Croatia – Emerging
Digital Challenger

Digitization as the new growth engine for Croatia

November, 2018

McKinsey&Company
McKinsey & Company has a strong presence across the entire CEE region.

We have the biggest footprint in the region:
- The largest and most experienced strategy consulting firm with extensive local footprint
- Over 1800 people in McKinsey & Company in the region
- 9 local offices with over 270 consultants
- Recognized and trusted partner in public and social space
- Our consultants have extensive experience working in CEE and other regions, covering all relevant sectors

272 consultants in McKinsey Offices and Knowledge experts and support services.

We have deep understanding of Croatian market:
- More than 100 projects in Croatia
- McKinsey served 8 out of 10 largest companies in Croatia, including supporting 2 major IPOs, biggest M&A deals and 5 restructuring situations in the last 5 years

14 consultants in Croatia.
We are a thought leader in the CEE region on topics such as economic development, automation, and digital opportunities.

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- **Pan-CEE reports**
  - Digital Challengers
  - Reigniting growth in CEE

- **New growth model for CEE countries**
  - 5 opportunities for Poland
  - Poland 2025
  - How Hungary can win productivity race

- **Future of work**
  - Automation potential in Poland
  - Automation potential in Hungary

- **Digital**
  - Digital Czech Republic
  - Digital Poland
  - AI Revolution
Executive summary

Despite double-digit growth in the last 5 years, Croatian GDP is still below other EU economies

- Croatian GDP grew by 12% in the last 5 years, growing at slightly lower rate compared to other CEE countries
- Regardless, gap in GDP per capita compared to other EU economies is still significant – mainly driven by lower productivity and inadequate investments – and indicates substantial improvement potential in Croatia

Digital economy could be the new growth driver and contribute up to 8.3 EUR billion in GDP by 2025 (additional ~2,000 EUR GDP per capita)

- Digital economy is still not exploited by Croatia: it accounts for ca. 5% of GDP (equivalent to 2.4 EUR bln)
- Most of the Croatian sectors have significant digitization gaps that need to be closed to unlock full digitization potential - allowing digital economy to grow to 10+ EUR bln in GDP contribution (equivalent to 16% of GDP)

Automation potential in Croatia is up to 52% working hours by 2030 (equivalent to ca. 0.8 mln FTEs) – therefore, mitigating actions need to be developed to address wider macroeconomic implications – shift towards new, highly productive jobs, enabled by digitalization, with focus on technology and social skills

- Six sectors are expected to account for 72% of entire automation effect (equivalent to ca. 0.6 mln FTEs)
- Even though automation implies some jobs becoming obsolete, at the same time it creates new jobs with higher productivity
- Automation could help sectors with the highest job vacancy rates by lowering the demand for workers

To drive digitization, Croatia needs to build on existing strengths and address identified pain points – while ensuring collaboration with other CEE countries

- Croatia should build its digitization effort on three favorable factors: ICT education system, macroeconomic landscape (e.g., labor costs) and positive examples of local pioneers driving digitization
- However, additional work is needed in building education system, creating ICT infrastructure, developing digital skills and setting up entrepreneurial environment to further support digital growth

*Disclaimer: Analysis made in line with MGI methodology, in order to be consistent with other countries the data provided may contain a small margin of error*
Contents

▪ Potential of Digital Economy
  ▪ Current digitization of Croatian economy
  ▪ Digitization impact on Croatian labor market
  ▪ Key drivers of digitization
  ▪ Recommendations
  ▪ Case for unity
Despite significant 10+% increase in the last 5 years, Croatian GDP per capita is still below other EU economies...

- Digital Frontrunners¹
  - 58 million people
  - ~4x
  - Population: 312 million people

- CEE – Digital Challengers²
  - 104 million people

- Croatia
  - 4 million people
  - Population: 4 million people

- EU Big 5³
  - 312 million people

GDP per capita, 2017, EUR

- Croatia: 11,500
- CEE: 13,044
- EU Big 5: 30,140
- Digital Frontrunners: 46,911

GDP per capita growth, 2013-2017, %

- Croatia: +12%
- CEE: +15%
- EU Big 5: +6%
- Digital Frontrunners: +9%

1 Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, Netherlands, Norway, Sweden
2 CEE: Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia
3 France, Germany, Italy, Spain, UK

SOURCE: Local institutes of statistics; Eurostat
... mainly driven by low productivity and limited investments

<table>
<thead>
<tr>
<th>Digital Frontrunners³</th>
<th>Croatia</th>
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<tbody>
<tr>
<td><strong>Productivity</strong></td>
<td><strong>Labor</strong></td>
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<tr>
<td>Productivity - GDP per hour worked², 2017, EUR</td>
<td>Unemployment, Aug 2018, %</td>
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<tr>
<td>64</td>
<td>5.7</td>
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<td>30</td>
<td>8.5</td>
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1 Cobb–Douglas production function: Total production = Total factor productivity * Labor input² * Capital input³ (α + β = 1; α and β are the output elasticities of capital and labor, respectively)
2 EUR purchasing power parities in current prices
3 Belgium, Denmark, Estonia, Finland, Ireland, Luxembourg, Netherlands, Norway, Sweden

SOURCE: Eurostat; Local institutes of statistics
As traditional growth engines fade away, digital economy is the new growth driver - however, not yet exploited by Croatia.

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<tr>
<th></th>
<th>Croatia</th>
<th>CEE</th>
<th>EU Big 5</th>
<th>Digital Frontrunners</th>
<th>Sweden</th>
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<tbody>
<tr>
<td>Size of Digital Economy¹</td>
<td>2.4²</td>
<td>75.7</td>
<td>731.1</td>
<td>202.7</td>
<td>41.8</td>
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<tr>
<td>Share of Digital Economy % GDP, 2016</td>
<td>5.1</td>
<td>6.5</td>
<td>6.9</td>
<td>7.4</td>
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<td>Growth of Digital economy %, 2012-16</td>
<td>0.6</td>
<td>6.2</td>
<td>3.1</td>
<td>5.8</td>
<td>9.9</td>
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<td>Growth of non-digital economy %, 2012-16</td>
<td>1.4</td>
<td>2.6</td>
<td>1.2</td>
<td>2.0</td>
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¹ Sum of gross value added for sectors ICT, e-commerce and consumer spending on digital equipment (e.g., computers, smartphones, smartwatches).
² ICT sector size ~ 1.2 EUR bln reported by HUP ICT, due to different methodology for calculating gross value added.
³ France, Germany, Italy, Spain, UK

SOURCE: Eurostat; Euromonitor; Local institutes of statistics; McKinsey Global Institute
Strong focus on digitization can generate up to 8.3 EUR billion of GDP in Croatia by 2025.

Digital economy growth potential for Croatia
“Maximum value extraction scenario”

EUR bln

2016  2.4  5% GDP

2025  up to 10.7

1 Assumptions: Fixed annual growth of digital economy from duration 2012-2016 (0.1 EUR bln); Acceleration of e-commerce and consumer offline spending on digital (assumed fixed annual growth of e-commerce from 2012-2016 until 2025 to yield 0.6 EUR bln based on Sweden benchmark); Capturing digitization potential in business and public sector (assumed growth until 2025 to yield 7.6 EUR bln based on Sweden benchmark).

Digitization with potential to drive considerable GDP contribution for Croatia; however, wider macroeconomic implications need to be considered and mitigating actions to address these implications need to be developed.

SOURCE: Eurostat; IHS; Local institutes of statistics; McKinsey Global Institute
Contents

▪ Potential of Digital Economy
▪ Current digitization of Croatian economy
▪ Digitization impact on Croatian labor market
▪ Key drivers of digitization
▪ Recommendations
▪ Case for unity
In Croatia, most of the sectors have not yet recognized the value of digital economy...

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<tr>
<th>Share of GDP, %</th>
<th>Digitization of sectors in Croatia with their share in economy</th>
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<tbody>
<tr>
<td>15</td>
<td>Manufacturing</td>
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<tr>
<td>11</td>
<td>Trade (retail &amp; wholesale)</td>
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<td>10</td>
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<td>7</td>
<td>Public administration</td>
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<td>6</td>
<td>Finance and insurance</td>
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<td>5</td>
<td>Professional, scientific &amp; technical services</td>
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<td>4</td>
<td>Education</td>
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<td>3</td>
<td>Transportation and warehousing</td>
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<td>2</td>
<td>Agriculture, forestry, fishing, and hunting</td>
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<tr>
<td>1</td>
<td>ICT sector</td>
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<tr>
<td>0</td>
<td>Digitally less advanced</td>
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<tr>
<td>1</td>
<td>Digital followers</td>
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<tr>
<td>2</td>
<td>Digital leaders</td>
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</tbody>
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SOURCE: Eurostat; GUS; IHS; McKinsey Global Institute
... resulting in significant digitization gaps compared to other EU economies – these gaps will need to be closed to unlock full potential.

Wider macroeconomic implications of digitization need to be considered and mitigating actions to address these implications need to be developed.

1 Italy and Spain excluded due to lack of available data

SOURCE: Eurostat; Local institutes of statistics, McKinsey Global Institute
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Low digitization across sectors today indicates that substantial automation potential exists in the long-term.

1 Estimates for sectors made in line with MGI methodology; construction & real estate sectors excluded due to lack of available data
2 Estimate for sectors made in line with MGI methodology by using Czech Republic, Hungary and Poland data as a proxy

SOURCE: Eurostat; Forbes; IHS; McKinsey Global Institute
Automation potential in Croatia is estimated to be up to 52% working hours until 2030 – impacting about 800 ths FTEs...

1 Automation does not directly impact number of jobs

2 Digitization with potential to drive considerable GDP contribution, competitiveness and net export balance for Croatia; however, wider macroeconomic implications need to be considered and mitigating actions (e.g. shift towards new jobs, enabled by digitalization, with higher productivity) to address these implications need to be developed

1 Estimate made in line with MGI methodology by using Czech Republic, Hungary and Poland automation potential data as a proxy

SOURCE: Eurostat; Forbes; IHS; McKinsey Global Institute
...with six sectors accounting for 72% (ca. 565,000 FTEs) of total automation potential

Maximum automation potential, ths FTEs

- Manufacturing: 179, 66%
- Trade (retail & wholesale): 116, 53%
- Accommodation & food services: 70, 64%
- Transportation & warehousing: 68, 66%
- Agriculture: 68, 56%
- Construction: 64, 64%
- Public administration: 48, 43%
- Healthcare & social services: 41, 38%
- Education: 30, 30%
- Professional, scientific & technical services: 29, 41%
- Utilities: 21, 52%
- Telecommunication: 20, 40%
- Finance & insurance: 16, 41%
- Arts, entertainment & recreation: 10, 39%
- Mining: 3, 62%
- Real estate: 3, 43%

Up to 565 ths FTEs = ~72% of jobs

SOURCE: Eurostat, McKinsey Global Institute
In the sectors with high job vacancy rates, automation could close the gap by lowering the demand for workers.

<table>
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<tr>
<th>Sector</th>
<th>Job vacancy rate 2017</th>
<th>Change Q1 2014-Q4 2017</th>
<th>Maximum automation potential</th>
<th>% of time</th>
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<tbody>
<tr>
<td>Accommodation &amp; food service</td>
<td>2.8</td>
<td>+1.1%</td>
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<tr>
<td>Construction</td>
<td>1.9</td>
<td>+0.4%</td>
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<td>Professional, scientific &amp; technical activities</td>
<td>1.3</td>
<td>-0.2%</td>
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<tr>
<td>Agriculture</td>
<td>1.2</td>
<td>+1.0%</td>
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<td>56</td>
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<td>Manufacturing</td>
<td>1.0</td>
<td>+0.2%</td>
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<tr>
<td>Wholesale trade</td>
<td>0.8</td>
<td>+0.4%</td>
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<td>53</td>
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<tr>
<td>Real estate</td>
<td>0.8</td>
<td>+0.2%</td>
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<td>43</td>
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<tr>
<td>Transportation &amp; warehousing</td>
<td>0.7</td>
<td>+0.2%</td>
<td></td>
<td>66</td>
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</tbody>
</table>

1 Job vacancy rate = Number of job vacancies/(number of occupied posts + number of job vacancies)
2 Estimate made in line with MGI methodology by using Czech Republic, Hungary and Poland data as a proxy

SOURCE: Eurostat
Automation will drive substantial shift in required skill set towards technology and social skills.

Change in working hours 2016-2030

- Basic cognitive skills: -17%
- Physical and manual skills: -16%
- Social and emotional skills: +22%
- Technology skills: +52%

1 Based on Western Europe estimates

SOURCE: McKinsey Global Institute
Today, Croatian workforce is already lagging behind Digital Frontrunners in digital skills.

**Basic Digital Skills**

- **16-24**
  - CEE: 87%
  - CEE: 76%
  - Croatia: 84%
  - Croatia: 76%
  - Frontrunners: 72%
  - Frontrunners: 66%
  - Delta: -4%

- **25-34**
  - CEE: 85%
  - CEE: 66%
  - Croatia: 67%
  - Croatia: 57%
  - Frontrunners: 72%
  - Frontrunners: 52%
  - Delta: -21%

- **35-44**
  - CEE: 80%
  - CEE: 52%
  - Croatia: 50%
  - Croatia: 38%
  - Frontrunners: 72%
  - Frontrunners: 39%
  - Delta: -37%

- **45-54**
  - CEE: 72%
  - CEE: 38%
  - Croatia: 39%
  - Croatia: 26%
  - Frontrunners: 72%
  - Frontrunners: 39%
  - Delta: -46%

- **55-64**
  - CEE: 59%
  - CEE: 23%
  - Croatia: 23%
  - Croatia: 15%
  - Frontrunners: 59%
  - Frontrunners: 23%
  - Delta: -61%

- **65-74**
  - CEE: 42%
  - CEE: 9%
  - Croatia: 9%
  - Croatia: 6%
  - Frontrunners: 42%
  - Frontrunners: 9%
  - Delta: -79%

**Advanced Digital Skills**

- **16-24**
  - CEE: 68%
  - CEE: 44%
  - Croatia: 40%
  - Croatia: 33%
  - Frontrunners: 68%
  - Frontrunners: 24%
  - Delta: -12%

- **25-34**
  - CEE: 59%
  - CEE: 33%
  - Croatia: 35%
  - Croatia: 26%
  - Frontrunners: 59%
  - Frontrunners: 24%
  - Delta: -41%

- **35-44**
  - CEE: 51%
  - CEE: 24%
  - Croatia: 26%
  - Croatia: 15%
  - Frontrunners: 51%
  - Frontrunners: 24%
  - Delta: -49%

- **45-54**
  - CEE: 41%
  - CEE: 13%
  - Croatia: 15%
  - Croatia: 6%
  - Frontrunners: 41%
  - Frontrunners: 13%
  - Delta: -63%

- **55-64**
  - CEE: 24%
  - CEE: 6%
  - Croatia: 6%
  - Croatia: 2%
  - Frontrunners: 24%
  - Frontrunners: 6%
  - Delta: -75%

- **65-74**
  - CEE: 13%
  - CEE: 2%
  - Croatia: 3%
  - Croatia: 1%
  - Frontrunners: 13%
  - Frontrunners: 2%
  - Delta: -76%

*Source: Eurostat, McKinsey analysis*
This is partly driven by lack of education and training – companies will need to invest to up-skill their workforce.

Enterprises – in particular SMEs – have a significant role to play in helping their employees pick up the skills which will be in demand as their business models adapt to become more digital oriented.

Participation rate in education and training in the last 12 months
% of 25-64 years old, 2016

-40.8%

Enterprises that provided training to develop/upgrade ICT skills of their personnel, % of enterprises, 2017

-21.3%
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Croatia should build its digitization effort on three favorable factors that are already in place:

**ICT education system**
Strong pool of ICT graduates present in the country

**Macroeconomic landscape**
Strong competitive advantages at the macroeconomic level, mainly competitive “labor costs” in the ICT sector

**Local pioneers**
Private digitally advanced companies successful worldwide in various industries, as well as “flagship” project in public sector

SOURCE: Eurostat, OECD
ICT graduates in Croatia represent high share of the student population – above CEE and Digital Frontrunners.

Information and Communication technology graduates, % of all graduates

Digital Frontrunners 1  CEE 2

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Number of STEM graduates, per 100,000 inhabitants, 2016

Digital Frontrunners 1  CEE 2

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<td>Sweden</td>
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<td>Bulgaria</td>
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<tr>
<td>Croatia</td>
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<tr>
<td>Czech Republic</td>
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<td>Hungary</td>
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<td>Latvia</td>
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<td>Lithuania</td>
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<tr>
<td>Poland</td>
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<td>Romania</td>
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<td>Slovakia</td>
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<td>Slovenia</td>
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<td>244</td>
<td>226</td>
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<td>221</td>
<td>143</td>
</tr>
</tbody>
</table>

1 Belgium, Denmark, Estonia, Finland, Netherlands, Ireland, Norway, Luxemburg, Sweden
2 Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia

SOURCE: Eurostat, UNESCO Institute for Statistics
Labor cost in ICT industry is lower in comparison to Digital Frontrunners as well as some CEE countries.
Several highly successful and globally recognized digital companies and projects have already emerged.

### Awards/Recognitions

<table>
<thead>
<tr>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>e-Gradani</strong></td>
<td><strong>nanobit</strong></td>
</tr>
<tr>
<td>- Project introduced in 2014 in order to simplify and speed up services offered by Croatian public administration to its citizens</td>
<td>- Company founded in 2008 &amp; specialized in developing and delivering mobile games with over 3.5 mln unique active users per month</td>
</tr>
<tr>
<td>- Number of unique users reached ~630,000 in Nov 2018</td>
<td>- In last 5 years revenue increased from EUR 1.7 mln to EUR 7.2 mln (312%)</td>
</tr>
<tr>
<td></td>
<td>- Total number of employees increased from 26 to 80+</td>
</tr>
</tbody>
</table>

### Overview & general info

<table>
<thead>
<tr>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>e-Gradani</strong></td>
<td><strong>nanobit</strong></td>
</tr>
<tr>
<td>- Project e-Citizens has been declared the best project in Europe at the Open Government Partnership global summit, held in Mexico City in Oct 2015</td>
<td>- Only Croatian company to be included in Financial Times List of 1000 Europe’s Fastest Growing Companies in 2017</td>
</tr>
<tr>
<td></td>
<td>- Number of unique users reached ~630,000 in Nov 2018</td>
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<tr>
<td></td>
<td>- In last 5 years revenue increased from EUR 8 mln to EUR 19 mln (312%)</td>
</tr>
<tr>
<td></td>
<td>- Total number of employees increased from 26 to 80+</td>
</tr>
</tbody>
</table>

**SOURCE:** Company websites, press search

1. Communication Platform as a Service
2. The list referred to the fastest growing companies in 2012-15 period
However, additional work is needed across four areas to further support digital growth:

**Education system**
There is significant lag behind other countries in terms of Math, Reading and Science Literacy (PISA\(^1\) scores) as well as overall education system quality.

**ICT infrastructure**
Broadband speed and quality rank among worst in Europe.

**Digital skills**
Slow adoption of digital tools in public and private sectors.

**Entrepreneurial environment**
Lack of support for innovation and entrepreneurship developments and further ease of running digital business.

\(^1\) Program for International Student Assessment (PISA)

*SOURCE: Eurostat, OECD*
Croatian education system shows substantial improvement potential based on actual PISA scores

One of the things that primary education should tackle is to get teenagers interested in ICT, show them the spectrum of possibilities and benefits from career in this field.

Scores in Math, Reading and Science Literacy, PISA (OECD) Synthetic scores, 2015

1 Outliers excluded (Bulgaria and Romania)
2 Reading literacy includes the ability to extract the relevant information from texts and also to understand, use and reflect on written texts

SOURCE: OECD, PISA, World Bank
There is a significant gap in speed and quality of broadband service compared to CEE and Digital Frontrunners.

- **Household covered by the standard fixed broadband (availability)**
  - % of the households: 99, 94, 98 (+1.7%)

- **Percentage of populated areas coverage by 4G - measured as the average coverage of telecom, % of the country**
  - 73, 87, 98 (-25.5%)

- **Share of ultra fast broadband subscriptions >= 100Mbps**
  - % of total fixed broadband subscriptions: 1, 27, 30 (-96.7%)

- **Share of fast broadband subscriptions >= 30Mbps, <100Mbps**
  - % of total fixed broadband subscriptions: 11, 26, 29 (-62.1%)

*Source: DESI 2018, World Economic Forum*
Croatians are slower in adoption of Internet services compared to peers from CEE and Digital Frontrunners.

The main problem isn’t access to the internet but rather how people use it. Very often in CEE people use it to post pictures on social media instead of embracing the whole spectrum of possibilities that connectivity gives us.

SOURCE: DESI 2018, Eurostat
Entrepreneurial activity in Croatia is lagging behind other EU economies ...

Number of startups per one million inhabitants

<table>
<thead>
<tr>
<th>Region</th>
<th>2018 Startups</th>
<th>Average Startups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croatia</td>
<td>57</td>
<td>58</td>
</tr>
<tr>
<td>CEE</td>
<td>215</td>
<td>0.39</td>
</tr>
<tr>
<td>Digital Frontrunners</td>
<td>0.66</td>
<td>-73.5%</td>
</tr>
</tbody>
</table>

Global Entrepreneurship Index

<table>
<thead>
<tr>
<th>Region</th>
<th>2018 Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Croatia</td>
<td>0.34</td>
</tr>
<tr>
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</tr>
<tr>
<td>Digital Frontrunners</td>
<td>0.66</td>
</tr>
</tbody>
</table>

-48.5%

1 The GEDI methodology collects data on the entrepreneurial attitudes, abilities and aspirations of the local population and then weights these against the prevailing social and economic ‘infrastructure’
2 Number of startups calculated as an average from Funderbeam and Angellist and Dealroom, data used as a proxy

SOURCE: Eurostat, Invest Europe, Funderbeam, Angellist, Dealroom, Pitchbook
... mainly driven by lack of structured support and complexities in running businesses.
Contents

▪ Potential of Digital Economy
▪ Current digitization of Croatian economy
▪ Digitization impact on Croatian labor market
▪ Key drivers of digitization
▪ Recommendations
▪ Case for unity
Public sector

1. **Build skillset for the future** by developing a wide-ranging reskilling strategy, updating youth education for the future and actively counteracting brain drain

2. **Support technology adoption in the public sector** by speeding up the development of online public services and its adoption

3. **Support technology adoption among businesses** by promoting digitization benefits and digital transformation, enabling e-commerce through favorable regulation and incentivizing companies to use digital tools

4. **Strengthen regional cross-border digital collaboration** by creating a strong digital pillar within regional collaboration platforms and ensuring standardized & flexible digital policy solutions

5. **Improve startup eco-system** by developing entrepreneurial talent pool and, supporting startup hubs, increasing and simplifying access to capital

Private sector

6. **Invest in human capital** by preparing talent strategy for the digital economy, updating approach to recruiting and actively driving re/up-skilling

7. **Actively adopt technology and innovation** by adapting your business model and leveraging digital tools in revenue and cost management

8. **Embrace a pro-digital organizational culture** by ensuring role modeling from top leadership and implementing reinforcing mechanisms to reward adoption digital

Individuals

9. **Prepare for the digital economy** by investing in life-long learning, especially in competencies that are hard to automate

10. **Take advantage of digital tools** by leveraging digital platforms and tools in everyday life

10 recommendations to increase digitization in Croatia
<table>
<thead>
<tr>
<th>Implications for Policy Makers (1/4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What?</strong></td>
</tr>
<tr>
<td>Develop a wide-ranging reskilling strategy</td>
</tr>
<tr>
<td>Update youth education for the future</td>
</tr>
<tr>
<td>Promote life-long learning and mid-career training</td>
</tr>
<tr>
<td>Actively counteract brain drain</td>
</tr>
<tr>
<td>Capture benefits from independent work platforms</td>
</tr>
<tr>
<td><strong>How?</strong></td>
</tr>
<tr>
<td>Diagnose the state of current workforce and forecast the necessary skillset shift for the future, e.g. develop a labor market model, identify sectoral shifts and understand a gap towards future skill needs</td>
</tr>
<tr>
<td>Search for relevant solutions and benchmarks, e.g. looking at the experiences and best practices of other markets such as Denmark, Canada, Singapore</td>
</tr>
<tr>
<td>Commit to the program and measure effectiveness of actions, e.g. measuring changes in employment rates and salaries; holding educators responsible for the outcomes of reskilling programmes etc.</td>
</tr>
<tr>
<td>Ensure standard digital infrastructure, the integration of digital tools and resources at schools (e.g. online courses, virtual reality, gamification) as well as equipping teachers with necessary skills</td>
</tr>
<tr>
<td>Update pre-university schools’ curriculum for the future, increasing focus on skills such as programming, entrepreneurship and initiative-taking, leadership and managing others, communication skills, etc.</td>
</tr>
<tr>
<td>Promote STEM specialization to build ICT talent base, focus especially on enabling women to study technology in order to close the gender gap</td>
</tr>
<tr>
<td>Cooperate with the private sector to create useful education programs and support apprenticeships</td>
</tr>
<tr>
<td>Create an ecosystem supporting adults in re/up-skilling: build motivation among adults for learning, offer practical trainings or incentives, provide support during the transition period and assist in job seeking</td>
</tr>
<tr>
<td>Support new types of education credentials, especially digital programs</td>
</tr>
<tr>
<td>Increase the accessibility of education through improvement of English language proficiency to enable access to global knowledge resources</td>
</tr>
<tr>
<td>Keep ICT specialists from leaving the country, e.g. by encouraging universities to collaborate with private sector to provide high quality internships as part of their programmes or right after graduation</td>
</tr>
<tr>
<td>Attract back those ICT specialists who left, across all tenures, e.g. by providing scholarships for young people studying abroad in exchange for commitment to come back and work in the home country</td>
</tr>
<tr>
<td>Attract additional ICT specialists from across the globe: work with private sector to determine the demand for high skilled workers and simplify the migration process for them</td>
</tr>
<tr>
<td>Engage in research in order to understand the size and growth of the gig and independent work economy</td>
</tr>
<tr>
<td>Consider rethinking the policies supporting the gig economy and worker protection initiatives</td>
</tr>
</tbody>
</table>
Implications for Policy Makers (2/4)

Potential actions

**What?**

- Digitize the public sector
- Support technology adoption at companies

**How?**

- Ensure strong drive behind and support for digitization efforts by government, e.g. by setting up a dedicated task force/ministry, charged with monitoring and tackling regulatory barriers that impede new business models & stimulating the growth of the digital economy
- Speed up the development of online public services, e.g. promote integrated online public services platforms and online signatures
- Support the adoption of online public services, e.g. by launching educational campaigns, promoting online solutions during offline interactions and decreasing adoption barriers (i.e., offering simple user interfaces)
- Develop digital skills amongst public sector employees
- Digitize back-end government processes focusing on the most labor intensive and expensive processes first
- Unleash big data capabilities through standardizing government data and opening it to third party collaborators to build applications on top of it, e.g. researchers, businesses, startups
- Invest in internet of things infrastructure in public sectors, e.g. supporting smart city & human health solutions strongly leveraging public data and resources
- Promote digitization benefits and digital transformation, focusing on SMEs and large sectors far away from the digital frontier
- Enable e-commerce through favorable regulation balancing business needs and consumer protection, e.g. by ensuring safe online payments and setting the rules of responsibility for e-commerce platforms providers
- Incentivize companies, especially SMEs, to use digital tools, e.g. by making business -- government interactions digital by default
- Leverage external funding, e.g. from the EU to finance most prospective initiatives supporting the development of the digital economy

**NOT EXHAUSTIVE**
## Implications for Policy Makers (3/4)

**What?**

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

**Strengthen cross-border digital collaboration**

**Ensure standardized & flexible digital policy solutions across the region**

**Implement cross-border projects facilitating the digitization of the region**

**Cooperate in managing societal shifts related to the changes in the labor market**

**Potential actions**

- Establish a coalition in favor of 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 national level, private sector leaders.
- Facilitate best-practice & experience sharing in the region on what has worked well in regulatory policy and investments.
- Cooperate to abolish barriers to the full functioning of the Digital Single Market, like geo-blocking, unjustified data localization practices and other regulatory barriers.
- Support the standardization and free flow of cross-border non-personal data in the public sector, as well as the technological interoperability of digital infrastructures, e.g., 5G networks.
- Establish common security models and cybersecurity standards.
- Facilitate cross-border digital infrastructure projects which will close gaps across the region, such as fibre optics, 5G technology, strategic e-commerce logistic 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 of enterprises.
- Strengthen cross-border industrial scientific research and educational cooperation, in support of joint technology initiatives like autonomous transportation, smart city, human health solutions. Examples of cross-border collaboration include the Franco-German alliance in AI, Nordic Council efforts to integrate electronic authentication systems, etc.
- Improve cross-border freedom of movement, skills accreditation and worker safeguard procedures.
- Join forces in tackling talent pool issues, including brain drain, 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.

**NOT EXHAUSTIVE**
## Implications for Policy Makers (4/4)

<table>
<thead>
<tr>
<th>Improve entrepreneurial talent pool</th>
<th>How?</th>
<th>Potential actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve entrepreneurial talent pool</td>
<td></td>
<td>Embed entrepreneurship in formal education (especially in STEM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Link entrepreneurial education with startups, accelerators, incubators and business angels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Expand entrepreneurial talent pool by attracting talents from outside of the country and region</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strengthen the position of major cities as startup hubs, tailored to local needs</th>
<th>How?</th>
<th>Potential actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position startup hubs high on municipal governments agenda and actively communicate importance of startups</td>
<td></td>
<td>Provide physical startup clusters where they can cooperate at scale, e.g. Station F in Paris or Blk 71 in Singapore</td>
</tr>
<tr>
<td>Support the creation of testing grounds for new business models, e.g. by implementing regulatory sandboxes enabling entrepreneurs to trial their innovations against real market conditions</td>
<td></td>
<td>Simplify business angel investing, e.g. standardized and easily-available forms, low capital corporations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide additional incentives, e.g. tax breaks, for business angels and serial entrepreneurs</td>
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<tr>
<td></td>
<td></td>
<td>Simplify procedures of obtaining and reporting public funds/EU funds</td>
</tr>
</tbody>
</table>

*NOT EXHAUSTIVE*
Implications for business

Invest in human capital

- Implications:
  - Actively adopt technology and innovation
  - Embrace a pro-digital organizational culture

<table>
<thead>
<tr>
<th>What?</th>
<th>How?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare your talent strategy for the digital economy</td>
<td>Potential actions</td>
</tr>
<tr>
<td>Future employees: update approach to recruiting</td>
<td>- Diagnose current skills of employees and identify gaps towards future needs by analyzing HR data</td>
</tr>
<tr>
<td>Current employees: actively drive up-skilling</td>
<td>- Search relevant solutions and benefits</td>
</tr>
<tr>
<td></td>
<td>- Commit to the program and measure effectiveness of actions, e.g. ROI based on promotions, retention or new business as a result of training, gather and integrate employees’ feedback</td>
</tr>
<tr>
<td>Leverage contractors or freelancers to fill talent gaps, using digital platforms to optimize the search effort</td>
<td>- Put more focus on candidate’s skills assessment, e.g. through open competitions, games &amp; hackathons</td>
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<tr>
<td></td>
<td>- Develop a talent pipeline to shift from reactive to proactive recruiting, e.g. offer workshops and apprenticeships to help candidates build desired skills</td>
</tr>
<tr>
<td>Leverage digital tools in revenue and cost management - especially for SMEs</td>
<td>- Build reskilling motivation among employees through career planning and professional development guidance</td>
</tr>
<tr>
<td></td>
<td>- Enable reskilling opportunities: provide practical in-house training or offer financial support, create opportunities for formal and informal knowledge sharing</td>
</tr>
<tr>
<td>Use internet to increase your revenue growth capabilities by utilizing e-commerce, e.g. building an online presence for your organization, developing your own or making use of aggregated e-commerce platforms</td>
<td>- Anticipate and if needed prepare for how digital disruption will change the supply on your market: analyze the possibility of new, online players and anticipate changes in the value chain structure caused by the automation</td>
</tr>
<tr>
<td>Build cybersecurity capabilities to ensure competitive dynamics and customers’ trust</td>
<td>- Anticipate and if needed prepare for digital disruption of the demand for your product, e.g. by unbundling and tailoring your product or turning it into a service</td>
</tr>
<tr>
<td></td>
<td>- Future employees: update approach to recruiting</td>
</tr>
<tr>
<td></td>
<td>- Leverage digital tools in revenue and cost management - especially for SMEs</td>
</tr>
<tr>
<td></td>
<td>- Adapt your business model to meet the demands of the digital economy</td>
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<tr>
<td></td>
<td>- Start the change from the top – ensure role modeling among leadership and middle management in terms of using digital tools</td>
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<td></td>
<td>- Foster understanding and conviction among employees on the benefits of digital</td>
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<tr>
<td></td>
<td>- Support employees in developing their skills &amp; knowledge, e.g. encouraging employees members to cultivate their curiosity to create opportunities in combining emerging technologies with innovative services</td>
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<tr>
<td></td>
<td>- Implement reinforcement mechanism, e.g. rewarding employees pioneering the adoption of digital</td>
</tr>
<tr>
<td></td>
<td>- Prioritize agility and learning over forecasting and planning</td>
</tr>
</tbody>
</table>

NOT EXHAUSTIVE

Potential actions

- How?
- What?
## Implications for individuals

### What?
- Prepare for the digital economy and take advantage of digital tools in all aspects of your life.
- Use digital in everyday life.

### How?
- Invest in life-long learning.
- Seize the opportunities of work in the digital economy.

### Potential actions

<table>
<thead>
<tr>
<th>What?</th>
<th>How?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invest in life-long learning</td>
<td>Continuously update your digital skills and actively seek to learn how to work with new technologies.</td>
</tr>
<tr>
<td></td>
<td>Invest in competencies that are hard to automate, e.g. focus on development of social and emotional skills, teamwork, creativity.</td>
</tr>
<tr>
<td></td>
<td>Use digital tools and resources to get access to global knowledge.</td>
</tr>
<tr>
<td>Seize the opportunities of work in the digital economy</td>
<td>Be ready to take several job opportunities by having to change sectors and occupations.</td>
</tr>
<tr>
<td></td>
<td>Leverage digital platforms to find freelance jobs, sell goods, gain additional sources of income, e.g. creators tapping into global audiences for their content using online video streaming platforms.</td>
</tr>
<tr>
<td></td>
<td>Take advantage of falling entry barriers and access to capital to become an entrepreneur.</td>
</tr>
<tr>
<td></td>
<td>Build a personal presence online, e.g. utilizing professional networking and recruitment platforms, personal websites to market your own brand.</td>
</tr>
<tr>
<td>Use digital in everyday life</td>
<td>Use digital tools and resources to benefit from the digital economy in everyday life, e.g. take advantage of platforms maximizing consumer value (e.g. price comparison websites).</td>
</tr>
</tbody>
</table>
Contents

▪ Potential of Digital Economy
▪ Current digitization of Croatian economy
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▪ Recommendations
▪ Case for unity
Collaboration between CEE countries is necessary to capture the digital opportunity

I  Cooperation will allow to achieve economies of scale

CEE countries could leverage both the size the region (100m people and EUR 1.2 tn GDP – equivalent of world’s 12th largest economy) and EU (500m people) to unleash scale effects in digital solutions

II  The region faces common challenges

The region’s countries face a number of challenges, most importantly the “brain drain” and the need to reskill the workforce

III  Similar economic situation

The countries have high levels of market openness and similar levels of digitization

IV  Best practice sharing

Each of the CEE countries has developed digitally in different areas - sharing best practices can accelerate digitization
CEE countries need to create ICT-favorable regulatory environment to support digitization ...

Market digitization compared to digital trade restrictiveness

Digital Economy and Society Index (DESI)

Digital Frontrunners average

CEE average

Digital Trade Restrictiveness Index

Lower market digitization

Higher market digitization

Lower digital trade restrictiveness

Higher digital trade restrictiveness

Importance of ICTs to government vision
Synthetic score (out of 7), World Economic Forum

CEC Digital challengers

Digital fronrunners

3.5

4.7

-25%

Laws relating to ICTs
Synthetic score (out of 7), World Economic Forum

CEC Digital challengers

Digital fronrunners

4.3

5.2

-18%

The Digital Trade Restrictiveness Index cover 64 economies worldwide, and is based on a comprehensive database entirely dedicated to digital trade policy. It includes several KPIs around four broad clusters: A) Fiscal restrictions: Tariffs and trade defense, taxation and subsidies, public procurement; B) Establishment restrictions: Foreign investment, IPR, competition policy, business mobility; C) Restrictions on data: Data policies, intermediary liability, content access; D) Trading restrictions: Quantitative trade restrictions, standards, online sales and transactions.

SOURCE: European Centre for International Political Economy, Eurostat
... and prevent further “brain drain” that is currently observed across all the CEE countries.

Emigration is particularly visible among the highly skilled population...

Highly skilled emigration rate
% of tertiary educated population living abroad (in EU), size of bubble – '000 people, 2017

... and the trend of emigration is not reversing

CEE emigration size¹
'000 citizens

Different emigration trends can be observed in CEE countries with some countries showing decline in net migration (e.g. Czechia, Hungary, Romania), while others observe increase of migration size (e.g. Bulgaria or Poland).

1 Migration rates includes only citizens of the reporting country. For Croatia, Bulgaria, Romania, Latvia and Slovakia some of the values are missing. In those years migration rates are calculated as average rate for the rest of CEE region.

SOURCE: Eurostat, the average for CEE is weighted for population, OECD, LinkedIn research.
Croatia – Emerging Digital Challenger

Digitization as the new growth engine for Croatia

November, 2018

McKinsey&Company