The rise of Digital Challengers

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

Perspective on Hungary

Digital/McKinsey

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About the Digital Challengers research

This report is part of a wider research into the potential of the digital economy in Central and Eastern Europe. In our November 2018 report, *The rise of Digital Challengers: How digitization can become the next growth engine for Central and Eastern Europe* we cover the regional perspective, joined by additional country reports for the Czech Republic, Hungary, Poland, Romania, and Slovakia.

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Preface

This report constitutes a perspective on Hungary as part of wider research analyzing the opportunities presented by the digital economy in Central and Eastern Europe (CEE). Using proprietary research and published sources, we define the economic potential of accelerated digitization in Hungary. We consider Hungary, alongside nine other markets in the region (Bulgaria, Croatia, the Czech Republic, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia), as a "Digital Challenger." Hungary demonstrates strong potential as a competitor in the digital economy, emulating a group of relatively small, highly digital countries that we consider "Digital Frontrunners:" Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, the Netherlands, Norway, and Sweden.

Discussion about the opportunities and challenges of digitization has been ongoing for years. We aim to provide a unique perspective: a comprehensive, fact-based analysis that, for the first time, attempts to quantify the size and growth rates of digital economy in Hungary 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 Hungary and the CEE region (Chapter 1). Building on previous research conducted for Hungary, a core part of the study is our investigation of the impact of digital transformation on the labor market (Chapter 2). Our discussion here covers both the shifts in society caused by new technology and the increasingly accessible nature of the labor market as a result of the digital transformation. Following this, we consider a comprehensive, yet prioritized list of digitization enablers for Hungary (Chapter 3). Our insights in this chapter are based on quantitative analysis and discussions with numerous market experts.

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

The ideas we present build on those outlined in our previous reports *Digital Europe: Pushing the frontier, capturing the benefits; A future that works: Automation, employment and productivity; The next gold medal: How Hungary can win the productivity race in the digital age; and Transforming our jobs: Automation in Hungary.* 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, inspiration and guidance.

The work on this report was led by Jurica Novak, McKinsey's Managing Partner in Central Europe, Levente Jánoskuti, Managing Partner in Hungary, András Havas, Partner, and Pèter Puskás, Associate Partner, with significant contributions by McKinsey Partners Marcin Purta and Tomasz Marciniak, and Associate Partner Karol Ignatowicz in Poland.

These individuals worked together with a team comprising the consultants Kasper Yearwood, Kacper Rozenbaum and Viktor Kozma, as well as Anna Szucs, Joanna Iszkowska, Milena Tkaczyk, Małgorzata Leśniewska and many others.

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

Digitális gazdaság: a magyar növekedés új motorja

2025-re éves szinten 9 milliárd euróval, azaz közel 3000 milliárd forinttal növelheti a GDP-t Magyarország, ha sikeresen gyorsítja fel a gazdaság digitalizációját. Az alapok adottak, de számos teendő van.

A McKinsey tanulmánya szerint 2025-re akár 9 milliárd euróval is nőhet a magyar GDP, amennyiben sikerül felgyorsítani a digitalizációt és ezzel elősegíteni a technológia-vezérelt gazdaság felé való elmozdulást. Az ambiciózus forgatókönyv szerint így akár fél százalékkal is magasabb lehet a GDP-növekedés évente, és 2025-re a digitális gazdaság a magyar GDP 11 százalékát tenné ki a jelenlegi 6,9 százalékkal szemben. A gyorsítás nélkül, a gazdaság normál átalakulásának köszönhetően az ország digitális gazdasága 3 milliárd euróval bővül 2025-ig, ezzel elérve a GDP 7,5 százalékát.

Ha sikerül kihasználni ezeket a lehetőségeket, az Magyarország számára érezhető termelékenységjavulást eredményezne, ezáltal jelentősen nőne az ország versenyképessége is. Miután az alacsony munkanélküliség és a növekvő hazai bérszint miatt Magyarország munkaerőköltségből eredő előnye folyamatosan csökken, így a digitalizáció lehet a válság vége óta elért évi 3,2 százalékos növekedés fenntartásának egyik motorja.

KIINDULÓ HELYZET

A McKinsey tanulmánya számos európai országot vizsgált és úgy találta, hogy Magyarország a Közép- és Kelet-Európában található 10 „Digitális Kihívó” egyike. Ez a gyakorlatban azt jelenti, hogy bár egyelőre itthon alacsonyabb a digitalizáció mértéke, mint az úgynevezett „Digitális Éllovasok” esetében (Belgium, Hollandia, Luxemburg, Dánia, Finnország, Norvégia, Svédország, Észtország és Írország), vagy akár az EU 5 legnagyobb országában (Franciaország, Németország, Olaszország, Spanyolország és az Egyesült Királyság), ugyanakkor már most érezhető a digitális gazdaság térhódítása. 2012 és 2016 között ez a szegmens évente 4,1 százalékkal nőtt, melynek eredményeképpen nagyobb a digitális gazdaság mérete (2016-ban a GDP 6,9 százaléka), mint a közép-kelet-európai átlag (6,5 százalék). Az eddigi növekedés az erős alapoknak köszönhető, mint például a fejlett digitális infrastruktúra (szélessávú internet és 4G-lefedettség tekintetében a régiós átlag felett van Magyarország). A közép-kelet-európai régió többi országához képest a magyarok nagyobb mértékben férnek hozzá az online közszolgáltatásokhoz, és itthon nagyobb arányban vannak informatikusok a munkaerőpiacon. Ugyanakkor bizonyos iparágak digitalizációs indexe elmarad a régiós átlagtól, ilyenek például a közüzemi szolgáltatások és a feldolgozóipar. Ezen felül az úgynevezett STEM (természettudományok, technológia, mérnöki tudományok, matematika) témákban végzettek aránya jelentősen elmarad a régiós átlagtól.

HOGYAN LEHET MAGYARORSZÁG „DIGITÁLIS KIHÍVÓ”?

A digitális gazdaság fejlődése az összes érintett részvételét igényli. A hazai vállalatok számára kulcs a digitalizálásban rejlő lehetőségek kiaknázása, a digitális eszközök és megoldások fokozott alkalmazása révén, különös tekintettel a kis- és középvállalatokra, ahol regionális szinten is elmaradás tapasztalható. Ezek a lépések javítják a termelékenységet és ezáltal segítik a cégek versenyképesebbé válását.

Az állam is jelentősen profitálhat a digitális megoldásokból: a közszolgáltatások további digitalizációja egyrészt javítja a hatékonyságot, másrészt növeli a felhasználói (lakosság és vállalatok) elégedettséget.

A lakosság számára a digitalizáció egyszerre tartogat lehetőségeket és kihívásokat. Annak érdekében, hogy a változó és egyre inkább automatizálódó munkaerő-piacon sikeresen alkalmazkodjanak a munkavállalók, az élethosszig tartó tanulás szemlélete elengedhetetlen lesz. A döntéshozók ezt a szemléletet elő tudják segíteni, például az oktatási és képzési programok támogatásával (pl. digitális készségek fejlesztése a közoktatásban, átképzési programok az automatizáció hatásainak kezelésére), valamint a digitális megoldások széles körben való megismertetésével.

A DIGITÁLIS KITÖRÉST MOST KELL ELKEZDENI

A digitalizáció felgyorsítása jelentős előnyöket kínál Magyarország számára. Ennek érdekében érdemes minél előbb megkezdeni a szükséges lépéseket, különös tekintettel arra, hogy a mostani gazdasági növekedés lehetővé, míg a munkaerő-piaci környezet szükségessé teszi ezeket. A digitalizáció terén érdemes együttműködni a kelet-közép-európai régió más országaival, ugyanis ezen gazdaságok is hasonló helyzetből indulnak és hasonlóak az előttük álló kihívások, így a jó gyakorlatokat egymástól át tudják venni az országok. Ráadásul a piacaik együttesen jóval nagyobb lehetőséget képviselnek a régió vállalkozásainak a növekedésre, mint a helyi piacok külön-külön.

A digitális gazdaságok világszerte növekednek, a digitalizációt meghatározó globális játékszabályok egyre világosabbak. Ahhoz, hogy Magyarország ténylegesen Digitális Kihívóvá váljon és ez legyen a versenyképesség egyik motorja, egy világos digitális stratégiára és akciótervre van szükség.

Hungary as a Digital Challenger

For Hungary, the potential economic and developmental benefits of digitization can reach up to €9 billion in additional gross domestic product (GDP) by 2025. This would lead to increased global competitiveness and prosperity for the country's 10 million people and allow Hungary to join the most digitally advanced economies in Europe.

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

Over the past 20 years, Hungary has experienced rapid development. Since the end of the global financial crisis, there has been a healthy economic growth (3.2 percent per year), primarily fueled by increasing employment levels driven by export-driven industries (benefiting from labor cost advantage) and investments (enabled by funding from the European Union). However, there are fewer labor market reserves as the unemployment rate is at historically low levels (3.7 percent in 2018). Furthermore, rising incomes mean that the labor cost advantage of Hungary is diminishing. Therefore, in order to remain on a strong development trajectory, the Hungarian economy will need to find new sources of growth, focusing on labor productivity which is lagging the EU average.

2 DIGITIZATION CAN BE THE NEXT DRIVER OF SUSTAINED GROWTH FOR HUNGARY, WITH €9 BILLION OF INCREMENTAL GDP BY 2025 AT STAKE

Our analysis shows that accelerating digitization and converging toward a technology-driven economy offers substantial potential to unlock a new growth engine for the country. In 2016, the digital economy in Hungary already accounted for 6.9 percent of GDP, the equivalent of €8 billion. Accelerating digitization in the country to close the gap to Northern European economies could see this base expand by up to €9 billion by 2025. In this aspirational scenario, the digital economy in Hungary would grow to represent 11 percent by 2025. This could mean an extra half percentage point on GDP growth each year over the period. Without this acceleration, following a "business as usual" scenario, the digital economy in the country is poised to expand by €3 billion to reach a ~7.5 percent share of GDP by 2025.

3 HUNGARY IS WELL POSITIONED TO CAPTURE THE DIGITAL OPPORTUNITY

In this report we consider Hungary to be one of 10 Digital Challenger markets based in Central and Eastern Europe. These countries exhibit lower digitization rates than the so-called Digital Frontrunners (Belgium, the Netherlands, Luxembourg, Denmark, Finland, Norway, Sweden, Estonia and Ireland), or EU Big 5 markets (France, Germany, Italy, Spain and United Kingdom). However, Hungary has strong foundations on which to accelerate its digitization. The size of the digital economy in Hungary (at 6.9 percent of GDP in 2016) is above the CEE average of 6.5 percent, and on a par with EU Big 5 markets. And while a gap to Digital Frontrunner markets such as Sweden (9.0 percent) remains, Hungary has recently gained substantial momentum in its digital economy – between 2012 and 2016, it grew by 4.1 percent a year, twice as fast as the non-digital economy and faster than the EU Big 5. Additionally, the presence of high quality academic institutions (e.g., the Budapest University of Technology and Economics, Óbuda University), a large STEM (science, technology, engineering, and math) and ICT (information and communication technologies) graduate talent pool, high quality digital infrastructure, as well as a legacy technology lock-in that is milder than in Western and Northern European countries, lend support to Hungary's Digital Challenger status. Also, relative to other countries in the CEE region, Hungary's general population exhibits higher adoption of digital skills and tools and a higher share of ICT specialists in the labor force. The country already functions as a popular destination for offshoring software development (e.g., notable local software development houses include Supercharge), and has been home to many global startup success stories such as Prezi, UStream or LogMeIn to name just a few.

4 FOR A SUCCESSFUL DIGITAL TRANSITION IN HUNGARY, JOINT EFFORT FROM GOVERNMENT, BUSINESSES AND INDIVIDUALS IS NEEDED

To achieve the aspirational digitization trajectory, Hungary will have to count on all stakeholders. Companies will need to understand and embrace the opportunities in digitization, increasing their adoption of digital tools contributing to improved productivity, as well as enabling them to reach new customers and expand into global markets. The public sector could also integrate technologies, increasing efficiency as well as improving the services provided for both companies and citizens. Examples of such solutions implemented in Hungary in recent years include the e-SZJA (electronic tax administration) system, online cash registers, and Ügyfélkapu (the online governance administration system). For individuals, investing in lifelong learning for upskilling and reskilling will be key to take advantage of new labor market opportunities – programs such as Green Fox Academy, Skool and Logiscool are already picking up in popularity in Hungary. Policy makers are called upon to promote the adoption of technology in both the public and private sectors. They can also support workers through promoting lifelong learning in the form of reskilling and upskilling programmes, as well as improve the ecosystem for startups and create opportunities for digital innovation.

5 HUNGARY'S COLLABORATION WITH OTHER CEE DIGITAL CHALLENGERS IS KEY

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

- **Scale effects:** As the CEE region, Digital Challengers represent €1.4 trillion in GDP – more than 10 times the size of the Hungarian economy. Enabling Hungarian 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:** Hungary 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:** Hungary, like other CEE markets, exhibits high levels of market openness and similar levels of digitization. This adds relevance to their shared experiences on what has worked well in digital investments and regulatory policy.
- **Best practices:** Hungary has developed different strengths and weaknesses related to the digital economy compared to other CEE markets. Leveraging the strengths of neighboring countries could limit the risk of harmful competition and allow for the creation of centers of excellence. Also, this could encourage regional coordination and planning – instead of developing solutions in isolation, Hungary could speed up the development of its digital economy by replicating successful strategies already tested elsewhere.

In the future, Hungary 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. Efforts could include allowing access to standardized public datasets to fuel innovation and support the digitization of enterprises, as well as cross-border infrastructure projects for the development of fiber optics and 5G technology. Also, a pan-CEE coalition could help to ensure that the digital interests of the region's countries are heard at the European level.

6 TO CAPTURE THE DIGITAL OPPORTUNITY IN HUNGARY, THE TIME TO ACT IS NOW

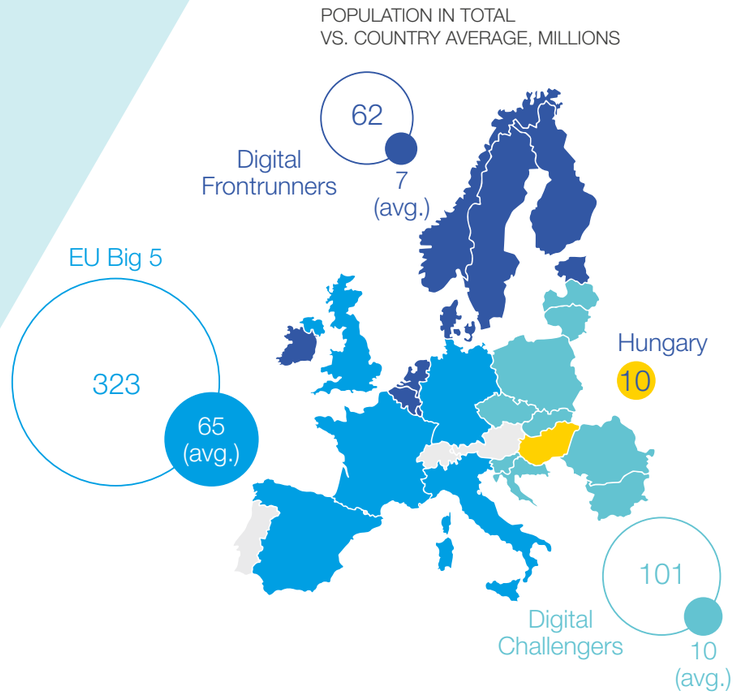
We believe that Hungary currently has a great opportunity to double down on its digital transformation. The healthy economic growth and tight labor market indicates that now is the time to identify future productivity drivers and take necessary actions. Embracing digitization will help tackle labor shortage, and prepare the economy and the population for the upcoming transformation of the labor market – our analysis shows that up to 49 percent of workplace activities in the country today could be automated by 2030 using technology that already exists, which represents a higher potential than for the EU on average. While this transformation will lead to greater productivity, it will be essential to manage the transition, especially focusing on the reskilling of the workforce. As digital economies are growing across the world, global rules are crystallizing. To effectively navigate the transformation and become a true digital challenger, a clear digital agenda is vital.

Hungary and Digital Challengers at a glance

In our recent *The rise of Digital Challengers: How digitization can become the next growth engine for Central and Eastern Europe* report, we investigate the digital economy in the region – analyzing its potential, possible impact on GDP and the labor market of ten CEE economies, including Hungary. We use a comprehensive set of more than 100 different indicators to compare the digitization levels of these CEE countries (Digital Challengers) and compare with other country groups (EU Big 5, Digital Frontrunner countries). Our research indicates that digitization has the potential to become the next growth engine for the CEE region, with wide-ranging influences on both the private and public sectors, as well as individuals. In this report, we take a deep-dive on how Hungary fits into this regional perspective.

Hungary has recorded significant economic growth since the 1990s. Gross domestic product (GDP) per capita grew by 74 percent between 1996 and 2017. The main growth drivers in this period were traditional industries, dynamic exports, investments from abroad, labor-cost advantages and the inflow of EU funds. The lower level of digitization enables Hungary to leverage the digital economy as its next growth engine, similarly to the rest of the CEE region.

Comparing GDP per capita levels between Hungary and the average of Digital Frontrunner countries we observe a significant, ~4x difference. In order to better understand the reason for this immense gap we further broke down this figure into its key drivers, namely capital and labor. The Hungarian economy is generally undercapitalized compared to more advanced European economies: the ratio of capital, measured as net assets per employee, is more than 60 percent lower here than in the five largest economies in the European Union (the EU Big 5 of France, Germany, Italy, Spain, and the United Kingdom). Furthermore, workforce costs are rising and there are limited labor reserves left to plug into the economy, with total employment rate in Hungary standing at 45.3 percent in 2016, compared to 45.6 percent among the EU Big 5 and 48 percent among Digital Frontrunners. Additionally, the average number of annual working hours per employee in Hungary is already 13 percent higher than in Western and Northern Europe. Consequently, there is a major productivity gap between Hungary and Digital Frontrunners amounting to 4 times on average. Closing this gap should be Hungary's priority for the next decade, and one lever to support this goal could be to transform into a more digitized economy.■



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

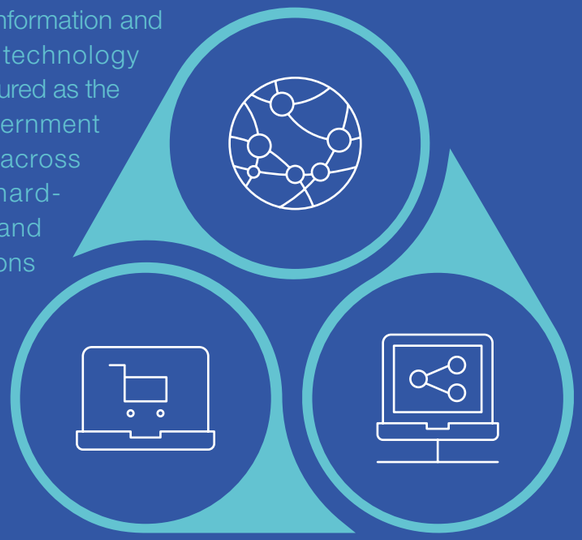
SOURCE: World Bank

Our approach to measuring the digital economy in Hungary

The term digitization is widely used, but its precise definition is open to discussion, particularly as it pertains to measuring its impact on economies.[1] Consequently, there is some uncertainty as to the scale of the digital economy in Hungary and the CEE more broadly.

In this report, as with the CEE edition, we define digitzation as the sum of three components, as depicted below:

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

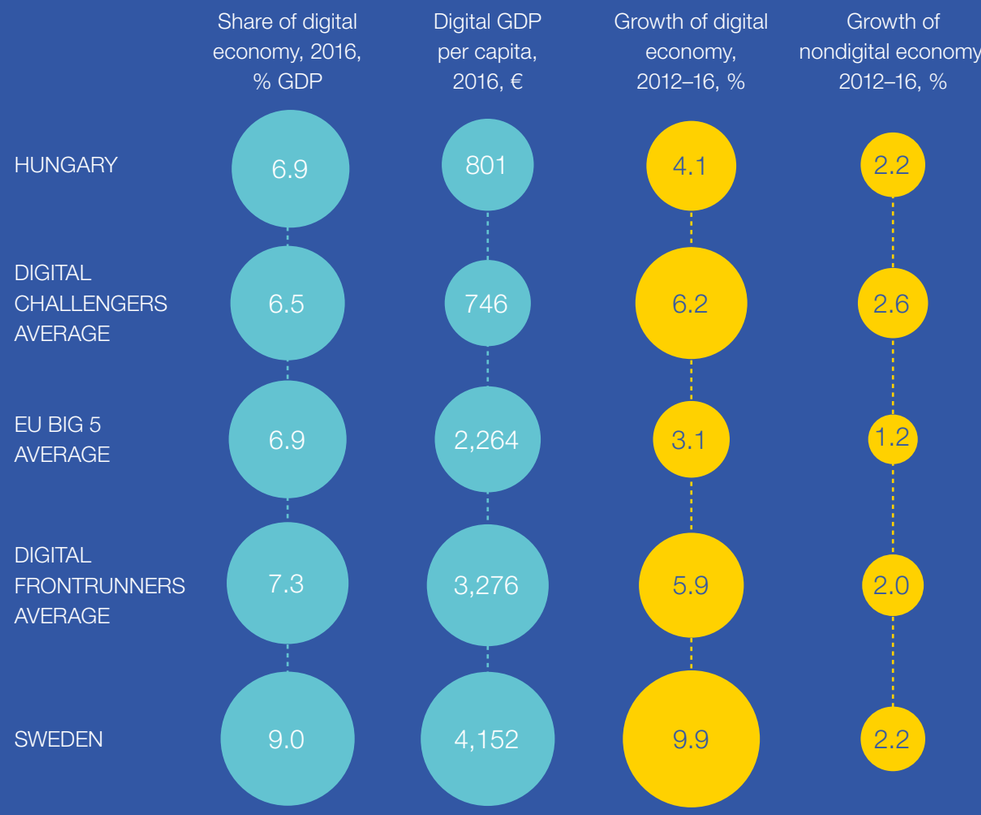


The value of the e-commerce market, measured as online purchases of goods and services by consumers

The value of offline consumer spending on digital equipment

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

The size and growth of the digital economy in Hungary



According to our analysis, the digital economy accounted for 6.9 percent of Hungary's total GDP in 2016. While this is on a par with the EU Big 5, it lags behind Digital Frontrunners (markets such as Sweden), where the share is ~30 percent higher. Furthermore, Digital Economy per capita amounts to ~€800 in Hungary, compared to more than €3,000 in Digital Frontrunner countries, and more than €4,000 in Sweden, revealing a 4-5 times differential in line with the general GDP per capita difference highlighted as part of our introduction

Importantly, however, historical dynamics indicate a faster growth pace for the digital economy in Hungary (at 4.1 percent a year) than in the EU Big 5 (3.1 percent). While this is a positive indicator in terms of the country's potential going forward, room for improvement clearly remains. Despite starting from a higher digital economy share, Digital Frontrunners were able to grow their digital economies by 5.9 percent a year between 2012 and 2016. Outliers such as Sweden, for example, achieved even higher growth rates of close to 10 percent per year. Furthermore, Digital Challengers countries in CEE also show a higher average digital economy growth rate of 6.5 percent. This clearly indicates that Hungary needs to focus on accelerating its digital growth rate in order to close the gap to the Digital Frontrunners.

Sector level digitization in Hungary

Before identifying potential levers for achieving accelerated growth in Hungary, we should look at the manner in which digitization is already taking place around the world. An examination of global trends indicates that there is no standard route to achieving high rates of digitization. Most markets, including Digital Frontrunners, have digitized unevenly, with large variations between different sectors and individual companies. To understand which sectors drive digitization at a "macro" level, we need a multidimensional view. The McKinsey Global Institute (MGI) Industry Digitization Index offers such a perspective, assessing digitization at the level of individual sectors.[2] 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 to the global digital frontier, namely the ICT sector in the United States.[3]

MCKINSEY INDUSTRY DIGITIZATION INDEX

Digital-asset spending

Hardware spending
Share of total expenditure spent on ICT hardware (e.g., computers, servers)

Software and IT services spending
Share of total expenditure spent on software and IT services (e.g., enterprise resource planning software)

Telecommunications spending
Share of total expenditure spent on telecommunications (e.g., broadband access, mobile data services)

Digitalasset spending per worker

Hardware spending on workers
ICT hardware (e.g., computers, servers) expenditure per full-time-equivalent employee (FTE)

Software and IT services spending per worker
Software (e.g., enterprise software licenses) and IT services expenditure per FTE

Telecommunications spending per worker
Telecommunications (e.g., broadband access, mobile data services) expenditure per FTE

Digitalcapital deepening

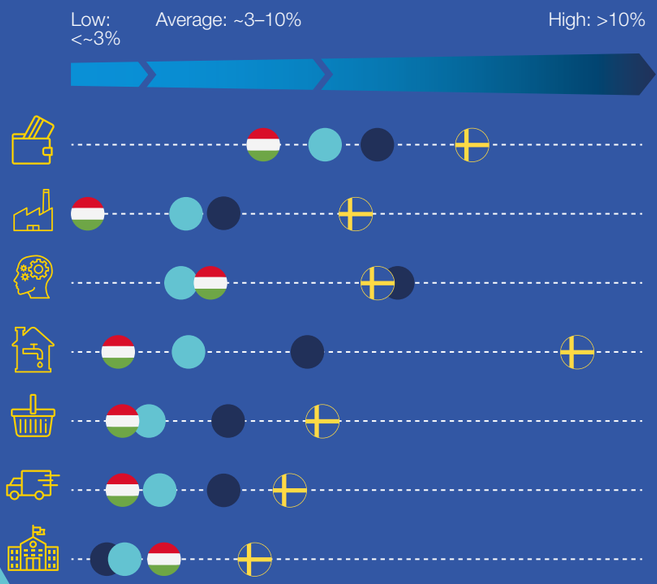
Hardware assets per worker
ICT hardware assets (e.g., servers, computers) per FTE

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

Sector level digital leaders, followers, and novices in Hungary
Share of GDP, %

Hungary is slightly lagging behind CEE in most sectors, with a significant gap compared to Western EU countries and Sweden. The largest gaps are in utilities, manufacturing, and the finance and insurance sectors. Furthermore, Hungarian agriculture is severely under-digitized compared to other CEE countries. On the other hand, Hungary exhibits comparatively high digitization rates both in professional and business services (due to its role as a major shared services center host in the region), as well as public sector services.

Sector digitization in Hungary compared to CEE, EU Big 5, and Digital Frontrunner benchmarks



SOURCE: McKinsey Global Institute; Eurostat; local institutes of statistics

When taking into account the GDP contribution of each Hungarian sector, we observe that the most digitally underdeveloped industries also hold significant economic weight. Hence, we conclude that additional investment into the digitization of these sectors would have a significant positive impact on GDP growth, and would also affect the labor market (see Chapter 2). Therefore Hungary could build on previous digitization efforts to catch up to Digital Frontrunner countries.

Digitization can be the next driver of sustained growth in Hungary

Looking ahead, we see two potential scenarios for further digitization in Hungary.

In the first "business as usual" scenario, the country maintains its historical growth rate for the digital economy. The digital economy expands by €3 billion to reach 7.4 percent of GDP by 2025. The gap with the most advanced and dynamic markets in terms of the digital economy's share of GDP, such as Sweden, increases.

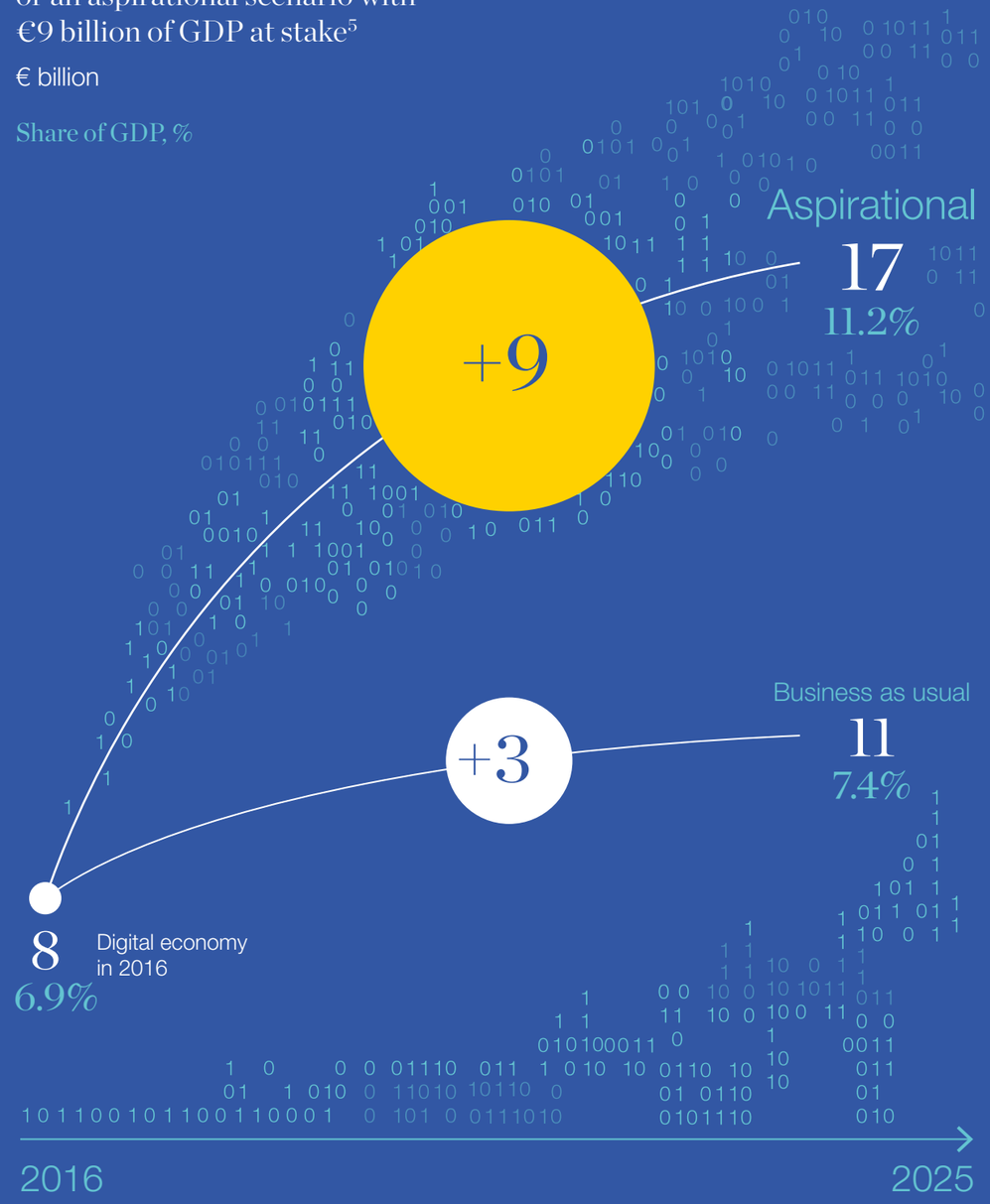
The second scenario is an "aspirational" perspective. Here, we estimate the value at stake from Hungary closing the gap to Digital Frontrunners in terms of the per capita digital economy intensity. This would see its digital economy growing by €9 billion to reach 11.2 percent of GDP by 2025, translating into an extra 0.5 percentage point GDP growth each year, or 14 percent increase in the projected growth rate. The additional €6 billion,[4] on top of the €3 billion impact of maintaining the historical growth rate, is made up of the following amounts:

- €4 billion from increased productivity from closing the gap to Digital Frontrunners in the digitization of public and private sectors
- €2 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 Hungary increasing its ICT spending levels (as a share of sector GDP) to match Digital Frontrunner markets. To achieve this, acceleration of the digital transformation is required, especially in those sectors that lag farthest behind their Digital Frontrunner benchmarks and at the same time account for a significant share of the Hungarian economy. These include asset-heavy sectors such as manufacturing, retail trade, 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. For companies, it will mean taking advantage of solutions enabling growing sales through digital channels, including boosting their export capabilities. For both public and private organizations, it will mean improving operating efficiency by integrating automation and streamlining solutions. For individuals, it will mean investing in developing the skills needed in the digital economy. ■

We see two trajectories for Hungary to grow its digital economy: a business as usual scenario bringing an additional €3 billiion of GDP, or an aspirational scenario with €9 billion of GDP at stake[5]



The potential for work automation in Hungary

As we have already explored in the introduction section, Hungary's labor market is characterized by a total employment rate of 45 percent compared to the total population of the country, slightly lagging behind the average of Digital Frontrunners at 48 percent.[6] The two main drivers behind total employment are the activity rate and the unemployment rate. While Hungary boasted a record low unemployment rate of 3.7 percent in 2018, which was lower than the EU average unemployment rate of 6.8 percent, the activity rates for some population segments remain far below digitally advanced countries, revealing an overall difference of 15 percentage points (see analysis on page 18). Closing this gap would take Hungary to peak employment levels, increasing GDP growth significantly. Besides increasing total employment, another way to reignite growth is through improving workforce productivity, thus decreasing the country's disadvantage compared to northern economies. To better understand the requirements and implications of such growth, in this section, we explore the impact of an increased pace of digitization on Hungary's labor market.

As discussed in Chapter 1, Hungary's digital economy has shown strong growth over the past four years, and through the right set of programmes, this growth can be further accelerated in the future. As our definition of the digital economy is based on ICT spending, this would mean that additional €20–40 billion would be available for the Hungarian economy to be invested in digital technologies over the next seven years. The application of such investment would most likely take two forms:

A. Automation: funds are used to purchase and install digital equipment, that could substitute currently inefficient/overly manual processes and consequently decrease workforce need for the given activity. The most notable example for automation is the installment of fully automated production lines in factories, eliminating time-consuming manual process steps. In this case, automation leads to increased daily output of products (e.g., through lower average time of production) and lower workforce needs, both contributing to higher productivity.

B. Digital enhancement: funds are used to purchase and install digital equipment that enables and broadens the work of the current workforce, rather than substituting it. Examples of such investments range from introducing an online sales channel for SMEs (small- and medium-sized enterprises) to purchasing digital equipment that enables part-time jobs from home. The impact from such investments includes (but is not limited to) an increase in corporate sales through better access to the EU market and a higher activity rate in some population segments (e.g. young individuals, women in maternal age).

THE IMPACT OF AUTOMATION

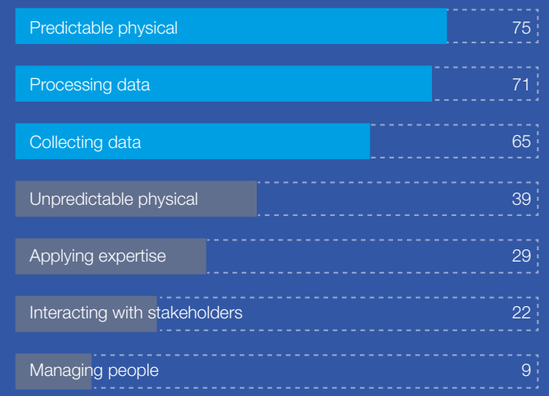
We have explored the implications of automation at length in the 2018 report *Transforming our jobs: Automation in Hungary*, where we estimate that up to 49 percent of workplace activities today in Hungary – the equivalent of around 2 million jobs – could potentially be automated by 2030 using technology that already exists today.[7] This is close to the potential for the entire region, which we have estimated at 49–51 percent.[8]

Some historically workforce intensive (and at the same time under-digitized) sectors, such as manufacturing, trade and agriculture display significant automation potential, possibly making more than half of their current workforce redundant by 2030. On the other hand, sectors with high vacancy rates today may benefit in the short term by de-bottlenecking growth stifled by inadequate labor supply.

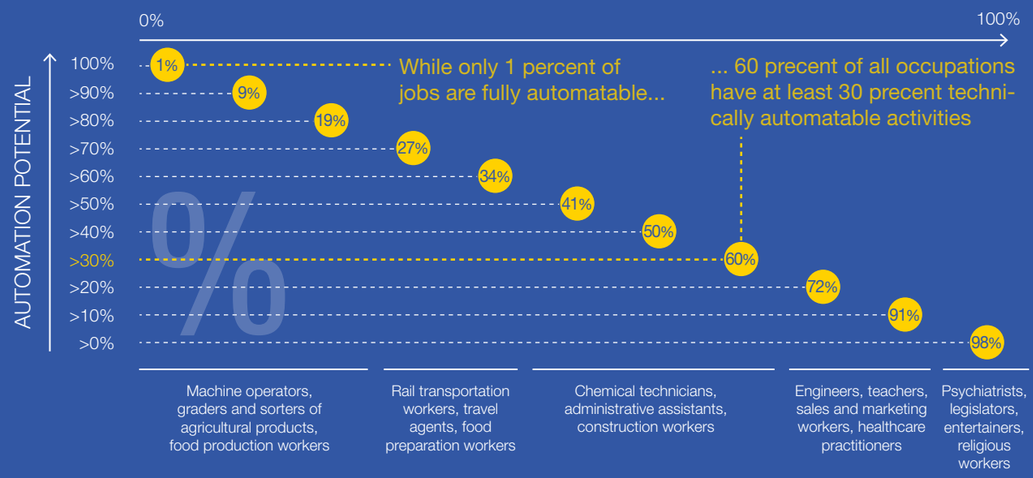
49% of working time in Hungary is spent on activities that could be automated

~2.0 million equivalent number of jobs that could be automated in Hungary

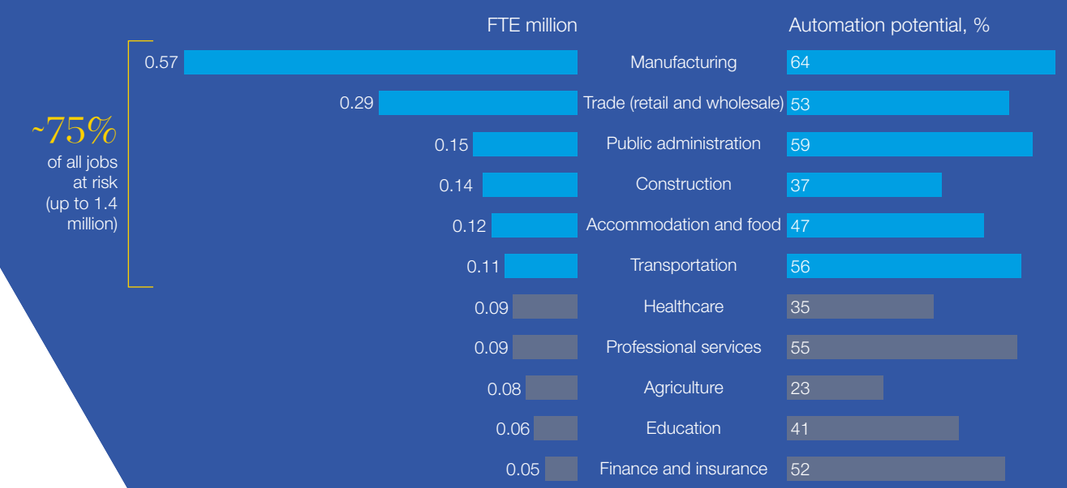
% OF ACTIVITY THAT COULD BE AUTOMATED



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



TOTAL AUTOMATION POTENTIAL IN EQUIVALENT NUMBER OF JOBS

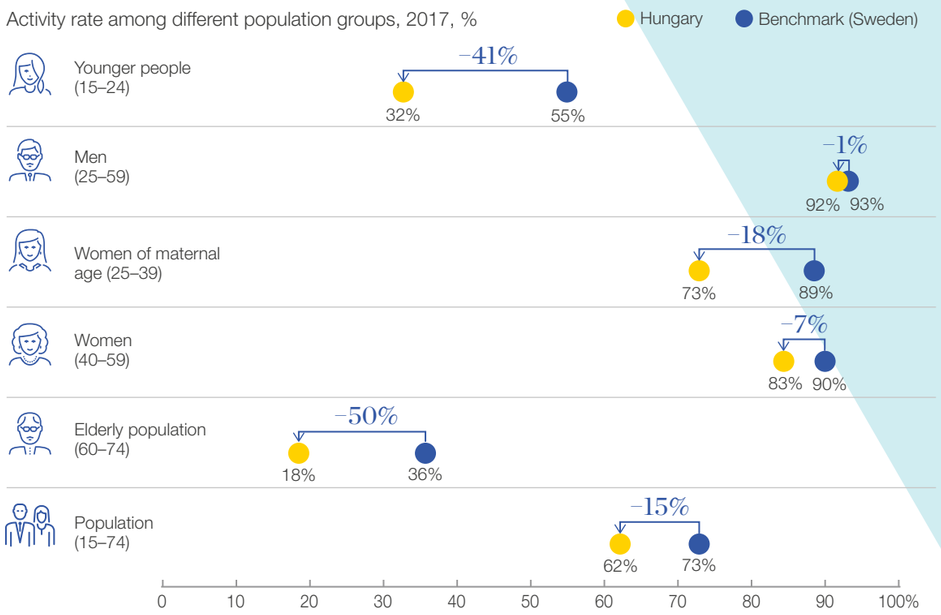


SOURCE: McKinsey Global Institute analysis

Opportunities and challenges of work automation

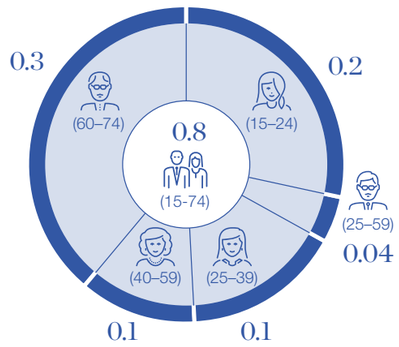
THE IMPACT OF DIGITAL ENHANCEMENT

Compared to Digital Frontrunner benchmarks, Hungary could have up to 0.8 million people in untapped labor reserves due to lower activity rates



Beyond automation, additional investments into digital technology are expected to create additional employment opportunities, either through higher demand in certain sectors (e.g. ICT jobs) or through enabling new flexible working solutions that could in turn increase activity rates. Assuming benchmark activity levels of one of the most active labor markets in Europe – Sweden – Hungary has around 1 million people forming untapped labor reserves. In the whole population of Hungary there are 15 percent fewer active people than in Sweden. The highest gap can be observed among young (41 percent) and elderly (50 percent) people. Women participation in maternal as well as middle age also falls short by 7–18 percent. Part-time jobs that can be performed remotely through the use of digital technology could significantly increase the job market involvement of both younger people and women, leading to an increasing employment rate.

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



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

ACQUIRING A DIGITAL SKILLSET

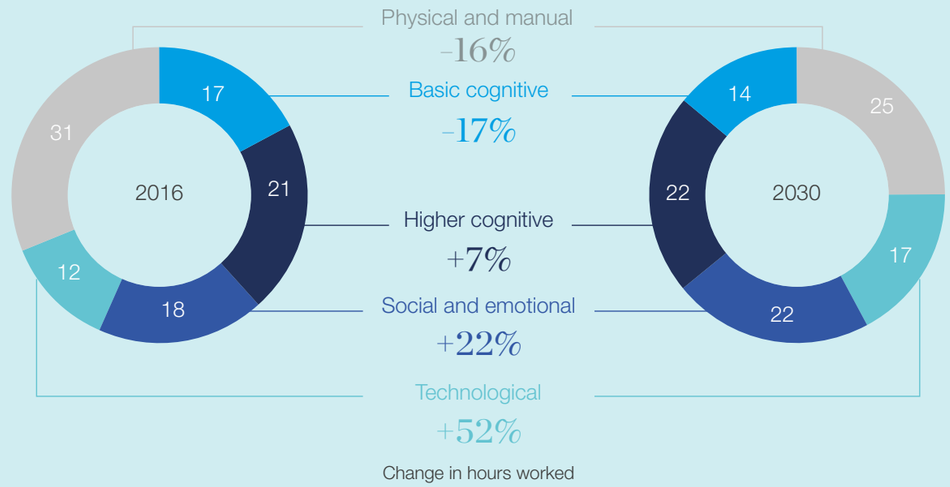
As shown before, both automation and digital enhancement will cause significant shifts in the Hungarian labor market by 2030. As the workforce undergoes a transition to new job pools, acquiring new skills will be inevitable to prevent a sudden and lasting increase in unemployment rate. Progressing digitization 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 McKinsey Global Institute has developed a model for the skill shifts that will likely take place in the workplace.[9] Looking at Western European countries, 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. Advanced technological skills will be critical for digitizing the economy in CEE, but people with these skills will still be a minority. At the same time, all employees will need to develop basic digital skills, as workers will be required to use online applications or other technological tools in their day-to-day work.■

Growth in demand for skills could exceed 50% for technological and 20% for social and emotional skills, based on Western European benchmarks.

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



SOURCE: McKinsey Global Institute

Key enablers for further digitization in Hungary

Having considered the value at stake for Hungary in closing the digitization gap to Digital Frontrunners, as well as the impact this may have on the labor market, we now turn to considering what will be needed in order to make this happen. The digitization of a country or region is ultimately the outcome of many processes and factors. All levels of the economy have a role to play – policy makers and institutions, large corporations and SMEs, and even individuals. Hence, in this chapter we look at the key areas of importance for digital transformation and identify which of these areas should be prioritized for action by Hungary.

8 key enablers of digitization for Digital Challengers

1. Increase the adoption of digital tools by Hungary's small, medium and large enterprises
2. Increase the adoption of digital skills and take-up of internet services by Hungary's general population
3. Continue stimulating Hungary's already vibrant and emerging digital ecosystem
4. Develop, implement, and promote e-government solutions in Hungary's public sector

Soft infrastructure

PRIORITY FOR HUNGARY

5. Continuously improve Hungary's physical digital infrastructure

Hard infrastructure

6. Ensure a strong pipeline for Hungary's ICT specialist talent

Talent

7. Improve and standardize Hungary's ICT regulatory environment to ensure investment attractiveness and easy scalability across the region

Legal, political, and business environment

8. Foster entrepreneurship in Hungary to stimulate the startup ecosystem

Innovation

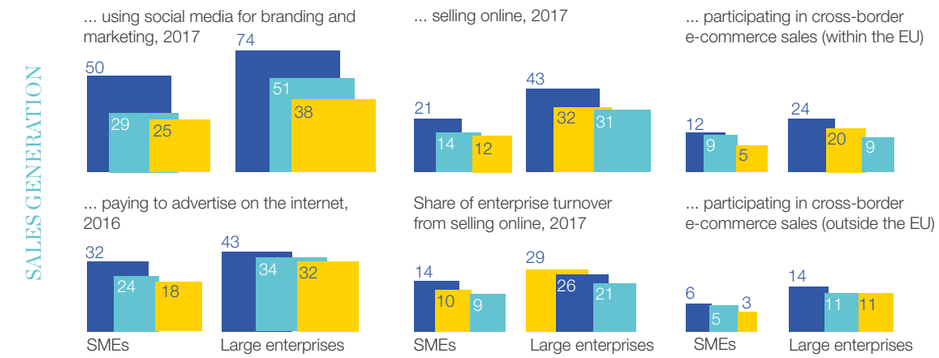
1 DIGITIZATION ENABLER

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

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

REGIONAL AVERAGES — Digital Frontrunners, average; Digital Challengers, average; Hungary

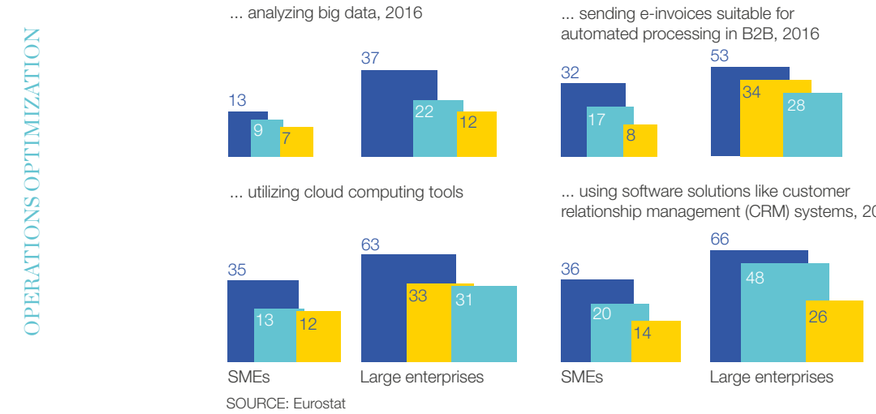
% of companies in CEE that are...



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

Digital-tool adoption: Proxy metrics

ADVANCED ANALYTICS FOR DECISION MAKING | STREAMLINING AND AUTOMATING PROCESSES



SOURCE: Eurostat

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

In terms of leveraging digital tools for revenue growth, enterprises in Hungary exhibit on average lower adoption rates, with the share of enterprise turnover from selling online below the Digtal Frontrunner average.

Hungary's enterprises are also relatively less inclined to use online channels for cross-border sales, and this is particularly true for SMEs.

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

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

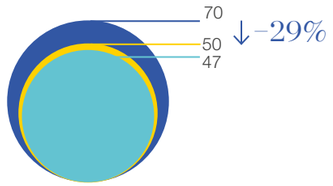
Increase the adoption of digital skills and take-up of internet services by Hungary's general population

We consider the widespread adoption of digital skills among the general population a key enabler for digitization in Hungary. It is an area where Digital Frontrunners excel, with clear gaps for Digital Challengers to close. Take-up of internet services is also clearly lower in Hungary 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.

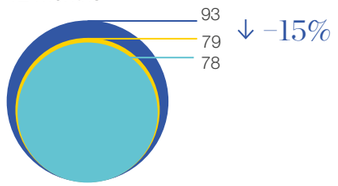
DIGITAL TOOLS AND SKILLS PERSPECTIVE

Basic digital skills – % of population aged 16–74 (2017) ...

... with at least basic digital skills

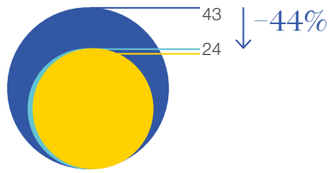


... using the internet in the last 12 months

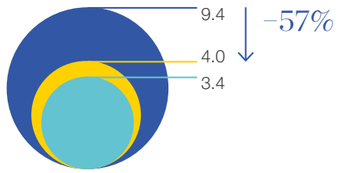


Advanced digital skills – % of population aged 16-74 (2017) ...

... with above basic digital skills



... who have written a computer program



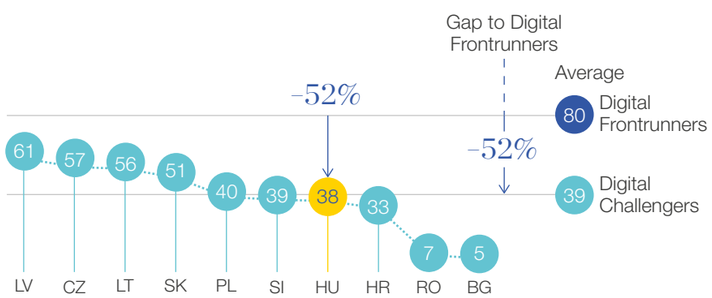
- Digital Challengers, average
- Digital Frontrunners, average
- Hungary, average

Whilst the share of the population in Hungary using the internet is slightly above the CEE average, it is still below the Digital Frontrunner average. We can also see gaps to the latter group in terms of basic digital skills adoption.

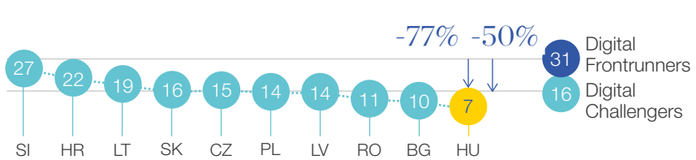
Looking at advanced digital skills, the gap to Digital Frontrunners is larger. The share of people with above basic digital skills is almost twice larger there compared to Hungary.

TAKE-UP OF INTERNET SERVICES PERSPECTIVE

% of population aged 16-74 who have used online banking (2017)



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



Looking at the adoption of various internet services in Hungary, gaps can also be seen to Digital Frontrunners. For instance, a smaller share of people in Hungary, compared to Digital Frontrunners, have used online banking or health and care services.

SOURCE: Eurostat; Digital Economy and Society Index, 2017

Continue stimulating Hungary's already vibrant and emerging digital ecosystem

As we have explored in Chapter 1, even though Hungary lags Digital Frontrunner markets such as Sweden in terms of the size of its digital economy, it has over the past few years experienced rapid growth. This has allowed for many digital success stories to emerge in the country, which we explore below across four select areas. Stimulating the further growth of this ecosystem will be key for Hungary to continue on its digitization journey – it may also lead to positive ripple effects. For example, attractive work places directly connected to the digital economy can help keep local talent in the region, or even attract back specialists who have left previously – a potentially crucial avenue for combating the issue of brain drain.

SELECTED DIGITAL SUPERSTARS

There are many digital success stories in Hungary of companies leveraging the digital economy to achieve scale and revolutionize their industries. Prezi, a presentation software company, has a community of over 100 million users and their presentations have been viewed over 3.5 billion times. LogMeIn is a provider of software as a service and cloud-based remote connectivity services that give users and administrators access to remote computers. Ustream, the streaming video platform and hosting services company has been acquired by IBM in 2016 and is now part of IBM Cloud Video services, still having a strong technology hub in Budapest. Starschema is a data warehousing, business intelligence and big data service provider to many Fortune 500 companies. Tresorit is a cloud-based, secure file synchronizing software, primarily designed to share confidential data between business users.

MOBILITY CHAMPIONS

Hungary is at the forefront of the CEE's growing mobility sector. AIMotive is an autonomous vehicle technology software company relying on visual information processing. GreenGo operates a fully electric fleet of 300 cars in Budapest. Zala Zone is a test track project at Zalaegerszeg which provides a unique integration of classic vehicle dynamic tests with the possibilities for testing autonomous vehicle functions and electric vehicles. The potential users include OEMs, Tier 1 and 2 suppliers as well as communications technology companies.

SOFTWARE DEVELOPMENT PLAYERS

Several Hungary based software development companies have started becoming regional powerhouses in their respective fields, with many ranked among the fastest-growing companies in Europe.[10] Examples include Supercharge and Attrecto. There are various providers focusing on upskilling and reskilling talent in software development, such as Skool, Green Fox Academy and Logiscool.

TRADITIONAL INCUMBENTS ADOPTING DIGITAL

Large incumbents from more traditional industries are also following suit. Some banks were quick to adapt to the changing customer needs: OTP, the largest bank in Hungary, created ecosystems around its products Simple and eBiz, while also setting up a start-up lab. Simple is a retail application with in-app purchases and mobile wallet functionality, while eBiz is an online accounting tool for SMEs and accountants. OTP has also invested in Szállás.hu, one of Hungary's market leaders for online accommodation booking portal. Furthermore, MKB set up an Innovation lab and start-up investor called FintechLab, which is one of the most active early-stage fintech investor in the CEE region supporting the digital transformation of financial services. Besides banks, MOL extended its mobility strategy via entering the car sharing market with a fleet of 450 cars, of which 100 are electric. Wizzair, the low-cost airline, can also serve as a case-in-point for effectively leveraging digital tools in a traditional industry.

SOURCE: Press releases, company webpages, McKinsey research

4 DIGITIZATION ENABLER

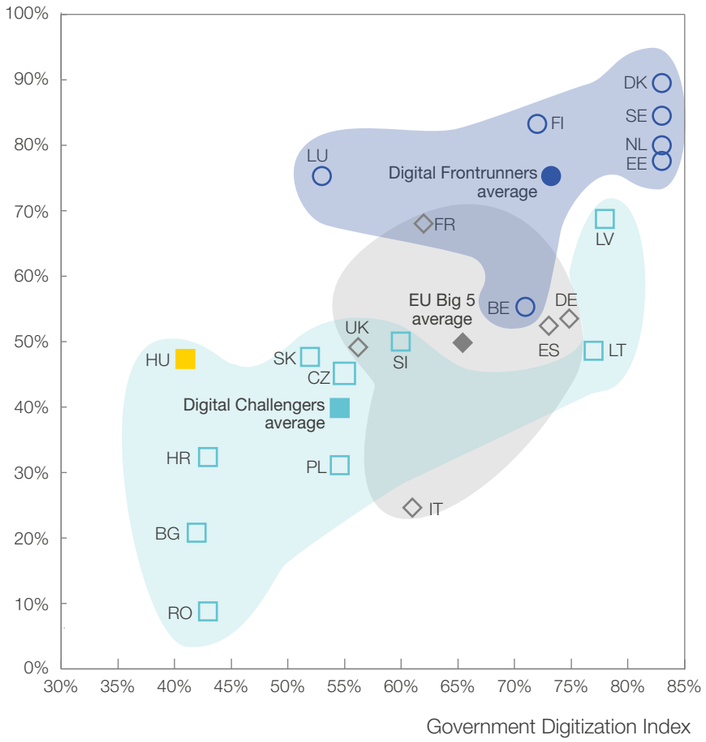
Develop, implement, and promote e-government solutions in Hungary's public sectors

Digitizing public services has various benefits for citizens, businesses, and the government itself. Digital government services can significantly reduce the administrative burden on citizens and firms. It also increases transparency about decisions and thus reduces the risk of corruption. Whilst, as we saw in Chapter 1, the public sector in Hungary exhibits relatively high rates of spending on software, hardware and telecommunication solutions (translating into a relatively high digitization score) – this has not yet translated into a high availability of key e-government solutions. Therefore, we consider there to be still room for improvement in Hungary in this area.

E-GOVERNMENT PENETRATION AND UPTAKE

Digital Challengers
Digital Frontrunners
EU Big 5
Hungary

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 access public services online.

Among Digital Challengers, Hungary is above average in terms of uptake of online public services. However, government digitization remains low – looking at Digital Frontrunner markets, room for improvement clearly remains in both dimensions.

SOURCE: Eurostat; Digital Economy and Society Index, 2017

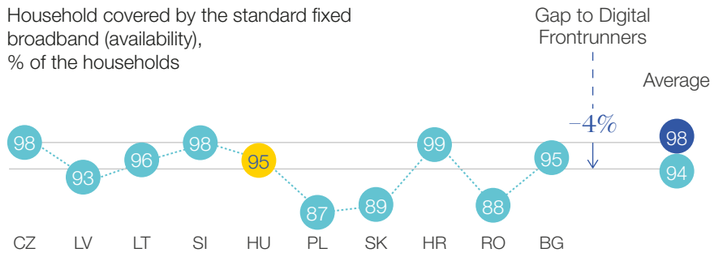
5 DIGITIZATION ENABLER

Continuously improve Hungary's physical digital infrastructure

With regards to physical digital infrastructure, Hungarian fixed and mobile telecommunication companies invested continuously in their respective networks, therefore both the coverage and price of broadband services is comparable to Western European standards. This enables virtually all Hungarian citizens and businesses to use the internet and related services. Going forward, however, continuous improvements will be needed to maintain those standards.

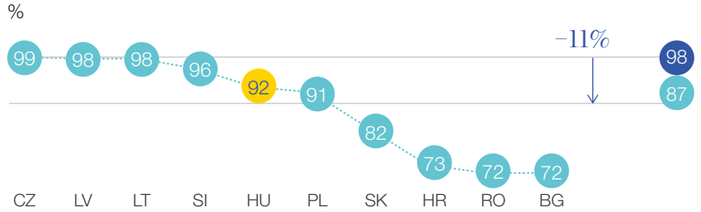
Digital Challengers
Digital Frontrunners
Hungary

Household covered by the standard fixed broadband (availability),
% of the households



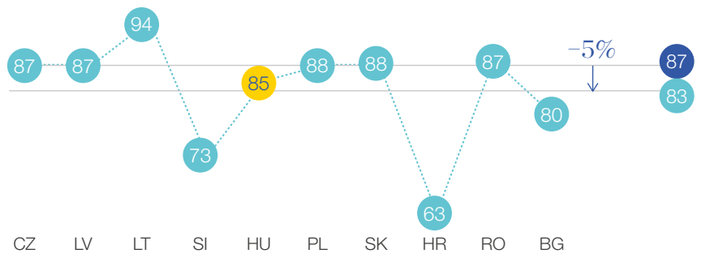
In terms of standard fixed broadband coverage, the difference is not large between Hungary and Digital Frontrunners.

Share of populated areas covered by 4G,
%



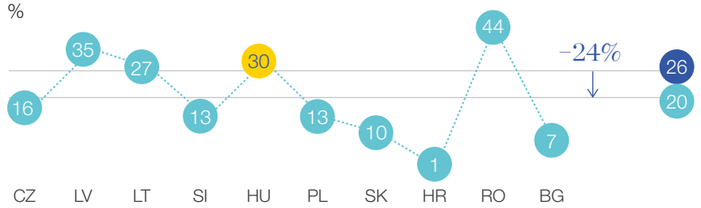
In terms of 4G coverage, Hungary trails Digital Frontrunners but is aboce the CEE average.

Price index of broadband price,
synthetic score



In a synthetic score developed for the DESI index, Internet prices in Hungary are comparable to Digital Frontrunners and Digital Challengers.

Share of ultrafast broadband subscriptions ≥100 Mbps,
%



Hungary is one of the leaders in the share of ultrafast broadband subscription in comparison to Digital Frontrunners and CEE countries.

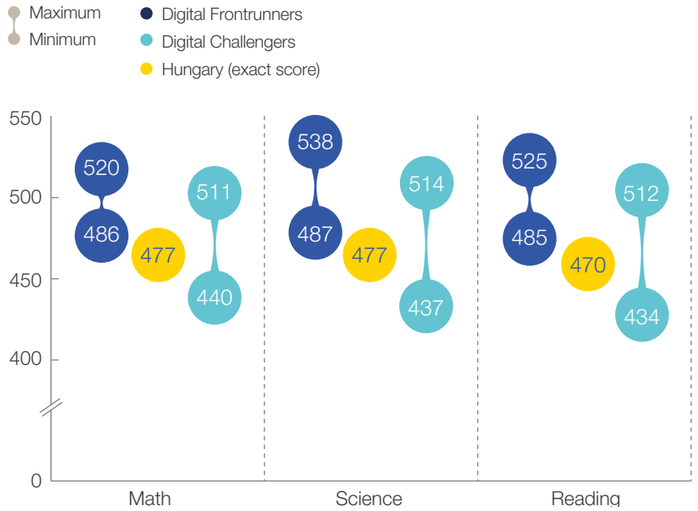
SOURCE: DESI 2018

Ensure a strong pipeline for Hungary's ICT specialist talent

The digital readiness of the overall population is highly dependent on the educational system performance in any given country. In order to capture the performance of the Hungarian primary and secondary school system, we investigate recent PISA[11] test results as well as the STEM graduate talent pool. We then look at how these translate into a ICT specialist pool in the labor force.

PRIMARY AND SECONDARY EDUCATION

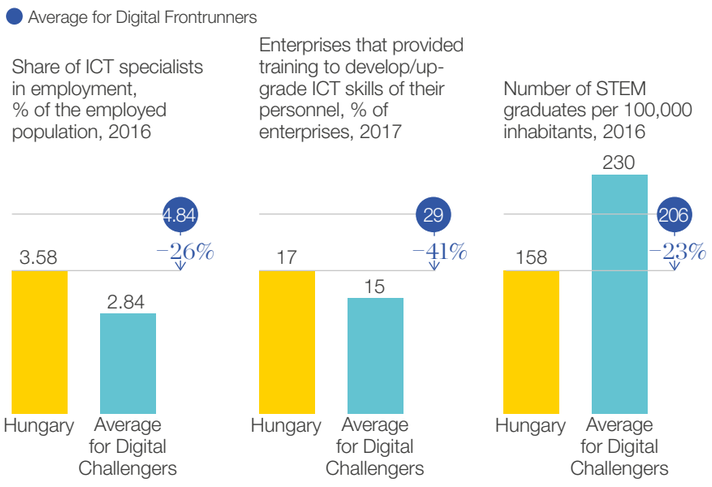
Primary- and secondary-education quality gap between Hungary and digital frontrunner countries is almost non existent.
PISA, range of country scores, 2016



Hungary's PISA test results are in line with broader CEE results and are 6–7 percent lower than Digital Frontrunner countries.

However, Hungarian results have declined in the last 10 years, in particular for science and math indicating this as an area of improvement for the country. Decreasing regional differences within Hungary would be the greatest lever in addressing the challenge.

TERTIARY EDUCATION AND EMPLOYMENT



The amount of ICT specialists that are key to digitization is significantly lower than in DF countries.

The supply of STEM graduates from the Hungarian education system is not able to close this gap.

Already available workforce is not trained/re-trained toward ICT skills, hence cannot compensate for lower amount of specialists and graduates.

SOURCE: Eurostat; PISA: Programme for International Student Assessment (OECD)

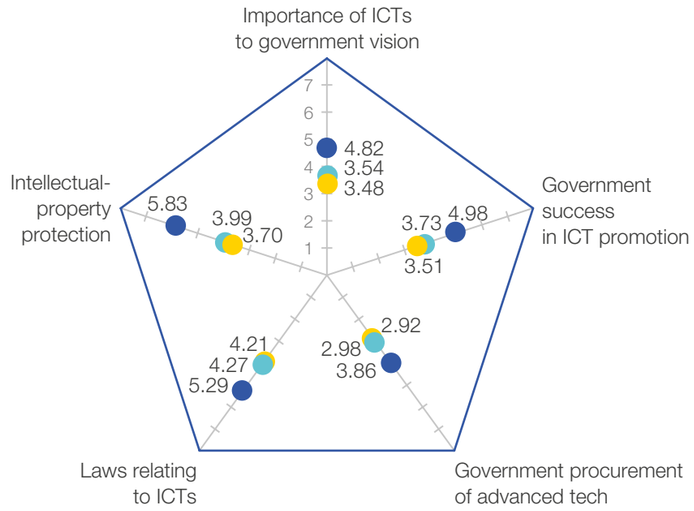
Improve and standardize Hungary's ICT regulatory environment to ensure investment attractiveness and easy scalability across the region

With regards to the legal and economic framework, Hungary has a firm and well established legal system. On the other hand, some aspects of regulation are overly restrictive, and thus decrease the overall ease of doing business in the country. Thus, there are some areas where the regulation could be enhanced, for instance to better protect Intellectual Property rights. Furthermore, the digitization of trade can be expected to magnify the importance of formal and informal institutional factors for comparative advantage. The ability of countries to enforce contracts and to ensure data privacy, and follow pro-ICT regulations will grow in importance.

Digital Frontrunners, average | Digital Challengers, average | Hungary

WORLD ECONOMIC FORUM NETWORK READINESS INDEX

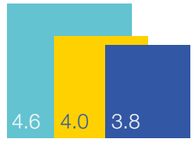
Synthetic score, scale of 1 to 7, where 7 is highest performance



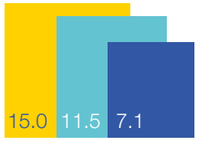
In investigating the friendliness of the regulatory regime toward ICT in Hungary and CEE, we see gaps with Digital Frontrunners. On average, laws related to the use of ICTs (e.g., electronic commerce, digital signatures, consumer protection) are considered to be less well developed, with Hungary below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

STARTING A BUSINESS

Number of procedures to start a business

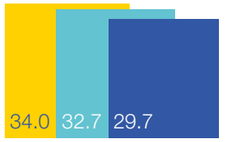


Number of days to start a business

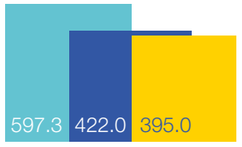


ENFORCING CONTRACTS

Number of procedures to enforce a contract



Number of days to enforce a contract



The overall attractiveness of the business environment in Hungary indicates room for improvement compared with Digital Frontrunners. Looking at proxy metrics, such as the number of procedures needed to start a business or to enforce a contract, Hungary underperforms compared to Digital Frontrunners. It also takes significantly longer to start a business in Hungary relative to Digital Frontrunner markets.

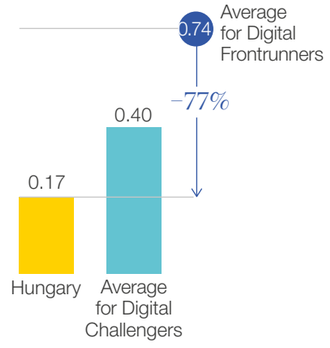
SOURCE: World Economic Forum

Foster entrepreneurship in Hungary to stimulate the startup ecosystem

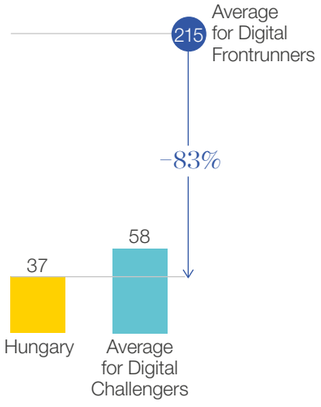
Lastly – as discussed at length in our *The rise of Digital Challengers* CEE perspective report – a vibrant startup ecosystem can significantly accelerate the pace of digitization in more than one way. These companies have significantly higher growth rate than traditional enterprises within the same economic sector, and are generally outwards focused, generating up to half of their revenues outside their original market. They also create high value-add digital/tech jobs, that are capable of attracting and keeping top talent in the region. In fact, entrepreneurial activity is significantly lower in Hungary compared to both the larger CEE region and Digital Frontrunner countries.

EARLY-STAGE STARTUPS

Risk acceptance in Hungary



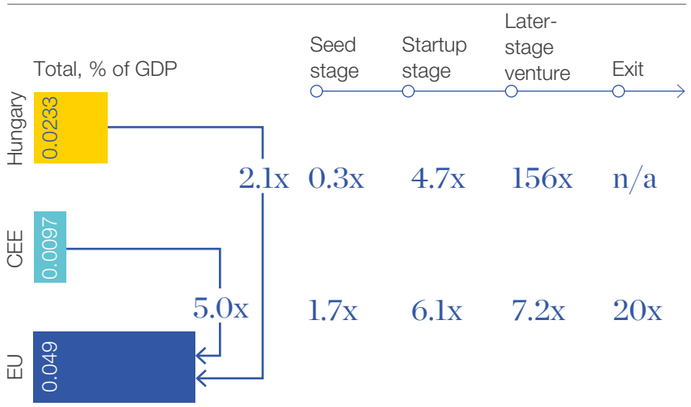
Number of startups per million citizens, 2018



We use risk acceptance as a proxy to capture one missing factor: Hungarian citizens in general have a risk-averse mindset, which in turn prevents them from leaving their jobs as employees and start their own business. This means, that the CEE region has 50 percent more startups per 1 million residents than Hungary, while the gap to Digital Frontrunner countries is six-fold. The required large-scale mindset shift is most likely to come from public and adult education, as well as government measures to support the ecosystem through more entrepreneur-friendly regulation and making ample funding opportunities available in the right growth stages from Seed to Exit.

STARTUP FUNDING IN CEE, 2017

Gap in venture capital (VC) investment as share of GDP, by stage



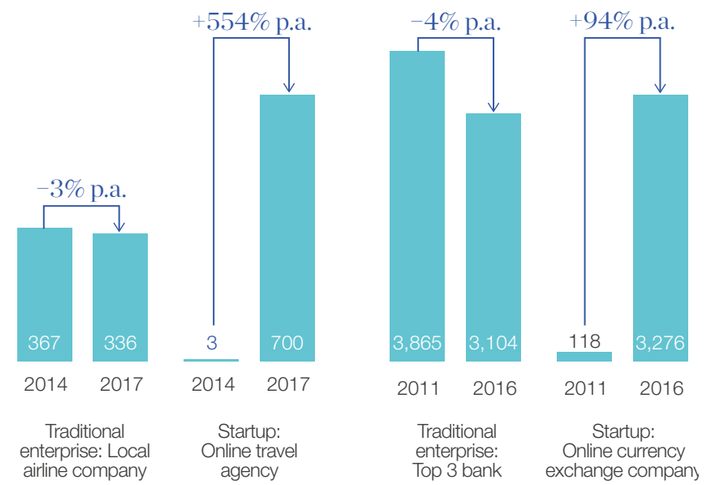
Controlling for GDP size, venture capital (VC) investments in Hungary are still significantly behind Digital Frontrunners, especially in later stages of VC investments.

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

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

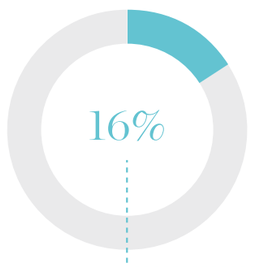
STARTUPS VS. TRADITIONAL FIRMS – SELECTED EXAMPLES FROM CEE

Annual revenue, € million

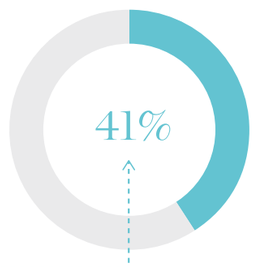


European startups are oriented toward international markets. On average, they generate 55 percent of their revenue outside their domestic markets. Digitization allows startups to replicate digital assets and reach a global consumer base - examples of companies in Hungary such as these include LogMeIn or PublishDrive 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 disproportionally 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.■

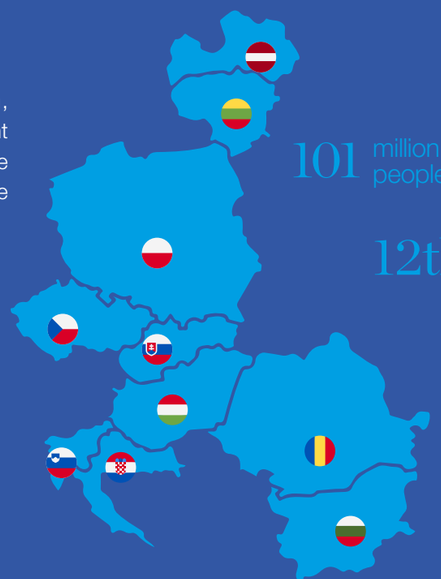
NOTE: Young SMEs: companies with less than 250 employees and operating for no longer than 5 years

SOURCE: European Startup Monitor; European Commission; Financial Times

Four arguments for the benefit of collaboration between Digital Challengers

Ⓐ SCALE EFFECTS

Within the CEE region, Digital Challengers represent €1.4 trillion in GDP — more than 10 times the size of the Hungarian economy.



101 million people

12th largest economy

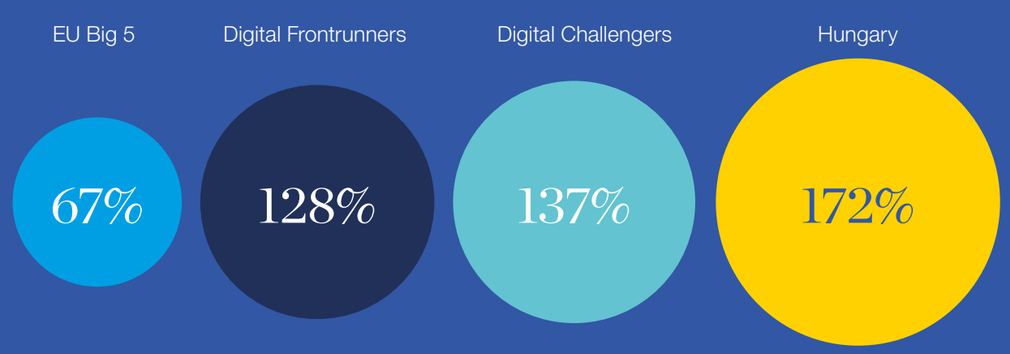
€1.4 trillion in GDP

SOURCE: World Bank

Ⓑ SIMILAR STARTING POINTS

Hungary, like other CEE markets, exhibits high levels of market openness and similar levels of digitization, besides cultural and historic commonalities.

Trade, 2017, % of GDP

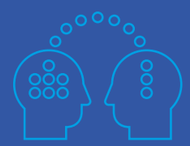


NOTE: Digital Frontrunner figure not including Luxembourg (strong outlier with a 424 percent result)
SOURCE: World Bank

Ⓒ BEST PRACTICES

Hungary has developed different strengths related to the digital economy compared to other CEE markets – sharing best practices can accelerate digitization.

Looking at the various key performance indicators (KPIs) and case studies we have explored in our CEE report *rise of Digital Challengers: Digitization as the next growth engine for Central and Eastern Europe*, we see that no single Digital Challenger market outperforms the other countries across all digitization enabling areas. Most markets in the region appear to have digitized differently, developing advantages in certain fields. For instance, we already saw Hungary exhibiting digitization rates above the CEE average in professional services as well as public sector services. Furthermore, Hungary exhibits relatively high adoption of digital skills among the general population, as well as a relatively high share of ICT specialists in the labor force – compared to to the CEE average. In other areas, there are examples across the region of countries performing better than Hungary. This implies that sharing best practices between countries could be very beneficial.

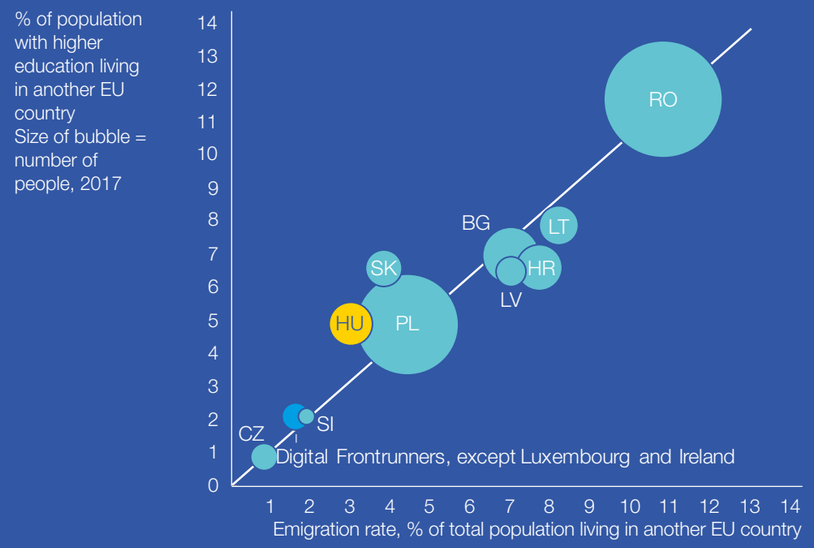


Leveraging the strengths of neighboring countries could limit the risk of harmful competition and allow for the creation of centers of excellence. Also, this could encourage regional coordination and planning – instead of developing solutions in isolation, Hungary could speed up the development of its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

Ⓓ COMMON CHALLENGES

Hungary faces the same challenges as many other CEE markets, importantly the “brain drain” and need to reskill the workforce in the long term.

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



NOTE: Other common challenges explored in our CEE report *The r ise 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 HUNGARY

- Hungary has a large future need for workforce reskilling and promotion of adult education: up to 49 percent of workplace activities could potentially be automated by 2030, using technology that already exists.
- Hungary's general population lags Digital Frontrunners in basic and advanced digital skills – the older the age group, the bigger the gap.
- Despite a large STEM graduate talent pool, the share of ICT specialists in the Hungarian labor force (3.6 percent) lags the Digital Frontrunner average.
- Whilst the adult participation rate in training in Hungary is high, more can be done to further stimulate life long learning through adult eduction focusing on skills which will become more relevant in tomorrow's labor market, such as tech related skills as well as soft skills leveraging social and emotional capabilities.
- Brain drain for well-educated members of the population in Hungary is more than two and a half times higher than the average for Digital Frontrunners.

Implications for policy makers

Develop a wideranging reskilling and adult education strategy

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

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

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

Update youth education

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, and critical thinking.

Promote specialization in STEM subjects to build an ICT talent base, focusing especially on enabling women to study technology in order to close the gender gap.

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

Promote lifelong learning and mid-career training

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

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

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

Actively counteract talent leakage

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

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

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

Leverage independent work platforms

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

Consider updating policies supporting the gig economy (e.g., freelance work, ride-sharing), including worker protection initiatives.

Support technology adoption

KEY FACTS ABOUT HUNGARY

- Hungary significantly trails both the CEE and Digital Frontrunner averages in the European Comission's Government Digitization Index which, among others, measures the availability of key e-government solutions, such as electronic identification (eID), digital documentation, electronic authentication changes, and digital post in communication with citizens and businesses.
- At the same time, while take-up of e-government services is above the CEE average, there is still room for improvement with less than 50 percent of citizens aged 16–74 accessing public services online, compared with 75 percent of Digital Frontrunner citizens.
- As we have seen in Chapter 3, even though Hungarian enterprises exhibit a relatively high adoption rate for digitial tools (in line or even above the CEE average across many metrics), there are still gaps for both SMEs and large enterprises compared to their Digital Frontrunner peers.

Implications for policy makers

Continue the digitalization of the public sector at scale

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. One of the first inter-ministry initiatives seen in Hungary in this space, include setting up the Digitális Jólét Program (DJP) for creating public Internet access points.

Continue and accelerate the transition of public services online.

Support the adoption of online public services, e.g., launch educational campaigns, promote online solutions during offline interactions, and decrease adoption barriers by creating simple user interfaces.

Develop digital skills among public-sector employees.

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

Unleash big data capabilities by standardizing government data and opening it up to third-party collaborators (researchers, businesses, startups, etc.) so they can build applications on top of it.

Invest in Internet of Things (IoT) infrastructure in the public sector, e.g., support smart city and human health solutions that strongly leverage public data and resources.

Support technology adoption at companies

Promote the benefits of digital transformation, focusing on SMEs and major sectors that lag behind regional peers.

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

Promote innovation and R&D among SMEs by fostering collaboration with academia (e.g., innovation vouchers).

Improve the ecosystem for startups

KEY FACTS ABOUT HUNGARY

- Risk acceptance in Hungary is much lower than both the region and Digital Frontrunners, inhibiting entrepreneurship.
- The number of startups per million citizens in Hungary, at 37, is less than half the average of 58 for the CEE region – and far behind the Digital Frontrunner average of 215.
- As a share of GDP, venture capital investments in Poland are one-fifth 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, promoting risk and failure acceptance in trial and error approaches, as well as creating awareness around success stories.

Link entrepreneurial education to startups, accelerators, incubators, and business angels.

Expand the entrepreneurial talent pool by attracting talent from outside the region.

Create an awareness and communication program around entrepreneurship, e.g., showcasing good practices

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.

Enable local physical startup clusters to scale up.

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.

Increase access to capital

Simplify business angel investing, e.g., improve the transparency on basic term sheets and on what best practices look like in this area among academia, entrepreneurs, venture capital firms, etc.

Provide additional incentives for business angels and serial entrepreneurs, e.g., tax breaks.

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

Strengthen cross-border digital collaboration

KEY FACTS ABOUT HUNGARY

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

- **Similar starting points:** Hungary, like other CEE markets, exhibits high levels of market openness and similar levels of digitization, besides cultural and historic commonalities.
- **Scale effects:** Like the CEE region, Digital Challengers represent €1.4 trillion in GDP – more than ten times the size of the Hungarian economy.
- **Common challenges:** Hungary faces the same challenges as many other CEE markets, importantly the "brain drain" and the need to reskill the workforce in the long term.
- **Best practices:** Hungary has developed different strengths (explored in Chapter 4) related to the digital economy compared with other CEE markets; sharing best practices can accelerate digitization.

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

Implications for policy makers

Create a strong digital pillar within regional collaboration platforms (e.g., 3SI, V4, B9)

Establish a coalition favoring pro-digital legislative measures at the European level, strengthening the voice of individual countries in EU policy discussions.

Assemble working groups at relevant levels to develop a pipeline of priority collaboration areas, e.g., representatives from digitization ministries at the national level, private-sector leaders. Initial working groups in the area of digital have already been seen in CEE, for instance during the 2016 Regional Digital Summit in Budapest, where a Memorandum of Uderstanding was signed for Regional Cooperation in the Areas of Innovation and Startups, establishing cooperation with regard to promoting the expansion of startups in CEE.

Facilitate the sharing of best practices and experience in the region – disseminate what has worked well regarding regulatory policy and investment.

Ensure standardized, flexible digital-policy solutions across the region

Cooperate to abolish barriers to the full functioning of the Digital Single Market such as geo-blocking, unjustified data localization practices, and other regulatory barriers.

Support the standardization and free flow of cross-border nonpersonal data in the public sector, as well as the technological interoperability of digital infrastructures, e.g., 5G networks.

Establish common security models and cybersecurity standards.

Implement cross-border projects facilitating the digitization of the region

Facilitate cross-border digital infrastructure projects that close the gaps across the region, e.g., fiber optics, 5G technology, strategic e-commerce logistics centers, complementary energy infrastructures.

Establish common platforms for cross-border public-sector services, including cross-border integration of eID systems, increasing their effectiveness and reducing administrative burdens for enterprises. An example of cross-border collaboration in this space is the Nordic Council's efforts to integrate electronic authentication systems.

Strengthen cross-border industry cooperation over research and education supporting joint technology initiatives such as autonomous transportation, smart cities, human health solutions. An example of cross-border collaboration here is the Franco-German alliance in artificial intelligence.

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

Improve cross-border freedom of talent, 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.

Countries could also cooperate in developing solutions to provide an opportunity for trans-border digital service providers to take part in financing public services though aligned schemes.

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

KEY FACTS ABOUT HUNGARY

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

- Using social media for branding and marketing (SME gap: -50%, large-enterprise gap: -46%);
- Paying to advertise on the internet (SME gap: -44%, large enterprise gap: -16%);
- Selling online (SME gap: -43%, large enterprise gap: -26%);
- Participating in cross-border e-commerce sales within the European Union (SME gap: -58%, large enterprise gap: -17%);
- Analyzing big data (SME gap: -46%, large enterprise gap: -68%);
- Using software solutions such as customer relationship management systems (SME gap: -61%, large enterprise gap: -45%).

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

Implications for business leaders

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

Anticipate and, if necessary, prepare for the impact of digital disruption on demand for your product, eg., unbundle and tailor your product or turn it into a service.

Anticipate and, if necessary, prepare for how digital disruption will change supply in your market, e.g., analyze the possibility of new, online players and anticipate changes in the value-chain structure caused by automation.

Investigate the potential for forming strategic alliances with innovative organizations and enterprises changing the face of the market (e.g. startups) to create new competencies in your organization.

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

Leverage social media and online advertising to connect with customers in real time, in a targeted and measurable way.

Use the Internet to increase your revenue growth capabilities by utilizing e-commerce, e.g., build an online presence for your organization, develop your own e-commerce platform, or make use of a multi-vendor e-commerce platform.

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

Use digital tools to optimize your bottom line

Utilize automation to streamline internal operations where possible, implementing for e.g., e-invoicing suitable for automated processing, resource management software tools, focusing on the most labor-intensive, expensive processes first.

Leverage the power of big data and cloud computing for improved decision making and process optimization.

Build cybersecurity capabilities to ensure competitive dynamics and customer trust.

Update your approach to recruiting future employees

Put more focus on assessing candidates' skills, e.g., through open competitions, games, hackathons.

Develop a talent pipeline to shift from reactive to proactive recruiting, e.g., offer workshops and apprenticeships to help candidates build the desired skills.

Leverage contractors or freelancers to fill talent gaps, using digital platforms to optimize the search effort.

Create reskilling and upskilling opportunities for current employees

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

Embrace a pro-digital organizational culture

Start the change from the top, fostering understanding and conviction among employees on the benefits of digital: ensure that leadership and middle management act as role models in terms of their use of digital tools.

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

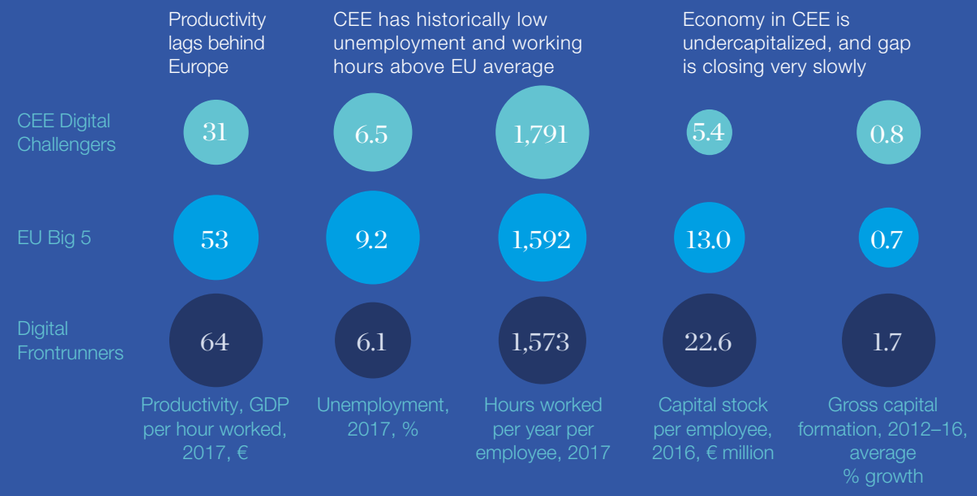
Prioritize agility and learning over forecasting and planning.

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

CEE DIGITAL CHALLENGERS – KEY MESSAGES FOR CEE – RECAP

WHY IS DIGITIZATION KEY FOR CEE?

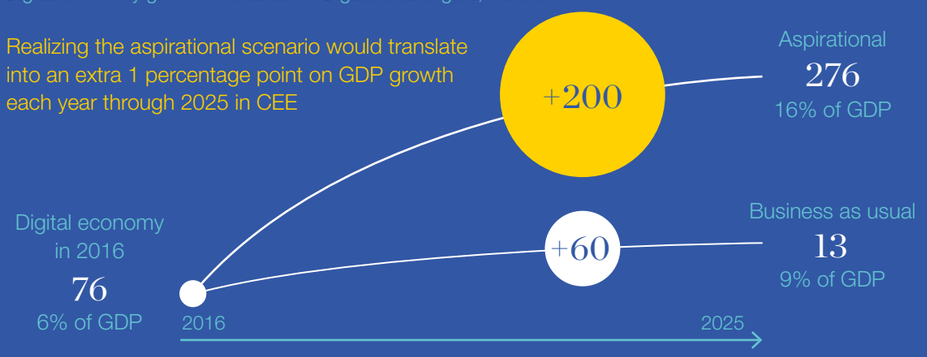
1 THE GROWTH ENGINE OF CENTRAL AND EASTERN EUROPE IS LOSING MOMENTUM



2 DIGITIZATION CAN BE THE ANSWER TO THIS CHALLENGE

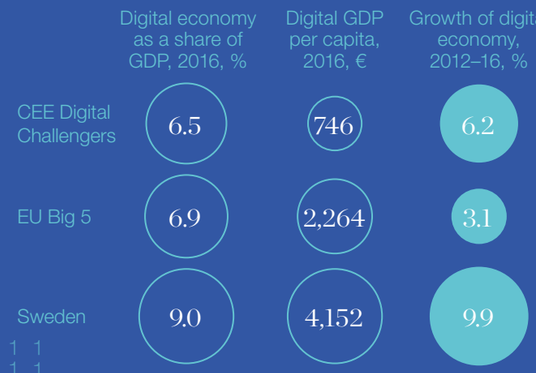
Digital-economy growth scenarios for Digital Challengers, € billion

Realizing 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 lower 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:

- Good primary and secondary education
- A large STEM and ICT graduate talent pool
- High-quality, affordable digital infrastructure
- A milder legacy technology lock-in
- An already-emerging, vibrant digital ecosystem

HOW TO CAPTURE THE POTENTIAL?

4 ALL STAKEHOLDERS NEED TO ACT FOR A SUCCESSFUL TRANSITION

Implications for policy makers

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

Implications for business leaders

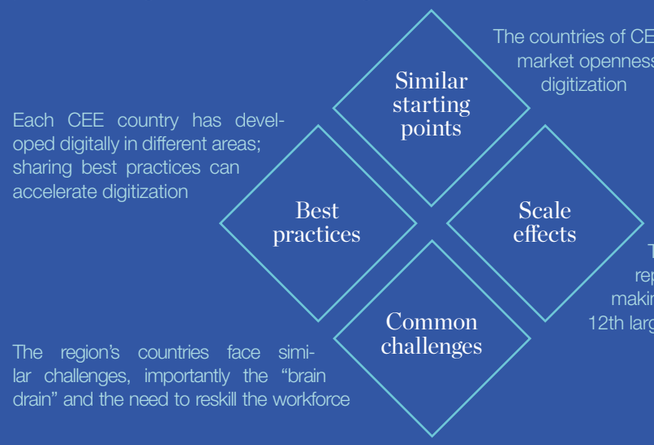
- Adapt your business model to meet the demands of the digital economy
- Use digital tools for revenue growth, including boosting your export capabilities
- Use digital tools to improve your bottom line
- Invest in human capital and prepare talent strategies for the future, including an updated approach to recruiting and actively driving reskilling and upskilling
- Form strong digital collaborations within industry associations
- Embrace a pro-digital organizational culture

Implications for individuals

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

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 – OTHERWISE THE REGION MAY MISS THE DIGITAL OPPORTUNITY

Digital Challengers are enjoying an economic boom. This could give new digital initiatives a head start.

The Fourth Industrial Revolution will transform the economy and labor market. An immediate response is needed.

The global rules of the digital game are crystallizing. 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 analyzed.

Digitization Index

One of the goals of the Digitization Index is to show the level of digital penetration across sectors by indicating the gap between the "digital frontier" (the most advanced digital sector) and the other parts of the economy. The Digitization Index presents a view across sectors of how corporations invest in ICT (a proxy for ICT spending, calculated as the value of the ICT sector less consumer spending on communication services and equipment) and how they digitize their internal processes. It uses eight indicators to capture different ways in which companies are digitizing. For instance, digital assets include spending on computers, software and telecom equipment and the stock of ICT assets. Workforce, on the other hand, is calculated on a per-worker spending basis. We measure this by aggregating digitization scores across sectors, which is easily comparable between European countries against the United States. To calculate the digitization scores, the Digitization Index is weighted for the economic size of the sector, to measure the distance of each sector from the global digital frontier, namely the ICT sector in the United States. This sector was chosen as the global digital frontier as previous MGI research[12] 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.[13] On the other end of the spectrum, institutions such as the IMF use studies[14] define it as all digital activities in all sectors of the economy. In our report we use the latter definition, while ensuring that the digital economy in our definition is quantifiable and comparable between countries.

Impact scenarios

Baseline growth

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

E-commerce and offline spending

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

Digitization potential in the public and private sectors

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

Internet of Things, big data and artificial intelligence use cases

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

Automation potential

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

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Endnotes

1 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 and development. See for example: *International Monetary Fund Staff Report*, "Measuring the Digital Economy," February 2018, [online] Available at: https://www.imf.org/en/Publications/Policy-Papers/Issues/2018/04/03/022818-measuring-the-digital-economy

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

3 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

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

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 data from Eurostat

7 For more insights, see McKinsey & Company, *A future that works: Automation, employment, and productivity*, James Manyika, Michael Chui, Mehdi Miremadi, Jacques Bughin, Katy George, Paul Willmott, and Martin Dewhurst

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

9 McKinsey Global Institute, *Skill shift: Automation and the future of the workforce*, May 2018

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

11 PISA: Programme for International Student Assessment (OECD)

12 McKinsey Global Institute, *Digital America: A tale of the haves and have-mores*, December 2015 https://www.mckinsey.com/industries/high-tech/our-insights/digital-america-a-tale-of-the-haves-and-have-mores

13 OECD report, *Digital Economy Data Highlights, 2016*, https://www.oecd.org/sti/ieconomy/Cancun_ChartBooklet.pdf

14 *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

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