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Acronyms

B2B – Business to Business
B2C – Business to Customer
B2G – Business to Government
CRM – Customer Relationship Management
DESI – Digital Economy and Society Index
ERP – Enterprise Resource Planning
EU15 – Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom
EU28 – all EU member states
FTTP – Fiber to the Premises
ICT – Information Communications Technologies
Mbps – Megabits (Mb) per second
NMS13 – Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia
RFID – Radio-frequency identification
SCM – Supply Chain Management
SMEs – Small and Medium-sized Enterprises
Executive Summary

In this report we examine the level of digital transformation of SMEs in Romania in comparison to SMEs from other EU countries. We take into consideration both the digital business environment (digital infrastructure such as Internet availability and digital skills of human capital) and the adoption of digital technologies. The introduction of digital technologies such as websites, social media, e-commerce, electronic information sharing and cloud computing simplifies and accelerates decision making, allows effective brand building, facilitates transactions and makes it possible to reach new customers.

Why is it so important for SMEs to go digital?

Internet and digital tools become a must in the context of the Digital Single Market strategy. The regulations proposed within the DSM greatly enhance the opportunities stemming from successful digital transformation, as well as pose risks connected with losing markets and customers due to digital business illiteracy. Although the digital revolution affects both ICT and traditional businesses, it puts significant pressure on Small and Medium Enterprises (SMEs) that are relatively more sensitive to global competition occurring within the Internet compared to their stronger, bigger counterparts.

Are Romanian SMEs ready to compete on the Digital Single Market?

Our analysis suggests that Romanian SMEs strongly require a digital makeover. Romanian SMEs are the least digital in the EU, making no use of of e-commerce tools, cloud computing services and electronic information sharing tools. Unfortunately, Romanian business may lack the basic foundation for digital development: an appropriate digital infrastructure with high Internet coverage and a digitally skilled labour force. Poor digital skills of Romanian society pose a major obstacle for going digital. Furthermore, enterprises do not invest in digital training for their workforce. As a result, according to the indicators measuring digital transformation of economy and society (DESI), the country takes the last place among the EU28 and falls considerably behind other NMS13 countries.
Definitions

Digital transformation of enterprises
Changes in the functioning of enterprises due to the adjustments in business environment associated with the new application of digital technologies

Digital business environment
The digital skills of human capital and the development of digital infrastructure enabling utilisation of digital technologies

Digital skills of human capital
Adoption and skillful utilisation of digital technologies by human capital

Digital infrastructure
Structure needed for adoption and utilisation of digital technologies; facilities to interconnect components of digital business environment

Digital technologies
Electronic tools, systems, devices and resources that generate, store or process data: websites, social media, e-commerce, management tools, cloud computing
Main Concepts

Digital transformation enables and accelerates the smart integration of products and services into the economy and society. Its strongest effect lies in the optimal combination of digital technologies with digital business environment. The more developed the digital infrastructure and digital skills within a society, the better the utilisation of digital technologies. Similarly, the higher the utilisation of digital technologies, the higher the demand for human capital to employ and upgrade digital inventions. Digital tools enable smart economic integration of production and delivery of products and services to customers. Digitally aware SMEs find new market opportunities with greater ease, grow their business partner networks faster and obtain quality feedback from their clients through customer relation management tools.
Romania in a Nutshell

Key findings for SMEs in Romania

- Subscribe to fast Internet at a level above the EU average
- Provide websites with advanced services for the customers
- Have not taken up digital technologies, they are the least digital in the EU
- Do not invest in upgrading ICT related skills of employees
- Do not engage in e-commerce

Romania in the EU28

- 2nd in the share of subscriptions to fast Internet
- 3rd in the usage of social media by individuals
- 23rd in Connectivity
- 27th in Human Capital
- 27th in Use of the Internet
- 28th in Integration of Digital Technology
- 27th in Digital Public Services
Digital Map: Romania in the EU28

“Digital Economy and Society Index” (DESI) measures the degree of digital transformation of the EU member states. Namely, the index reports the level of development in the following categories: access, speed and quality of Internet infrastructure (represented by “Connectivity”), digital skills of society (“Human Capital” and “Use of Internet”), digitalisation of businesses (“Integration of Digital Technology”) and public e-services.

According to the DESI Index, Romania lags behind all the other EU member states, taking the 28th place. The overall low level of digital development is visible in all analysed dimensions. The problems hold back the business sector as well: Romania is the weakest country of the EU concerning the Integration of Digital Technologies.
Romania is at its strongest in Connectivity (which measures the deployment of broadband infrastructure and its quality), taking the 23rd place among the EU countries. While the overall share of households with fixed broadband subscriptions is relatively low (23rd position), most of these subscriptions concern high-speed Internet (2nd position). Human Capital indicates the level of digital skills of the society. Romanians, ranking 27th, lag behind the other EU countries, outperforming only Bulgaria. Additionally, Romanian Internet users engage less in online services (27th place), particularly in online shopping (28th position) and online banking (27th place). The level of development of Digital Public Services (like e-government) is also one of the lowest (27th place) in the EU.

Figure 1
DESI Index, 2016

Source: Digital Agenda for Europe, DESI
Integration of Digital Technology presents the level of digital transformation achieved by enterprises (with more than 10 employees). It is measured by the adoption of digital tools, like cloud computing services, and the engagement in e-commerce. Romanian enterprises are the least digital in the EU, which suggests that the country’s problems with digital transformation affect the business sector. Romanian enterprises do not use social media (28th), and do not take full advantage of other digital tools. The share of Romanian enterprises using electronic information sharing tools, like ERP software (24th) or cloud computing services (26rd), is one of the lowest in the EU. Romanian enterprises are not engaged in e-commerce (24th regarding the share of firms selling online, 24th in turnover share and 28th in cross-border selling).

**Figure 2**
Integration of Digital Technology, 2016

Source: Digital Agenda for Europe, DESI
Digital Business Environment creates the common framework that enables SMEs to utilise digital technology and facilitates engagement of SMEs in the digital economy.

We assess Digital Business Environment by analysing the development of digital skills and digital infrastructure. More precisely, we consider the efforts of companies in hiring and training digitally skilled people (including, but not exclusively, ICT specialists) and we assess digital infrastructure by the access, affordability, speed and quality of the Internet.
Digital Skills

When it comes to digital skills, Romanians perform worse than other NMS citizens: the share of Romanians with “basic” digital skills (16%) is 10 percentage points below the NMS13 average (26%); and even more strikingly, 43% of Romanians report no digital skills, which is much higher than the regional average (25%). Considering the share of individuals with “above basic” skills, which is an important asset for enterprises, Romanians are way behind the rest of the EU: only 8% of Romanians report such skills, as opposed to 25% of citizens in the NMS13, and 33% in the EU15.

Figure 3
Levels of digital skills amongst individuals (%), 2015

Above basic skills refer to the ability to carry out most of the tasks in all of four general categories (Communication, Information, Problem Solving and Software)
Basic skills refer to the ability to carry out one specific task in each category
Low skills refer to users who are unable to perform any tasks in up to 3 categories
No skills refer to users who are unable to perform any tasks in all categories listed including those who have not accessed the Internet in the last 3 months

Source: DELab UW own calculations based on the data from Eurostat
Analysing the specific skill categories, the gap between Romanians and other NMS13 citizens reporting “above basic” skills is quite large in all categories. The share of Romanians with advanced software skills (13%) is less than half of the NMS average (31%), and the difference is similarly high in problem solving as well.

**Figure 4**
Individuals with “above basic” digital skills (%), 2015

<table>
<thead>
<tr>
<th>Skill Category</th>
<th>EU15</th>
<th>NMS13</th>
<th>ROMANIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>62%</td>
<td>55%</td>
<td>41%</td>
</tr>
<tr>
<td>Information</td>
<td>74%</td>
<td>63%</td>
<td>43%</td>
</tr>
<tr>
<td>Problem solving</td>
<td>61%</td>
<td>44%</td>
<td>26%</td>
</tr>
<tr>
<td>Software</td>
<td>61%</td>
<td>46%</td>
<td>31%</td>
</tr>
</tbody>
</table>

**Communication skills** include the ability to communicate online via e-mail, video calls or the social media

**Information skills** show the ability to find relevant information online

**Problem solving skills** represent the ability to manage files, change settings of software and use online services

**Software skills** include the ability to use word processing, spreadsheet and multimedia editing software

Source: DELab UW own calculations based on the data from Eurostat
One of the important obstacles of digital development is the attitude of Romanian SMEs towards the digital skills of employees. Overall, SMEs in Romania show a huge gap in employing and recruiting ICT specialists, even relative to the regional average. Additionally, the share of enterprises that provide training to increase the digital skills of their ICT specialists and other employees is half of the NMS13 average. Furthermore, the share of SMEs that provide training to other employees is almost 4 times lower in Romania than the NMS13 average.

**Figure 5**
SMEs employing and training ICT specialists (%), 2015

Source: DELab UW own calculations based on the data from Eurostat
Digital Infrastructure

The access to high-speed Internet should be the cornerstone of digital infrastructure. In Romania, 12% of SMEs have no access at all to the Internet (the EU15 average is only 2%), which is an additional weak point of the digital ecosystem.

Figure 6
SMEs with no Internet access (%), 2015

On the other hand, the share of Romanian SMEs that use high-speed Internet (29%) is above the NMS13 level (23%). At the same time, less Romanian SMEs use low-speed Internet (28%) than the NMS13 average (40%). Therefore, although less Romanian SMEs have access to the Internet, those that do at least use a faster connection.

Figure 7
SMEs according to the speed of their fixed Internet connection (%), 2015

Source: DELab UW own calculations based on the data from Eurostat
The significantly lower cost of high-speed Internet access may explain the relatively good take-up of high-speed Internet connections: Romania is the cheapest EU country in terms of median Internet prices. While in the EU15, median price of monthly subscription is 37 euros, in Romania it is less than 19 euros.

**Figure 8**
Median price of monthly subscription to the Internet (30-100 Mbps) in euros/PPP, 2015

Source: DELab UW own calculations based on the data from Eurostat
FTTP is a pure fiber-optic cable connection running from an Internet Service Provider (ISP) directly to the user’s home or business. It is remarkable that Romania is the fourth best in total coverage of the most advanced broadband technology – “Fiber to the premises” (FTTP). On the other hand, the rural coverage is relatively low.

### Households covered by FTTP technology (%), 2014

- **Total**
- **Rural**

Source: Eurostat
Digital Technologies

The usage of digital technologies simplifies and accelerates decision-making processes within the enterprise; allows more effective business analyses; facilitates the communication with business partners; allows effective image and brand building; and supports the penetration of new markets as well as reaching new customers. To measure the adoption of digital tools we consider the usage of five key technologies: websites, social media, e-commerce, management tools (like ERP) and cloud computing.

Romanian SMEs are below the NMS13 average in all examined categories, which means an even wider gap in comparison with the EU15. Less than half of Romanian SMEs have a website, while the EU15 average is almost 80%. Additionally, the share of Romanian SMEs using social media and management tools, or engaging in e-commerce is around half of the EU15 level. The gap is even larger in case of cloud computing services: only 5% of SMEs subscribe to CC services in Romania, which is more than four times less than the adoption rate in the EU15. Romanian enterprises, similarly to the whole Romanian society, still have a long way to go before realizing the full potential of their digital revolution.

Figure 9
SMEs using main digital technologies (%), 2015

Source: DELab UW own calculations based on the data from Eurostat
Romanian firms, similarly to enterprises throughout the EU, mainly use websites to provide information about products and prices. However, the share of SMEs that offer online booking or online ordering (e.g. via a shopping cart) and provide order tracking is slightly higher in Romania than in the rest of the EU. This suggests that those Romanian SMEs that have already gone digital are able to use the more advanced features.

**Figure 10**
SMEs with websites providing selected services (%), 2015

- **Product catalogues or price lists**
  - EU15: 55%
  - NMS13: 59%
  - Romania: 40%

- **Ordering or reservation or booking**
  - EU15: 20%
  - NMS13: 18%
  - Romania: 19%

- **Order tracking**
  - EU15: 8%
  - NMS13: 8%
  - Romania: 9%

Source: DELab UW own calculations based on the data from Eurostat
Although social media and microblogs are powerful tools for marketing and communication, the share of SMEs in Romania using social networks is very low: only every fourth SMEs engage in social networks, while on average every third NMS13 firm uses these channels.

Likewise, the usage of multimedia content sharing websites (e.g. YouTube) is at a relatively low level (5% against 11% in the NMS13). Moreover, blogs, microblogs and wiki-based knowledge sharing tools are used only half as frequently by Romanian SMEs compared to the regional average.

**Figure 11**
SMEs using social media services (%), 2015

<table>
<thead>
<tr>
<th>Service</th>
<th>EU15</th>
<th>NMS13</th>
<th>ROMANIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social networks</td>
<td>43%</td>
<td>34%</td>
<td>23%</td>
</tr>
<tr>
<td>Multimedia content sharing website</td>
<td>15%</td>
<td>11%</td>
<td>5%</td>
</tr>
<tr>
<td>Enterprise’s blog or microblogs</td>
<td>14%</td>
<td>8%</td>
<td>4%</td>
</tr>
<tr>
<td>Wiki-based knowledge sharing tools</td>
<td>5%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Source: DELab UW own calculations based on the data from Eurostat
The purposes for social media usage are similar in Romania and in the rest of the EU. Firms mainly use social media to develop image and market products, and to communicate with customers. On the other hand, Romanian SMEs are relatively more engaged in communication within the enterprise or with business partners, which is shown by the smaller difference when compared with the rest of the EU.

**Figure 12**
Reasons for using social media services by SMEs (%), 2015

<table>
<thead>
<tr>
<th>Reason</th>
<th>EU15</th>
<th>NMS13</th>
<th>ROMANIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop image or market product</td>
<td>37%</td>
<td>29%</td>
<td>18%</td>
</tr>
<tr>
<td>Recruit employees</td>
<td>18%</td>
<td>13%</td>
<td>7%</td>
</tr>
<tr>
<td>Obtain or respond to customer opinions</td>
<td>23%</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>Exchange views within the enterprise</td>
<td>12%</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Involve customers in development of goods or services</td>
<td>12%</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Collaborate with business partners and organisations</td>
<td>11%</td>
<td>11%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: DELab UW own calculations based on the data from Eurostat
**E-commerce**

An **e-commerce transaction** is the sale or purchase of goods or services conducted over computer networks.

- **Business to Consumer (B2C)** refers to sales to private consumers.
- **Business to Business (B2B)** refers to sales to other enterprises.
- **Business to Government (B2G)** refers to sales to public authorities.

The engagement of Romanian SMEs in e-commerce is around half of the EU15 countries. A lower share of firms engage in electronic sales to private consumers (B2C: 6% versus 12% in the EU15), or to other enterprises and public authorities (B2B, B2G: 4% versus 11% in the EU15).

**Figure 13**
SMEs selling via a website or apps (%), by type of transaction, 2015

Source: DELab UW own calculations based on the data from Eurostat
Analysing sectors, the participation of Romanian SMEs in e-commerce is proportional to other EU countries: the share of firms selling online is two times higher in services (8%) than in industry. More specifically, the largest share of enterprises selling online is engaged in publishing activities (34%), works as a travel agency (21%) or sells motor vehicles (20%).

**Figure 14**
SMEs selling via a website or apps, according to sectors (%), 2015

Source: DELab UW own calculations based on the data from Eurostat
In the domain of e-commerce, the gap between Romania and the other EU countries is greater in cross-border than in domestic e-commerce. Only 2% of SMEs in Romania make electronic sales to other EU countries, which is 3 times less than the EU15 average. Moreover, less than 1% of Romanian SMEs sell outside the EU, while this share is 4 times higher in the EU15.

**Figure 15**
SMEs engaged in electronic sales (%), 2015

Source: DELab UW own calculations based on the data from Eurostat
Management Tools

Management tools (Enterprise Resource Planning - ERP) allow automatic flow of information between different business functions such as accounting, planning, production and marketing. Supply Chain Management (SCM) means exchanging all types of information with suppliers and/or customers about the availability, production, development and distribution of goods or services. Customer Relationship Management (CRM) is a management methodology that places the customer at the center of the business activity, based on intensive use of information technologies to collect, integrate, process and analyze information related to the customers.

The uptake of management tools by Romanian SMEs is at a quite low level and lags behind the average EU levels. However, the gap with respect to other NMS13 countries is relatively narrow in the case of CRM: while around 24% of SMEs use CRM software in the NMS13, 20% of Romanian firms have adopted it. However, only 9% of SMEs benefit from SCM software usage in Romania, while the regional average is 17%.

Figure 16
SMEs using CRM and SCM software (%), 2015

Source: DELab UW own calculations based on the data from Eurostat
Cloud Computing

Cloud Computing (CC) refers to ICT services that are used over the Internet to access software, computing power, storage capacity, etc.

SMEs in Romania show an extremely low adoption of cloud computing: the share of Romanian SMEs paying for such services is less than half of the average level of NMS13 firms in all analysed categories. Furthermore, the gap between Romanian and the EU15 firms is strikingly wide. Namely, the share of SMEs using cloud-based storage of files is seven times lower, while the share of SMEs hosting their database, using finance applications or office applications is five times lower. Additionally, Romanian SMEs do not seem to use cloud-CRM at all. Cloud-based email, which is the most widely used application, is used four times more frequently by the EU15 SMEs.

Figure 17
SMEs buying selected Cloud Computing services (%), 2014
Source: DELab UW own calculations based on the data from Eurostat
Conclusions

What have we found?

In terms of the digital transformation, Romanian SMEs significantly lag behind the other NMS13 countries. Enterprises in Romania suffer especially from the poor digital skills of the society and the labour force.

- The overall share of Internet users (52%) is the lowest in the EU, along with the share of individuals with at least basic digital skills (just 24% in the age group of 25-64).

- Romanian SMEs do not take an active role in increasing the human capital of their employees by providing training for them.

What are the problems and challenges?

- The low level of digitalisation throughout Romanian society (individuals, public services) holds back Romanian SMEs as well. Unfortunately, Romanian business underperforms all EU countries in terms of using the analysed digital tools. Not only do firms in the EU15 play in an entirely different league, but there is a long way to go to reach the average level of NMS13 SMEs.
What needs to be done?

• Romanian enterprises need to take the initiative in the digital revolution by hiring experts and training their workforce. The adoption of the most important digital technologies require more advanced digital skills, which is clearly a bottleneck of the Romanian economy.

• The creation of DSM will reduce barriers to enter the EU markets, which means an increase in competition among enterprises. Romania needs to bridge the gap with other NMS13 countries by increasing Internet accessibility, developing the digital skills of the labour force, and accelerating the digitalisation of SMEs.

• To avoid the so-called middle income trap, the productivity of Romanian enterprises should rapidly be increased. And the best way to do so is the adoption of digital technologies, which may help to optimize economic processes and gain competitive advantage in international markets. In other words, the main requirement for a successful digital revolution of Romanian SMEs is improving both the business environment and the digital skills/competences of entrepreneurs and employees.
Digital Economy Lab (DELab) is a research centre established in 2014 within the University of Warsaw to accelerate the development of digital economy and society by providing high-quality research on the impacts of digital transformation and innovation. By application of data science methods DELab examines how digital markets, skills and societies build smart economies, businesses and governance. We deliver policy recommendations on how to better meet the challenges of global digitalisation. Our studies promote entrepreneurship and enhance society's awareness of the benefits of digital transformation. DELab’s interdisciplinary team consists of professors and young researchers from various academic backgrounds including economics, sociology, law, administration, IT, European integration, philosophy, political sciences, globalisation, management and entrepreneurship.