DIGITAL SOCIETY AND NEW ECONOMY: CONTENT, HIERARCHIES AND EXPERIENCES

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Abstract

Digital society and the new economy is one of the coordinates of the world we live in, and its dynamics seem to eliminate those who disregard it. The paper aims to provide some benchmarks of what the new economy and digital society means through evaluations/classifications/indexes. Also, the paper aims to analyse the structure of the elements taken into account in order to shape the concept of economy and digital society. This analysis takes into account the indexes of the new economy and digital society published by the European Union, the UN Department for Economic and Social Affairs and, last but not least, a private institution, a Swiss Research Institute and Swiss Business School, International Management Institute, with expertise in leadership training and change management in organizations. At the same time, the paper aims to investigate the hierarchies of the previously mentioned charts and to present some experiences of some countries regarding the new economy and digital society.

Keywords: *digital economy, digital society, e-government, digital competitiveness*

JEL classification: O10, L80

1. General traits

Information society, knowledge society, new economy, digital revolution, digital economy, e-Commerce, e-business, e-Banking, e-Learning, e-Money, e-Trading, telemedicine, teleactivity, telework, e-Teaching, e-Learning, virtual libraries, virtual museums, art galleries on the Internet, digitization of information, digitized textbooks, digitization of national and international heritage. Here is just a brief inventory of the new reality man has to live, work, spend his spare time in. Not everyone, however, because some people either do not know about, are opaque to these new realities, are trying to escape their habits and traditions, or selectively adopt new realities according to their needs, their level of understanding and costs.

The concepts of information economy, digital economy, the new economy are not sufficiently clear, with different approaches from author to author, from work to work. But, in general, these categories relate to information, its production, its use, the equipment through which it is accessed or produced, and last but not least, the exchange of information between economic operators, consumers, public entities. Rather, we can better outline these concepts if we follow the various rankings that rank the nations in the information society. The analysis of this paper starts from three rankings that evaluate the penetration level of digital economy:

- The Digital Economy and Society Index (DESI), calculated by the European Commission, for the Member States of the European Union;
- The E-Government Development Index (EGDI), calculated by the United Nations, for 193 of the UN member states;
- The World Digital Competitiveness Ranking (WDCR), calculated by the Swiss IMD Institute, for a total of 64 economies.

2. DESI (Digital Economy and Society Index)

The Digital Economy and Society Index (DESI) is a composite index that centralizes the performance of the EU Member States in terms of their economy and digital society, taking into account in various proportions five main dimensions: connectivity, human capital, use of internet services, integration of digital technology and digital public services [1].

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In turn, the five dimensions are broken down into other sub-dimensions, with different values, in total, the DESI being calculated on the basis of 14 indicators. The dimensions and sub-dimensions that make up this index are shown in Table 1.

Table. 1. Indicators that form the DESI

DIMENSION	%	SUB-DIMENSION	%
Connectivity	25	fixed broadband	20
		mobile broadband	30
		fast broadband	20
		ultrafast broadband	20
		broadband price index	10
Human capital	25	basic skills and usage	50
		advanced skills and development (ICT specialists and Science, IT, Engineering and Mathematics graduates)	50
Use of Internet Services	15	use of content by citizens (news, music, video, games, video on demand)	33,33
		online communication (videotelephony and social networks)	33,33
		online transactions (banking and shopping)	33,33
Integration of digital technology	20	enterprise digitization (Electronic Information Sharing, RFID Radio-Frequency Identification, Social Media, eInvoices, Cloud)	60
		e-commerce (SMEs Selling Online Ecommerce Turnover, Selling Online Cross-border)	40
Digital public services	15	E-government (E-government Users, Pre-filled Forms, Online Service Completion, E-government Services for Businesses, Open Data)	80
		eHealth	20

Source: European Commission, Directorate-General for Communications Networks, Content and Technology, DESI 2018 Digital Economy and Society Index Methodological notem Updated: May, 2018

Table. 2. Digital Economy and Society Index (DESI)

	2014						2018					
	Connectivity	Human capital	Use of internet services	Integration of digital technology	Digital public services	**DESI**	Connectivity	Human capital	Use of internet services	Integration of digital technology	Digital public services	**DESI**
Denmark	14,79	16,46	9,25	9,70	10,12	**60,31**	19,62	17,60	11,26	12,26	10,98	**71,73**
Sweden	16,36	17,10	9,07	8,55	8,97	**60,07**	19,00	18,56	11,01	11,27	10,61	**70,45**
Finland	13,63	18,12	8,18	8,98	10,76	**59,68**	16,51	19,81	9,81	12,18	11,80	**70,11**
Netherlands	16,49	17,15	7,71	7,11	8,68	**57,13**	20,28	18,56	9,97	10,47	10,58	**69,87**
Luxembourg	14,94	17,87	8,14	6,28	4,57	**51,80**	20,01	17,83	9,88	6,63	8,43	**62,79**
United Kingdom	13,30	16,67	7,31	6,10	7,74	**51,12**	16,28	15,43	7,85	12,00	9,71	**61,26**
Belgium	14,34	13,58	5,76	7,73	6,78	**48,19**	17,21	17,91	9,36	7,99	8,74	**61,21**
Estonia	11,77	13,23	8,06	4,33	10,34	**47,73**	18,78	14,36	8,00	10,91	8,68	**60,73**
Malta	12,36	11,21	7,94	6,31	7,91	**45,72**	16,03	15,34	9,24	7,41	11,72	**59,74**
Germany	12,68	13,97	6,18	6,21	5,72	**44,75**	16,18	13,64	7,41	9,96	10,85	**58,05**
Austria	10,63	14,26	5,17	5,65	8,27	**43,98**	15,93	16,09	7,14	8,83	9,97	**57,96**
Ireland	9,68	13,00	5,52	8,29	7,27	**43,76**	18,28	12,91	9,49	7,78	9,19	**57,66**
Lithuania	9,70	10,85	7,57	7,73	7,39	**43,24**	16,22	12,13	8,53	9,49	10,23	**56,61**
Spain	10,09	11,11	5,93	5,61	9,64	**42,38**	16,19	15,71	7,91	8,27	7,54	**55,61**
Portugal	12,60	9,06	5,70	5,72	8,93	**42,02**	15,64	14,12	7,57	8,02	8,62	**53,98**
European Union	**11,03**	**12,28**	**6,01**	**5,50**	**6,72**	**41,54**	**15,08**	**13,00**	**6,74**	**9,57**	**8,60**	**53,00**
France	10,69	12,74	5,39	4,85	6,34	**40,01**	16,85	11,46	6,95	8,39	8,95	**52,59**
Slovenia	11,01	12,00	5,62	4,92	6,03	**39,59**	15,97	13,77	6,97	8,09	7,52	**52,32**
Latvia	11,33	9,86	7,77	3,66	5,79	**38,41**	14,10	14,77	6,34	7,57	8,76	**51,53**
Czech Republic	9,04	12,26	5,94	6,83	4,21	**38,29**	16,48	10,96	8,22	5,41	9,78	**50,84**
Slovakia	8,22	11,75	5,72	6,41	4,53	**36,62**	13,77	12,97	7,69	7,49	7,56	**49,48**
Hungary	9,65	10,71	6,31	3,21	4,93	**34,81**	15,16	10,76	7,67	7,53	8,22	**49,34**

	2014						2018					
	Connectivity	Human capital	Use of internet services	Integration of digital technology	Digital public services	**DESI**	Connectivity	Human capital	Use of internet services	Integration of digital technology	Digital public services	**DESI**
Poland	9,03	9,79	4,54	3,37	7,03	**33,75**	12,36	12,45	8,11	7,09	6,65	**46,66**
Croatia	6,35	10,08	5,59	6,94	4,04	**32,99**	15,43	11,99	8,05	5,02	6,06	**46,55**
Cyprus	8,64	7,67	6,38	4,42	5,67	**32,78**	14,70	12,07	6,31	4,71	7,23	**45,02**
Italy	7,34	8,51	4,80	3,74	6,66	**31,05**	13,21	10,20	5,60	7,36	7,88	**44,25**
Greece	7,42	7,94	5,09	4,43	3,53	**28,41**	13,73	8,71	6,25	4,88	7,46	**41,03**
Bulgaria	7,92	6,80	4,85	2,93	5,63	**28,12**	10,78	9,55	6,78	5,39	5,89	**38,38**
Romania	**8,92**	**6,28**	**2,89**	**2,87**	**4,08**	**25,03**	**14,53**	**8,02**	**5,24**	**3,55**	**6,20**	**37,55**

Source: European Commission, Directorate-General for Communications Networks, Content and Technology, DESI 2014, 2018

To analyse the progress made by the European states in terms of their economy and digital society, we took two years, 2014 and 2018, as a benchmark. From the analysis of the DESI values at the two moments, the results are:

- the average progress of EU states between 2014 and 2018 was around 11.5 points;
- the largest increases in the DESI are about 14 points for Hungary and Malta respectively, and the smallest, about 10 points, for countries with large scores: Sweden, Finland, Luxembourg, UK, but also Bulgaria, the penultimate country in the ranking;
- the hierarchies are almost unchanged between the two moments;
- the highest progress, on average, of about 4 points is recorded in the Connectivity and Integration of digital technology dimensions, while Human capital and Use of internet services progress is very small, below 1 point, and Digital public services averaging about 2%;
- apart from the Connectivity dimension, where only increases are recorded, some even very high, at 9 points (Ireland, Croatia), the other dimensions are much lower and some countries even register drops.

Table. 3. Romania and the Digital Economy and Society Index (DESI)

Country	2014						2018					
	Connectivity	Human capital	Use of internet services	Integration of digital technology	Digital public services	**DESI**	Connectivity	Human capital	Use of internet services	Integration of digital technology	Digital public services	**DESI**
Denmark	14,79	16,46	9,25	9,7	10,12	60,31	19,62	17,6	11,26	12,26	10,98	**71,73**
UE	11,03	12,28	6,01	5,5	6,72	41,54	15,08	13	6,74	**9,57**	**8,6**	**53**
Romania	8,92	6,28	2,89	2,87	4,08	25,03	14,53	8,02	5,24	**3,55**	**6,2**	**37,55**
Romania/UE	80,9	51,1	48,1	52,2	60,7	60,3	96,4	61,7	77,7	**37,1**	**72,1**	**70,8**
Romania/Denmark	60,3	38,2	31,2	29,6	40,3	41,5	74,1	45,6	46,5	**29,0**	**56,5**	**52,3**

Source: Author's calculations

The comparative analysis of the values of the DESI calculated for 2014, respectively, is totally unfavorable for our country, which occupies the last place among the countries of the European Union. The categories that get the lowest scores (the latest in the EU) are: human capital, the use of the Internet and the integration of digital technology.

The only positive is a slight closing of the gap with the average values calculated for the European Union. Thus, if in 2014 Romania's index was about 60% of that calculated for the EU as a whole, in 2018, Romania's index represents 70% of the EU average.

Also, we can see the progress of our country in all five dimensions, with higher values than the EU averages, but the major problems are our country's modest starting values. But some, despite all the progress achieved over the last four years, remain very low: integration of digital technology (29% of the EU average), human capital (45.6% of the EU average), use of internet services (46.5% of the EU average), with higher connectivity (74.1%) and digital public services (56.5% of the EU average).

3. E-Government Development Index (EGDI)

Since 2001, the United Nations Department for Economic and Social Affairs (UNDESA) has published a study on e-government. The study provides an analysis of the progress in using e-governance.

This study is the only global report assessing the status of e-government development of all member states of the United Nations. It looks at the evolution of e-governance through an index, the E-Governance Development Index (EGDI) [4]. From a technical point of view, EGDI is a composite index, calculated as the weighted average of the normalized scores of three of the most important dimensions of e-government, namely: online services (Index Online Service, OSI), the stage of telecommunication infrastructure development (Telecommunication Infrastructure Index, TII) and human capital (Human Capital Index, HCI).

EGDI = 1/3 * OSI normalized + 1/3 * TII normalized + 1/3 * HCI normalized

Each of the three indices that are part of the EDGI is a value composed of other indicators. So,

- The OSI - Online Service Index - is comprised of the answers of 111 researchers, UN experts and volunteers (students, qualified graduates and university graduates in public administration universities) from over 60 countries, covering 66 languages, which assesses each country's national site in its mother tongue, including the national portal, the e-services portal and the e-participation portal, as well as the websites of the ministries of education, labor, social services, health, finance and the environment.

- The Telecommunications Infrastructure Index (TDI) is an arithmetic mean of five indicators: (i) Internet users per 100 inhabitants; (ii) the number of fixed telephone lines per 100 inhabitants; (iii) the number of subscribers to mobile telephony services per 100 inhabitants; (iv) the number of broadband wireless subscriptions per 100 inhabitants; and (v) the number of fixed broadband Internet subscriptions per 100 inhabitants.

- The Human Capital Index (HCI) is a weighted arithmetic mean of four indicators, namely: (i) adult literacy rate (1/3); (ii) Population coverage rate in the primary, secondary and tertiary education system (2/9); (iii) years of schooling (2/9); and (iv) the average school years (2/9).

The United Nations Department for Economic and Social Affairs (UNDESA), in addition to the EGDI index, also calculates an e-participation index (EPI). The E-Participation Index (EPI) is a derivative of the E-Government Development Index, focusing on the use of online services by citizens. The EPI of a country reflects the mechanisms of e-government participation implemented by the government, compared to all other countries. EPI is built on surveys, and new questions have been added in recent years including: availability of public information, citizens' rights to access government information, and feedback from citizens on how to improve online public services and public opinion use of tools such as social media, online surveys, and online discussion forums to participate in government.

Table. 4. E-Government Development Index and e-Participation Index for EU countries

Country Name	2005						2018					
	E-Government Rank	E-Government Index	Online Service Index	Human Capital Index	Telecommunication Infrastructure Index	E-Participation Index	E-Government Rank	E-Government Index	Online Service Index	Human Capital Index	Telecommunication Infrastructure Index	E-Participation Index
Denmark	**2**	**0,91**	0,97	0,98	0,76	**0,76**	**1**	**0,92**	1,00	0,95	0,80	**1,00**
United Kingdom	**4**	**0,88**	1,00	0,99	0,65	**1,00**	**4**	**0,90**	0,98	0,92	0,80	**0,98**
Sweden	**3**	**0,90**	0,87	0,99	0,84	**0,57**	**5**	**0,89**	0,94	0,94	0,78	**0,94**
Finland	**9**	**0,82**	0,83	0,99	0,65	**0,56**	**6**	**0,88**	0,97	0,95	0,73	**1,00**
France	**23**	**0,69**	0,61	0,96	0,51	**0,41**	**9**	**0,88**	0,98	0,86	0,80	**0,97**
Germany	**11**	**0,80**	0,84	0,95	0,62	**0,56**	**12**	**0,88**	0,93	0,90	0,80	**0,92**
Netherlands	**12**	**0,80**	0,73	0,99	0,68	**0,70**	**13**	**0,88**	0,93	0,92	0,78	**0,99**
Estonia	**19**	**0,73**	0,70	0,98	0,53	**0,62**	**16**	**0,85**	0,90	0,88	0,76	**0,91**
Spain	**39**	**0,58**	0,39	0,97	0,39	**0,08**	**17**	**0,84**	0,94	0,89	0,70	**0,98**
Luxembourg	**28**	**0,65**	0,40	0,91	0,64	**0,14**	**18**	**0,83**	0,92	0,78	0,80	**0,94**
Austria	**16**	**0,76**	0,74	0,96	0,58	**0,41**	**20**	**0,83**	0,87	0,85	0,77	**0,83**
Ireland	**20**	**0,73**	0,71	0,96	0,50	**0,19**	**22**	**0,83**	0,83	0,96	0,70	**0,93**
Italy	**25**	**0,68**	0,63	0,93	0,48	**0,24**	**24**	**0,82**	0,95	0,83	0,68	**0,96**
Belgium	**18**	**0,74**	0,71	0,99	0,51	**0,51**	**27**	**0,81**	0,76	0,97	0,69	**0,76**
Portugal	**30**	**0,61**	0,43	0,97	0,43	**0,21**	**29**	**0,80**	0,93	0,82	0,66	**0,90**
Malta	**21**	**0,70**	0,79	0,87	0,44	**0,48**	**30**	**0,80**	0,84	0,80	0,77	**0,85**
Poland	**38**	**0,59**	0,51	0,96	0,29	**0,35**	**33**	**0,79**	0,93	0,87	0,58	**0,89**
Greece	**35**	**0,59**	0,51	0,95	0,31	**0,16**	**35**	**0,78**	0,82	0,89	0,64	**0,88**
Cyprus	**37**	**0,59**	0,46	0,89	0,41	**0,08**	**36**	**0,77**	0,78	0,81	0,73	**0,82**
Slovenia	**26**	**0,68**	0,59	0,96	0,48	**0,22**	**37**	**0,77**	0,80	0,89	0,62	**0,81**
Lithuania	**40**	**0,58**	0,52	0,96	0,25	**0,11**	**40**	**0,75**	0,80	0,83	0,63	**0,80**
Hungary	**27**	**0,65**	0,70	0,95	0,31	**0,38**	**45**	**0,73**	0,74	0,84	0,61	**0,71**
Bulgaria	**45**	**0,56**	0,52	0,91	0,25	**0,25**	**47**	**0,72**	0,76	0,81	0,58	**0,87**
Slovakia	**36**	**0,59**	0,54	0,91	0,32	**0,17**	**49**	**0,72**	0,74	0,81	0,60	**0,81**
Czech Republic	**29**	**0,64**	0,59	0,92	0,41	**0,21**	**54**	**0,71**	0,65	0,88	0,60	**0,62**
Croatia	**47**	**0,55**	0,44	0,90	0,30	**0,17**	**55**	**0,70**	0,68	0,82	0,61	**0,77**
Latvia	**32**	**0,61**	0,48	0,95	0,38	**0,17**	**57**	**0,70**	0,67	0,81	0,62	**0,69**
Romania	**44**	**0,57**	0,64	0,88	0,19	**0,32**	**67**	**0,67**	0,66	0,79	0,55	**0,71**
United States	**1**	**0,91**	1,00	0,97	0,75	**0,90**	**11**	**0,88**	0,99	0,89	0,76	**0,98**
Zambia	**180**	**0,00**	0,00	0,68	0,02	**0,00**						
Somalia							**193**	**0,06**	0,11	0,00	0,06	**0,13**

Source: United Nations, UN E-Government Knowledge, Country Data

Specifically, the e-participation index (EPI) is based on the following information:

- electronic information - the availability of online information, that is to say, the level of information provided by governments to citizens (exchange of electronic information);

- electronic consultation - online public consultation, i.e. interaction between the parties by electronic means (electronic consultation), and

- making electronic decisions - involving citizens directly in decision-making processes.

In regards to the E-Government Development Index, Romania occupies a middle position in the ranking (67th place, with an index value of 0.67) and, unfortunately, the last among EU member states. Over time, our country's position deteriorates (dropping down from 44th place), although the value of the index is rising. Per dimension, the index gains an important addition to the telecommunication infrastructure dimension (0.55 in 2018, compared to 0.19 in 2005), value is maintained from the online service dimension (0.66 in 2018 versus 0.64 in 2005) and registers the human capital dimension (0.79 in 2018, compared to 0.88 in 2005).

Regarding the E-Participation Index, Romania has a value of 0.71, which places it on the second to last place among EU states (after the Czech Republic and Latvia).

4. The World Digital Competitiveness Ranking - WDCR

The World Digital Competitiveness Ranking (WDCR) is a relatively new tool and has begun seeing use "in response to the growing need for decision-makers and practitioners to appreciate and manage digital transformations." The objective of this index is to assess the extent to which a country adopts and explores digital technologies that lead to transformations in government practices, business models and society in general.

The WDCR is computed by an independent business school (IMD), with Swiss roots and global coverage, specializing in leadership training and organizational change management. IMD has its origins in a higher education and research institute specialized in economics, IMEDE - Institute for Entrepreneurial Direction set up in Lausanne by the Nestlé Company in collaboration with Harvard Business School. The Institute would operate under the name of IMEDE until 1989, when it would merge with the Centre d'Etudes Industrielles in Geneva (now IMI - International Management Institute). Following the merger between IMEDE and IMI in 1990, the new organization becomes IMD - the International Institute for Management Development, based in Lausanne, with the goal of forming world leaders. IMD is also known for the World Competitiveness Yearbook (WCY), which classifies the nations in terms of economic performance and competitiveness, the first such yearbook being published in 1989. Since 2016, IMD has been developing a global ranking of digital competitiveness (Digital World Competitiveness Ranking - WDCR). The WDC classification methodology [2] defines digital competitiveness according to three major factors, and each of these factors is divided into 3 sub-factors that highlight each aspect of the analysed areas, resulting in 9 such sub-factors. These include 50 indicators/aspects, but each sub-factor, regardless of the number of criteria it contains, has the same share as a whole (i.e. about 11.1%; 9x11.1~100). The 50 indicators/aspects are either measurable indicators (which have a share of 2/3 in the overall ranking), or are "soft data", resulting from surveys (analyses competitiveness as it is perceived), which have a share of 1/3. It should also be noted that WDCR was calculated for 63 states in 2018.

Specifically, the three factors and the 9 sub-factors are the following:

1. Knowledge, assessed based on three sub-factors:

1.1. Ability (talent), where the following are commensurate: the results of the educational assessment, the PISA test - mathematics, the international experience of high-level managers, if the highly qualified foreign staff is attracted to the country's business environment, if city management supports business development, if digital / technological skills are easily accessible, the net flow of international students:

1.2. Training and education, the aspects considered being: whether employee training is a major priority in companies, the total public spending on education as a percentage of GDP, the percentage of the population aged 25-34 that reached at least the level of tertiary education, the number of students returning to a teaching staff, the number of graduates in ICT, engineering, mathematics and natural sciences, the share of women with a university degree in the population aged 25-65;

1.3. Scientific concentration, as seen by the indicators: total R&D expenditure as a percentage of GDP, total full-time R&D personnel, female researchers, as a % of total R&D productivity (by the number of published scientific articles correlated with R&D expenditure as % of GDP), employment in the fields of science and technology as % of total employment, high technology patents as % of all patents granted by the applicant’s country of origin.

2. Technology, also evaluated based on three sub-factors, namely:

2.1. The regulatory framework, quantified through the business initiation procedure, contract execution, immigration laws (if immigration laws do not prevent the company from

resorting to foreign employment), if the development and application of technology is supported by the legal environment, if the scientific research legislation encourages innovation, if intellectual property rights are properly implemented;

2.2. Capital, assessed through the IT & media sector's market capitalization as a % of total stock market capitalization, if technology development funding is available, if banking and financial services support economic activities effectively, what are investment risk and country risk, if venture capital is easily accessible for business, what are the telecommunication investments as a % of GDP;

2.3. Technological framework, where the following types of indicators are evaluated; if the communications technology (voice and data) meets the business requirements, the number of Mobile Broadband 3G & 4G subscribers as % of the mobile market, wireless broadband penetration rate per 100 people, the number of Internet users per 1000 people, average speed Internet bandwidth, high technology exports as a percentage of total manufactured exports;

3. Future Readiness, as seen through these three sub-factors:

3.1. Adaptive attitudes, which result from the following: the use of online services that facilitate public interaction with the government, Internet retail per one million people, possession of tablets as % of total households, smartphone possession as % of total households, if their attitudes to globalization are generally positive;

3.2. Business agility, assessed through issues such as: whether companies respond quickly and efficiently to opportunities and threats, what is the number of innovative firms as a % of total production enterprises, how agile/fast companies are, whether companies use data analysis to support decision-making, how much knowledge is developed between companies and universities;

3.3. IT integration, quantified through: e-governance – i.e. providing online government services to promote citizens' access and inclusion, public-private partnerships – i.e. whether public-private partnerships support technological development, cyber security - if computer security is adequately addressed by corporations, software piracy - that is % of unauthorized software.

Table. 5. The World Digital Competitiveness Ranking, total and factors

Country	WDCR					Knowledge					Technology					Future readiness				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
USA	2	2	2	3	**1**	4	6	4	5	4	5	6	5	6	3	1	3	1	2	2
Sweden	3	5	3	2	**3**	2	2	2	2	7	4	9	4	5	5	3	9	8	5	5
Denmark	7	8	8	5	**4**	8	9	8	8	8	14	13	12	10	10	4	6	6	1	1
Finland	4	3	6	4	**7**	5	7	9	9	9	2	7	7	4	4	6	4	5	4	8
Netherlands	6	6	4	6	**9**	11	14	13	11	12	13	15	10	9	8	2	1	2	3	4
G. Britain	12	12	12	11	**10**	13	12	11	10	10	17	18	18	16	13	14	11	11	9	3
Austria	24	26	19	16	**15**	14	16	12	12	13	27	29	28	28	26	16	19	19	15	14
Germany	14	17	15	17	**18**	16	10	10	13	14	24	25	25	21	21	8	13	14	18	20
Ireland	17	25	20	21	**20**	21	26	25	25	22	22	27	27	25	29	11	12	12	10	13
Belgium	25	19	18	22	**23**	26	21	20	22	25	29	24	21	24	24	17	15	16	22	23
Luxembourg	19	16	21	20	**24**	28	23	29	27	32	3	2	11	12	15	21	23	24	23	21
Estonia	23	27	27	26	**25**	23	30	30	28	29	20	19	17	19	20	22	26	26	26	26
France	22	20	22	25	**26**	15	20	21	19	20	19	23	23	22	19	26	21	20	28	27
Lithuania	32	28	29	29	**29**	25	18	18	21	23	32	28	29	29	30	37	34	33	31	33
Spain	29	30	30	30	**31**	35	35	36	33	31	36	35	32	33	33	28	29	30	29	30
Portugal	30	29	31	33	**32**	31	29	31	31	27	33	30	35	37	36	30	31	31	35	32
Czech R.	31	31	32	32	**33**	38	36	34	36	38	26	26	26	26	31	33	33	34	37	34
Slovenia	37	39	36	34	**34**	32	28	26	26	26	43	43	40	40	38	39	41	35	36	35
Latvia	33	34	33	35	**35**	33	32	33	34	34	28	32	33	32	32	40	37	39	41	39
Poland	39	38	38	37	**36**	36	31	27	32	33	37	36	36	39	37	50	49	51	39	37
Italy	41	36	34	39	**41**	46	42	40	42	42	50	46	44	45	41	31	30	29	30	36

Country	WDCR					Knowledge					Technology					Future readiness				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Bulgaria	53	54	47	45	**43**	47	45	38	41	41	45	42	38	42	42	59	59	58	57	55
Croatia	45	46	44	48	**44**	49	46	45	50	43	44	41	43	47	49	47	52	50	56	54
Hungary	36	44	42	44	**46**	42	44	43	48	48	34	39	37	38	40	36	47	45	55	58
Romania	**54**	**51**	**49**	**54**	**47**	**56**	**50**	**48**	**47**	**45**	**51**	**45**	**46**	**46**	**44**	**56**	**57**	**57**	**59**	**57**
Slovakia	40	43	41	43	**50**	40	43	41	43	49	35	40	41	43	47	43	44	43	46	53
Greece	48	40	45	50	**53**	44	34	46	51	51	52	51	52	52	51	42	36	36	47	46
Cyprus	-	-	-	53	**54**	-	-	-	46	55	-	-	-	54	56	-	-	-	54	44

Source: International Institute for Management Development, Competitiveness Centre, IMD World Digital Competitiveness Ranking 2018

The World Digital Competitiveness Ranking ranks Romania 47th among the 63 countries it takes into account. Our country has improved its position in the rankings, climbing seven places in the last five years. Romania is better ranked on the criterion of knowledge (45th place) and the technology criterion (44th place) and a weaker position on the future readiness (57th place), respectively.

5. Highlights of digital society

The countries [3] that rank first in the previous charts have taken steps to move towards a digital society 15-20 years ago, have permanently had their citizens as allies in the process, have approached at least two digital channels, have prioritized digitizing public services, hence the impetus for business digitization, the latter being interested in adopting digitization through economic advantages, regulations and transparency. Here are some experiences of well-positioned states in previous rankings.

Denmark

2006 - The electronic passport (contains an information chip) and the digital photograph are introduced;

2007 – The www.borger.dk online portal is launched, containing information about public institutions and digital services offered;

2008 - The portal is upgraded, with the introduction of a page dedicated to citizens and the history of their relationship with the state;

2009 - An application that allows teachers to disseminate digitization-related knowledge through online training is launched;

2010 - Digital signature is introduced to provide fast and secure access to a wide range of public and private solutions, including e-banking, cadastre, insurance and pension funds (70% of the Danish population uses digital signature);

2011 - Technology that allows companies to send electronic invoices via the Internet in a secure way is launched;

2012 - The mobile version of this application is introduced;

2011-2015 - Introducing a service that facilitates the receipt of private and government emails in a single digital box.

Estonia

- Is an example of digital democracy and e-government, because 95% of tax returns are filed electronically via the e-Tax application, 95% of medicines are bought with a digital recipe (2015), 30% of votes are online, at European, national and local levels;

- Digital banking is used over 50%;

- A unique portal containing central and local government digital services in Estonia has been launched. It can be accessed using an e-ID/mobile ID, or alternatively through bank authentication elements;

- Government meetings are held online through a dedicated portal (the Estonian Government was the first in the world to prepare government meetings in the online environment, making decision-making transparent, reducing the duration of a meeting from 4-5 hours to 30 -90 minutes and lowering costs);

- Since 2000, an application (the X-road Concept) has permitted the secure exchange of data between public and private computer systems, while also allowing each person to access a number of public registers (www.eesti.ee), the connection being made in the e-ID or mobile phone number base, which the citizens have the opportunity to review, and correct their own data in the registers;

- In 2003, the e-School application, which allows communication between students, teachers, parents and the school administration, starts functioning;

- In 2014, the e-Residency application/portal is established, which allows the digital signing of contracts, managing the company online, the relationship with banks and tax bodies.

Switzerland

It followed Estonia's example, as a model for digitization;

1990 - the E-Tax application is implemented;

2002 – Inception of digital identification (e-ID), without the system being generalized (fears about data protection and security);

2003 - Electronic voting is introduced in the Geneva canton (replacing the vote by post), the model being followed by other cantons, and an integrated system for the digital identification of voters being developed;

2007 - Inception of e-Health (patient's online file, development of national health services and information and introduction of the health card in 2010);

2010 – Beginning of Suisse ID (enables electronic identification and digital signature);

2015 - The electronic transport card is introduced;

The uPort concept is introduced - a decentralized identity concept based on "blockchain" technology that allows the transmission of credentials, signing online transactions in a secure environment.

United Kingdom

- The GDS-Government Digital Service exists, dedicated to digital services;

2013 - the Total Mobile App platform is launched, which integrates all data from the relationship with public institutions;

2014 - GOV.UK Verify appears, an application that permits the online verification of citizens' identity;

- Inception of The Red Tape Challenge Website, a portal facilitating maximum transparency on legislative decisions, the audience having 2 weeks to express their opinion, and the institutions, 3 months to comply;

- Introduction of HMRC ("Her Majesty's Revenue and Customs"), which allows for the payment of taxes online;

- Healthtech and EdTech, portals that enable e-health and e-education services;

- ICT disciplines are taught to children from the age of 5;

- Single Business Identifier, an application that provides all relevant information about a company;

- Government Gateway, a portal that allows access to governmental digital services.

Singapore

- Reach portal - for citizen-government communication;

- GWS-X - for data exchange between government agencies;

- Data.gov.sg - for the integration of 8000 databases and the use of 100 applications;

- eCitizen - allows citizens to interact with the public administration;

- Mobile SingPass - allows personal transactions via mobile;

- Citizen connect centers - channels / access points that include e-mail, mobile services, terminals, information points and ensure their overall connectivity;
- eVoice, allows the delivery of services using speech recognition technology;
- Business portal, allows interaction between business and public institutions;
- OBLS, allows licensing;
- Alliance for Corporate Excellence (ACE), a single system that integrates acquisitions, IT and financial aspects;
- Interactive TV, allows the transmission of government information to citizens, and feedback;
- Sing Pass - a common password for all government services;
- OneMap - platform that integrates spatial data (eg transport, schools, parks, sports centers, demographic data visible on the map);
- iEP - dedicated application to develop intellectual property

6. Conclusion

The digital society and new economy are one of the coordinates of the world we live in, and its dynamics seem to eliminate those who disregard it. This paper aims to provide some benchmarks of what this digital economy and society means, through evaluations/classifications/indexes. For this assessment, three rankings are analysed:

- The Digital Economy and Society Index (DESI), calculated by the European Commission, for member states of the European Union;
- The E-Government Development Index (EGDI), calculated by the United Nations for 193 of its member states;
- The World Digital Competitiveness Ranking (WDCR), calculated by a Swiss IMD Institute, for a total of 64 economies.

From analysing international rankings that evaluate this digital economy and society, it follows that the main issues associated with it are included:

- Knowledge, assessed through: skills (talent), training and education, scientific concentration, human capital, digital competences;
- Digital technology, assessed based on: telecommunication infrastructure, internet connectivity, use of internet services, regulatory framework, digital capital stock size, technology framework;
- Future availability, evaluated through factors such as: use of online services, the number of innovative businesses, providing government online services, E-government, e-Health, online services, integration of digital technology, online businesses.

Additionally, based on the analysis of the three indexes, it is clear that Romania occupies low positions in all three rankings.

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