A Comprehensive Analysis Regarding DESI Country Progress for Romania Relative to the European Average Trend

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ABSTRACT:

In the absence of globally coherent specifications and standards, digitalization would never have spread across the world in such a huge extent as it did. The availability of digital technologies has significantly increased in the last decade, shifting the focus of policy-makers from on the diffusion of these technologies to their usage by governments, companies and also individuals. Actually, digital technologies and internet became the main forces for transforming the modern world and its economy.

Activating within a turbulent environment, Romania faced many challenges in the last three years, but it managed to perform better from period to period. Relative to the past performance, Romania registers a higher rate of digitalization, benefiting from coverage of rapid broadband connections, mostly in urban areas. This made Romania having the second highest share of subscriptions within the EU in 2016.

Romania has developed increasingly fast over the last years and reached a position closer to the EU average, which translates into a positive evolution. While positive, the obtained results are not enough to compensate the country’s digital skills deficit.

Keywords: DESI index, Digital Economy, Romania, Digital Competitiveness

1. INTRODUCTION

The access to high-speed digital infrastructures represents a prerequisite, while the social inclusion and productivity in the digital economy depends mostly on adequate skills to support the effective usage of highly developed digital technologies. Despite the fact that the presented topic is one of great interest and significance, there is still no scientific literature focused on this area.

Considering that Information and Communications Technology (ICT) is not just a particular sector but the infrastructure of all modern economic systems, The European Commision stated that "The Internet and digital technologies are transforming the lives we lead, the way we work – as individuals, in business, and in our communities as they become more integrated across all sectors of our economy and society."1

Therefore, in order to improve Europe’s digital performance and also follow the evolution of EU Member States, the European Commission has developed the Digital Economy and Society Index (DESI), which represents a composite index that summarises approximately 30 significant

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1 European Commission (2015). Communication From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions - A Digital Single Market Strategy for Europe. Brussels.
indicators which take into consideration five main dimensions: Connectivity, Human Capital, Use of Internet, Integration of Digital Technology, Digital Public Services.

DESI overall index is computed as the weighted average of the principal dimensions, as following: Connectivity (25%), Human Capital (25%), Use of Internet (15%), Integration of Digital Technology (20%) and Digital Public Services (15%). Each of the five main dimensions of the DESI index is formed by a cluster of other sub-dimensions, which are in turn divided in individual indicators used in order to determine a more comprehensive and clear analysis.

The 2017 Digital Economy and Society Index (DESI) emphasises that, as a whole, the EU is making constant progress. Firstly, connectivity is the DESI dimension where EU countries perform best, being steady improved. On the other hand, a real digital economy is one wherein businesses improve their productivity and efficiency by taking full advantage of the benefits provided by digital technologies, and that is the second dimension where the DESI Index shows a positive evolution regarding the EU members.

According to the 2017 DESI Index, the percentage of the Europeans that go online at least once a week, increased by 3 percentage points compared to last year, from 76% to 79%. They usually use the online environment for daily tasks like banking or shopping, but the use online public services also increased significantly.

Despite all these progresses, the gap among EU countries is still a significant one. The top digital players can easily be differentiated from the lower-performing countries. Therefore, increased investments and bigger efforts are needed in order to get the most of the Digital Single Market.

2. STRUCTURE OF THE DESI INDEX BY DIMENSIONS

Measuring the performance of EU members beside a digital economy and society, the DESI index comprises a set of relevant indicators regarding the current Europe digital policy mix. At high level, the Digital Economy and Society Index (DESI) measures the five main policy areas of concern, which are in fact interconnected. Intrinsically, the developments in the digital economy can be achieved just through concerted improvement in all fields, not through individual improvements in distinct areas.

The development of a digital society is certainly conditioned by the capacity of its members to connect to the Internet. However, nowadays, a simple Internet connection is not enough to take full advantage from the whole spectrum of developments generated by the Internet. Hence, the Connectivity dimension refers to the implementation of broadband infrastructure and the quality provided by this, the access to fast broadband services being a compulsory condition for competitiveness.

In order to benefit from the advantages provided by the Internet, the digital skills level of citizens plays a decisive role. The wide cluster of resources unravelled by a digital society can be enjoyed to its fullest using only by humans endowed with the appropriate skills. The Human Capital dimension takes into consideration those skills, from elementary usage skills that empower individuals to participate in the digital society and consume digital services and goods, to high-developed skills that allow the workforce to take full advantage of modern technology, thus enhancing the productivity and the economic growth.

Individuals that have access to Internet connection and also possess the required skills to benefit from it, can take part in a broad mix of online activities. The wide range of activities provided by the online environment are conditioned by the high-speed connectivity yielded by a broadband subscription. Thus, the Use of Internet dimension is formed by three sub-dimensions (Content, Communication and Transactions) which measure the extent to which citizens of a country use their broadband connections to obtain online content, the extent to which they interact online and communicate using their broadband connections and analyze the tendency of Internet users to carry out online transactions.

Digitization remains one of the key contributors to a strengthen economic growth, on the business side. In order to reduce costs, increase efficiency, build strong engagement with collaborators, customers or business partners, the adoption of digital technology became a necessary condition for
enhancing the competitiveness. The Integration of Digital Technology dimension captures significant aspects related to the level of integration of digital technologies by a country’s businesses and it also focuses on the utilization of eCommerce tools by a country’s SMEs.

In addition, the interaction of citizen and businesses with the Public Sector can be improved through the adoption of digital technology. Such efficiency gains can appear both on the business side as well as on the Public Administration side, and implies benefits such as significant cost reductions and reductions in time spent. In order to analyze all these aspects mentioned before, Digital Public Services dimension takes into consideration only one sub-dimension, i.e. eGovernment, which measures the level of development eGovernment tools in each country of EU.

All Member States progressed on the DESI in the last three years, but the growth was not made at the same rhythm. In the first quarter of 2017, Denmark, Finland, Sweden and the Netherlands are the countries which posses the most advanced digital economies within the EU, followed closely by Luxembourg, Belgium and the UK, while Bulgaria, Greece, Italy and Romania registered the lowest scores regarding the DESI. While Romania is placed on the last position, its weighted average of the five main DESI dimensions is close to the average of European Union (Figure 1), which emphasizes the struggles faced to improve the digital economy and society of the country.

![Figure 1. Digital Economy and Society Index, by Main Dimensions of DESI - Romania vs. EU](image)

3. **CONNECTIVITY**

In our technology-oriented world, individuals are more connected than ever before. Across the entire society, there has been a huge expansion in connectivity over the last three years, and the future seems to have even further growth of digital tools and communication.

Romania's rate of digitalization has certainly increased during the past three years, benefiting from coverage of fast broadband connections, mainly in urban areas. More people are taking up mobile broadband, making Romania one of the countries with the highest shares of subscriptions to fast broadband within the EU. Despite of these, the coverage of mobile and fixed (4G) broadband networks is still one of the lowest in the EU. Thus, connectivity represents the DESI dimension where Romania made constant progress, growing from 10.98% in 2014 to 13.53% in 2017 (Figure 2), but its performance is in a lower position compared to the EU average, as of 2017.
Regarding the analysed DESI dimension, connectivity, Romania faces two major challenges. Firstly, the coverage of fixed broadband networks should be improved, currently reaching only 89% of households, being below the EU average of 98%. Secondly, the number of broadband subscribers must be increased: only 63% of households subscribe to fixed broadband, compared to an EU average of 74%. Also, there are only 71 subscriptions to mobile broadband per 100 people, while the EU average is 84, restricting Romania's ability to take full advantage of the benefits of the digital economy. There are still many issues to be recovered in order to reach the level of the other countries, the causes of these problems being attributed to the size of investment and the level of Internet penetration in Romanians homes (Caraiani, 2008).

In the case of high-speed Internet access, Romania performs better than the EU as a whole. In more than two-thirds of Romanian households there are networks capable of providing at least 30 Mbps (NGA), with a percentage of 72%, slightly less than the EU average (76%). On the other hand, Romania is one of the leaders of fixed Internet subscriptions to fast broadband with 70%, almost double compared to the EU average of 37%.

4. HUMAN CAPITAL

Concerning the second dimension of the Digital Economy and Society Index (DESI), Human Capital, with an improved weighted score of 6.92% (up from 6.45% in 2014), Romania is ranked 27th among EU countries in 2016. The number of people who go online increased and the digital skills levels were certainly improved, but Romania's rank remains the second lowest compared to the EU as a whole.
Some progress was registered, but only half of Romanians could be considered regular internet users (56% vs 79% in the EU). Besides, the digital skills of the Romanians are the lowest in the EU with only 28% of population having basic levels of digital skills relative to the EU average of 56%.

Nowadays, digital skills are compulsory in any corner of the workforce. In Romania the level of the workforce possessing basic or advanced digital skills is very low. This can easily become a significant barrier to the country’s economic development. Intensifying digital skills and digital literacy can generate digital jobs and thus, becoming a pillar for the development of a digital economy.

The percentage of ICT specialists in the total workforce reached 1.9% in 2015, growing from 1.6% in 2014. Despite the fact that numerous skilled ICT specialists exist in Romania, more are needed. Regarding the STEM (Science, Technology and Mathematics) graduates, Romania performs relatively well, having 1.7% of Romanians aged 20-29 years old holding a STEM level. Unfortunately, even if the result is a positive one, this is not enough to compensate for the country’s digital skills deficit. Furthermore, by taking into consideration the post-analysis period, the indicator was slightly reduced, from 1.9% in 2012 to 1.6% in 2014.

5. USE OF INTERNET

The Internet is undoubtedly one of the most important inventions from all the times, which has proven to ease our everyday existence by providing a lot of advantages. Being an open communication channel, a powerful tool for businesses and a researching and browsing instrument are just particular uses of the Internet. We can affirm that the Internet considerably facilitates and affects almost every aspect of modern life, being significant for a vast variety of reasons.

Related to the tendency of individuals to use Internet services, after three years of constant progress, the weighted score for Romania is 4.36% (down from 4.45%, as of 2016) and ranks 28th among EU countries.
Romanian Internet users are engaged in a diverse range of online activities, but much less comparing to the EU average, especially when it comes to eBanking (8%), eCommerce (18%) or Video on Demand (6%). They read news using online instruments (63%), watch movies, listen to music and play online games (67%), use the Internet in order to communicate through video calls or voice (45%) or via social networks (74%). Relative to 2016, for almost all of these activities, Romanians engagement has decreased, with the exception of the voice and video calls which register an improvement (up from 42%).

Despite progresses from 2014 to 2016, the shares of Romanian Internet users that shop online or use online banking are still the lowest compared to EU countries. Taking into consideration the fact that a digital economy is to some extent based on its citizens’ trust in the online environment, we can emphasize that this is the main challenge for Romania regarding Internet use by its population.

### 6. INTEGRATION OF DIGITAL TECHNOLOGY

Representing one of the key transformational drivers of the society and economy in the 21st century, digital technology provides various ways to collaborate, connect, conduct organizations and build important bridges among people, influencing the core of all business functions and also the ways in which organizations are managed. From the firm perspective, the ability to effectively apply Internet and electronic technology has become both a major opportunity and a big challenge (Anvari & Norouzib, 2016). While digital technology is already of significant importance to organizations of all sizes and across all industries today, it is expected to become an indispensable tool in the near future.

Romania's results regarding Integration of Digital Technology by businesses were positive since 2014 until now, registering a weighted score of 3.72%, as of April 2017. Although the country's performance related to the fourth DESI dimension was improved, Romania has the lowest score compared to the EU countries, falling to the last position.
The integration of digital technologies represents a key driver of labour productivity growth and, therefore, it should certainly be strengthened. The percentage of organizations which use technologies such as Social Media (8%) or Electronic Information Sharing (ERP – 22%) in Romania is the lowest within EU. The utilization of Cloud services decreased in 2016 in comparison to 2015, reaching 5% (down from 5.7%), being also one of the lowest in the EU. In the absence of digitisation and the productivity and efficiency that could be obtained through this, Romanian businesses have to struggle a lot to achieve it in the global digital economy.

Furthermore, the number of SMEs which sell online in Romania has decreased, down from 7.4% in 2015 to 7% in 2016, and the percentage of SMEs which sell online to other EU member states is extremely low (1.9%). Also, the businesses which do sell online create a small share of their turnover from those sales (4.3%). In order to compete in the global digital economy, the exploitation of on-line commerce should be on a high level. For this purpose, Romanian businesses have a long way to go.

7. DIGITAL PUBLIC SERVICES

Digital public services are becoming more and more available across Europe, constituting an efficient instrument for reduction of public administration spending, as well as for increasing efficiency for both citizens and enterprises. Although a lot of public services are accessible via online instruments, the growth is unequal within EU countries and a significant number of EU members are still lagging behind.

For Digital Public Services, Romania reached in 2017 a weighted average score of 3.98% (up from 3.09% last year), improving its ranking to the 27th. With a constant and meaningful progress regarding the availability of Open Data over the last three years (63% in 2016 - up from 27% in 2014), Romania occupied 11th position compared to EU as a whole (59%). Despite this considerable performance, the supply and use of eGovernment services remain still very low. After a small improvement, the number of eGovernment Users in 2015 was 8% (up from 5.8% in 2014), but it decreased to 6% in 2016, positioned last in EU.
Although there was some decline, three of four sub-dimensions were constantly improved, i.e. Pre-filled Forms (12), Online Service Completion (55) and Open Data, the sub-dimension where Romania's performance was one of the best. These progresses emphasise the fact that Romania is struggling to provide access to more online public services, but the level of sophistication of its services should be improved.

8. CONCLUSIONS AND OUTLOOK

Digitalization is no longer just an extension of the business or a term defining the modern society, it has become the fundamental driving force of change. Adopting information technologies is no more an option, it is the only way of generating competitiveness while activating on a global market. Countries must fashion their own responses. Ad hoc or passive postures are likely to lead to increasing digital and economic divides, marginalization of poor, and increasingly costly and burdensome government that erodes economic competitiveness (Hanna, 2011). Thus, as it was observed, the EU as a whole is going digital, improving its performance each year, although the progress is not made at the same pace by every country.

The digitalization doors were wide open to a new economy and society through the European Commission priority "to make the EU's single market fit for the digital age – tearing down regulatory walls and moving from 28 national markets to a single one". Hence, with respect to the European Commission's strategy, the EU members should struggle for reducing the existing difference regarding their performance.

Ranked 28th in DESI 2017, Romania has the advantage of fast broadband connections especially in urban areas, as well as the adoption of mobile broadband which is also increasing. However, the country faces some big challenges regarding human capital digital skills and the integration of digital technology, dimensions which are still low.

Due to the fact that the five DESI dimensions are interconnected and cannot be separated, a low performance in one of these areas is affecting the whole level of digitalization of Romania. With the purpose of improving its overall performance, Romania has to take into consideration both the direct and indirect influencing factors. The main direct factor is represented by the development level of the digital economy, including the digital skills level of citizens, device and internet use. In fact, improvements in these areas will determine a high performance in all the other dimensions, accelerating the eCommerce development and the availability of digital public services. On the other hand, inflation, household consumption and net monthly earnings are factors that have an indirect influence on Romania's performance and should not be neglected.

To sum-up, the country's performance will probably continue to increase in the following years, but the obstacles still exist. Taking into consideration the digitalization trends in European countries, there is still a huge potential for progress and growth in Romania and the country should benefit from all the existing advantages in order to become one of the digital leaders of EU.
The limitation of this paper is represented by the use of secondary information sources, which narrows down in some extent the possibilities of finding applicable solutions for the country's performance improvement. Related to the further direction of the concerned research, it would be advisable to deeper explore relationships of the decisive factors of Romania's digital development, conducting a representative, nationwide analysis.

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