EUROPEAN INFORMATIONAL SPACE.
ROMANIAN PERSPECTIVE

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ABSTRACT

Building a single digital market, as a key element of European Union strategy has required, among others, the development of a common, unitary and coordinated framework for the systematic achievement of community statistics, regarding the informational society. As a result, it can be said that, especially in the last two decades, it has gradually developed a new field of the official statistics.

The statistics of the informational society allows the comparative evaluation of the overall state and evolution of the digital economy and also of each Member State; establishing strategic objectives; monitoring community policies and progress for adjusting future behaviors.

KEYWORDS: *informational society, community statistics, digital economy, digital single market, indicators*

1. THE GLOBAL FRAMEWORK

From the end of the 1970, the concept of informational society has been gradually approached from different perspectives.

a. At first, the technological dimension of the post-industrial society predominated. Major national statistics were focusing on traditional indicators in the field: the equipment of companies and households with ICT- Informational and Communication Technologies, the number or the percentage of users and the subscriptions to different ICT services etc.

b. With the massive inclusion/penetration of the new generation, processing, transmission, storage and usage of data and information in the entire society, it has generated the necessity of quantifying the economic impact of informational society and of the contribution of this sector for shaping the future. As a result, besides the three sectors of the national economy (primary, secondary, third) more often it is used the term of fourth sector. Simultaneously with the clear delimitation efforts of this sector (whose activities are found in industry and services) it has been accentuated the interest for quantifying the ICT sector contribution to economic growth and employment, by using synthetic indicators.

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c. After 2000, by fitting and spreading the concept of *knowledge-based society,* the social-cultural aspects of the current informational society have been highlighted. The integrated approach of the process of the new society model has required the political dimension of the process, by the intervention of the public authorities in organizing, coordinating and regulating at national and European level, and by creating, a digital single market, favorable to innovation and inclusion. In addition to the free movement of goods, people, services and capital, there is the concept of free movement of information that requires unlimited access to online activities in the context of loyal competition and with a high level of consumer and personal data protection.

2. THE STATISTICS RESPONSE

In this context, statistics has a difficult task. In fact, in the last two decades we have assisted to the creation of a new area of global statistics, *the informational society statistics*, which uses new methods for collecting primary data; updates, adaptation and extension of the indicators system; modernizing the analyses methods of results.

Especially after the two waves of accession of the new Member States (2004 and 2007), at European Union level there has been significant difference in term of informational society development: countries with diversified cultural and institutional characteristics, with specific regulations in this field, with levels of performance, development and priorities, sometimes divergent, which used for their performance indicators that, many times, were different or methodologically incomparable. These conditions have led to the isolation of national markets, fragmentation and regional exclusion of European informational space.

Building a single digital market as a key element of EU strategy required the establishment of a government structure that will encompass the major actors involved, including the area of informational society statistics: EU structure, Eurostat, governments and statistical institutes of Member States, business, academic representatives etc.

The first step was to regulate[1] a common, unitary and coordinated framework, for systematic developing of community statistics regarding the informational society that will enable the use of a common language, with a goal of:

- Comparative evaluation – based on a specific system of indicators – of the state and the evolution of the European informational society and each Member State;
- Setting the strategic objectives, with a proactive role designed for modernizing of economy and society, building an informational society able to cover all the areas;
- Monitoring the community policies and progress at national and European level for the adjustment of future behavior.

This is how – nowadays – European statistics, including Romanian statistics, is able to satisfy the permanent need of users for of relevant, coherent, harmonized, reliable and quality statistics information that are adapted to society rapid changes.

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[1] The regulation (CE) no. 808/2004 of European Parliament and of Council regarding the community statistics of informational society and the regulation (CE) no. 1006/2009 with modifications.

3. THE INFORMATIONAL SOCIETY EVALUATION BY SYNTHETIC INDICATORS. ADVANTAGES AND LIMITATIONS

A global analysis, frequently used in practice, is done by two relevant synthetic indicators:

- ✓ share of ICT specialists of total employment;
- ✓ ICT share of Gross Domestic Product;

These indicators of the National Accounts represent an important starting point for sectorial analyses, providing useful information for investigating the informational society contribution to substantially stimulation of economic growth, to increase of employment rate by creating new jobs and ensuring macroeconomic and regional balance.

As any synthetic indicator, the share of ICT specialists of total employment provides a global image of the level and dynamics of the specific phenomenon. In Romania's case, even though the number of ICT specialists has registered spectacular growth after the economic and financial crisis (from 125 thousands persons in 2011 to 168 thousands in 2016), their share of total employment is still at a low level (2%, 27th place in EU, surpassing only Bulgaria).

The established objectives by national and community strategies design to create the digital single market should take in consideration the detailing of synthetic indicators, which can express very different distribution aspects (Table 1).

For instance, Romania has significant levels when analyzing the structure of ICT employment:

- *From the education point of view* (tertiary education or higher), Romania is ranked on 8th place, over the medium level of EU, overpassing many developed economies;
- *From the age point of view* (younger than 35), Romania is outrun only by five countries (Malta, Latvia, Poland, Lithuania and Estonia);
- *From the share of women in ICT activities point of view*, Romania takes the second rank in EU.

Table 1. ICT specialists employed in the EU-2016

	Maximum level EU	Average level EU	Romania	Minimum level EU
Share of ICT specialists in employment –as percentage of total employment	Finland 6.6%	3.7%	Rank 27 2.0%	Greece 1.4%
Share of ICT specialists with tertiary education levels –as percentage of among ICT specialist employed	Ireland 82.4%	61.8%	Rank 8 70.0%	Italy 32.8%
Share of ICT specialists younger than 35 – as percentage of among ICT specialists employed	Malta 63.1%	36.3%	Rank 6 48.4%	Italy 24.5%
Share of women ICT specialists – as percentage of among ICT specialists employed	Bulgaria 30.2%	16.7%	Rank 2 26.3%	Slovakia 9.2%

Source: Elaborated based on data from ec.europa.eu/Eurostat New Release – ICT specialists no. 114/2017

All of these opportunities – true comparative advantages for Romania – should be valorized on a medium and long term. As ICT represents the most dynamic and innovative economic sector, the orientation towards education and sustainability offers a huge potential for adaptation to spectacular changes, from a rapid response to the challenges of a changing environment, able to generate innovation and supplementary added value.

Between the synthetic indicators used for sectorial analyses, there can also be found the share of ICT value added of GDP. Examining this indicator – in the context of time and space comparison – is facing a series of challenges, such as:

- Some countries don't have available data required in order to provide higher or lower accuracy estimations;
- Other countries have provisional data calculated based on the *main activity of companies* principle, instead of *homogeneous production* principle;

As a result, the information provided is not always consistent, coherent, relevant, this being the case for careful interpretation, depending on the methodology underlying the primary data processing.

The last information available[1] shows a favorable image of Romania in term of this indicator. Therefore, the ICT share of GDP is one of the highest in the EU (5.6% compared to the average of EU 4.2%) raking on 4th place, after Ireland, Sweden and Luxemburg (Table 2).

The isolated interpretation of a single indicator (even more when is a synthetic indicator) can lead to unreliable conclusions, which can create the *illusion of performance.*

Indisputably, in the last decade, Romania has registered spectacular progress in the area of informational society development. The question arisen is how to interpret the paradoxical situation of a country that is ranked on 27th place regarding the ICT specialists and also on the 4th place in terms of ICT added value. Two explanations can be identified:

- The first one is justified by the own performance of ICT sector, where there is supplementary added value compared to other fields. Being a growing sector, the dynamics of ICT added value has outgrown the growth of total GDP, that determined permanent increase in the share of digital economy;
- The second one is motivated by the comparative performance deficit of the other economic sectors and the specific sectorial structure. The correlative analysis of the two synthetic indicators: the share of ICT added value of GDP - % ICT (GDP) and the share of ICT specialists of total employment - %ICT (L), allows identifying an incontestable trend. For all Member States, the first indicator registers higher level than the second one, because the ICT labour productivity (W_{ICT}) surpasses the average labour productivity (W_{EC}):

$$K = \frac{\% \text{ ICT (GDP)}}{\% \text{ ICT(L)}} = \frac{W_{ICT}}{W_{EC}} > 1$$

K – Overtaking coefficient

Table 2. ICT share of GDP and labour productivity – 2014

	Maximum level EU	Average level EU	Romania	Minimum level EU
ICT share of GDP %	Ireland 12.1%	4.2%	Rank 4 5.6%	Greece 3%
Labour productivity in the ICT sector –thousands of current euros per person	Ireland 291	95	Rank 21 Approx.50	Bulgaria 27
Labour productivity in the economy - thousands of currant euros per person	Luxemburg 125	Approx.65	Rank 21 17	Bulgaria 12

Source: Elaborated based on data from European Commission - The EU ICT Sector and ITS R&D Performance – Europe's Digital Progress Report 2017;

The gap is even higher as $W_{ICT} > W_{EC}$: for the majority of Member States, the overtaking coefficient is around 1.5, representing an advance of 50% of W_{ICT} compared to W_{EC}; in Romanian case, the level of W_{ICT} exceeds almost three times the W_{EC}. Hence, Romanian favorable position on the contribution of ICT sector to GDP creation could be explained by the productivity deficit of the traditional sectors, by the slow progress in other sectors (inter sectorial gaps).

4. INFORMATIONAL SOCIETY EVALUATION BY ITS OWN INDICATORS SYSTEM

In order to evaluate the profile and progress of the Member States, regarding the development of a digital economy and society, a system of relevant indicators is used, that would reflect with more accuracy the essence of the specific processes and phenomena of economy digitalization and their development.

The *thirty analytical indicators*[1] are structured in five complementary functional areas:

- Connectivity
- Human Capital
- Internet usage by population
- Integration of digital technology in business
- Digital public services

This logical structuring corresponds to a complex approach that allows the sector to be characterized as much as possible, facilitates the analysis of causal relations and the real connections of the domain specific processes.

A. Connectivity evaluates the households and companies access to reliable, high speed and affordable ICT services. This requires the development of high performance communication infrastructure and digital services in an appropriate legal and regulatory framework, providing significant opportunities for innovation, loyal competition and social inclusion. (Network neutrality).

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[1] http://ec.europa.eu/digital-single-market

The connectivity is evaluated based on *four dimensions*:

- Fixed Broadband;
- Mobile Broadband;
- Internet speed;
- Affordability;

B. Human Capital is analyzed by two subdivisions: basic skills and usage for population and advanced skills and development for ICT specialists.

Between the five main dimensions, the connectivity and human capital are the most important, being associated with the highest shares (25% each) for building the Digital Economy and Society Index –

DESI. As a result, the infrastructure development and the professional training in this field are considered important conditions to take into consideration for increasing competitiveness and valorizing the opportunities provided by the digital economy.

C. Internet usage by population is analyzed on a diverse area, which covers *three sectors*:

- *Content* (news, music, videos and gaming);
- *Communication* (social networks and video calls);
- *Transactions* (banking and online shopping).

D. Integrating digital technology in business represent the dimension which appreciates the extent to which companies are valorizing the new technologies as a tool to stimulate labour productivity and economic growth, by developing new business models. Two important sub dimensions are taken into account:

- Business digitalization (electronic exchange of information, electronic bills, cloud computing services etc.)
- E-Commerce (online sale; including cross-border services)

E. Digital public services (E-Government)

The level and evolution of this sector represents a measure to strengthen governance, as for the improvement of the service quality offered by public administrations, by coordinated implementation of E-Government solutions. This is evaluated by *four dimensions*:

- Transparency of public administrations using the *open data policy*;
- Information electronic transfer between public institutions by using *the pre-filled forms*;
- Providing *online service* by public administrations;
- The percentage of *E- Government solution users*;

In order to create a general image of the comparative level of development of informational society in every EU Member States, it has been proposed to develop a composite index – Digital Economy and Society Index – DESI.

DESI allows, by successive aggregations – from the level of analytical indicator, sub dimension, main dimension to the country level – to obtain a rating as a synthetic substituent for the 30 indicators of the informational society.

DESI calculation involves solving two methodological situations: *the first case* refers to the fact that selected indicators are inhomogeneous, are expressed by different measurement units and have different values; therefore it is necessary that the indicators should be homogenized, in the sense that the initial values are assigned correspondent values that allow further aggregation; *in the second case* the aggregation process at different levels requires the establishing of a hierarchical and objective weighting system which would reflect the importance of each element.

DESI = 0.25xCV + 0.25xHC + 0.15xUI + 0.2xIDT + 0.15XDPS
CV= Connectivity
HC= Human Capital
UI= Use of Internet
IDT= Integration of Digital Technology
DPS= Digital Public Services

DESI varies on a scale of 0 to 1; the level of development of informational society is higher as it is closer to 1. In these conditions, DESI measures the gaps that separate the EU countries by total and by size and, implicitly, the relative distances compare to the present and, especially, future objectives.

5. ROMANIA'S PLACE IN THE EUROPEAN INFORMATIONAL SYSTEM

In 2017, *Romania was situated on the last place of the 28 EU Member States*, finding itself in the group of the low performance countries (DESI < EU medium), along with Bulgaria, Greece, Italy, Cyprus, Croatia, Poland, Hungary, Slovakia.

The relative gaps are significant: the DESI level is with 36.5% lower than the EU medium, as for the distance that separates us from the best performing countries, from the informational society development point of view is over 50% (Denmark, Finland, Sweden, and Netherlands).

Table 3. DESI-2017. Romania perspective

	Romania		Low performance countries score	Minimum level EU
	rank	score		
DESI-total	28	0.33	0.41	0.52
Connectivity	22	0.54	0.53	0.63
Human Capital	28	0.31	0.4	0.55
Use of Internet	28	0.29	0.39	0.48
Integration of Digital Technology	28	0.19	0.27	0.37
Digital Public Services	28	0.27	0.43	0.55

Source: Elaborated based on data from https://ec.europa.eu/digital-single-market, 2017 Interim report regarding the EU digital sector;

The size analysis offers a series of findings. The best results have been registered at *connectivity* (the 22nd place), area in which we are situated over the medium level of the group of countries of which it belongs. For the other four dimensions, Romania is ranked last, with a relative gap compared to the EU average of 40-50%.Examining the evolution

in dynamics, in the last years it reflects a series of progresses, to slow to allow significant gaps to recover.

A detailed analysis based on each dimension provides a unitary image[1]:

Connectivity – the first two subdivisions (Fixed Broadband and Mobile Broadband) have a certain infrastructure deficit. The coverage of Fixed Broadband services (26th place) and the coverage new 4G Broadband (28th place) indicate a still low penetration rate. The explanation consists in the obvious high differences between the urban areas (economic developed and highly populated), where is fierce competition, on one hand and the rural areas, with low density of population, where substantial investment and other intervention measures of public administrations are needed, including the access to structural funds, on the other hand.

Using the Broadband services has made progress (23rd place on Fixed Broadband and 22nd place on Mobile Broadband). Access to ICT services remains uneven, as gaps are justified by the low levels of digital competences of the population and also the prices of Broadband network subscriptions, although low in absolute value, are higher in comparison to the ones practiced in EU countries (compared to the incomes of a large part of the population).

Better results in Romania (9th place, over the EU average) can be noticed in allocation and management of radio spectrum licenses for communications, in accordance with a EU unitary regulation framework, that would facilitate the creation of a European digital single market.

The highest progress in connectivity and also in regard to the all 30 indicators is represented by the Internet speed. The percentage of high speed Broadband subscriptions (over 30Mbps) is one of the highest in Europe (70% of total subscriptions, second place), almost double to the EU average (37%).Likewise, the households coverage level of next generation access network is fairly close to the EU average (72%, compared to 76%).

Human Capital – although important progresses are made in the last years, Romania's performance regarding the human capital is ranked under the average level of EU. The basic digital competencies of population are among the weakest ones in the EU: a little over average is using Internet (56% compared to 79% in EU), while 32% have never used the Internet (compared to 16% in EU).

A positive situation is represented by STEM graduates (science, technology, engineering, mathematics) with the age of 20-29 years old (17th place in EU), *a particular development potential* generated by the growth of digital skills of the new generations. This situation cannot compensate, for the moment, the shortage of the skills, especially as numerous specialists have left the country to work abroad.

Use of Internet – The internet offers a variety of information and online applications in almost all areas. Romania's place for this indicator *is very different in regard to the considered sub dimension*.

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[1] Data and information used are processed from: http://ec.europa.eu/digital-single-market/en/desi;

The weakest performance is recorded at: online shopping (28th place) and online banking (27th place) are situated at a very large distance from the EU average. Only 8% of Internet users have turned to baking (5% EU average), whilst the E-commerce is represented by 18% of users (66% average EU). Romanian reluctance of online transactions can be explained by the population lack of trust in the online environment, the lack of clarity of the legislation in the field, generating potential legal conflicts between the companies and the consumers, excessive and sometimes on-transparent fees for banking etc.

The most favorable situation is – in Romania's case – the online communication, ranking itself over the average of EU: the social networks (74% of Internet users, compared to 63% EU average) as well as video calls (45% compared to 39% EU average).

Even though it ranked in the last two places at content, it can be seen an increase interest of Romanian users for online papers reading of news/magazines sites (63% compared to 70% in EU) and music, videos and games (67% compared to 78% in EU).

Integration of digital technology – even though some progress has been noticed, Romania continues to be ranked in the last place in EU. The advanced digital technology is partially used by Romanian companies as an important tool to stimulate productivity and growth.

Regarding the *business digitalization*, the only indicator to which the EU average is exceeded is represented by the radio frequencies identification technologies, used by $% of companies (14th place).Buying cloud computing services and using social media by companies are left far behind the ranking (26th place and 28th place).

As for the E-Commerce, Romania is among the last in Europe ranking, far from EU average.

Digital public services – the positive aspects take into consideration:

- firstly, for the open data policy, Romania is places on 11th place, over the EU average; this a consequence of the development –in the last years – of online public platforms that ensures public administrations transparency by consulting population and companies regarding the facilitation of interaction with the public institutions and identifying ways to reduce bureaucracy;

- secondly, there should be mentioned the progress regarding the initiation and development of pre-filled forms; though, in the last year, their level has doubled, we are still far from EU average.

As for the public administration offer to provide online service completion and the percentage of E-Government users, Romania is ranked last in EU, at a great distance from the European average.

6. CONCLUSION

At present, from the development of informational society point of view, Romania is situated in *gap recovery area*: the performances are under the EU average, but the growth speed is progressing faster; the very good results – especially regarding the stimulation of economic growth generated by the impact of the most innovative sector and the youth,

education and professional mobility orientation – contrasts with a number of modest results in the field.

In this context, the National Strategy for Digital Agenda for Romania 2020[1] has been adopted, for the development of ICT to reach the level of the countries in the region and to establish the Romanian integration premises for Europe Single Digital Market.

Although converging to the European objectives, the strategy is concentrated on national, relevant and assumed priorities, targeting a number of action areas, whose goals for 2020, quantifiable by a set of development indicators, such as: people that uses the E-Government system – 35%; regular users of Internet – 60%; on shopping – 30%; over 30 Mbps Broadband coverage – 80%.

Reaching these objectives requires the allocation of a significant volume of additional investigations, adopting some economic and financial policy measures to support the use of digital technologies in companies' current activities, as well as improving the ICT qualifications of persons hired in various sector of activity.

REFERENCES

[1]   European Commission – The EU ICT Sector and ITS R&D Performance – Europe's Digital Progress Report 2017;

[2]   Government Decision no. 244/2015 for approving the National Strategy for Digital Agenda for Romania 2020;

[3]   Romania Country Report 2017 – European Commission working document, Bruxelles, 22.02.1017, p.4;

[4]   The regulation (CE) no. 808/2004 of European Parliament and of Council regarding the community statistics of informational society and the regulation (CE) no. 1006/2009 with modifications;

[5]   ec.europa.eu/Eurostat New Release – ICT specialists no. 114/2017;

[6]   http://ec.europa.eu/digital-single-market

[7]   http://ec.europa.eu/digital-single-market/en/desi

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[1] Government Decision no. 244/2015 for approving the National Strategy for Digital Agenda for Romania 2020;