and funding from the European Union. However, many of these drivers are beginning to lose their momentum. Significantly undercapitalised compared to more advanced European economies, Slovakia is experiencing a shrinking and increasingly more expensive workforce, with unemployment at low levels (8.1 percent in 2017). With Slovakia's working hours already above the EU average, there is a need to improve Slovakia's productivity, which currently lags behind Western Europe. If Slovakia hopes to continue on its path to increased prosperity, it needs to redefine its growth strategy.

2 DIGITIZATION COULD BE THE NEXT DRIVER OF SUSTAINED GROWTH FOR SLOVAKIA, WITH EUR 16.1 BILLION OF INCREMENTAL GDP BY 2025 AT STAKE

Our analysis shows that accelerating digitization and the convergence toward a tech-driven economy have a large potential to unlock the new growth engine that Slovakia needs so urgently, resulting in EUR 16.1 billion additional GDP, equivalent to 19 percent of the GDP of Slovakia in 2016. In 2016, the digital economy in Slovakia already accounted for EUR 4.8 billion, the equivalent of 5.9 percent of GDP (total EUR 81.2 billion). In an aspirational scenario, the digital economy share in Slovakia would grow to EUR 20.9 billion, amounting to 16.9 percent of Slovak GDP by 2025 (total EUR 123.8 billion). In a "business as usual" scenario forgo-

ing this acceleration and maintaining the historical growth rate, the digital economy would amount to EUR 5.1 billion by 2025, moving the relative share down to 4.7 percent of GDP (total EUR 102 billion). In this scenario, Slovakia would remain a long way from the "digital frontier" represented by countries in Northern Europe.

3 SLOVAKIA IS WELL POSITIONED TO CAPTURE THE DIGITAL OPPORTUNITY

In this report we consider Slovakia to be one of ten Digital Challenger markets based in Central and Eastern Europe. These countries exhibit lower digitization rates than the Digital Frontrunners (Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway and Sweden) or the EU Big 5 markets (France, Germany, Italy, Spain and the United Kingdom). However, Slovakia has strong foundations on which to accelerate its digitization. The size of the digital economy in Slovakia (at 5.9 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). Even though the size of the Slovak digital economy is not far off the EU Big 5 average (6.9 percent), growth is stalling – between 2012 and 2016, the digital economy in Slovakia grew only by 0.7 percent per year, four times slower than in the EU BIG 5, indicating it still hasn't gained significant momentum. Additionally, a relatively large STEM and ICT graduate talent pool, high-quality digital infrastructure, and a legacy technology lock-in that is milder than in Western and Northern European countries, lend support to Slovakia's Digital Challenger status. Relative to other CEE markets, the country exhibits higher digitization rates in the utilities sector, but performs below the CEE average in many others, with major gaps in manufacturing, professional services and trade. Slovakia also performs close to or below the CEE average in many digitization-enabling areas, indicating room for improvement. This holds true in areas such as the startup ecosystem (with a significantly smaller number of startups per capita and share of VC investments) and preparedness of the regulatory regime for Slovak ICT businesses (including the ability to start a business and enforce contracts).

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

To achieve the aspirational digitization scenario, Slovakia will have to count on all stakeholders. Today, companies in Slovakia lag behind Digital Frontrunners not only in terms of digital tools, but also, for instance, in the degree to which they provide training to develop personnel ICT skills. Companies will need to understand and embrace digitization opportunities, increase their adoption of digital tools and reskill their workforces to match new talent demands, enabling them to benefit from improved productivity and profitability. Using digital technology, companies can grow internationally and challenge industry boundaries, creating new, international ecosystems of services. The public sector could integrate technologies to increase efficiency as well as improve the services provided for both companies and citizens. While Slovakia has already made 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 the key to new labour 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 programmes, 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, Slovakia 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 EUR 1.4 trillion in GDP – almost fifteen times the size of the Slovak economy. Enabling Slovak 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:** Slovakia 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:** Slovakia, like other CEE markets, exhibits high levels of market openness and similar levels of digitization, in addition to cultural and historic commonalities. This adds relevance to their shared experiences on what has worked well in digital investments and regulatory policy.
- **Best practices:** Slovakia has developed different strengths related to the digital economy than other CEE markets (e.g., the relatively high level of digital tool adoption by enterprises, high participation rates in adult learning). Sharing best practices can accelerate digitization. Leveraging the strengths of neighbouring countries could limit the risk of harmful competition and allow for the creation of centres of excellence. Also, this could encourage regional coordination and planning: Instead of developing solutions in isolation, Slovakia could speed up the development of its digital economy by replicating successful strategies already tested elsewhere.

In the future, Slovakia 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 ensure the digital interests of the region’s countries are heard at the European level.

6 THE TIME TO ACT IS NOW – OR SLOVAKIA MAY MISS THE DIGITAL OPPORTUNITY

For Slovakia to benefit fully from the digital transformation, we believe now is the time to act. Slovakia is booming economically. However, there are several future limitations to traditional growth drivers (e.g., undercapitalisation, rising workforce costs, limited labour reserves, lagging productivity). Moreover, technology is poised to fundamentally transform the Slovak labour market: Our analysis shows that up to 53 percent of workplace activities in the country today could be automated by 2030 using existing technology. This creates both a productivity increase opportunity and challenges related to transitioning the labour market to new job pools. Immediate action is needed to address these. Effectively navigating the transformation ahead requires a clear digital agenda. ■

Slovensko ako digitálny adept

Slovensku môže rozvoj digitalizácie do roku 2025 priniesť až 16,1 miliardy eur v dodatočnom hrubom domácom produkte (HDP). To by viedlo k zvýšeniu globálnej konkurencieschopnosti a blahobytu pre 5 miliónov obyvateľov krajiny a umožnilo by to Slovensku pripojiť sa k digitálne najrozvinutejším ekonomikám Európy.

1 PODOBNE AKO V PRÍPADE INÝCH TRHOV STREDNEJ A VÝCHODNEJ EURÓPY, EXISTUJÚCE ZDROJE RASTU NA SLOVENSKU SLABNÚ

Od svojho vzniku v roku 1993 Slovensko zaznamenalo rýchly rozvoj (HDP na obyvateľa od roku 1996 do 2017 vzrástlo o 114 percent) vďaka rastu tradičných odvetví, dynamického exportu, zahraničných investícií a rastúcej pracovnej sily v kombinácii s výhodou úrovňou ceny práce a financovania z Európskej únie. Mnohé z týchto zdrojov však začínajú slabnúť. V porovnaní s rozvinutejšími európskymi ekonomikami výrazne podkapitalizované Slovensko zažíva pokles a stále drahšiu pracovnú silu, a to pri nízkej úrovni nezamestnanosti (8,1 percent v roku 2017). Slovensko má už teraz dlhší pracovný čas ako EÚ priemer, no v produktivite zaostáva za západnou Európou. Ak chce Slovensko pokračovať v ceste za zvýšeným blahobytom, potrebuje predefinovať svoju stratégiu rastu.

2 DIGITALIZÁCIA BY MOHLA BYŤ ĎALŠÍM ZDROJOM UDRŽATEĽNÉHO RASTU SLOVENSKA, PRINÁŠAJÚC 16,1 MILIARDY EUR V PRÍRASTKU HDP DO ROKU 2025

Naša analýza ukazuje, že urýchliť digitalizáciu a smerovať k technologicky orientovanej ekonomike má veľký potenciál na umožnenie nového rastu, ktorý Slovensko tak veľmi potrebuje. Dosiahlo by tak 16,1 miliardy eur v zvýšenom HDP, čo je ekvivalent 19 percent HDP Slovenska v roku 2016. Digitálna ekonomika na Slovensku už v roku 2016 tvorila 4,8 miliardy eur – ekvivalent 5,9 percenta HDP (celkové HDP 81,2 miliardy eur). Pri optimistickom scenári by podiel digitálnej ekonomiky mohol na Slovensku do roku 2025 narásť na 20,9 miliardy eur, čo by predstavovalo 16,9 percent HDP Slovenska (celkové HDP 123,8 miliardy eur). Pri základnom scenári, ktorý by predchádzal tomuto urýchleniu a udržiaval by historické tempo rastu, by digitálna ekonomika do roku 2025 tvorila

5,1 miliardy eur, čím by sa relatívny pomer znížil na 4,7 percenta HDP (celkové HDP 102 miliárd eur). Pri tomto scenári by Slovensko zostalo ďaleko za „digitálnymi šampiónmi“ – krajinami severnej Európy.

3 SLOVENSKO MÁ DOBRÉ PODMIENKY NA VYUŽITIE DIGITÁLNEJ PRÍLEŽITOSTI

V tejto správe hodnotíme Slovensko ako jeden z desiatich trhov digitálnych adeptov v strednej a východnej Európe. Tieto krajiny preukazujú nižšiu mieru digitalizácie v porovnaní s tzv. digitálnymi šampiónmi (Belgicko, Dánsko, Estónsko, Fínsko, Írsko, Luxembursko, Holandsko, Nórsko a Švédsko) a päťkou veľkých trhov EÚ (EU Big 5 – Francúzsko, Nemecko, Taliansko, Španielsko a Spojené kráľovstvo). Slovensko má však silné základy, vďaka ktorým možno digitalizáciu urýchliť. Veľkosť digitálnej ekonomiky na Slovensku (5,9 percenta HDP v roku 2016) takmer siaha na priemer regiónu strednej a východnej Európy, ktorého podiel je 6,5 percenta, no s jednoznačným odstupom od trhov digitálnych šampiónov, akým je napríklad Švédsko (9,0 percent HDP). Hoci veľkosť digitálnej ekonomiky Slovenska nie je ďaleko za priemerom veľkej päťky EÚ (6,9 percenta HDP), rast je spomalený. Medzi rokmi 2012 a 2016 rástla digitálna ekonomika Slovenska medziročne o 0,7 percenta, čo je štyrikrát nižší rast ako v prípade krajín veľkej päťky EÚ. To znamená, že Slovensko stále čaká na dosiahnutie významného rastu. Okrem toho, relatívne veľké množstvo ľudí vzdelaných v technických odboroch (STEM) a odbore informačných a komunikačných technológií (IKT), vysokokvalitná digitálna infraštruktúra a nižšie upnutie sa na tradičné technológie, všetky podporujú stav Slovenska ako digitálneho adepta. Vo vzťahu k iným trhom strednej a východnej Európy vykazuje Slovensko vyššiu mieru digitalizácie v energetickom odvetví, no zaostáva v mnohých ďalších, najmä v odborných službách, výrobe a obchode. V mnohých oblastiach umožňujúcich digitalizáciu si Slovensko vedie takmer rovnako alebo pod priemerom krajín strednej a východnej Európy, čo predstavuje priestor na zlepšenie. To platí predovšetkým pre oblasti ako systémy rozbiehania podnikov (s výrazne nižším počtom rozbiehaných podnikov na obyvateľa a podielom investícií rozvojového kapitálu) a pre pripravenosť regulačného režimu pre slovenské IKT podniky (vrátane schopnosti rozbehnúť podnik a uplatnenie zmlúv).

4 VLÁDA, PODNIKATELIA A JEDNOTLIVCI – TÍ VŠETCI MUSIA KONAŤ ZA ÚČELOM ÚSPEŠNEJ DIGITALIZÁCIE

Na dosiahnutie optimistického scenára digitalizácie musí Slovensko počítať so všetkými zúčastnenými stranami. Dnes podniky na Slovensku zaostávajú za digitálnymi šampiónmi nielen v súvislosti s digitálnymi nástrojmi, ale napríklad i v miere, v ktorej poskytujú školenia na vytvorenie IKT zručností u svojich pracovníkov. Spoločnosti budú musieť pochopiť príležitosti digitalizácie, zvýšiť mieru používania digitálnych nástrojov a preškoliť svojich pracovníkov tak, aby vyhovovali novým personálnym požiadavkám, čo im zároveň umožní prosperovať zo zvýšenej produktivity a ziskovosti. Využitím digitálnych technológií môžu spoločnosti rásť globálne, prekonávať hranice odvetví a vytvárať nové, medzinárodné systémy služieb. Verejný sektor tiež môže integrovať technológie, ktoré zvýšia efektivitu a zlepšia služby poskytované spoločnostiam a občanom. I keď Slovensko už urobilo prvé kroky v oblasti digitalizácie verejnej správy, využívanie on-line služieb bežnou populáciou zostáva nižšie ako v priemere krajín digitálnych adeptov i digitálnych šampiónov. Pre jednotlivcov je investovanie do celoživotného vzdelávania na vyššiu kvalifikáciu a rekvalifikáciu kľúčové na využitie príležitosti na novom pracovnom trhu. Tvorcovia politik sú žiadaní o podporu technológií vo štátnom i súkromnom sektore. Môžu tiež podporiť zamestnancov prostredníctvom programov zvyšovania kvalifikácie a rekvalifikácie, či zlepšením systému rozbežania podnikov a príležitostí na digitálnu inováciu.

5 SPOLUPRÁCA S INÝMI DIGITÁLNYMI ADEPTAMI JE KLÚČOVÁ

Krajiny strednej a východnej Európy, medzi ktoré patrí i Slovensko, dokážu využiť plný potenciál digitalizácie iba ak budú navzájom úzko spolupracovať. Výhody spolupráce predstavujú tieto štyri dôvody:

- Veľkosť: Digitálni adepti z regiónu strednej a východnej Európy spolu predstavujú 1,4 bilióna eur v HDP – takmer 15-násobok ekonomiky Slovenska. Umožniť podnikom na Slovensku napojiť sa na tento potenciál môže zozáť úrodu v podobe značných prínosov. Podpora digitálnych riešení v celom regióne môže znížiť náklady cezhraničného obchodu.
- Spoločná problematika: Slovensko čelí tým istým výzvam ako ostatné trhy v strednej a východnej

Európe, medzi ktoré patrí najmä odliv mozgov a dlhodobá potreba rekvalifikácie pracovnej sily. Spoločné úsilie v regióne môže pomôcť pri nachádzaní a realizácii najefektívnejších riešení.

- Podobné východiskové pozície: Tak ako ostatné trhy v strednej a východnej Európe, aj Slovensko má vysokú úroveň otvorenosti trhu, podobnú úroveň digitalizácie a kultúrnu a historickú podobnosť. To pridáva na relevancii spoločným konverzáciám o tom, čo funguje v digitálnych investíciách a regulačnej politike.
- Zdieľanie skúseností: Slovensko má unikátne prednosti týkajúce sa digitálnej ekonomiky, napríklad relatívne vysokú úroveň používania digitálnych nástrojov podnikmi, či vysokú mieru vzdelávania dospelých. Rovnováha medzi prednosťami susediacich krajín môže znížiť riziko škodlivej konkurencie a umožniť vytvorenie centier excelentnosti (Centers of Excellence). Tiež môže povzbudiť regionálnu koordináciu a plánovanie – namiesto vytvárania riešení osamote môže Slovensko urýchliť rozvoj svojej digitálnej ekonomiky kopírovaním úspešných stratégií, ktoré sa už odskúšali inde.

V budúcnosti môže Slovensko spolu s ďalšími digitálnymi adeptami spolupracovať na digitálnych projektoch či politických riešeniach v celom regióne, a to s cieľom rastu digitalizácie. Paneurópska koalícia by tiež mohla pomôcť zabezpečiť, že digitálne záujmy krajín regiónu strednej a východnej Európy budú komunikované na európskej úrovni.

6 TERAZ JE ČAS KONAŤ – INAK MÔŽE SLOVENSKO PREMEŠKAŤ DIGITÁLNU PRÍLEŽITOSŤ

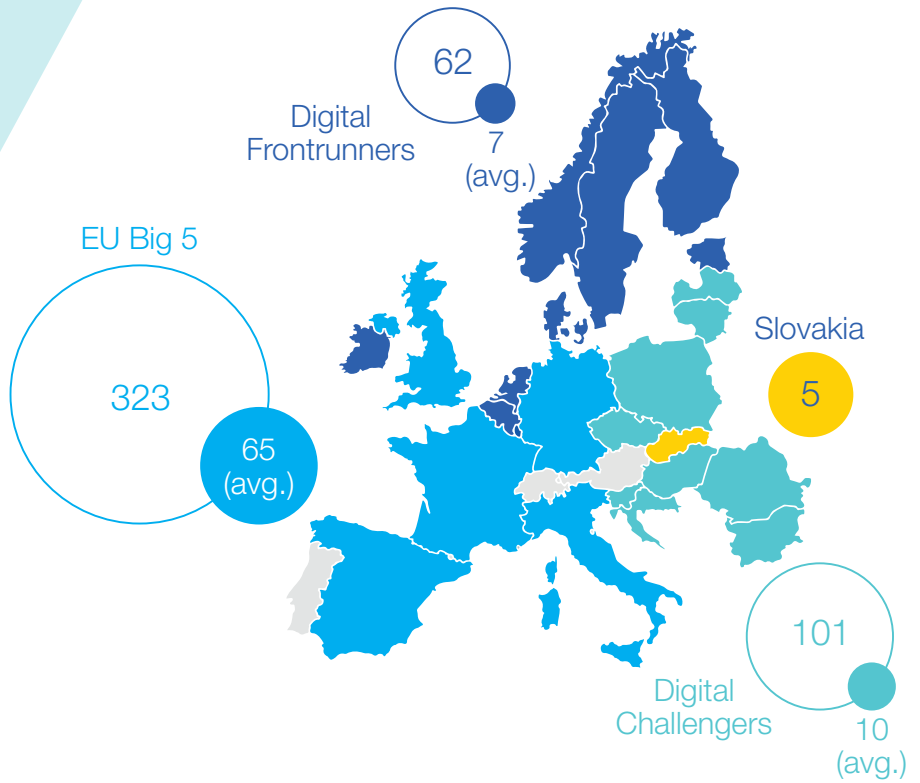
Ak chce Slovensko plne využiť prínosy digitálnej transformácie, musí konať teraz. Slovensko je v ekonomickom boome, no v raste pomocou tradičných zdrojov existujú mnohé limity (napr. nízka úroveň kapitalizácie, zvyšujúca sa cena práce, obmedzené pracovné rezervy, nízka produktivita). Technológie navyše podstatne zmenia pracovný trh na Slovensku – naša analýza preukazuje, že až 53 percent súčasných pracovných činností v krajine môže byť do roku 2030 automatizovaných pomocou už existujúcich technológií. To vytvára príležitosť na zvýšenie produktivity, no zároveň problémy súvisiace s prechodom pracovného trhu na nové pracovné zaradenia. Je potrebné konať okamžite, efektívna transformácia si vyžaduje jednoznačnú digitálnu agendu. ■

Slovakia and Digital Challengers at a glance

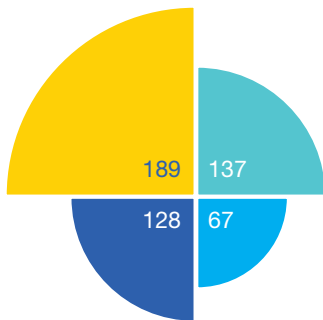
From the perspective of economy and digitization, three broad groups of countries have emerged over the last three decades. The first group is formed by relatively small, open economies with high digitization rates. This “Digital Frontrunners” group comprises Northern European and Benelux countries: 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 (the EU Big 5) – France, Germany, Italy, Spain and the United Kingdom. Compared to 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 the ten countries of Central Eastern Europe – Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

Slovakia has recorded significant economic growth since the 1990s. Gross domestic product (GDP) per capita grew by 114 percent between 1996 and 2017. Growth was captured by traditional industries, further enabled by dynamic exports, investments from abroad, labour-cost advantages and the inflow of EU funds as key drivers. These drivers are, however, beginning to lose momentum. The Slovak economy is generally undercapitalised relative to more advanced European economies: the ratio of capital, measured as net assets per employee, is more than 46 percent lower here than in the EU Big 5, the five largest economies in the European Union. Workforce costs are rising, and there are limited labour reserves left to plug into the economy, with unemployment in Slovakia at low levels: 8.1 percent in 2017, compared with 9.2 percent in the EU Big 5. Additionally, the working hours in Slovakia are already above the EU average. Productivity lags behind Western Europe, and the inflow of EU funds to Slovakia is likely to weaken after 2020. As a result, Slovakia needs a new engine to continue its economic growth. ■

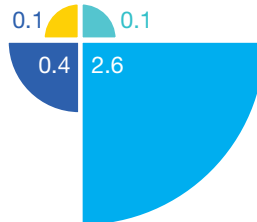
POPULATION IN TOTAL VS. COUNTRY AVERAGE, MILLIONS



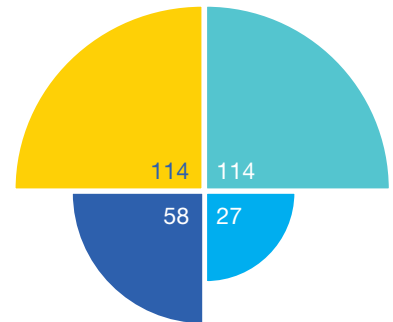
MARKET OPENNESS, 2017, TRADE AS % OF GDP



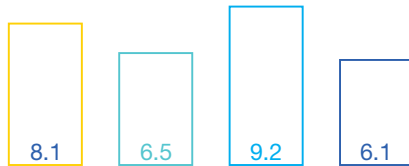
GDP COUNTRY AVERAGE, 2017, € trillion



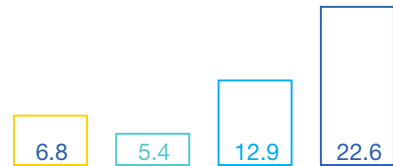
GDP PER CAPITA GROWTH 1996-2017, %



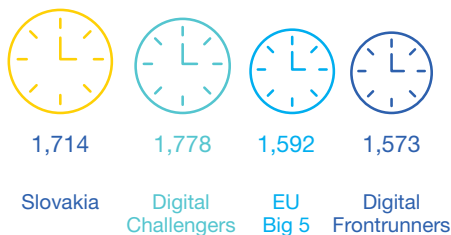
UNEMPLOYMENT, 2017, %



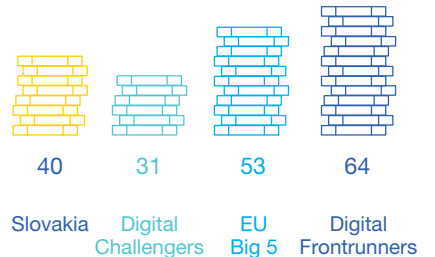
CAPITAL STOCK PER EMPLOYEE, 2016, € million



WORKING HOURS PER YEAR, 2017



PRODUCTIVITY, 2017, GDP per hour worked, €



EU BIG 5: France, Germany, Italy, Spain, the United Kingdom

Digital Frontrunners: Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway, Sweden

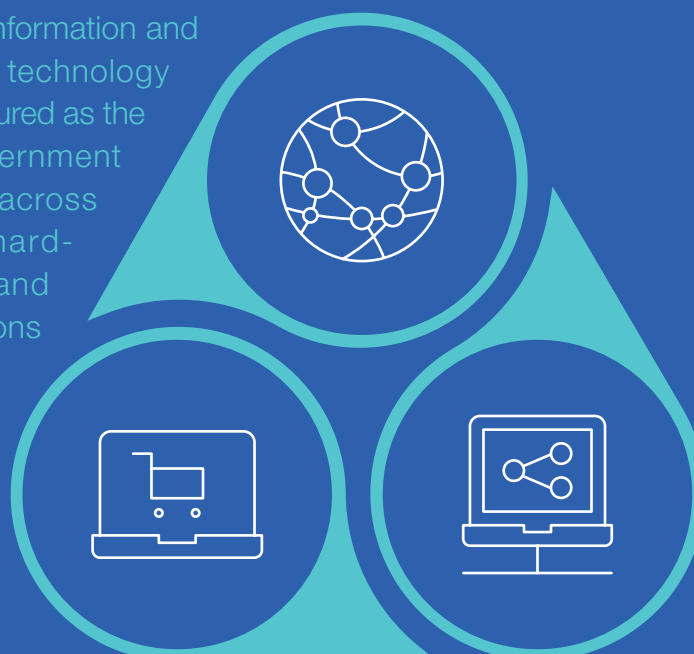
Digital Challengers: Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia

Our approach to measuring the digital economy in Slovakia

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 Slovakia and in the CEE.

In this report on Slovakia, similarly to its CEE edition, we try to strike a balance between the various definitions of digitization. We define it as the sum of three components:

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

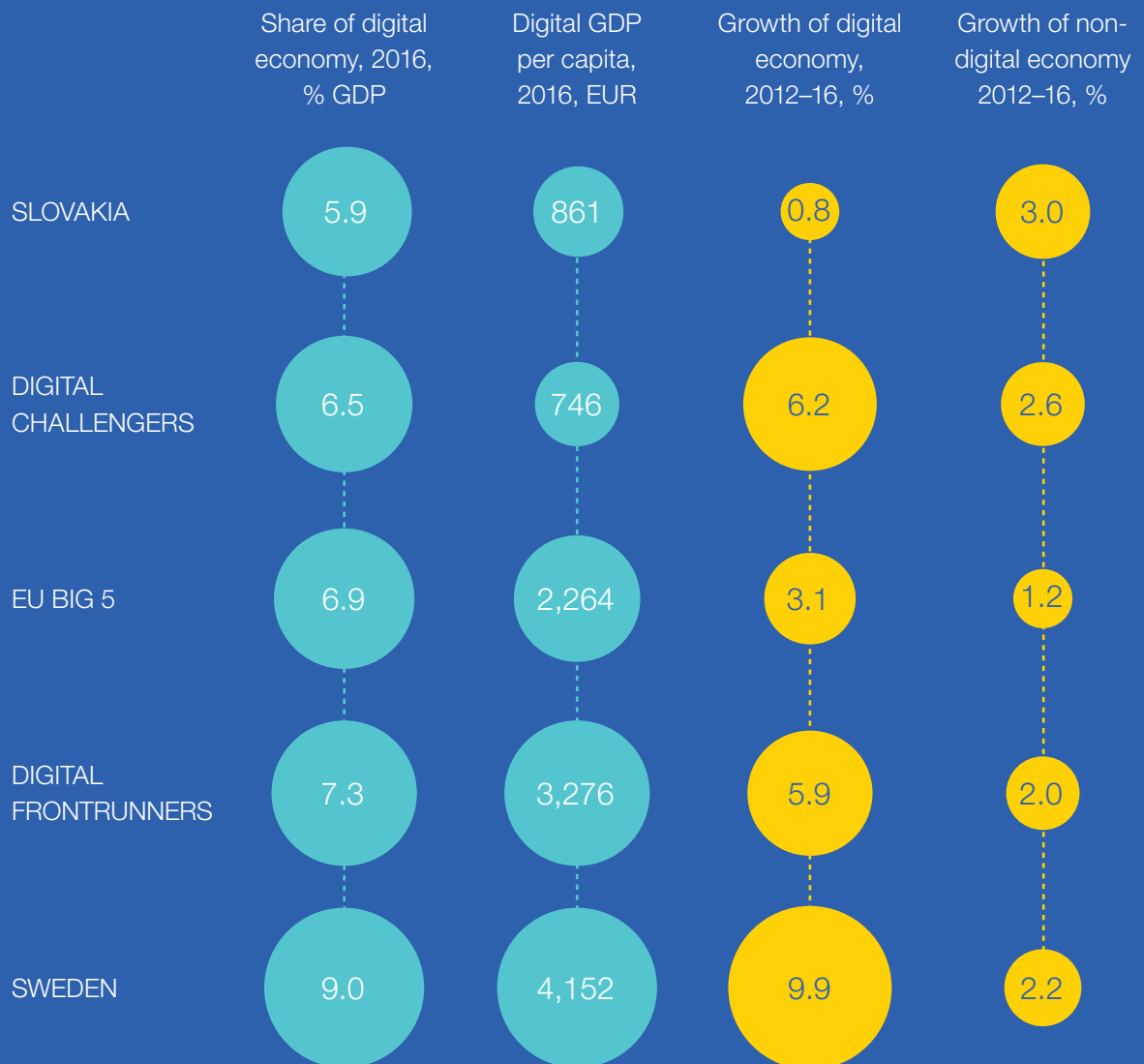


The value of the e-commerce market, measured as online purchases of goods and services by consumers

The value of offline consumer spending on digital equipment

As discussed in *The rise of Digital Challengers* (CEE perspective) report, we have chosen this definition for two 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 modelling approach, drawing on data collected at the national level.

The size and growth of the digital economy in Slovakia



According to our analysis, the digital economy in Slovakia accounted for 5.9 percent of total GDP in 2016. This is not far from both the Digital Challengers and EU Big 5 averages, while clearly lagging behind Digital Frontrunners markets such as Sweden. In per capita terms, the differences are more pronounced. The digital GDP per capita in Slovakia is just over one-fourth the size of the Digital Frontrunner average, and almost one-fifth that of Sweden. Moreover, despite showing a yearly growth rate of 3 percent for the non-digital economy over the years 2012–2016, digital economy grew only by 0.8 percent yearly in the same period. Growth in these two dimensions is, however, not mutually exclusive and the gap should be seen as an opportunity to accelerate the growth of the digital economy.

Importantly, however, historical dynamics do not indicate such quick growth for the digital economy in Slovakia as in the region. Slovakia still awaits their digital boom and should aspire to the level of Digital Frontrunners. 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, Slovakia 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 Slovakia

Before identifying potential levers for achieving accelerated growth in Slovakia, we should look at the manner in which digitization has already taken place around the world. An examination of global trends indicates 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.³ 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.⁴

MGI INDUSTRY DIGITIZATION INDEX

Digital asset spending



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

Digital asset spending per worker



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

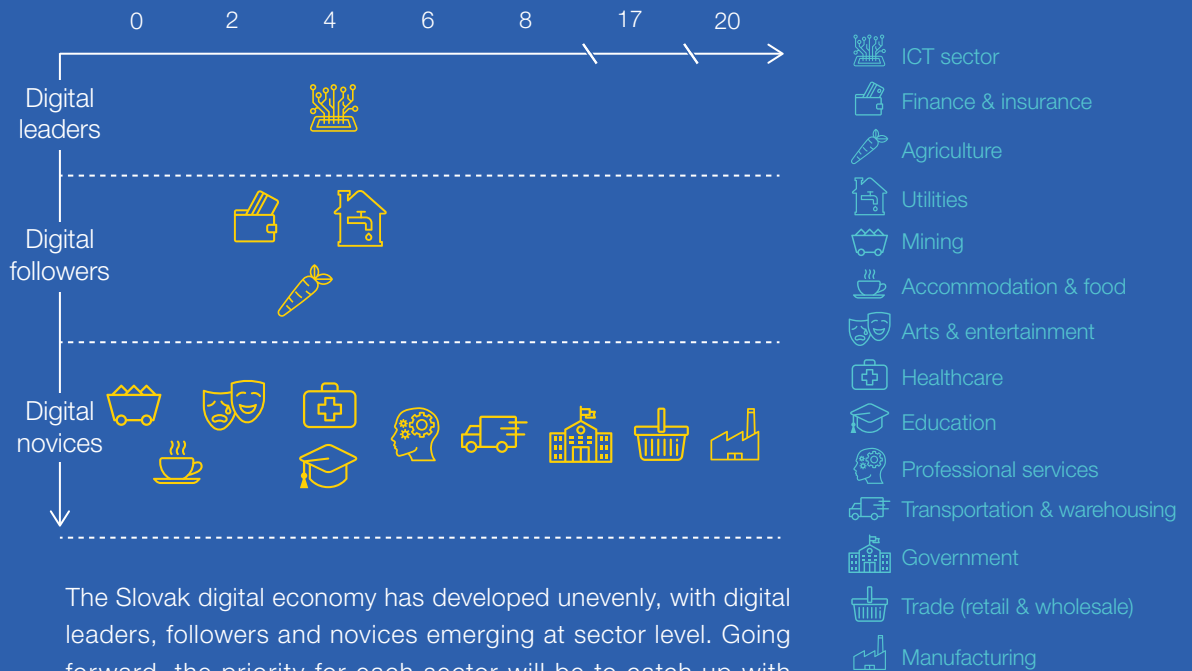
Digital capital deepening



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

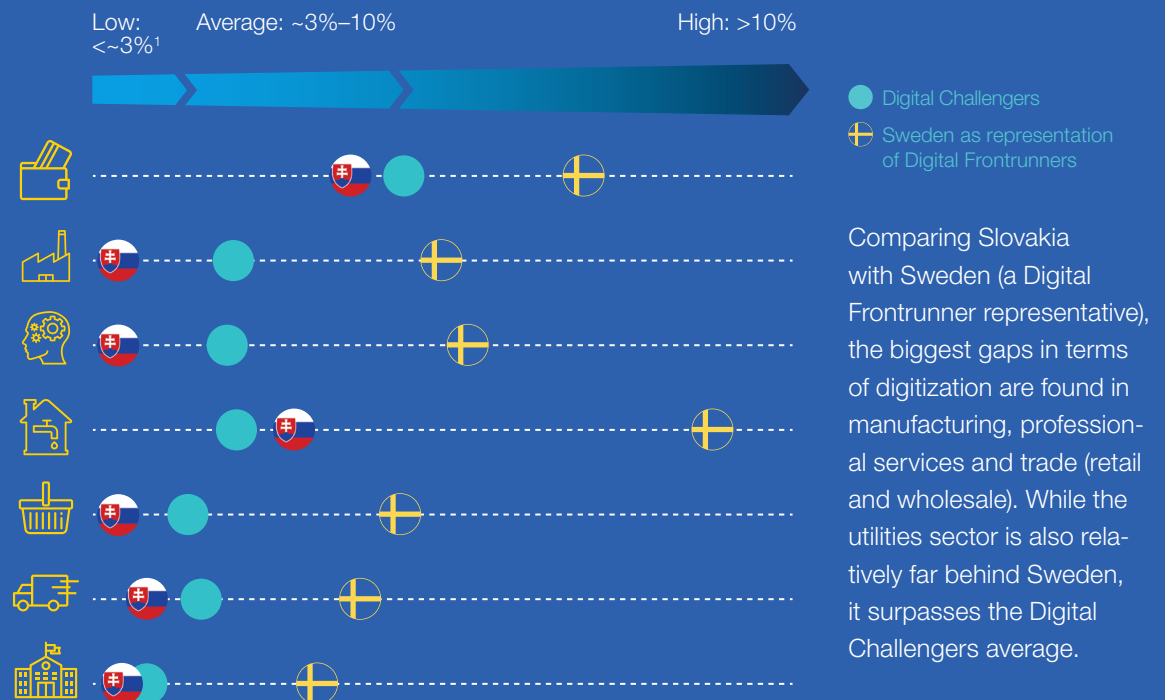
Sector-level digital leaders, followers and novices in Slovakia

% of GDP



The Slovak digital economy 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 Slovakia compared with Digital Challengers



Comparing Slovakia with Sweden (a Digital Frontrunner representative), the biggest gaps in terms of digitization are found in manufacturing, professional services and trade (retail and wholesale). While the utilities sector is also relatively far behind Sweden, it surpasses the Digital Challengers average.

SOURCE: McKinsey Global Institute

Digitization can drive sustained growth in Slovakia through 2025

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

In the first “business as usual” scenario, the country maintains its historical growth rate for the digital economy. The digital economy expands by merely EUR 0.3 billion, moving the digital economy to a 5 percent share of GDP by 2025, down from the 5.9 percent it accounted for in 2016. The gap to Digital Frontrunners (measured as the digital economy’s share of GDP) increases significantly.

The second scenario gives an “aspirational” perspective. Here, we estimate the value at stake from Slovakia closing the gap to Digital Frontrunners. In this scenario, Slovakia’s digital economy grows by EUR 16.1 billion to reach 17 percent of GDP by 2025, translating into an extra one and a half percentage point GDP growth each year, or a 50 percent increase in the projected growth rate. Of the EUR 16.1 billion, EUR 0.3 billion comes from maintaining the historical growth rate. The additional EUR 15.8 billion is made up of the following amounts:

- EUR 13.5 billion from increased productivity from closing the gap to Digital Frontrunners in the digitization of public and private sectors
- EUR 2.3 billion from extra growth in e-commerce and consumer offline spending on digital equipment

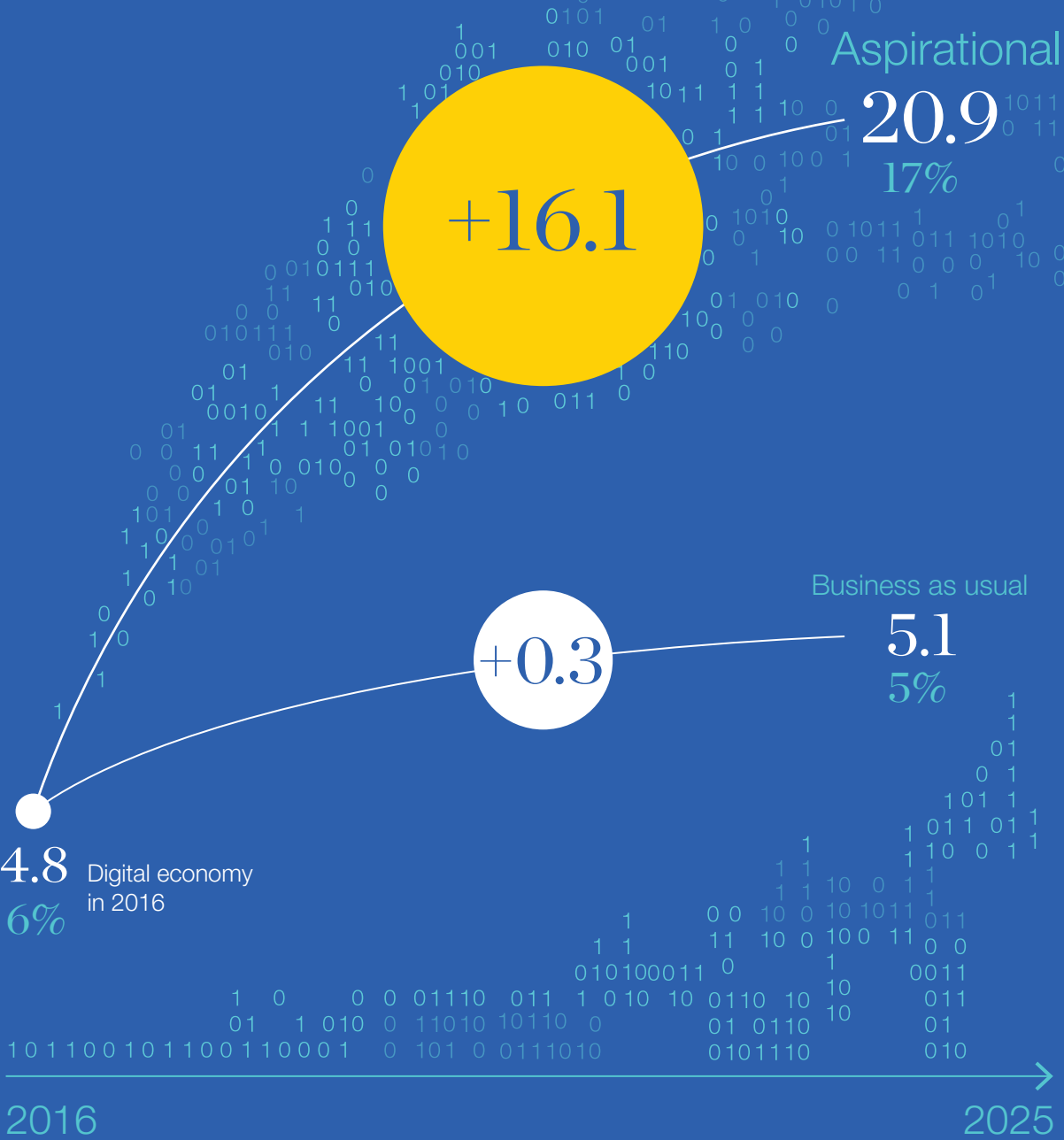
The first of these amounts (closing sectoral digitization gaps to Digital Frontrunners) comes from Slovakia increasing its ICT spending levels (as a share of sector GDP) to match Digital Frontrunner markets. Achieving this level would require acceleration of the digital transformation, especially in the sectors that lag furthest behind their Digital Frontrunner benchmarks and at the same time account for a significant share of the Slovak economy. This gap 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 organisations, 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 Slovakia to grow its digital economy: a business-as-usual scenario bringing an additional EUR 0.3 billion of GDP (effectively decreasing the share of Slovakia's digital economy from 6 percent to 5 percent of GDP) or an aspirational scenario with EUR 16.1 billion of GDP at stake⁶

EUR billion

Share of GDP, %



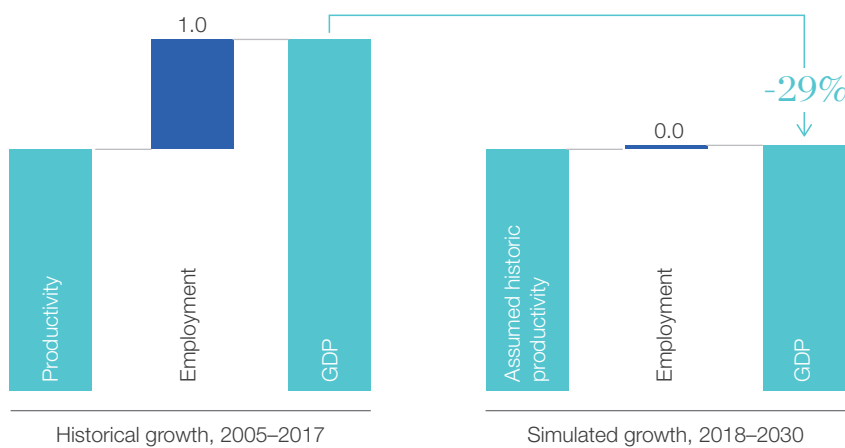
The potential for work automation in Slovakia

In the long term, the standards of living in a country are primarily determined by the growth of GDP per capita. Increases in GDP in Slovakia over the past decade were associated with rising productivity and employment, with the growth of the working population responsible for around 28 percent of GDP growth between 2005 and 2017.⁶ However, a growing consensus exists that Slovakia 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 29 percent of the GDP growth rate by 2030.⁷

One future source of productivity acceleration may come in the form of automation technologies. We estimate that up to 48–53 percent of workplace activities today in Slovakia – the equivalent of about 1.2 million jobs – could potentially be automated by 2030 using technology that already exists today.⁸ This is close to the potential for the entire region, which we have estimated at 49–51 percent⁹.

Without an acceleration in productivity growth, demographic trends might cut GDP growth in Slovakia by -29%

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



Note: Projection assuming historical productivity growth and change in employment growth.
SOURCE: MGI; McKinsey analysis



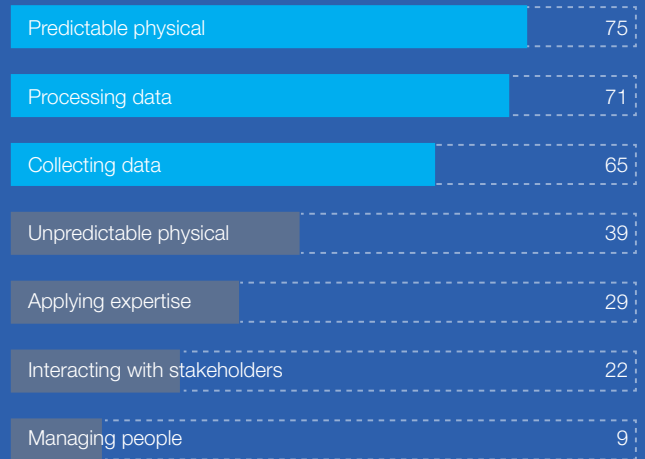
48-53%

of working time in Slovakia is spent on activities that could be automated

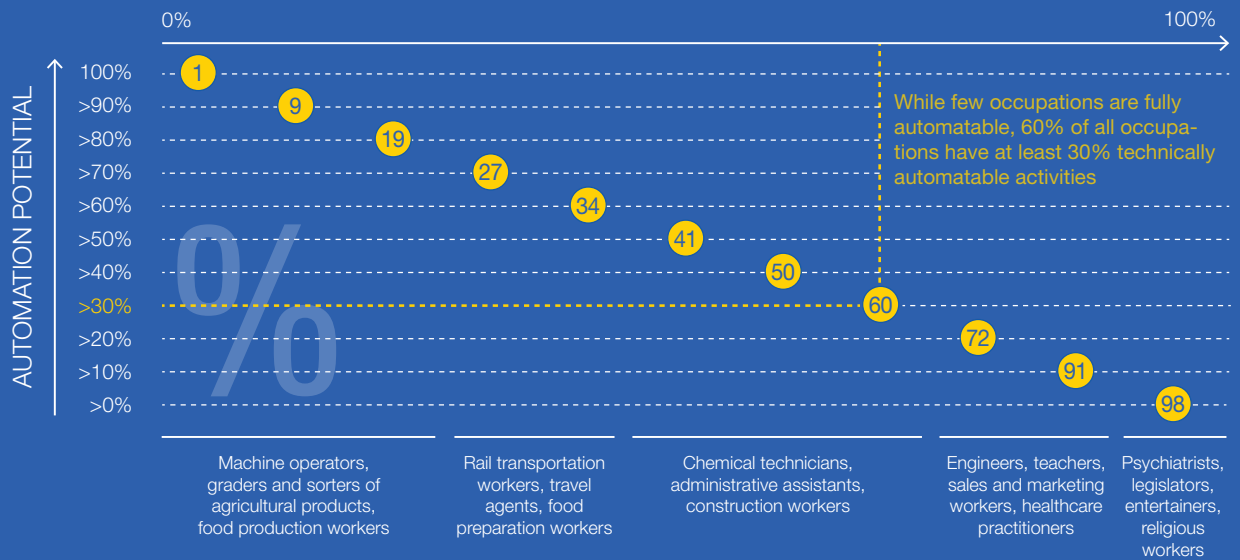
equivalent number of jobs that could be automated in Slovakia

1.2 million

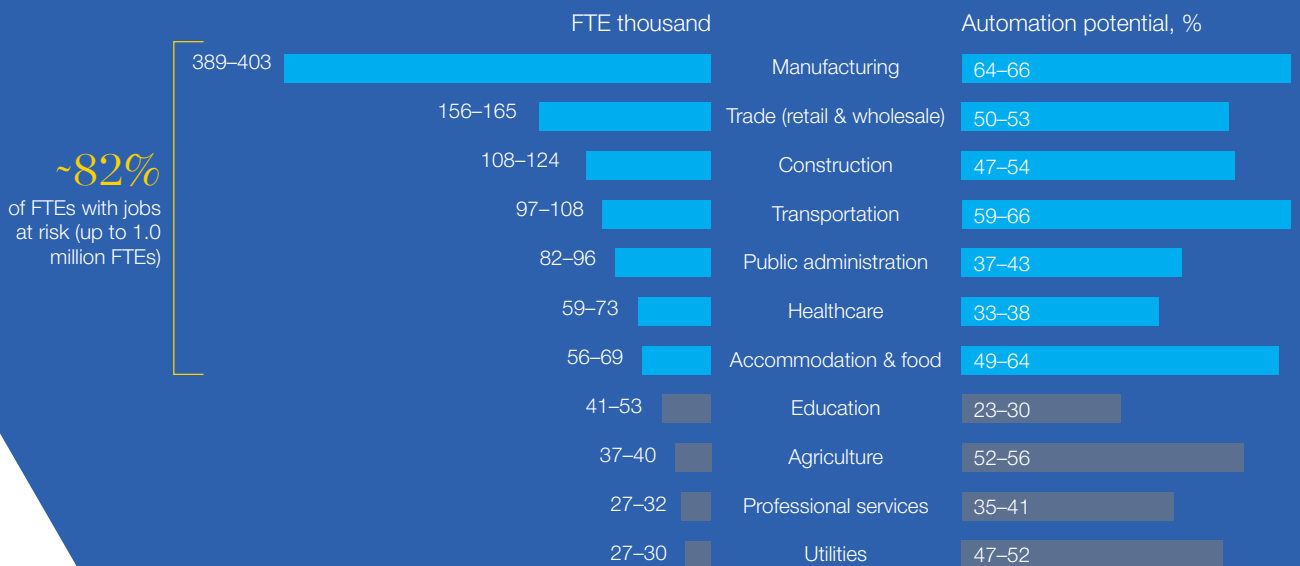
% OF ACTIVITY THAT COULD BE AUTOMATED



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

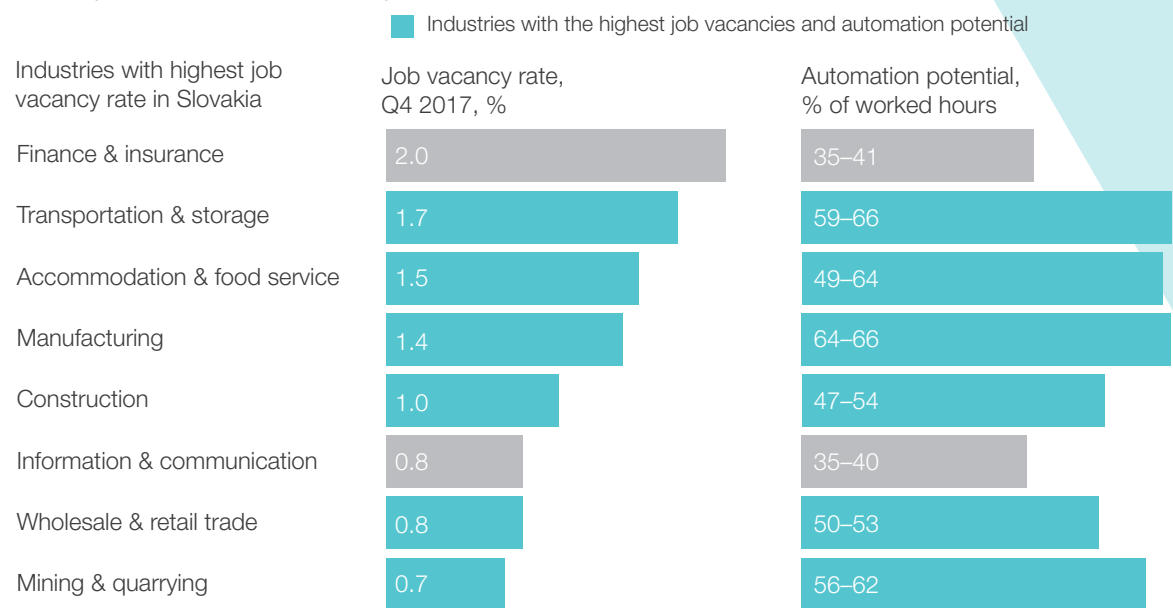
Opportunities and challenges of work automation

AUTOMATION CAN HELP DE-BOTTLENECK INDUSTRIES WITH BIG LABOUR SHORTAGES

Automation brings new opportunities as well as concerns. Technology adoption can be a significant productivity contributor, leading to stronger economic development. In the labour 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, mitigating the inadequate

labour supply. In recent years, relatively low unemployment rates and a growing number of job vacancies in Slovakia have created challenges for employers. Sectors such as transportation and storage, accommodation and food service, and manufacturing – all areas with a high potential for automation – have in recent years faced the biggest labour shortages.¹⁰ 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 labour supply



SOURCE: Eurostat; McKinsey Global Institute analysis

SKILL SHIFTS AND THE POTENTIAL FOR A LABOUR MARKET MISMATCH

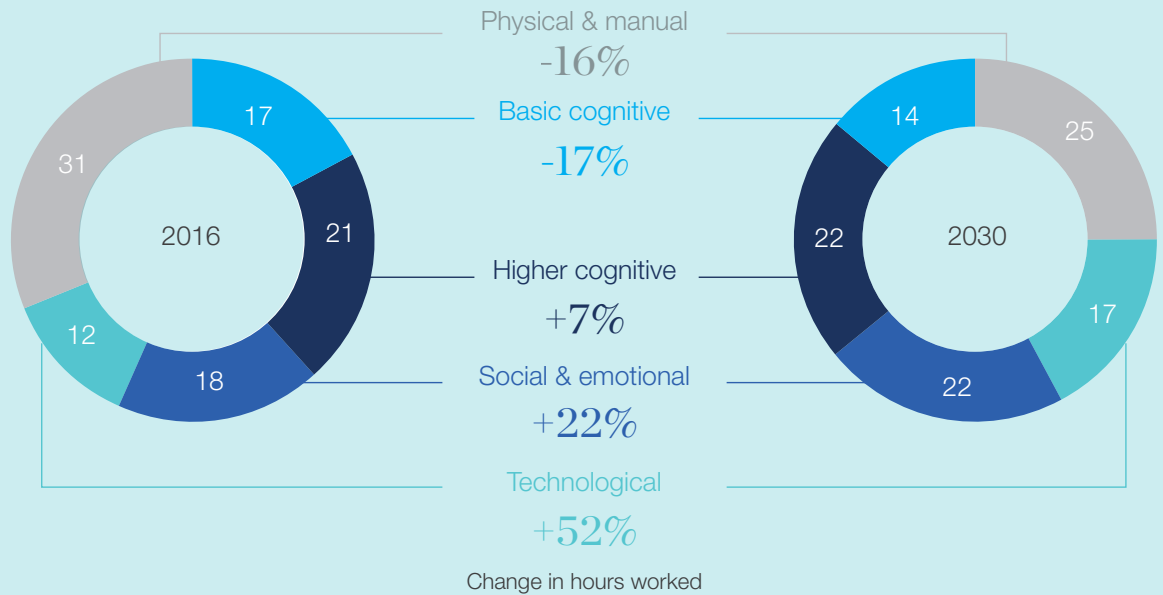
Skill shifts have accompanied the introduction of new technology in the workplace since at least the Industrial Revolution. The McKinsey Global Institute has developed a model for the skill shifts that will likely take place in the workplace in the future, as a result of increasing adoption of digital technologies, automation, and artificial intelligence. Looking at Western European countries, many of which have less automation potential, the strongest growth in demand will occur for technological skills, which constitute the smallest skill category today in terms of hours worked. Demand is expected

to rise by around 50 percent here, representing 17 percent of hours worked in 2030.

Demand will grow for both basic and advanced technological skills. Occupations requiring advanced technological skills include big data scientists, IT professionals, programmers, engineers, technology designers, advanced-technology maintenance workers, and scientific researchers. The McKinsey Global Institute model suggests that time spent on these skills will grow rapidly as companies realise their automation potential.

Demand for technological skills could grow by around 50 percent and for social and emotional skills by around 20 percent¹¹

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



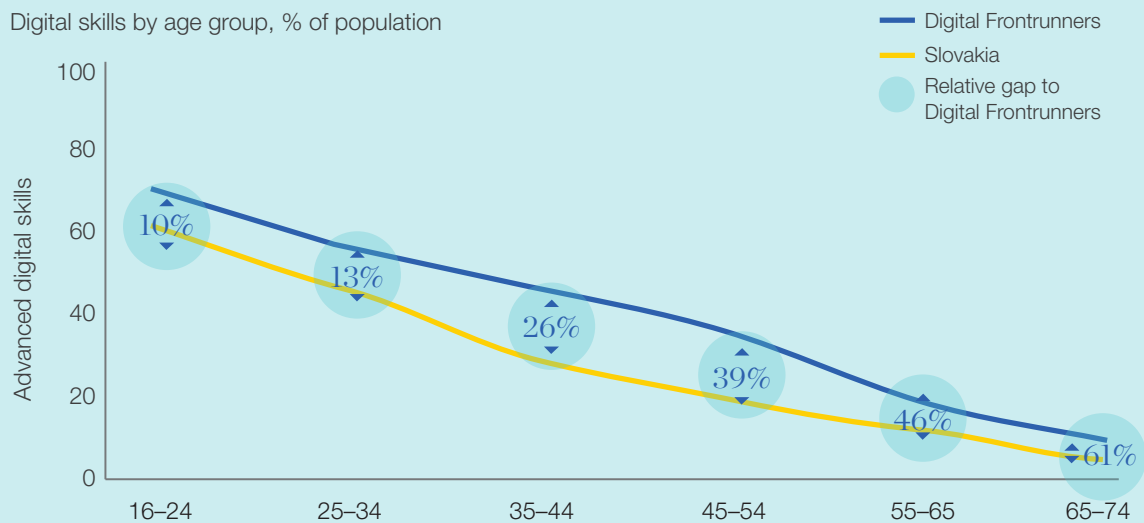
SOURCE: McKinsey Global Institute

Advanced technological skills will be critical for digitizing the economy in Slovakia, but people with these skills will still be a minority. At the same time, however, 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 Slovakia, 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 lifelong learning among the citizens of Slovakia. We explore lifelong learning in Chapter 3 as a key enabler for digitization in the region.

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

Digital skills by age group, % of population



SOURCE: Eurostat; McKinsey analysis

Opportunities and challenges of work automation

SLOVAKIA'S BIGGEST SECTORS ARE LIKELY THE ONES WITH THE LARGEST FUTURE LABOUR MARKET MISMATCH

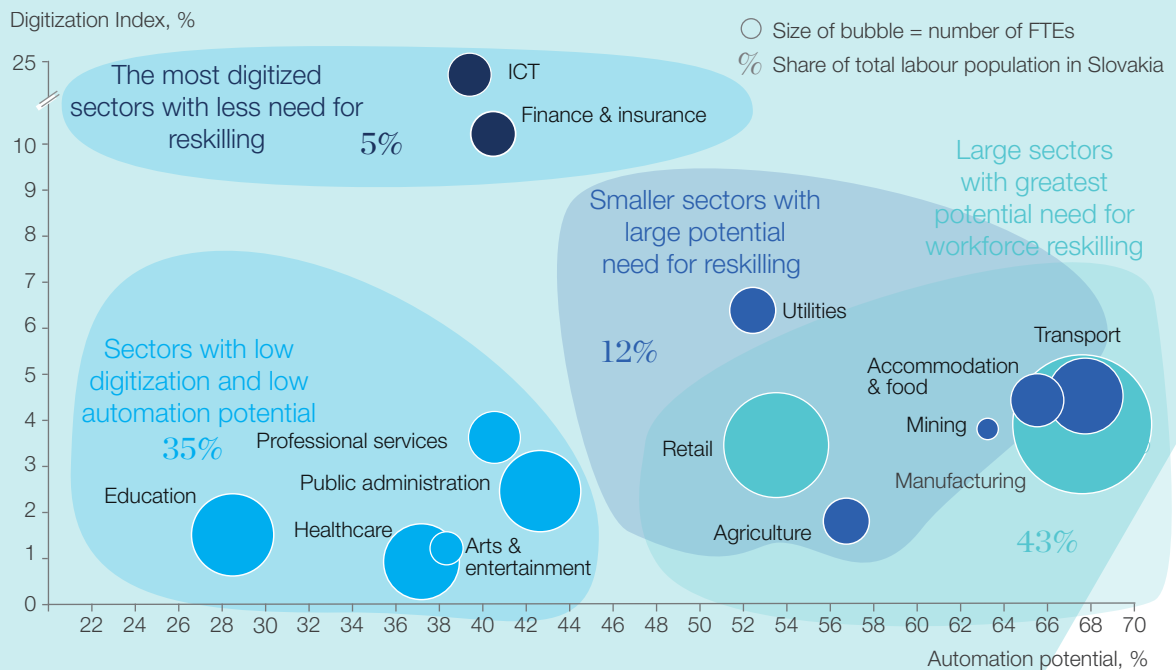
Progressing digitization of the economy will accelerate the demand for people who understand how to work with technology and are able to innovate in the workplace. The need for new digital talent will be particularly great in sectors where the potential for automation is high and the current penetration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

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

- **Big sectors with the greatest need for workforce reskilling.** The biggest labour pools in Slovakia are found in manufacturing and retail. These sectors also display a mismatch, with low current digitization rates and high future automation potential. Given that these sectors are responsible for almost 43 percent of the labour population in Slovakia, this creates a strong exposure for the region’s labour 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, accommodation and agriculture are the sectors in Slovakia displaying a similar mismatch in terms of low current digitization rates and high future automation potential. While these sectors will also have to significantly update their skill base, they are significantly smaller in terms of their share in the total Slovak labour population.
- **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 automation. Nevertheless, given their low starting point in terms of digitization, they should prepare to adopt more technology and not underestimate the effort required.

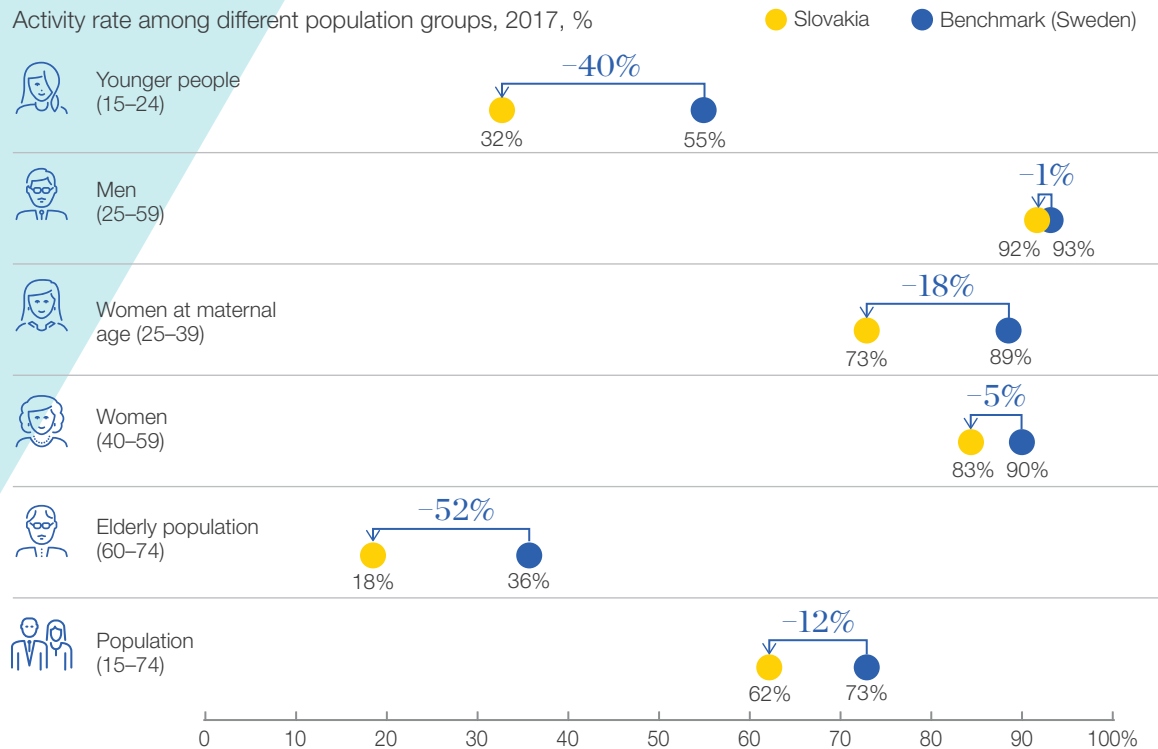
Sectors with low current digitization rates and high automation potential in Slovakia are likely to experience the greatest need for workforce reskilling in the future



SOURCE: McKinsey Global Institute; Eurostat; McKinsey analysis

NEW TECHNOLOGY CAN HELP ACTIVATE SLOVAKIA'S LABOUR FORCE

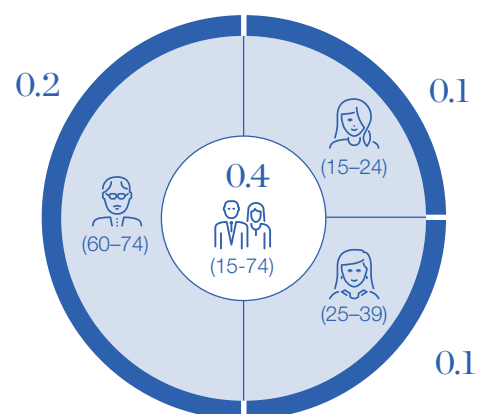
Compared with Sweden (a Digital Frontrunner representative), Slovakia could have up to 0.4 million people in untapped labour reserves due to lower activity rates



Beyond increasing productivity through automation, technology platforms could also grow employment beyond the current relatively high level. Despite a high job vacancy rate in Slovakia, there are demographic groups with rather low activity levels. Assuming benchmark activity levels of one of the most active labour markets in Europe – Sweden – Slovakia has around 0.4 million people in untapped labour reserves. In the whole population of Slovakia, there are 12 percent fewer active people than in Sweden. The highest gap can be observed among elderly (52 percent) and young (40 percent) people. The participation of women at maternal age also falls short by 18 percent. We see multiple ways in which digitization can increase the activity rates in Slovakia and the wider CEE region:

- Support new marketplaces for independent work, which empowers people to find flexible employment.
- Enable remote working by reskilling for technology jobs, e.g., women on or after maternity leave.
- Support platforms for upskilling young people and offering work experience. ■

Slovakia labour reserves compared with activity rate of Sweden, million people, 2017



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

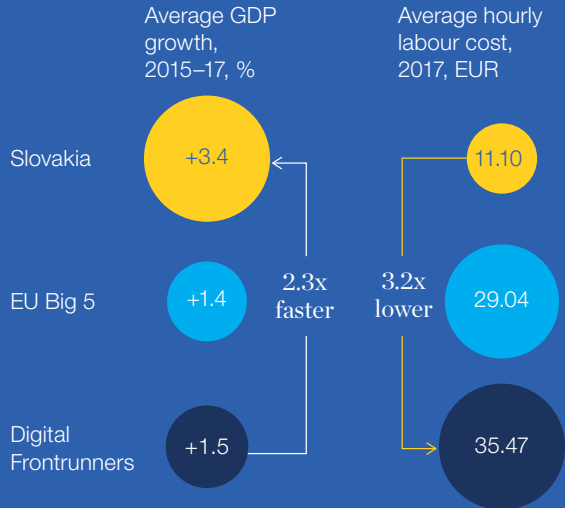
Key foundations for Slovakia's Digital Challenger status

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 prioritised for action by Slovakia. 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 Slovakia. 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 Slovakia already performs close to or on 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 SLOVAKIA

A Competitive advantages at a macroeconomic level

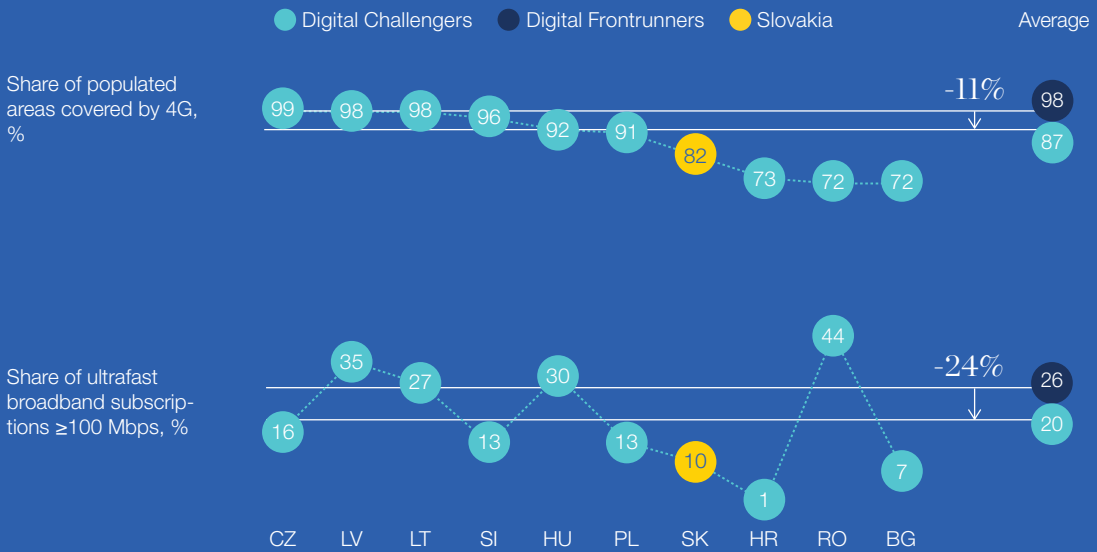
Slovakia offers high-growth economy with relatively low labour costs



SOURCE: World Bank; Eurostat

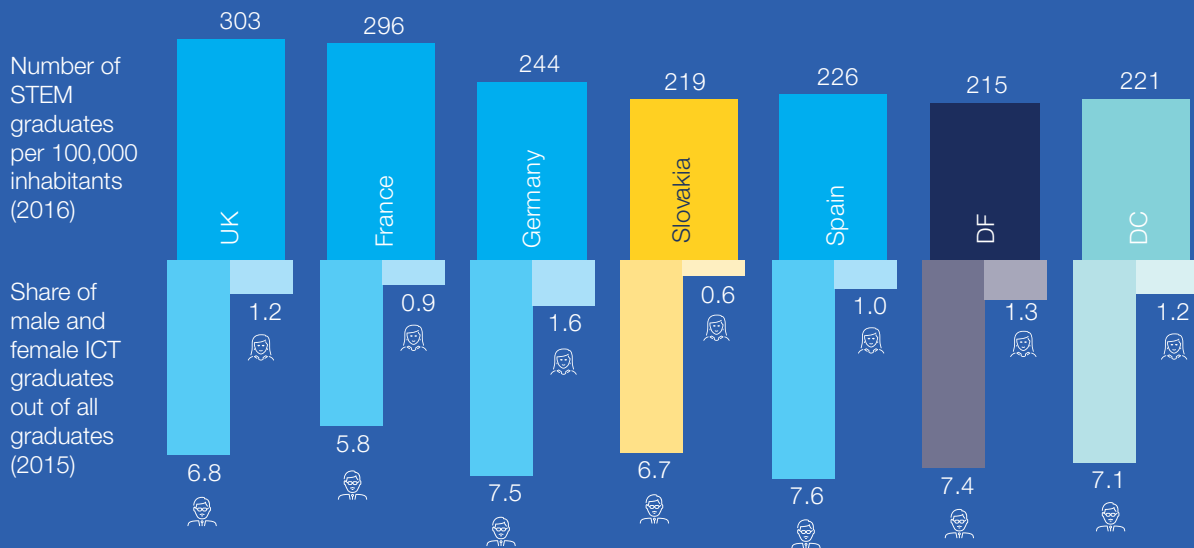
B Good overall quality and coverage of the digital infrastructure

Slovakia exhibits digital infrastructure quality and coverage close to the CEE and little below Digital Frontrunners averages



SOURCE: DESI 2018

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



NOTE: For the Netherlands and Norway, gender split taken from 2012

SOURCE: Eurostat, OECD

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



There are many digital success stories in Slovakia of companies leveraging the digital economy to achieve scale and revolutionise their industries. Exponea, a customer experience and data management engine that boosts e-commerce sites by utilising AI-powered automation, is expecting 400 percent revenue growth in the coming year and is expanding globally. WebSupport, a major hosting provider in the CEE, is one of the fastest growing companies in the region. GymBeam, a leading fitness e-shop, is leveraging data analytics to create and modify their product assortment and to set pricing dynamically; it now serves over 1.5 million customers across Europe. Other notable stories include sli.do, Photoneo, Innovatrics, Quality Unit and Staffino to name a few.

“We combine product specialists and a software house engine, enabling us to thrive as a business.”

- Dalibor Cicman, GymBeam CEO



Large incumbents from more traditional industries are also following suit in digitization. The financial services sector has been at the forefront. Slovenska sporitelna, the largest bank in the country, has recently switched off its traditional internet banking and migrated all customers to a new platform (George). Tatra Bank has implemented a fully automated customer authentication and onboarding process, decreasing customer servicing time by up to 70 percent. Innovation reaches beyond financial services, with Kia Motors Slovakia digitizing and automating its operations, enabling the company to capture 10 percent upside in productivity and decrease in injury rates. Ultraplant, a plastic manufacturer, was able to avoid bankruptcy and turn around its business with digital marketing, and now enjoys success in 10 European markets.

“Our story shows that even traditional sectors can digitize and leverage e-commerce to kick-start growth.”

- Peter Nedeliak, Ultraplant CEO

Key enablers for further digitization in Slovakia

Several areas remain where Slovakia 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 Slovakia, along four dimensions:

- Soft infrastructure, including the adoption of digital tools and skills among the Slovak general population, Slovakia-based enterprises and the public sector
- Talent, including stimulating lifelong learning among Slovak employees and the growth of the ICT specialist population
- Innovation in the form of fostering the country’s entrepreneurial culture
- The legal, political and business environments



① DIGITIZATION ENABLER

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

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

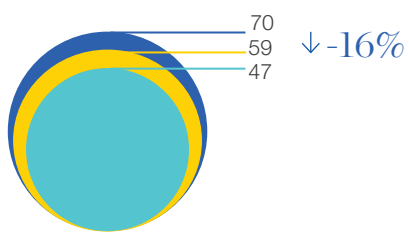
DIGITAL TOOLS AND SKILLS PERSPECTIVE

- Digital Challengers, average
- Digital Frontrunners, average
- Slovakia

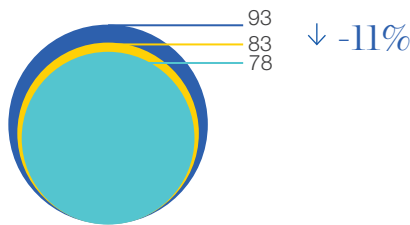
Basic digital skills

% of population aged 16–74 (2017) ...

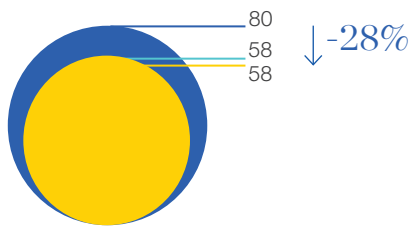
... with at least basic digital skills



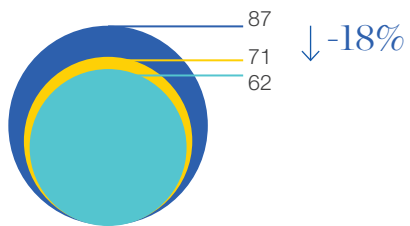
... using the Internet in the last 12 months



... looking online for information about goods and services



... sending/receiving email



Slovakia differs significantly from Digital Frontrunners (DF) in terms of basic digital skills, with a gap of around 16 percent.

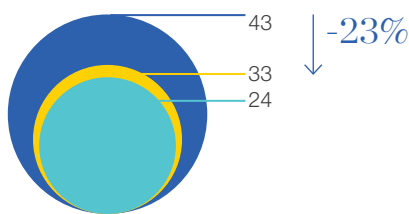
The vast majority of the population in Slovakia uses the internet. However, internet penetration at 83 percent is still 11 percent below the DF benchmark.

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 (28 percent below DF average) or sending and receiving email (18 percent below DF average).

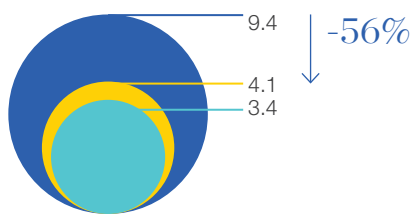
Advanced digital skills

% of population aged 16–74 (2017) ...

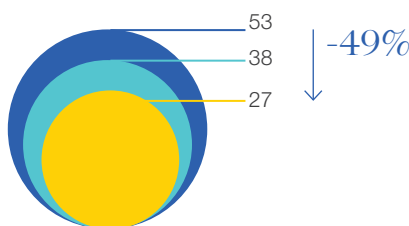
... with above basic digital skills



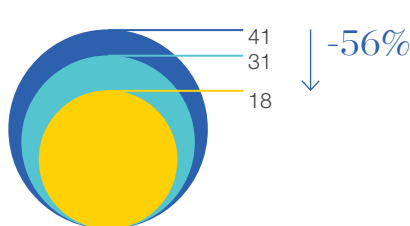
... who have written a computer program



... 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 larger by almost one quarter for Digital Frontrunners than for Slovakia. 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 there is a lot of scope for improvement.

Eurostat; Digital Economy and Society Index, 2017

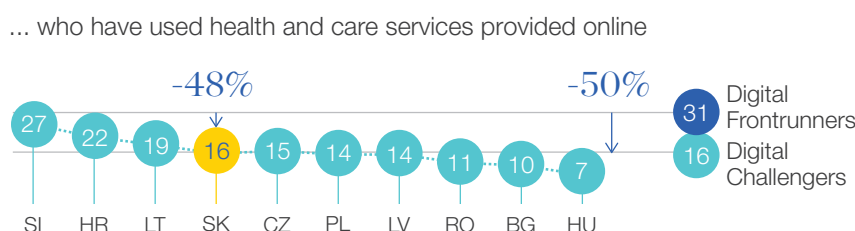
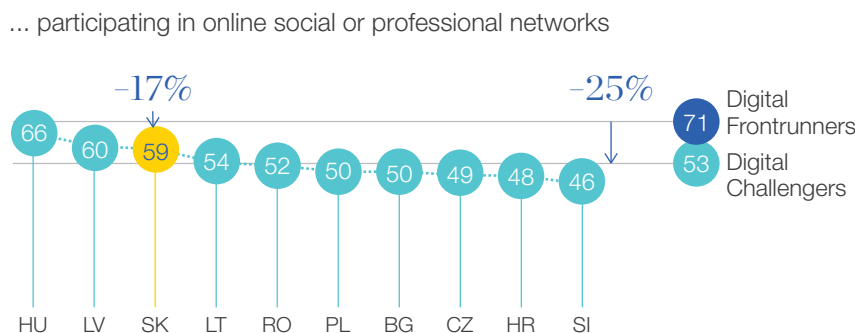
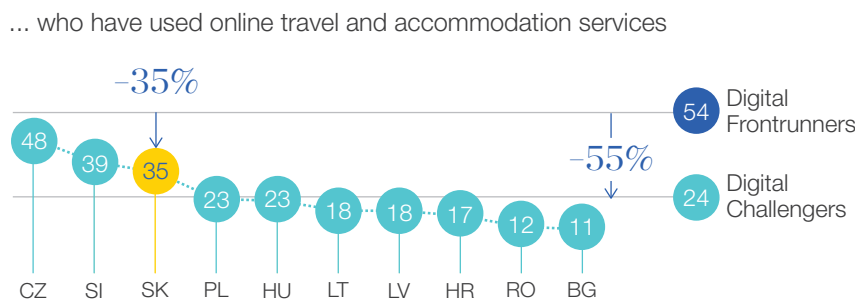
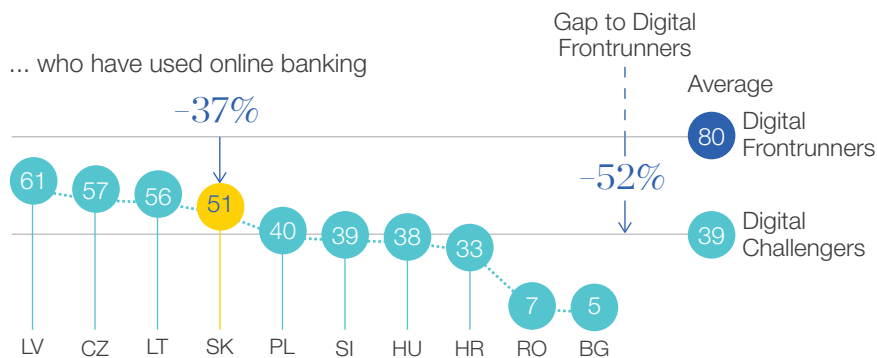
① DIGITIZATION ENABLER

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

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

TAKE-UP OF INTERNET SERVICES PERSPECTIVE

% of population aged 16–74 (2017) ...



Looking at the adoption of various internet services in Slovakia, gaps to Digital Frontrunners are even bigger than for digital skills. Comparing with Digital Frontrunners, 37 percent fewer people in Slovakia have used online banking. Slovakia performs slightly better than the Digital Challengers average, meaning that below-average gaps can be seen in other proxy measures, such as the share of people having used online travel and accommodation services (35 percent lower in Slovakia), participating in online social or professional networks (17 percent lower) or using health and care services provided online (48 percent lower).

Eurostat; Digital Economy and Society Index, 2017

Leverage and grow Slovakia's ICT specialist labour pool

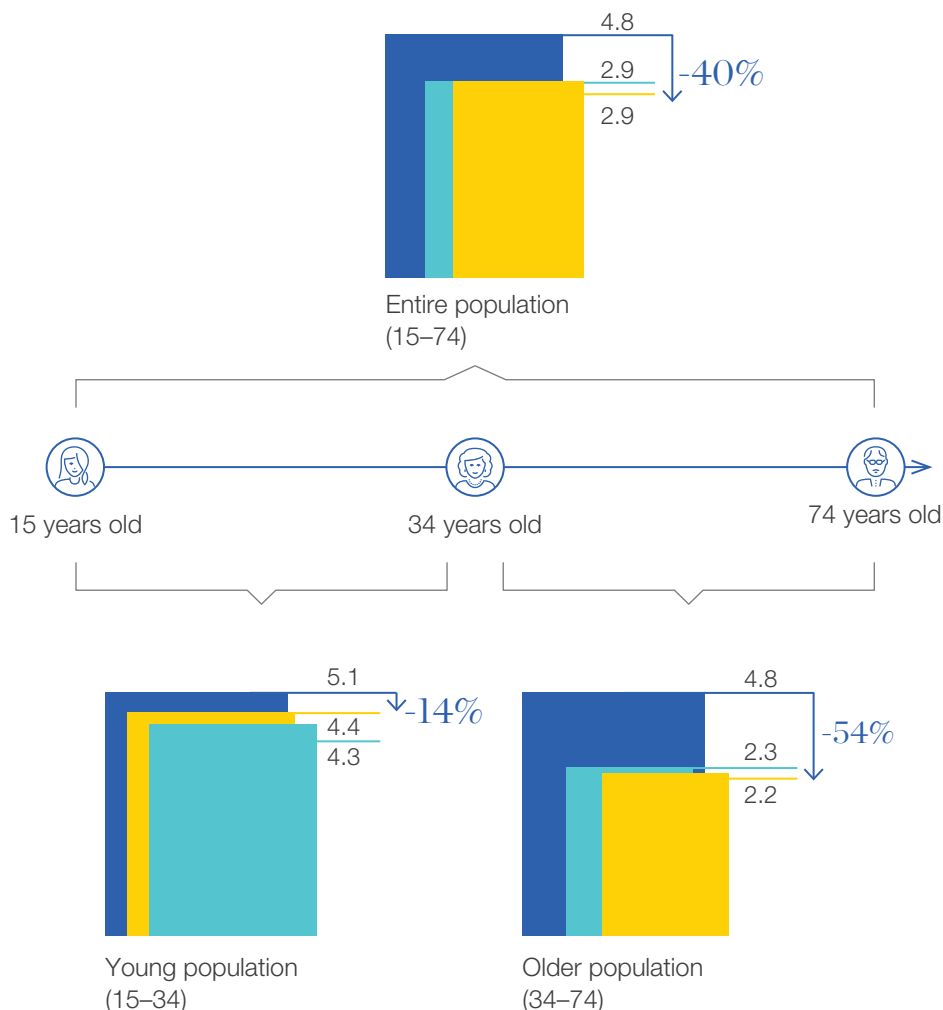
Having a large pool of information and communications technology (ICT) specialists enables the digitization of both private and public sectors. ICT specialists are the driving force behind the digitization and automation of back-end processes, developing next-generation customer experience solutions 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.

Slovakia can benefit from the relatively high share of ICT specialists in its younger population by encouraging companies to set IT and service hubs (similar to the approach adopted by Poland) and matching talent to business problems by, e.g., hackathons, competitions or school projects co-organised by universities and businesses. The ICT talent can be even more valuable to companies if universities encourage ICT students to take business-oriented elective courses, e.g., management and foreign languages, or participate in international exchange programmes.

SHARE OF ICT SPECIALISTS

2016, % of employed population, 2016

- Digital Frontrunners, average
- Digital Challengers, average
- Slovakia



A large gap exists between Slovakia and Digital Frontrunners in terms of the share of the population employed in the ICT sector. The gap is mainly driven by significant underrepresentation of ICT specialists in the older population. Slovakia performs slightly above the Digital Challengers average in the share of ICT specialists in its younger population.

SOURCE: Eurostat; Digital Economy and Society Index, 2017; UNESCO Institute for Statistics

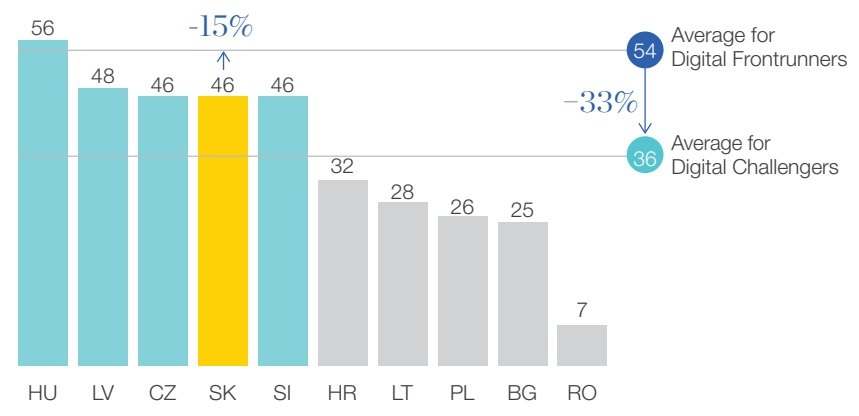
Increase the provision by Slovak enterprises of training to develop/upgrade employees' digital skills

With the progressive adoption of automation technologies, most Slovak industries will experience a growing shift in their demand for skills. Higher cognitive skills, social and emotional skills, and technology skills are the categories that will grow in importance. The labour market will have to adjust to meet this demand. In this context, national reskilling strategies, 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
- Slovakia

ADULT PARTICIPATION RATE IN EDUCATION AND TRAINING IN LAST 12 MONTHS

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

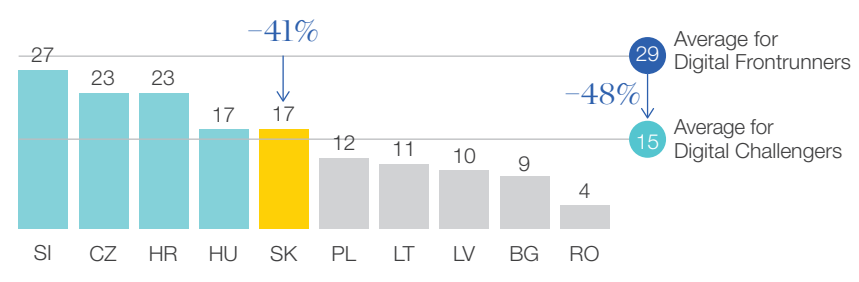


The degree to which the population in Slovakia embraces training for adults is above the Digital Challengers average.

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

FIRMS PROVIDING TRAINING TO DEVELOP EMPLOYEES' ICT SKILLS

2017, % of firms



When it comes to training in ICT skills, the gap is even bigger.

Almost twice as many firms in Digital Frontrunner countries provide training to employees to develop their ICT skills compared to Slovakia.

SOURCE: Eurostat; Digital Economy and Society Index, 2017

4 DIGITIZATION ENABLER

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

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

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

% of companies ■ Digital Frontrunners, average ■ Digital Challengers, average ■ Slovakia

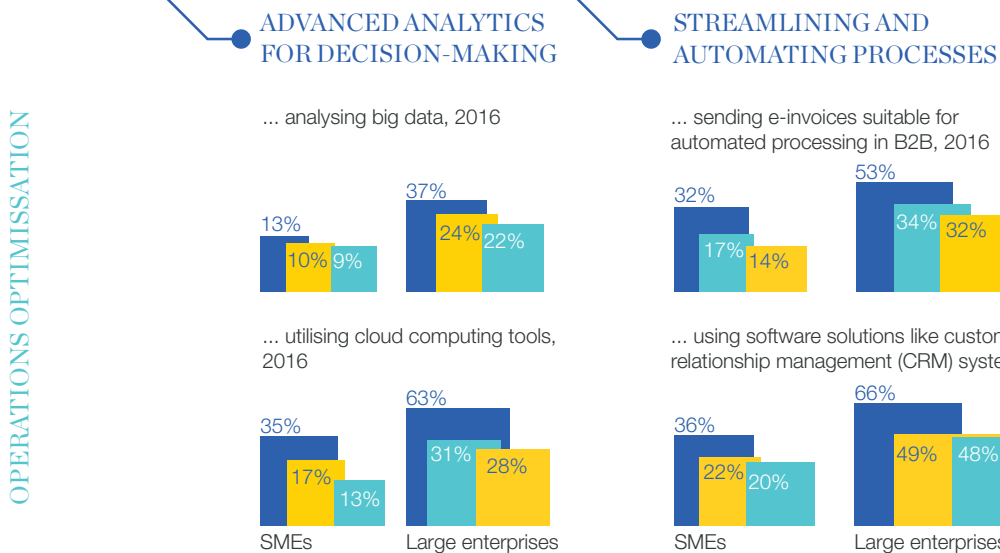


E-COMMERCE SALES OVERALL

INTERNATIONAL E-COMMERCE

CONNECTING IN REAL TIME

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 Slovakia in the share of companies leveraging the internet for online advertising, including the use of social media for branding and marketing.

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

however, even surpass the Digital Frontrunners average in certain metrics, such as share of turnover from selling online or cross-border e-commerce sales.

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

Finally, in leveraging digital solutions for analysing big data, both SMEs and large enterprises in Slovakia are above the Digital Challengers average yet below the Digital Frontrunners average.

5 DIGITIZATION ENABLER

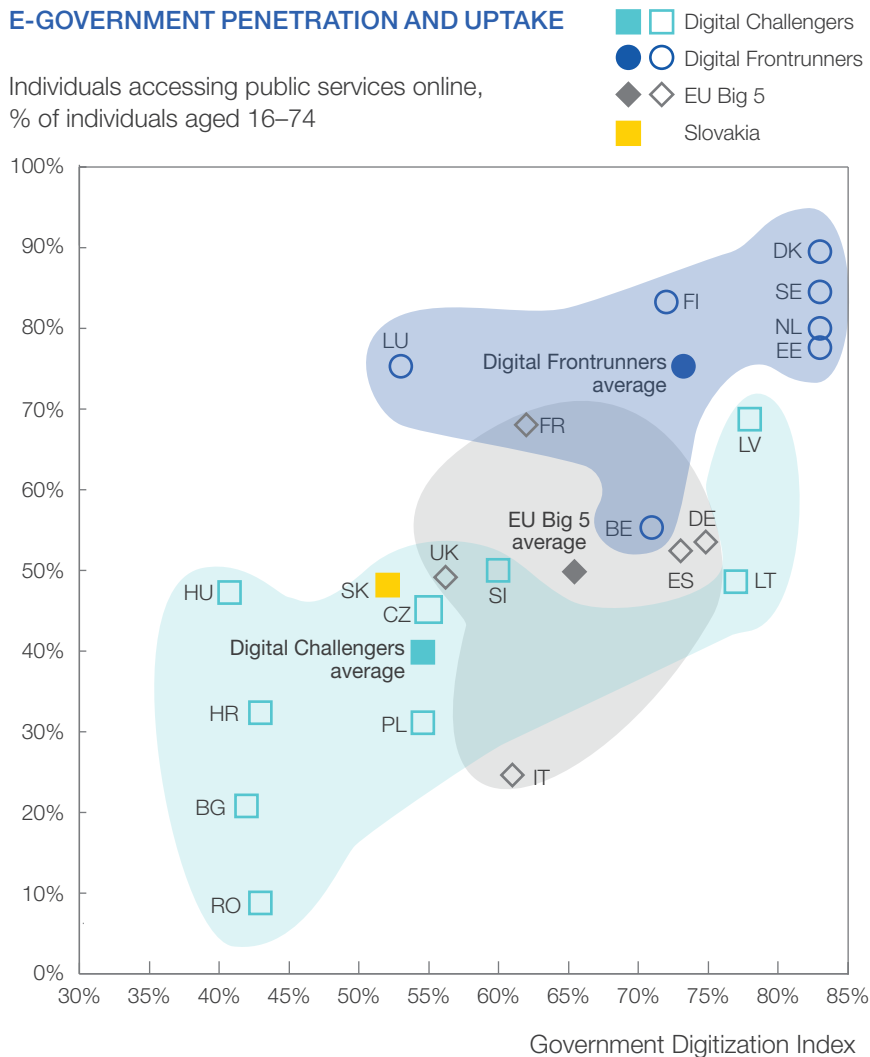
Develop, implement and promote e-government solutions in Slovakia's public sectors

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

Digital government services can significantly reduce the administrative burden on citizens and firms. It also increases decision-making transparency and thus reduces the risk of corruption.

E-GOVERNMENT PENETRATION AND UPTAKE

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



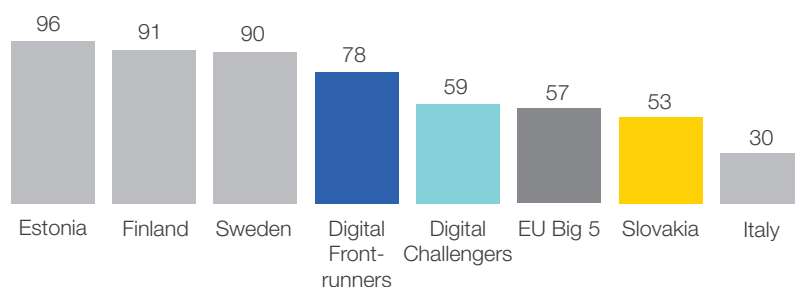
On average, Digital Frontrunners lead the way in both penetration of digitization in the public sector and uptake of public digital services by society. More than 80 percent of the population in these countries accesses public services online.

Among Digital Challengers, Slovakia is below average in terms of penetration and above in uptake; for reference, Latvia is well above.

Despite being well below the average for Digital Frontrunners, Slovakia is among the leaders in the Digital Challengers group, while Romania and Bulgaria have the furthest to go, with uptake rates below 25 percent.

E-GOVERNMENT ACTIVE USAGE

Percentage of individuals sending filled forms to public authorities



However, low user-friendliness and lack of integration between online government services is a major obstacle for e-government. As a result, Slovakia is below the EU Big 5 average in terms of active usage of e-government.

SOURCE: Eurostat; Digital Economy and Society Index; eGovernment Benchmark 2017

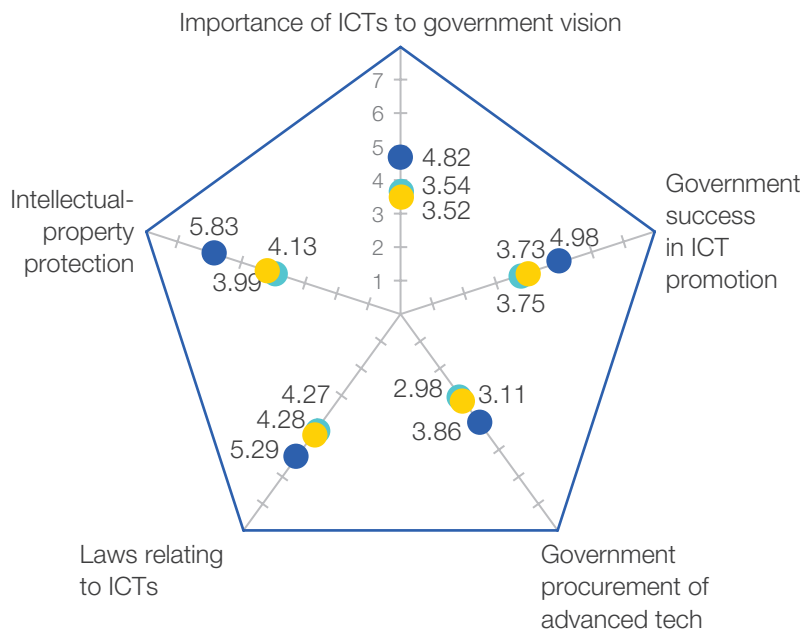
Improve Slovakia's ICT regulatory environment to ensure investment attractiveness

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 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 ■ Slovakia

WORLD ECONOMIC FORUM NETWORK READINESS INDEX

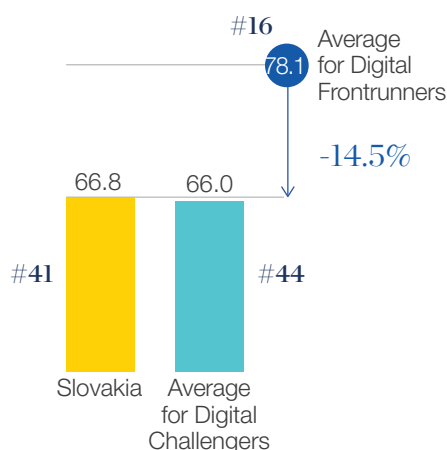
Synthetic score, scale of 1 to 7, where 7 is highest performance



Investigating the friendliness of the regulatory regime toward ICT in Slovakia and the CEE, we see significant gaps against Digital Frontrunners across all key factors. 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 Slovakia below the Digital Frontrunners average. In terms of a clear implementation plan for utilising ICTs to their country's overall competitiveness, Slovakia also lags behind Digital Frontrunners. The same can be said of governmental purchasing decisions fostering innovation, as well as the promotion of the use of information and communications technologies. Finally, the protection of intellectual property is also deemed weaker in Slovakia than in benchmark Frontrunner markets.

WORLD ECONOMIC FORUM GLOBAL COMPETITIVENESS INDEX

Score and rank among 140 countries



Slovakia ranks #41 among 140 countries in the Global Competitiveness Index. It is slightly ahead of Digital Challengers (average rank #44), but clearly lags behind Digital Frontrunners (average rank #16), as well as the EU Big 5 (average rank #17). The ranking reveals that Slovakia neglects several areas that enable innovation potential, especially those related to skills and the labour market (diversity of workforce, ease of finding skilled employees, ease of hiring foreign labour), institutions (labour tax rate, future orientation of government, efficiency of legal framework in challenging regulations) and entrepreneurship (attitudes toward entrepreneurial risk).

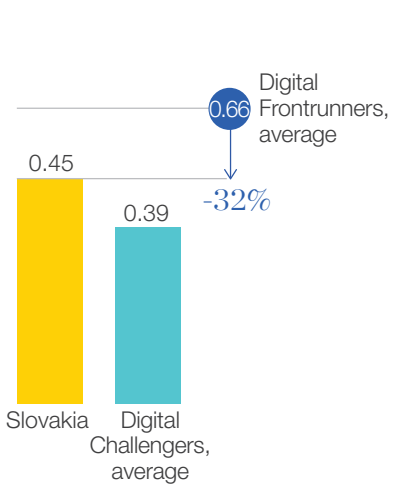
SOURCE: World Economic Forum

Foster entrepreneurship in Slovakia to stimulate the startup ecosystem

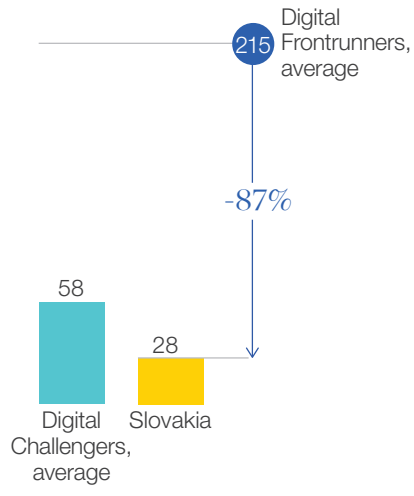
We analyse the state of the ecosystem for startups in Digital Challengers compared to Digital Frontrunners. Our focus is on five areas: the entrepreneurial talent base, the startup community, early-stage startups, growth-phase startups and enterprises having achieved significant scale. Digital Challengers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



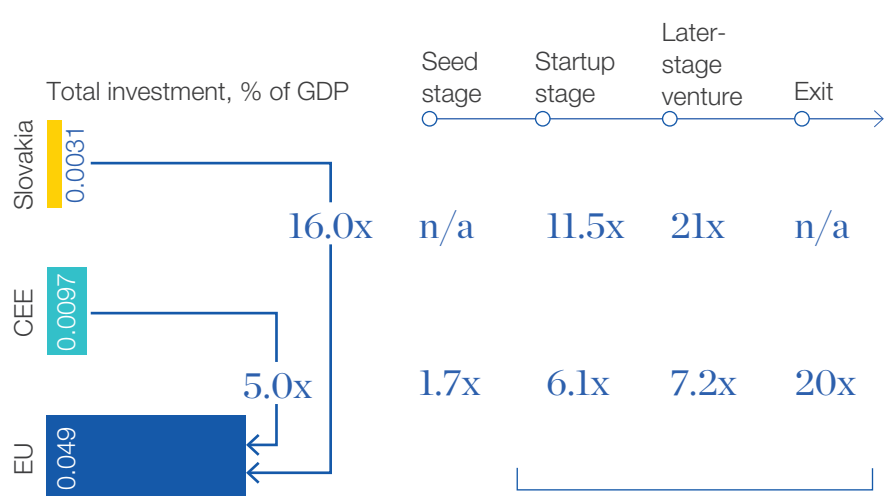
Number of startups per million citizens, 2018



Slovakia is above the Digital Challengers average in the Global Entrepreneurship index, but still behind the Digital Frontrunners. On average, Slovakia has one-eighth the number of startups per capita of Digital Frontrunners.

STARTUP FUNDING IN CEE, 2017

Gap in VC investment as share of GDP, by stage



Controlling for GDP size, VC investments in Slovakia are still significantly behind Digital Frontrunners.

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

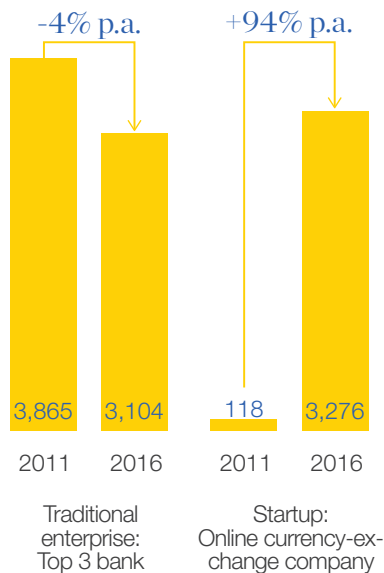
ANALYSIS: WHAT IS THE IMPACT OF STARTUPS ON THE ECONOMY

Startups contribute to the economy in three ways: they increase innovation, they lead to 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.

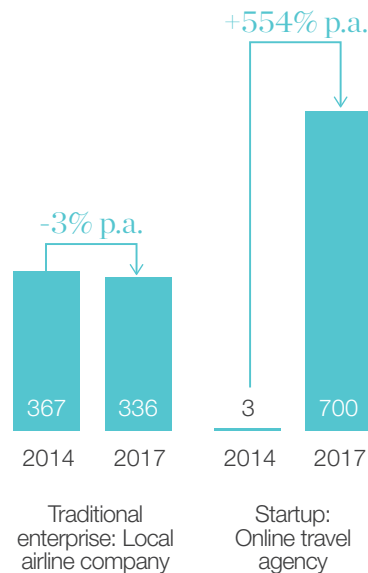
EXAMPLES OF STARTUPS VS. TRADITIONAL FIRMS

Annual revenue, EUR million

Poland

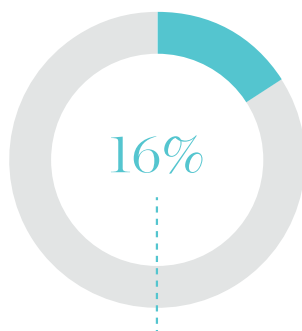


Czech Republic

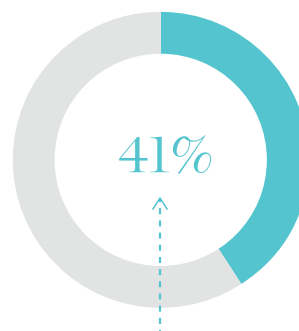


European startups are oriented toward international markets. On average, they generate 55 percent of their revenue outside their domestic markets. Digitization allows startups to replicate digital assets and reach a global consumer base (see examples on the left of two fast-growing startups from CEE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

% OF YOUNG SMEs IN TOTAL EMPLOYMENT



% OF YOUNG SMEs IN NEW JOB CREATION



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. ■

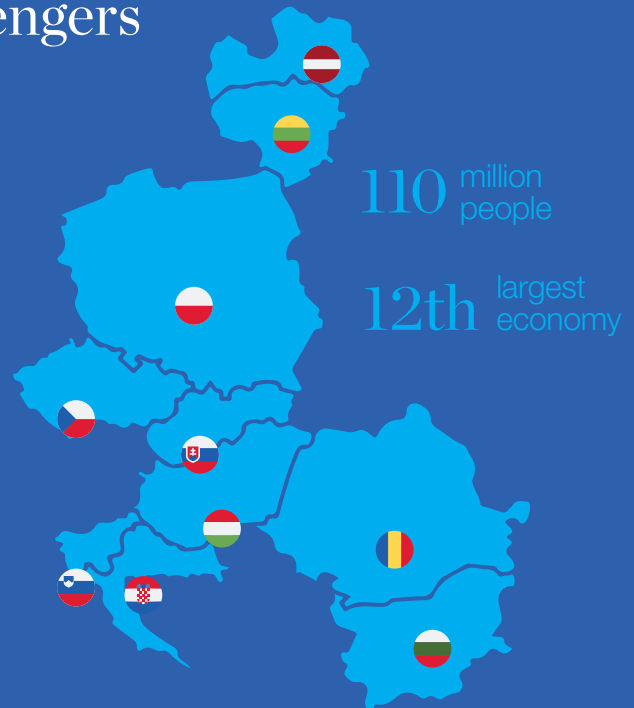
SOURCE: European Startup Monitor; European Commission; Financial Times

Four arguments for the benefit of collaboration between Digital Challengers

(A) SCALE EFFECTS

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

EUR 1.4
trillion
in GDP



(B) SIMILAR STARTING POINTS

The countries of CEE have high levels of market openness and similar levels of digitization, in addition to their cultural and historic commonalities.

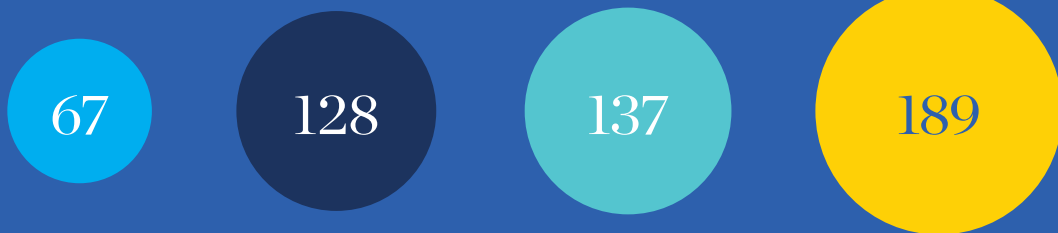
Trade, % of GDP, 2017

EU Big 5

Digital Frontrunners

Digital Challengers

Slovakia



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

SOURCE: World Bank

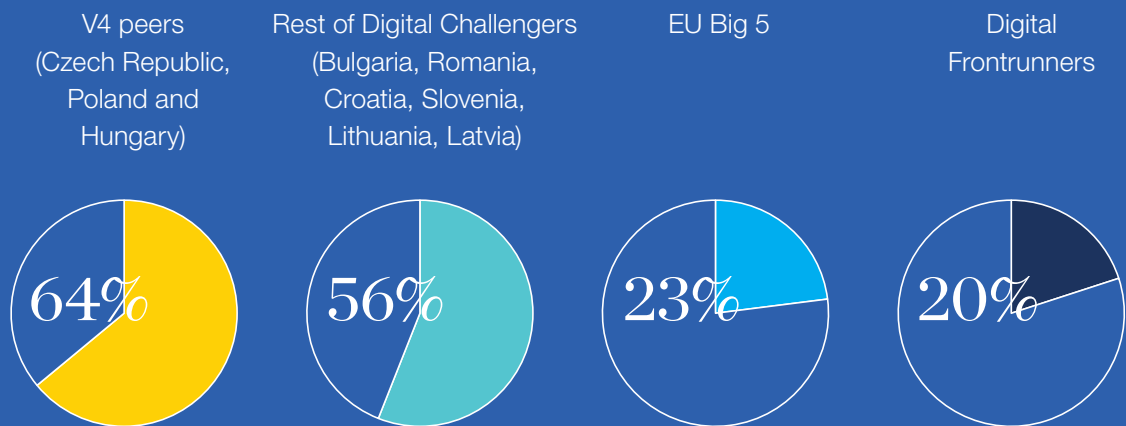
(C) BEST PRACTICES

Looking at the various 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 others across all digitization-enabling areas, each country having different advantages in certain fields. For instance, we already saw Slovakia exhibiting digitization rates above the CEE average in the utilities sector and the relatively high adoption of certain digital tools by Slovakia's enterprises. Participation rates in adult learning among the general population are also well above the CEE average. In many digitization-enabling areas, however, Slovakia performs below the CEE average, indicating room for improvement. This is true especially for digitization in manufacturing, professional services or retail, the lagging startup ecosystem and low adoption of certain advanced digital skills by Slovakia's general population. In these areas, sharing best practices among countries could limit harmful competition, allow for the creation of centres of excellence, and encourage regional coordination and planning. Instead of developing solutions in isolation, Slovakia could speed up the development of its digital economy by replicating successful strategies already tested elsewhere.

D COMMON CHALLENGES

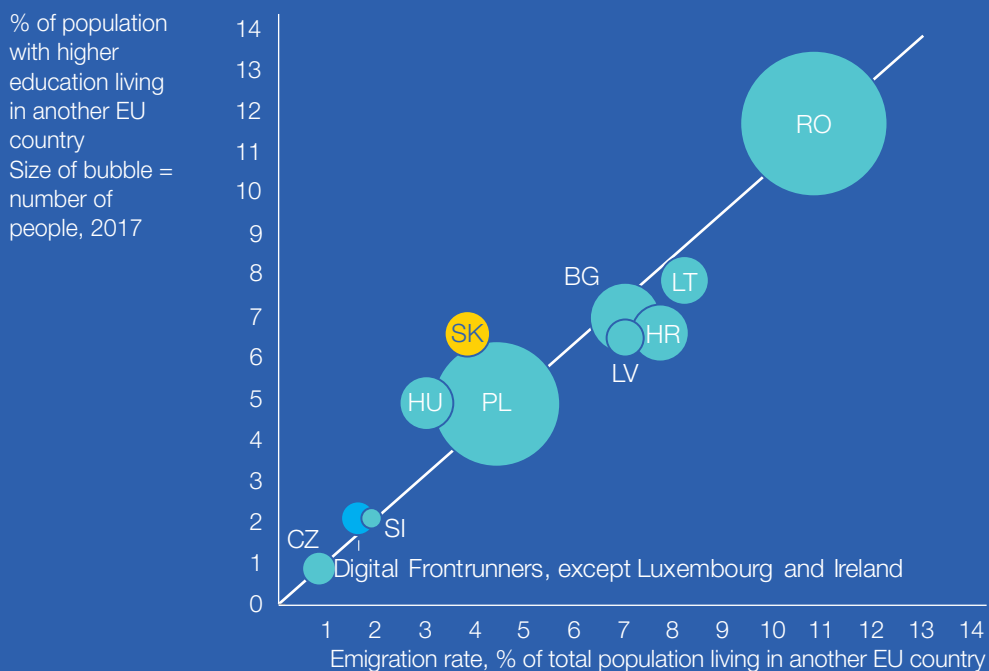
Slovakia faces many of the same challenges as the other CEE markets. For example, the ranking of Slovakia along the individual factors of the Global Competitiveness Index are well correlated to those of the other V4 countries and also to the rest of the Digital Challengers. The correlations with the EU Big 5 and the Digital Frontrunners are much lower. Slovakia, similar to the other Digital Challengers, needs to make its biggest improvements in its education, business environment and in the digitization of the public sector.

Components of the WEF Global Competitiveness Index – correlation between Slovakia and other markets, %, 2018



The region's countries share some of the same challenges, including "brain drain," the need to improve and standardise 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, Slovakia exhibits a two-and-a-half times higher emigration rate among individuals with higher education.



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

SOURCE: Eurostat; OECD

Build skill sets for the future

KEY FACTS ABOUT SLOVAKIA

- Slovakia has a large future need for workforce reskilling: up to 53 percent of workplace activities could potentially be automated by 2030, using technology that already exists.
- Slovakia's general population lags behind Digital Frontrunners in basic and advanced digital skills – the older the age group, the bigger the gap.
- Despite a STEM graduate talent pool on par with Digital Frontrunners relative to the country size, the share of male ICT graduates out of all graduates is low (6.7 percent), and alarming for female ICT graduates (0.6 percent). Moreover, the issues in talent pipeline results in a gap of ICT specialists in the Slovak labour force (2.9 percent) when compared against the Digital Frontrunner average (4.8 percent).
- The adult participation rate in training in Slovakia (46 percent of people aged 25–64), is significantly lower than the Digital Frontrunner average (54 percent).
- The emigration rate for well-educated members of the population in Slovakia is more than three times 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 labour market model, identify sector shifts, understand the gap between current and future skills.

Commit to the programme and measure the effectiveness of actions, e.g., measure changes in employment rates and wages, hold educators responsible for the outcomes of reskilling programmes. In the United Kingdom, for example, in response to changes in the labour market, Unionlearn has developed a network of “Union Learning Representatives” in firms across the United Kingdom. The representatives are trained to identify the skills needed in their workplaces and help their colleagues access relevant resources and training. The initiative led to 77 percent of participants registering positive effect on their workplace and return on investment of GBP 12.30 every GBP 1 invested.

Search for relevant solutions and benchmarks, e.g., look at the experiences of other markets.

Update youth education

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. Build on positive examples of several non-governmental organisations, such as The Duke of Edinburgh’s International Award, summer academy DISCOVER and leadership programmes by LEAF and Pre Stredoškolačkov.

Through programmes such as “Aj Ty v IT”, promote specialisation in STEM subjects to build an ICT talent base, focusing especially on enabling women to study technology in order to close the gender gap.

Cooperate with the private sector to create practical education programmes and support apprenticeships. As an example of an effective public-private partnership, the Italian government cooperated with the Google in Digitale initiative, offering free training on digital skills to SMEs and young people not working or studying.

Promote lifelong learning and mid-career training

Create an ecosystem that helps adults reskill and upskill: build a motivation system to encourage lifelong learning, offer practical training, provide support during the transition period and assist in job-seeking. Singapore, for example, has developed the SkillsFuture initiative to promote mastery and foster a culture of lifelong learning.

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

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 programmes or immediately after graduation, stimulate the startup ecosystem to attract local talent to seek tech-related jobs locally.

Attract back the ICT specialists who have left the country, e.g., provide scholarships for young people studying abroad. Build on programmes such as “Scholarship of Martin Filko”, which provides financial support to students in exchange for a commitment to come back and work in public administration, or the internship programme by LEAF, which encourages Slovak students at universities abroad to make an impact in their home country.

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 SLOVAKIA

Slovakia trails both the CEE and Digital Challenger averages in the European Commission's Government Digitization Index which, among other things, measures the availability of e-government solutions, such as electronic identification (eID), digital documentation, electronic authentication changes, and digital post in communication with citizens and businesses.

Take-up of e-government services is low, with less than half of 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 Slovakia is much lower than in Digital Frontrunners. Only 17 percent of companies in Slovakia exhibit a very high or high adoption rate for digital tools, compared with the 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. The Slovak government has already moved toward creating a single access point for electronic public administration services with slovensko.sk. At the same time, this topic is tied to strong civic engagement, with movements like Slovensko.digital continuously challenging public authorities to be more ambitious and improve the quality of digital services.

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. Estonia, a champion of digitizing public services with one of the most advanced e-governments in the world, has made 99 percent of their public services available online, resulting in staggering adoption with 96 percent of people filing their tax returns electronically and 2 percent of GDP captured in savings.

Develop digital skills among public-sector employees. The Italian Union of Chambers of Commerce may serve as an inspiration. It provides an e-Gov training and certification scheme to develop employees' ability to plan, develop and operate electronic services.

Digitize back-end government processes, focusing on the most labour-intensive and expensive processes first.

Unleash big data capabilities by standardising government data and opening it up (for instance, in the form of a virtual data repository) to third-party collaborators (researchers, businesses, startups, etc.) for application development.

Invest in Internet of Things (IoT) infrastructure in the public sector, e.g., support smart city and human health solutions by strongly leveraging public data and resources. The Netherlands, the first country to install a nationwide network to enable the Internet of Things, may be studied as an example.

Support technology adoption at companies

Promote the benefits of digital transformation, focusing on SMEs and major sectors that lag a long way behind. Some European countries are already doing this – for example, Sweden with the governmental Digilyft initiative, a programme that aims to motivate SMEs in the manufacturing industry to adopt digital processes.

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 SLOVAKIA

- While Slovakia 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 Slovakia, at 28, 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 Slovakia are one-sixteenth the average investment in the European Union.



Implications for policy-makers

Improve the entrepreneurial talent pool

Embed entrepreneurship in formal education, especially in STEM subjects. For high-school students, for example, consider programmes such as the French “Option Startup”, where students interact with startups, incubators, and accelerators and participate in workshops on entrepreneurship in different sectors.

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 clusters, such as Station F in Paris or Blk 71 in Singapore, where startups can cooperate at scale.

Build on learnings from a number of local networks of privately-owned incubators such as HubHub, Impact Hub, Eastcubator, Connect and many others.

Further support private sector efforts, which foster growth and act as the unifying voice for innovative companies, such as SAPIE (The Slovak Alliance for Innovation Economy), LEAF, Startup GRIND and Neulogy.

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. Some CEE countries are already doing this; for example, the Bank of Lithuania is introducing a regulatory and technological sandbox platform for blockchain solutions.

Increase access to capital

Simplify business angel investing, e.g., with standardised, easily available forms and corporations with low capital requirements.

Provide additional incentives for business angels and serial entrepreneurs. This could be achieved by means of tax incentive schemes, such as the United Kingdom’s Enterprise Investment Scheme (EIS) and Seed Enterprise Investment Scheme (SEIS), providing income tax relief on investments and exemption on capital gains that are reinvested.

Simplify procedures for obtaining and reporting public/European Union funds.

10010110
1 010 011
1010011 0
10 0110 10
10 101 0110
10010101110
10100111010
11000110110
1 10110110
10 10 01110
1 100 11010
11000 101 0
1001 110110
100 0101110
10100111 10
1100 110110
0 0101110
100111 10



Strengthen cross-border digital collaboration

KEY FACTS ABOUT SLOVAKIA

Slovakia 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: Slovakia, like other CEE markets, exhibits high levels of market openness and similar levels of digitization, in addition to cultural and historic commonalities
- Scale effects: As the CEE region, Digital Challengers represent EUR 1.4 trillion in GDP – almost fifteen times the size of the Slovak economy
- Common challenges: Slovakia 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: Slovakia 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)

Build on efforts such as the V4/Memorandum of Understanding for Regional Cooperation in the Areas of Innovation and Startups, or the Warsaw declaration, expressing the V4's desire to cooperate in cybersecurity, 5G mobile services, supporting SMEs, increasing ICT and digital skills at all levels of education, or supporting regional Industry 4.0 projects.

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 standardised, 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 localisation practices, or regulatory barriers.

Support the standardisation and free flow of cross-border nonpersonal data in the public sector, as well as the technological interoperability of digital infrastructures, e.g., fibre optics, 5G technology. Such collaborative efforts can be found in Finland and Estonia, which initiated an automated inter-government electronic information exchange process, providing information about citizens moving from one country to the other, deaths, marriages, name changes and so on. This helped both governments lower the reporting burden on consulates, enhance communication links and improve encryption solutions.

Establish common security models and cybersecurity standards.

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. Consider the example of the Nordic Council, which establishes cooperation between member states across three digital priorities: increased digitization in both government and society, improved competitiveness of enterprises through initiatives on innovation, and enhanced digital surface models (DSMs) in the region.

Strengthen cross-border industry cooperation over research and education supporting joint technology initiatives such as autonomous transportation, smart cities, human health solutions.

Cooperate in the management of social change as a result of changes in the labour 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 SLOVAKIA

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

- Selling online (SME gap: -57 percent, large enterprise gap: -28 percent)
- Participating in cross-border e-commerce sales within the European Union (SME gap: -75 percent, large enterprise gap: -64 percent)
- Using social media for branding and marketing (SME gap: -46 percent, large enterprise gap: -42 percent)
- Analyzing Big Data (SME gap: -30 percent, large enterprise gap: -40 percent)
- Using software solutions such as Customer Relationship Management systems (SME gap: -4 percent, large enterprise gap: -27 percent)

In terms of providing formal employee training for ICT skill development, the share of companies conducting such activities (17 percent) is significantly lower than the Digital Frontrunner average (29 percent).

Implications for business leaders

Reimagine your business in the digital economy

Anticipate and prepare digital disruption in your market, in particular the development of digital ecosystems. Ensure you get close to customers to lead a digital ecosystem or at least unbundle and transform products to services to successfully participate. For example, connect in real time to your customers, leverage digital marketing and communication, exploit e-commerce and globalise your reach.

Digitize internally to improve your bottom line and make your businesses scalable. Redesign processes to be cheaper, reduce risk and be more flexible by making them simple, paperless and highly automated.

Launch your digital delivery engines

Embark on a customer experience-driven transformation of all your customer touch points.

Exploit the power of data science throughout your business. Expand from individual use cases (e.g., predictive maintenance or “Next product to buy”) to a data-driven transformation.

Transform your organisation using Agile at Scale principles.

Digitize the day-to-day tasks of your employees using Digital Way of Working tools.

Modernise the IT foundations

Gradually rebuild your architecture to be robust and allow interoperability with external parties. Start from building an API layer that opens your IT to quick integration of new components.

Build cybersecurity capabilities and ensure your digital assets are protected against attacks.

Strengthen capabilities

Attract future employees: Shift from reactive to proactive recruiting, e.g., offer workshops and internships, put more focus on assessing candidates’ skills, e.g., through open competitions, games, hackathons, and leverage contractors to fill talent gaps using digital platforms to optimise the search.

Reskill and upskill current employees: provide practical in-house training, offer financial support, create opportunities for knowledge-sharing.

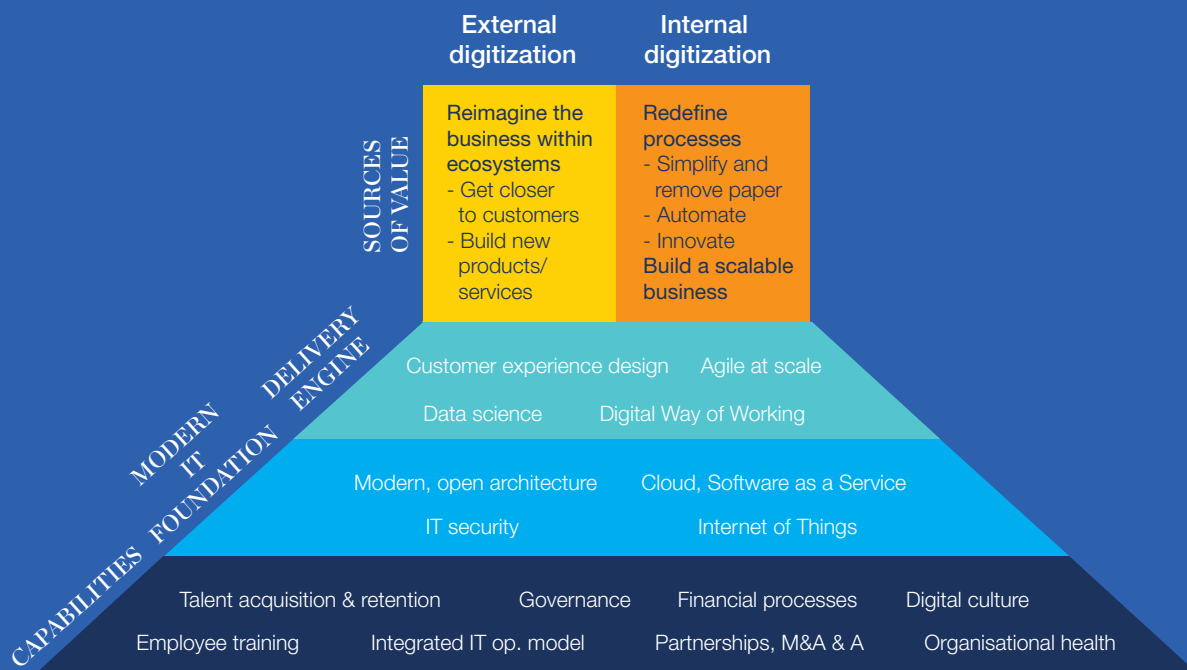
Build partnerships, alliances and M&A capabilities focused on driving growth beyond organic.

Digitize the culture and improve organisational health by fostering understanding and conviction among employees on the benefits of digital. Ensure the leadership and middle management act as role models for the digital way of working and entrepreneurship. Implement reinforcement mechanisms.

10010110
1 010 011
1010011 0
10 0110 10
10 101 0110
10010101110
10100111010
11000110110
1 10110110
10 10 01110
1 100 11010
11000 101 0
1001 110110
100 0101110
10100111 10
1100 110110
0 0101110
100111 10



Get the four levels of the digitization pyramid right



In our experience, the odds of succeeding in the digital world increase when companies master four important levels of the “digitization pyramid”:

1. REIMAGINE YOUR BUSINESS IN THE DIGITAL ECONOMY

As a first step toward digitization, companies must set their digital strategy by clarifying where they provide distinctive value to consumers and stakeholders and how they will continue to do so in a digital world. This understanding should then drive their external and internal digitization priorities.

A successful external digitization reimagines the company’s business in the context of future digital ecosystems. An ecosystem provides services in a seamless customer journey. For example, a digital B2C marketplace lets you choose a product, buy it, finance the purchase and get an extended warranty and insurance, all in one digital customer journey. External digitization requires that companies get closer to customers and deliver their products and services in a user-friendly way, with superior accessibility and range, and at an attractive price. Frequently, new products and services can be offered, as digital ecosystems facilitate crossing industry boundaries and country borders. The best digital businesses are built to be scalable in terms of growth, geographical footprint and even across industries.

Internal digitization, on the other hand, redefines internal processes to reduce costs, lower risks and increase flex-

ibility. New digital processes are simpler, paperless and to a large extent automated. Even in areas where full automation is not possible, productivity is increased by technological innovations. Internal digitization should go hand in hand with external digitization. Internal actions without customer focus seldom bring growth opportunities. Companies with digital sales that have not digitized their operations and way of working are at a considerable disadvantage to their fully digitized peers.

Determining the right digital strategy is not straightforward. Companies and their advisors use a variety of techniques such as trend immersion, ideation and collision workshops. We apply these approaches within the frame of the McKinsey Strategy Approach, which allows us to combine creativity with robust fact-based assessment and ensure commitment to the chosen digital strategy.

2. BUILD THE DELIVERY ENGINE

Once a digital strategy has been set, companies need to focus on the means by which they will offer targeted digital products and services to their customers. Customer-experience design, data sciences, agile development, and digital way of working can all be useful delivery engines.

Customer-experience design refocuses companies from the “products” to customer journeys. Steve Jobs’s famous quote “You’ve got to start with the customer experience and work backwards to the technology” underscores the importance of this area.

Data sciences enable a whole new world where decisions, previously made by expertise, can be made faster, cheaper and better based on data and algorithms or even training of deep neural networks. The list of use cases where data sciences have been successfully applied has quickly grown from traditional areas like credit scoring through operational topics like predictive maintenance to human interactions such as personalised experience and digital personal assistants in e-commerce.

Agile has been around for decades as a software development approach but is increasingly used in digital transformations. Agile involves short, fast “sprints” of development, prototyping, reassessment and adaptation. The agile development approach complements customer-experience design by product orientation that cuts across internal organisation boundaries and accelerates delivery.

Finally, a digital way of working brings technology to the daily life of all employees with immediate productivity and quality improvements, quick learning and a faster feedback loop. Typical DWoW applications are workflow and scheduling (e.g., app with interactive standard operating procedures for maintenance), performance management (e.g., digital dashboards with live data) and enhanced communication (e.g., live video calls).

3. MODERNISE THE IT FOUNDATIONS

Once the digital strategy is defined and digital delivery models decided upon, companies need to examine their IT infrastructure: Is it truly capable of supporting the activities required?

Complex legacy systems usually become a hurdle to fast digitization. Legacy systems have typically been built up in a patchwork fashion: new applications and gateways are bolted on to existing ones. The result is spaghetti code and fragmentation, neither of which promotes speed and transparency in IT operations.

Companies aspiring to be digitization leaders need to modernise their IT foundations in four dimensions:

- Robust architecture with a solid and reliable data backbone to ensure that all data are managed holistically, and users can access data sets quickly and easily. Establishing a “golden source” of truth for critical information relating to pricing, products, customers, invoices and contracts is a critical hygiene factor. APIs and stateless microservices ensure interoperability with external systems.
- Introducing flexibility to IT infrastructures by cloud-based platforms and software-as-a-service products reduces time to market and ultimately also development, roll-out and maintenance costs.
- Many companies also start incorporating connectivity into their IT architectures. This ranges from using sensors to monitor equipment status to wearable devices that monitor personal health and even recommend treatment.

- Of course, companies need rigorous cybersecurity policies and infrastructures to protect the most relevant pieces of information. This requires identifying digital assets (data, systems and applications) across the business value chain, identifying potential attackers and locating the weakest points and, finally, creating a set of initiatives to address highest-priority risks and gaps in control.

4. STRENGTHEN CORE MANAGEMENT CAPABILITIES

Any large transformation effort requires companies to strengthen and maintain their capabilities in several core areas.

The first is attracting and retaining talent, which goes hand in hand with training and reskilling of the current employees. Digital transformations require a deep internal benchmark with expertise in digital technologies and approaches. Recruitment, retention and development capabilities need to be upgraded to incorporate new skill sets, training needs and employee requirements.

Companies need to have a governance structure that is inclusive and gives internal and external stakeholders an opportunity to weigh in on digital decisions. External advisory boards and internal governance councils are increasingly prevalent among rapidly digitizing companies.

An Integrated IT operating model helps companies develop their IT from pilots and digital factories to a digital pure play future. In an integrated model, digital product teams merge with conventional technology teams and organise around capabilities. DevOps methodology is used to improve collaboration and speed up development.

Another core capability is in financial processes, where companies need to ensure that investment priorities are clear, revisited regularly, and updated as needed, and that sufficient capital is available.

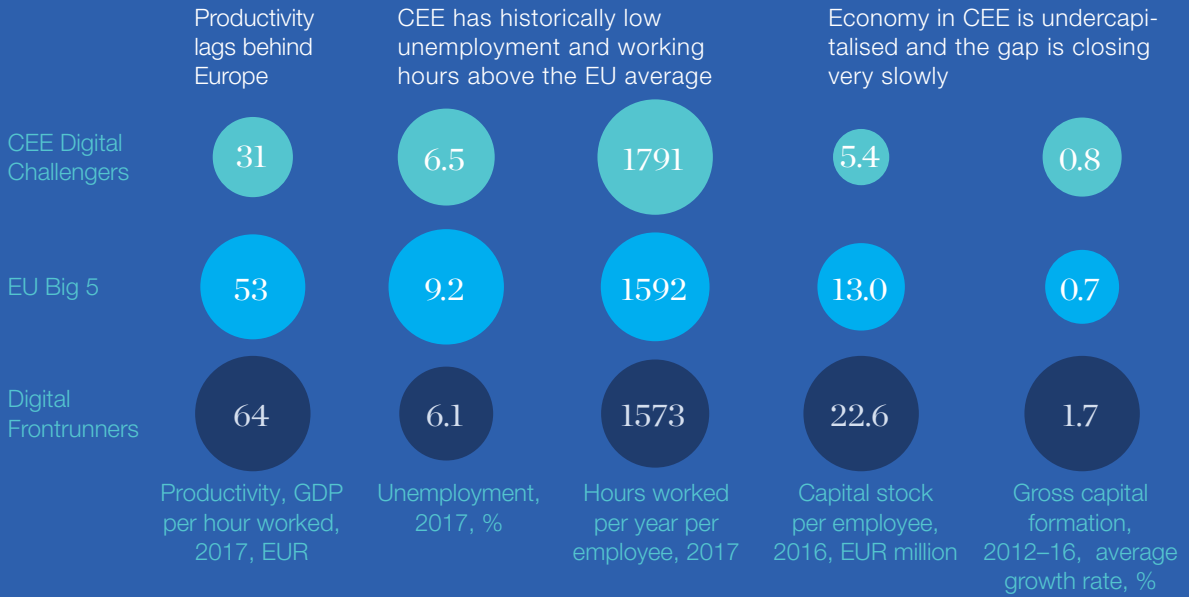
Ability to effect partnerships, mergers, acquisitions and alliances is becoming a critical skill in the digital economy. The speed at which technology and markets develop has accelerated to a level when even the best companies cannot rely solely on organic growth.

And last, but never least, culture is critical. Our research suggests that 70 percent of large transformation efforts fail because of poor organisational health. Digitization requires a healthy work environment open to new ideas and best practices. Senior leaders should focus all employees on five critical questions: Where do we want to go? How ready are we to go there? What must we do to get there? How will we manage the journey? How do we keep moving fast? Senior leaders also need to role model the digital way of working and entrepreneurship.

WHY IS DIGITIZATION KEY FOR CEE?

1

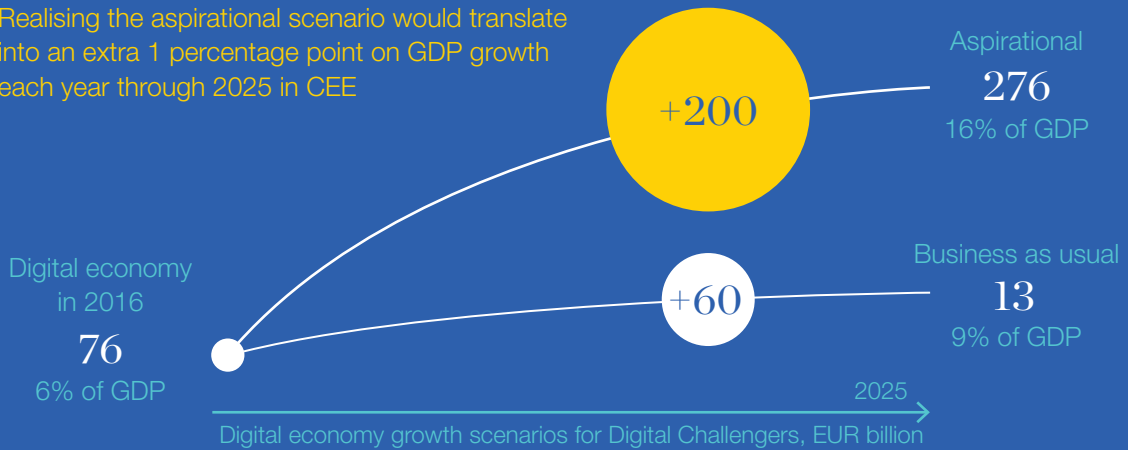
THE GROWTH ENGINE OF CENTRAL AND EASTERN EUROPE IS LOSING MOMENTUM



2

DIGITIZATION CAN BE THE ANSWER TO THIS CHALLENGE

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

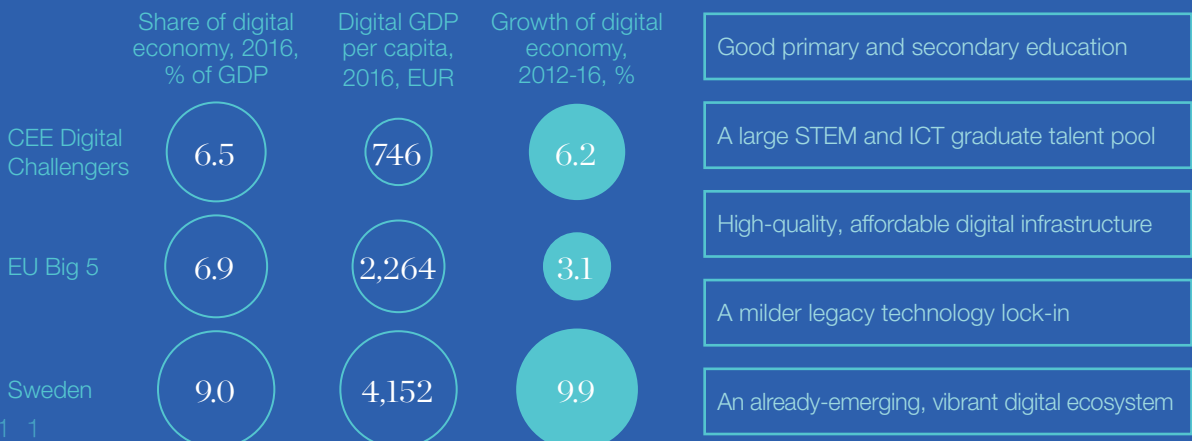


3

THE COUNTRIES IN CEE ARE UNIQUELY POSITIONED TO CAPTURE THIS OPPORTUNITY

Despite a smaller size of the digital economy, Digital Challengers can build on strong historical growth momentum

Digital Challengers have the necessary fundamentals in place for further digitization:



HOW TO CAPTURE THE POTENTIAL?

4

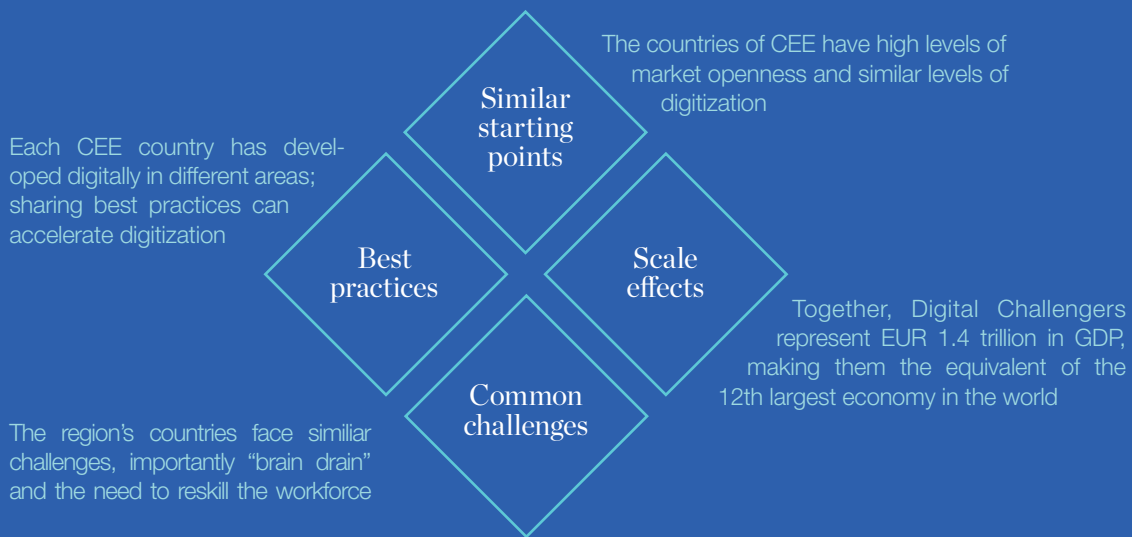
ALL STAKEHOLDERS NEED TO ACT FOR A SUCCESSFUL TRANSITION



5

COLLABORATION BETWEEN CEE DIGITAL CHALLENGERS IS KEY

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



6

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



Digital Challengers are enjoying an economic boom; this could give new digital initiatives a head start



The Fourth Industrial Revolution will transform the economy and labour market, requiring an immediate response



The global rules of the digital game are crystallising; to compete, Digital Challengers need to develop a clear digital agenda

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 analysed.

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 research¹⁰ 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.¹¹ On the other end of the spectrum, institutions such as the IMF use studies¹² 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 2012–2016.

Digitization potential in the public and private sectors

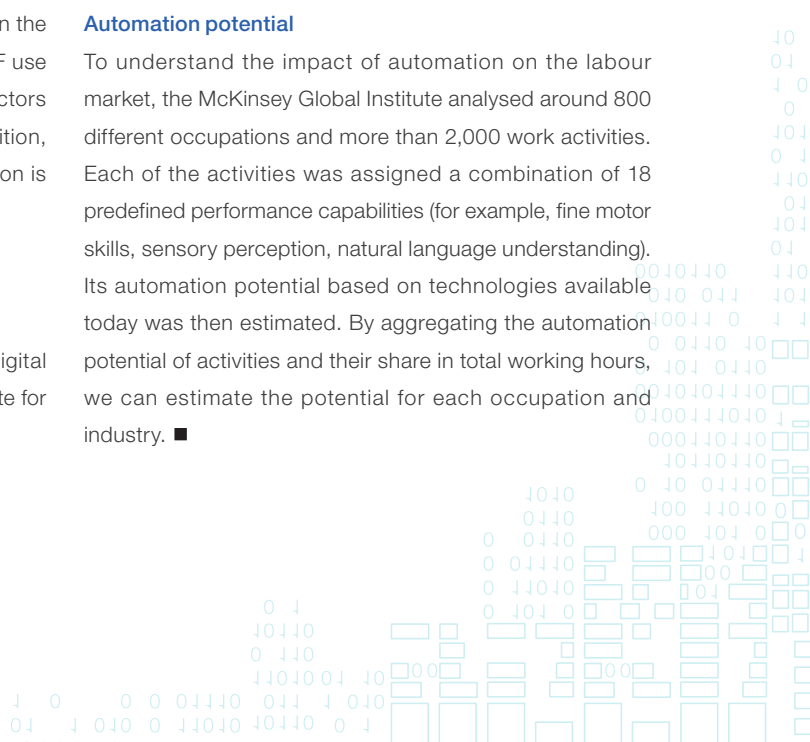
We assume that the Digitization Index in CEE will reach the level found in the Digital Frontrunner Sweden. We use Sweden as a benchmark because of its digital maturity and its inspiring digital growth in recent years. To assess the potential impact, we first analyse productivity and digitization levels 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 analysing more than 150 IoT use cases across the global economy. Based on our prioritisation, we examine the 57 of these use cases that promise to bring the highest value. We use bottom-up modelling to assess the potential benefits that these use cases can generate, including productivity improvements, time savings and improved asset utilisation. We also include an approximate economic value for reduced disease, accidents and deaths.

Automation potential

To understand the impact of automation on the labour market, the McKinsey Global Institute analysed 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. ■



About the authors



Jurica Novak
Managing Partner
in Central Europe

Advises clients in banking, telco, consumer goods, private equity, insurance, and other industries primarily on strategy, digital, corporate finance, and governance.



Marcin Purta
Managing Partner
in Poland

Expert with 20 years of experience in strategic consulting, advising clients on growth strategies based on advanced analytics and digital innovations in sectors such as TMT, retail, energy and logistics.



Tomasz Marciniak
Partner

Leader of the Strategy and Corporate Finance Practice, Banking and Insurance Practice in Poland as well as the Electric Power and Natural Gas Practice in Central and Eastern Europe.



Karol Ignatowicz
Local
Partner

Expert in strategic consulting with international work experience from Europe, Middle East, Asia, North and Latin America in industries such as TMT, retail, basic materials, energy, pharmaceuticals, real estate and logistics.



Kacper Rozenbaum
Engagement
Manager

Advises clients in energy, telecommunications and technology on the topics of strategy, turnarounds and digital transformations.



Kasper Yearwood
Consultant

Advises clients in retail, energy and finance on the topics of strategy, digital transformations and advanced analytics.



Dan Svoboda
Managing Partner
in the Czech Republic &
Slovakia

Advises clients on large scale transformations, operational and commercial effectiveness, and growth strategy



Michal Skalsky
Partner

Leader of Digital McKinsey in Central and Eastern Europe. Advises clients, mainly banks and insurance companies, on how to discover their full digital potential.



Helena Sarkanova
Associate Partner

Coleads the Prague office's Digital McKinsey Practice. Helps clients transform their companies into more agile organisations while utilising the latest digital and omnichannel capabilities.

The authors of the report would like to thank dozens of McKinsey colleagues who greatly contributed to this report, among them (in alphabetical order): Graham Ackerman, Maria Ballaun, Tim Beacom, Norbert Biedrzycki, Ola Bojarowska, Tomislav Brezinscak, Adam Chrzanowski, Mateusz Falkowski, Adrian Grad, Jerzy Gut-Mostowy, András Havas, Joanna Iszkowska, Levente Jánoskúti, András Kádócsa, Daniel Kaluža, Tomas Karakolev, Viktor Kozma, Krzysztof Kwiatkowski, Lucie Markova, Márta Matécsa, Małgorzata Leśniewska, Joanna Ostrowska, Péter Puskás, Daniel Spiridon, Jakub Stefański, Anna Szucs, Miléna Tkaczyk, Katarzyna Tłuściak, Daniela Tudor, Roxana Turcanu, Robert Wielogórski, Mateusz Zawisza, Jan Zieliński and Arkadiusz Żarowski.

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, [online]
Available at: www.imf.org/en/Publications/Policy-Papers/Issues/2018/04/03/022818-measuring-the-digital-economy
- 3 McKinsey Global Institute, *Digital America: A tale of the haves and have-mores*, December 2015
- 4 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
- 5 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
- 6 Based on the Total Economy Database by The Conference Board
- 7 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%)
- 8 *ibid*
- 9 McKinsey & Company, *The rise of Digital Challengers: How digitization can become the next growth engine for Central and Eastern Europe*, November 2018
- 10 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
- 11 OECD report, *Digital Economy Data Highlights*, 2016
- 12 International Monetary Fund Staff Report, *Measuring the Digital Economy*, February 2018 <https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/04/03/022818-measuring-the-digital-economy>: *How digitization can become the next growth engine for Central and Eastern Europe*

