DIGITAL ECONOMY AND SOCIETY INDEX - FROM THE PERSPECTIVE OF HUNGARY

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ABSTRACT: *Digitization in the European Union is a key, important policy aiming to build the digital economy and society in the European Union, which requires a complex legal relationship between the EU and the Member States. This is one of the reasons why membership of the European Union entails many rights and obligations for our country. One such obligation is that the Union develops a set of indicators from data provided by Member States. With these indicators the Union can compare the Member States' performance in different (economic) areas. One of these is Digital Economy and Society Index (DESI) which is a complex indicator that summerizes relevant indicators of the Union's digital performance and monitor the development of EU Member States' digital competitiveness. In the present study we examine the performance of Hungary in the European Union in recent years through the DESI indicators.*

KEYWORDS: *digital economy and society index (DESI); digital public services; DESI dimensions Hungary's perfomance.*
JEL Code: *K39*

1. INTRODUCTORY THOUGHTS/THEORETICAL UNDERPINNING

In building the digital economy and society of the European Union, DESI (Commission, 2022) aims to summarize the indicators of the digital performance of the Union. Why is it important to monitor the EU's digital performance? I think that the answer to this "poetic" question is particularly simple for today's children. Digital technologies play a significant role in our lives. By this I mean all the information communication technologies that are increasingly determining our personal life (smart watch, smart phone, smart TV, passive house, etc.), our workplace, and our work. However, these technological developments must be kept under control and used for the benefit of society. It may even happen that the number of Internet users in a country is very high, but the appropriate digital competences are lacking, so we cannot talk about the useful use of the Internet. DESI can also point out such and similar problems and shortcomings.

DESI was created in 2015 to measure the progress of the Digital Agenda for Europe (Csótó, 2019, p. 15.; Stavytskyy, Kharlamova and Stoica, 2019, p. 247.), adding that the European Commission has already collected data from 2014. (Folea, 2018, p. 125; Jordanoski-Meyerhoff Nielsen, 2021, p. 190; Bánhidi, Dobos and Nemeslaki, 2020, p. 44.)

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Since then, the EU has published the digital performance indicators of the member states every year. The 2021 DESI was published by the European Commission in November 2021. (Press Release, 2021) The 2021 DESI goes beyond the minor amendments of previous years and aims to comply with the EU policy guidelines of the current decade, which has resulted in a change in the structure and methodology. One of the mentioned policies is the the Recovery and Resilience Facility [1] and the other is the Digital Decade Compass. The DESI indicators are already built around the four main dimensions of the digital compass, replacing the previous five-dimensional (five dimensions[2] appeared in the index before 2021) structure. Eleven of the 2021 DESI indicators measure those defined in the digital compass. The aim is for DESI to be even more aligned with the digital compass in the future, to ensure that all set results are available to Member States. (DESI Hungary, 2021, p. 2.)

DESI has a three-layer structure. It consists of four dimensions, each dimension is made up of sub-dimensions, and sub-dimensions contain unique indicators. „DESI aggregates the results of more than 30 indicators and ranks the member countries according to the weighting system for measuring digital performance,…" (Racsko, 2017, p. 103.). The indicators are quantitative indicators hat help the analysis and comparative approach. Quantitative indicators are provided to DESI by the statistical offices of the member states, communications authorities and the ministries involved in their tasks and competences. The DESI indicator always shows the results of the previous year, which has already ended, unless the European Commission receives the data from the member states late. In this case, the result of the previous year with statistics will continue to be used in the index, which the European Comission already had before.

The dimensions of the DESI are:
- Human Capital (1),
- Connectivity (2),
- Integration of digital technology (3),
- Digital public services (4).

Let's take a brief look at the essence and purpose of the different dimensions. The dimension of human capital measures the skills and special expertise needed to take advantage of digital opportunities. Connectivity measures the construction and quality of broadband infrastructure, as well as 4 and 5G coverage. The integration of digital technologies dimension monitors the digitization of businesses and e-commerce. By implementing digital technologies, businesses can increase their efficiency, reduce their costs and better engage customers and business partners in online commerce. Furthermore, with the help of the Internet, they can access wider markets and this provides them with growth potential. The dimension of digital public services measures the digitization of public services, focusing on e-government and online public services provided to citizens and businesses. The modernization and digitization of public services can result in more

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[1] The aim is to mitigate the economic and social impact of the coronavirus pandemic and make European economies and societies more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions.

[2] For detailed content of the dimensions, ratios and values of the indicators, see Stoica-Bogoslov, 2017. and Molnár, 2020.

efficient administration for public administration, citizens and businesses both. (Cseh, 2020a, p. 53)

DESI wants to hold a mirror in front of member states so that they can clearly see their own performance and that of others through the same lens, thereby making member states' performances easier to compare. (Jakubelskas, 2021, p. 45) By combining the dimensions, DESI creates a unified index, based on the results of which, in 2021, our country ranked 23rd (Hungary: 41.2 points) among the 27 EU member states (EU average: 50.7 points). In 2021, among our regional competitors, Poland and Romania performed worse than our country, while the Czechs and Slovaks were slightly ahead of us. (DESI Hungary, 2021, p. 3.) If we look at the indicators of previous years (see Table 1.), we can say that our country's results have improved roughly at the same rate as the EU average. (DESI Hungary, 2021) As we indicated above, several changes took place in the 2021 DESI, this can be attributed to the - in some places significant - decline of the 2021 results in Table 1, which only shows the changed calculation methods, not the significant digital decline of our country and the Union.
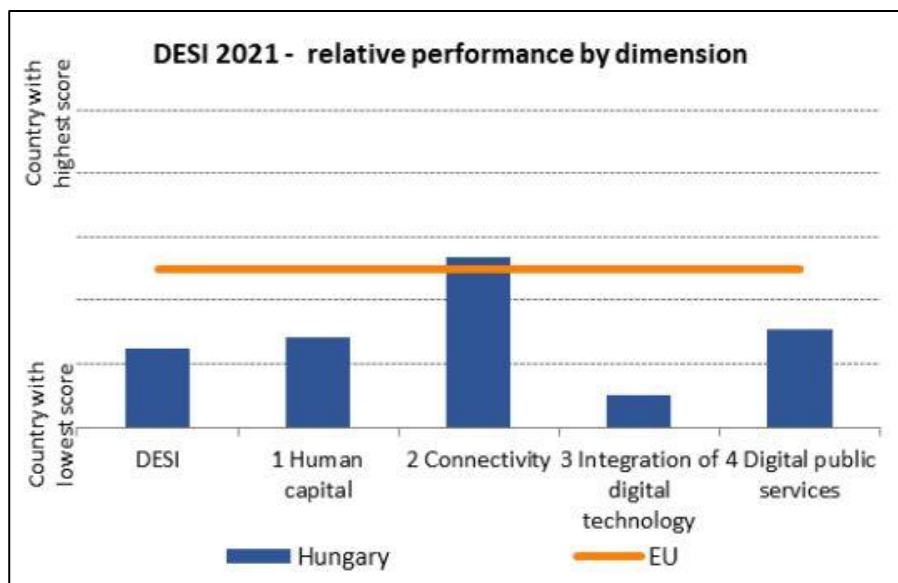

Figure 1: Comparison of DESI dimensions in 2021, Hungary vs. EU average (point averages)
Source: DESI Hungary 2021 p. 4.

Taking into account the results of the DESI indicator, our country cannot be completely satisfied (see Figure 1.), however, we also have some dimensional results that should be evaluated. In the connectivity dimension, we have performed above the EU average in the last four years (see Table 1.) and the two years before that. (Cseh, 2020b, p. 246) It should be emphasized that all unique indicators in this dimension - except for one - are from 2020 or 2021, so their relevance is unquestionable. We perform above the average in several indicators of broadband internet coverage (which is mainly due to the country's extensive

cable network), but we are below the average regarding the take-up of mobile broadband, despite the fact that our 4G coverage is 99.3%. (DESI Hungary, 2021, p. 7.) This may be due to the fact that the tariffs of mobile service providers are considered high even at the European level. (Cseh, 2020b, p. 248)

DESI dimensions		2018	2019	2020	2021
Human capital (1)	Hungary	42,5	47,6	41,8	40,5
	European Union	42,1	47,9	49,3	47,1
Connectivity (2)	Hungary	41,1	45,9	59,8	52,0
	European Union	39,9	44,7	50,1	50,02
Integration of digital technology (3)	Hungary	25,7	24,9	25,3	23,3
	European Union	37,8	39,8	41,4	37,6
Digital public services (4)	Hungary	43,6	50,7	57,8	49,2
	European Union	61,8	67,0	72,0	68,1

Table 1: Time-series comparison of DESI dimension scores 2018-2021, Hungary vs. EU average (point averages)
Source: own edits based on DESI Hungary, 2020 and DESI Hungary, 2021.

In the following, I would like to analyze the indicators in the dimensions in more depth and try to point out what steps our country has taken to counterbalance and strengthen the bad or even good results of previous years.

2. HUNGARY'S DESI-BASED RESULTS, DOMESTIC REACTIONS [3]

In this chapter, we will evaluate the dimensions of DESI, and we will try to point out what development programs and strategies our country has developed, and what other specific steps it has taken in view of the shortcomings.

In the 1st dimension (human capital), our country ranks 22nd. (DESI Hungary, 2021) It is a significant problem that half of the population has at least basic digital skills (49% compared to the EU average of 56%) and only half of the population has at least basic software skills (51% compared to the EU average of 58%). We are also not doing well in terms of digital skills at a higher than basic level, only a quarter of the population has it (25% compared to the EU average of 31%). It should be added that these values are from 2019, but what is more negative is that they have only changed very minimally since 2017. (DESI Hungary, 2021, p. 5.) The proportion of ICT (infocommunication technology) specialists is below the EU average (4.3%), although it is a fact that the domestic result in 2020 (3.8%) increased compared to 2019 (3.4%). Unfortunately, the field of ICT is still

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[3] This chapter is based on data from DESI Hungary 2021 and the website https://ec.europa.eu/digital-single-market/en/scoreboard/hungary.

not popular enough among women in our country, so only 12% of ICT specialists are female employees.

Although we do not perform so well in the field of ICT specialists, the proportion of our ICT graduates (4.9%) is significantly higher than the EU average (3.9%). Our country has launched a number of programs (e.g.: Digital Education Strategy of Hungary[4], Digital Workforce Program[5]) to develop the digital skills of the domestic population, but we do not yet see the results of these programs clearly reflected in the values of the DESI indicators. In connection with the programs, we should mention Hungary's National Digitalization Strategy (NDS)[6], which aims to define the digital development directions of our country between 2021-2030, so that by 2030 we will be among the ten leading European economies. The framework strategy also highlights DESI as a main point of alignment. The NDS builds its strategy around four pillars:

- Digital Infrastructure (1),
- Digital Skills (2),
- Digital Economy (3),
- Digital State (4).

The Digital skills pillar designates three main devices that work effectively with each other: 1. launching public digital competence development programs in order to qualitatively and quantitatively alleviate the lack of digital competences (based on DigComp[7]); 2. increasing the quantity and quality of the number of computer scientists and engineers; 3. supporting the structural change in education necessary for the development of digital competence. (National Digitalisation Strategy, p. 8-11.) The device system aimed at developing digital skills is particularly ambitious. It includes both the development of citizens' basic skills and increasing the supply of specialists, so it is an appropriate reaction to the "weaknesses" identified in the DESI. However, we must draw attention to the fact that Hungary has not yet adopted this strategy!

In the Internet access (2) dimension, as mentioned earlier, Hungary performs particularly well. We are currently in 12th place, and we beat the EU average in several individual indicators. Our 5G coverage (7 %) is only half of the EU average (14 %), yet in terms of 5G readiness (60 %), we perform above the EU average result (50 %). (DESI Hungary, 2021, p. 7.)

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[4] One of the key objectives of the Digital Success Programme is to make digitalisation a win-win situation for everyone in Hungary and to avoid a digital divide in society. Within the Digital Success Programme, the Government adopted the Digital Education Strategy of Hungary in October 2016, which aims to ensure that everyone in the education and training systems can acquire at least basic digital competences. (Available: at: https://digitalisjoletprogram.hu/files/d4/6b/d46bf17fdef3c9b5c1d38bd6db64c2a7.pdf [Accessed 18 07 2022])

[5] The Digital Success Programme supports the preparation of the Digital Workforce Programme, which includes short- and medium-term solutions to address the shortage of IT and digitally skilled professionals. Within the framework of the programme, it is essential to expand the capacity and update the content of traditional training systems and to develop alternative training pathways to provide the digital economy with an IT and digitally literate workforce. (Available at (only in hungarian): https://digitalisjoletprogram.hu/files 2e/86/2e865bc650f57539da2dbccf7b169eda.pdf [Accessed 18 07 2022])

[6] The National Digitalisation Strategy replaces the National Infocommunications Strategy (NIS) for the period 2014-2020, which is based on an integrated approach, and takes into account the Digital Success Programme and the initiatives launched by the ministries themselves, which represent a strategic orientation and measures important for digitisation.

[7] https://joint-research-centre.ec.europa.eu/digcomp/digital-competence-framework_en [Accessed 18 07 2022]

The development of our country's infrastructure was strongly influenced by the aforementioned National Infocommunications Strategy and the Digital Success Programme. They were also supported by the Superfast Internet Program[8], the Hungarian 5G Coalition[9] and the National Information Infrastructure Development Program[10]. These programs significantly increased our country's performance in this dimension, as most strategies and programs brought tangible results, and this is also indicated by the DESI results. One of the additional objectives of the National Digitalization Strategy for 2030 is to cover 95% of households with gigabit networks. (National Digitalisation Strategy, p. 9.)

The integration of digital technologies dimension (3) examines the proportion of the use of digital technologies within the scope of the company's activities. In this dimension, we also find data for 2019, 2020 and 2021. In this case, our country took 26th place, well behind the European average. Unfortunately, this is not a new problem, we have had a big disadvantage since the beginning of DESI, but the difference has become even bigger.[11] We are at a disadvantage compared to the EU average for all individual indicators (e.g.: electronic information sharing between businesses, use of cloud-based services, e-invoicing by businesses). n some cases, EU values are double compared to domestic values, which indicates that our disadvantage is significant. In the case of one indicator, (ICT for environmental sustainability) we are very close to the EU average, but here too we are 1% below it. (DESI Hungary, 2021, p. 11.)

The use of ICT tools by businesses is still very low at EU level. Despite the fact that there are several domestic initiatives (e.g.: Artificial Intelligence Coalition[12], Hungary Artificial Intelligence Strategy[13], Modern Enterprises Programme[14]) for the development and integration of ICT technologies and the acceleration of production processes, businesses still view the effects of digitization as a burden. We must also refer to the not yet adopted National Digitalization Strategy. The NDS designates four focus areas within the digital economy pillar: 1. Increasing the digital supply and use of small and medium-sized enterprises; 2. Development of digital startup businesses; 3. Targeted development of the ICT sector through support programs; 4. Utilization of state data assets for economic purposes with targeted strategies and measures. (National Digitalisation Strategy, p. 11.) As we indicated earlier, there are statistics in this dimension from several years, it can be

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[8] The aim of Superfast Internet Program is that, as a result of large-scale network developments, all Hungarian families will have the opportunity to use the superfast internet service with a speed of at least 30 Mbit/s.

[9] The goal of the Hungarian 5G Coalition (5GC) initiated by the Digital Success Programme is for Hungary to become one of the European centres of 5G developments and to play a regional leading role in the development and testing of 5G-based applications.

[10] The National Information Infrastructure Development Program, which provides an integrated national network infrastructure and services for the entire Hungarian research, education, and public collection institutional system.

[11] See: https://digital-agenda-data.eu/charts/desi-see-the-evolution-of-two-indicators-and-compare-countries # chart={%22indicator%22:%22desi%22,%22breakdown%22:%22desi_idt%22,%22unit-measure%22:%22pcde si%22,%22ref-area%22: [%22EU%22,%22HU%22]} [Accessed 19 07 2022]

[12] The Hungarian Artificial Intelligence Coalition aims to put Hungary at the forefront of artificial intelligence developments and applications in Europe and to become an important member of the international AI community.

[13] Hungary adopted a national AI strategy in September 2020. One of its goals is faster uptake of AIenabled solutions in both the private and public sectors to further develop the quality and efficiency of services. (Available at (only in hungarian): https://digitalisjoletprogram.hu/files/2f/32/2f32f239878a4559b6541e46277d6e88.pdf [Accessed 19 07 2022]

[14] Possibility of professional advice for the digitisation of businesses. Available at: https://en.vallalkozzdigitalisan.hu/?lrd [Accessed 19 07 2022]

highlighted that the ICT development indicator for environmental sustainability is the only one for 2021, in which we just do not reach the EU average. We've said before (Cseh, 2020b, p. 249.) that we hope the pandemic will push more businesses down the digital path. This seems to be confirmed in the previously mentioned indicator, and we hope that in the next DESI we will get closer to the European average in other individual indicators as well.

The last dimension (4) is digital public services. Unfortunately, we do not perform well in this dimension either, we only achieved the 25th place. Here, each individual indicator has a 2020 statistical background. As with the previous dimension, here too we can say that the roughly parallel development of the last four years (EU average/our country) broke in the last year and the indicators for 2021 started to diverge from each other (see Table 1.) In one of the five individual indicators, we perform above the EU average, in the case of the others, we are a considerable distance from the EU result. In terms of users of e-government services, we (70 %) are above the European Union's DESI result (64 %). Basically, this is a good result, but if we point out that this value shows that 70% of Internet users contacted public administration bodies online in 2020, the situation is a bit more nuanced. In the automatic filling of forms, we are only 3% behind the EU average. This indicator is strengthened by the municipal Application Service Provider system[15] introduced in 2019 at all municipalities in our country and the personalized administration interface (magyarorszag.hu), which also ensures the online availability of numerous forms and the E-paper service. Based on the DESI results, a higher percentage of digital public services are provided to businesses (76%) than to individuals (54%). However, both percentages are below the EU level. The center of the services that can be provided to both businesses and individuals is the already mentioned personalized administration interface (magyarorszag.hu). The National e-Health Infrastructure can be accessed from this website, among other things, which mainly owes its popularity in Hungary to the Covid 19 epidemic.[16] (DESI Hungary, 2021, p. 12.)

Again, we must mention certain objectives of the NDS. Within the Digital State pillar, the following main objectives are set out: 1. coordinated, user-centric digital development of central and regional administrations and professional systems on all platforms; 2. establishing a data-driven administration by further enhancing interoperable data links between public registries and relevant back-end systems, as well as egovernment services; 3. developing smart settlements and smart areas; 4. increasing the information security of government electronic services; 5. digital development of public services (a particular focus on the further development of e-health solutions). (National Digitalisation Strategy, p. 11-12.)

As you can see, the contents of the NDS try to strengthen and develop the Hungarian shortcomings pointed out by the dimensions of the DESI. It is no coincidence that we are talking in the plural, as the NDS - after its officialization and acceptance - could provide an excellent long-term framework for meeting the EU's expectations. This could also have a beneficial effect on increasing the competitiveness of our country.

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[15] For more on the ASP system, see Szabó, 2017 and Cseh-Czékmann, 2020.
[16] For more about the impact of the Covid 19, see Szabó-Laczik, 2022.

In the next section, we would like to make a comparison with European Union regional member states, namely Poland, the Czech Republic, Slovakia and Romania. We want to compare the results of the mentioned countries with Hungary's 2021 DESI performance.

3. VALUES OF THE DESI INDICATOR IN COMPARISON WITH REGIONAL COUNTRIES

In connection with the DESI evaluation, we would like to discuss - focusing on certain aspects of individuals/households - the comparison with our regional competitors. In terms of the DESI complex index, we have already explained the position of our country at the EU level, but now we want to show a more specific comparison, after we also record the position of the above countries in the ranking. (see Figure 2.) In Table 2, we highlight the individual indicators within the DESI dimensions that, in our opinion, are best suited to describe the digital preparedness of individuals and households. Why are we examining these indicators? We believe that the indicators of individuals and households best indicate where a member state is on the ladder of digital development, since digital developments usually first begin at the government and corporate level and their results are also seen in households. However, it is a fact that households are the beneficiaries of many government and corporate developments.
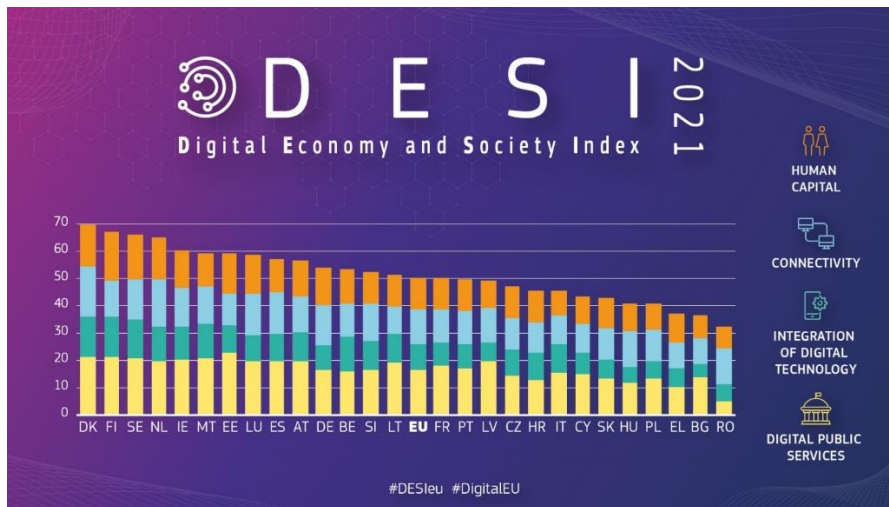

Figure 2: Digital Economy and Society Index 2021 - EU member states
Source: https://ec.europa.eu/commission/presscorner/detail/en/ip_21_5481
[Accessed 27 07 2022]

In Figure 2, we can see that the examined regional countries - based on their results - can be classified mainly in the category of poorly performing EU countries, the only exception being perhaps the Czech Republic, which with its 18th place can be classified as a medium performing EU country. Hungary is moving hand in hand with Slovakia and Poland. Romania, falling by a few positions, occupies the last place in DESI 2021. These

results have not changed in essence in recent years (DESI Hungary, 2020; DESI Hungary, 2019). The Czech Republic has always occupied a more prominent place compared to the other analyzed member states, which is why we have included it among the average performing countries. Romania was not the worst-performing country before, however, the performance of our country, Slovakia and Poland has been roughly the same for several years, even if the rankings change somewhat.

DESI-dimensions	Specific indicators	Hungary	Slovakia	Czech Republic	Poland	Romania	EU average
Connectivity	Overall fixed broadband take-up (in proportion to households)	77	78	83	68	67	81
	At least 100 Mbps fixed broadband take-up (in proportion to households)	56	25	24	37	52	34
	Mobile broadband take-up (in proportion to individuals)	69	67	71	58	68	71
Human capital	At least basic digital skills (in proportion to individuals)	49	54	62	44	31	56
	Above basic digital skills (in proportion to individuals)	25	27	26	21	10	31
	ICT specialists (in proportion to individuals in employment aged 15-74)	3,8	4,2	4,2	3,4	2,4	4,3
Digital public services	e-Government users (in proportion to internet users)	70	68	64	49	16	64
	Pre-filled forms (score)	60	36	45	65	6	63
	Digital public services for citizens (score)	54	64	71	65	44	75

Table 2: Comparison of individual (focusing on individuals, households) indicators of the 2021 DESI survey in our region.
Note: The data in the table, except for the indicator in the last two rows, are expressed as a percentage.
Source: DESI Hungary, 2021; DESI Slovakia, 2021; DESI Czech Republic, 2021; DESI Poland, 2021; DESI Romania, 2021.

In the following, we will examine the data contained in Table 2. First, let's take a look at households, given that the exercise of digital competences cannot be effectively implemented without the use of broadband internet access. Comparing the data of fixed broadband take-up, we can conclude that our country is ahead of the other two member states, apart from the Czech Republic and Slovakia, although we only approach the EU average from below. It should be added, however, that Slovakia's performance is numerically higher than Hungary's, but this cannot be considered a significant difference. Poland and Romania, on the other hand, are apparently significantly behind. On the other hand, more telling data (and more favorable for Hungary) is the take-up of at least 100 Mbps fixed broadband by households. In this case, Hungary's performance stands out from both regional competitors and EU average results. It should be emphasized that in the case of Romania, the difference between fixed broadband and at least 100 Mbps take-up is the smallest, which shows us the conscious and focused direction of the developments. However, for Hungary's northern neighbors, the distance between these two indicators is quite significant. Regarding the take-up of mobile broadband, we must point out that the results of most countries are roughly parallel to the take-up of fixed broadband (about 10% less), except in the case of Romania, where mobile broadband is 1 percent higher.

The next examined area of DESI is the evaluation of the quality of digital human competences. In terms of basic and above-basic digital skills, Hungary performs below the EU average, in relation to the two indicators, we are ahead of only Poland and Romania. This data would not even be so devastating if we did not examine the related Eurostat[17] data. the proportion of individuals with basic and above-basic digital competences increased on average in the Czech Republic and Romania between 2015 and 2019, but decreased in Hungary, Poland and Slovakia by 2019. In the case of Hungary and Poland, this is only a 1-2% drop, but in the case of Slovakia, the decline is 5%. The result of the proportion of ICT specialists below the EU average does not reflect well on any of the examined countries. The Czechs and Slovaks are just barely, our country and Poland are already more important, and Romania is at a distinct disadvantage in this area. However, for the innovation, and operation of digital developments, the existence of professionals with such qualifications is essential. At the EU level, each examined member state must achieve significant progress in this indicator.

We have highlighted a few unique indicators from the dimension of digital public services. Regarding the e-government users, Hungary stands out regionally, however, there are shortcomings in the other two indicators mentioned in the dimension. Not necessarily in connection with the pre-filled forms, since there we approach the EU average, Slovakia and the Czech Republic have a weaker indicator there, and Romania's result is catastrophic. Regarding the digital public services provided to citizens, only the Czech Republic can be satisfied, Poland and Slovakia are already at a greater distance, and our country and Romania are not within the foreseeable distance. These bad indicators also put a stamp on the bad aggregated dimensional results, since the performance of the examined countries in this dimension was enough for a maximum of 20th place, but in the other two examined dimensions, several countries achieved positions below 20. (e.g.: Human Capital - Czech Republic – rank: 15; Connectivity – Romania – rank: 10)

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[17] Eurostat - Individuals who have basic or above basic overall digital skills by sex. Available at: https://ec.europa.eu/eurostat/databrowser/view/tepsr_sp410/default/table?lang=en [Accessed 28 07 2022]

The results of the individual indicators of the dimensions support the DESI 2021 rankings of the examined countries. The elimination and development of Member State deficiencies affecting citizens and households should be the main driving force for the next period of the countries. (see National Digitalization Strategy in Hungary)

4. FINAL THOUGHTS

What I said about Hungary's digital performance in 2020 is still true today. Our country's 2021 DESI result is not great, not terrible. (Cseh, 2020a, p. 59.) Why can we say it is not good. Ranking 23rd out of 27 member states cannot be called good in any way, but it cannot be called tragic either, as we have pointed out our above-average or exceptionally good performance by examining several individual indicators. Based on the above, we can state that Hungary's results are not homogeneous at all. Domestic responses and possible solution alternatives must be created for the weaker points, and the stable, strong indicators must be kept at the forefront and, if possible, developed even further. The NDS is a particularly good initiative from the point of view of reflecting on weaker results, as we have repeatedly pointed out in the study. From a professional point of view, we can say that the NDS should be adopted as soon as possible so that the domestic operational programs and the goals included in them become available by 2030.

Examining Hungary's performance with respect to individual indicators, it can be concluded that for most indicators, the country ranks in the middle, at the end of the middle or among the low-performing countries, but it is constantly trying to improve. So, in general, Hungary could be characterized as having a weak digital economic and social result. However, the picture is much more nuanced than that. From the indicators for households and individuals, we could see that our country is particularly strong in creating and operating the digital technological background (see Connectivity (2)). This is essential for our citizens to be able to navigate the digitalized world well. Based on this, we can say that we have already successfully laid the stable foundations for the digitization of individuals and households. On the other hand, we are less developed in terms of the competences and training of human resources (see Human Capital (1)) and digital public services (see Digital Public Services (4)) and their use. However, as we have pointed out and highlighted several times, the complex DESI index contains both positive and negative results in connection with individual indicators.

The shortcomings and problems highlighted in the study led to this poor result at the EU level. We also need to see from the regional comparison that we still have room for improvement in order to achieve the role of the region's digital leader. The problems are not insurmountable, but it is necessary to recognize the situation and take active measures to turn the indicator in a positive direction.

+1 UPDATE

The DESI index 2022 was published in the last days of the preparation of the study. (Press Release, 2022) In the 22' index, a few elements have been changed again (e.g. DESI is brought into line with the policy program called "Path to the Digital Decade Policy Programme", which also includes the digital compass mentioned in the first thoughts), but the situation of the member states examined in the study and especially Hungary did not

change significantly. The 2022 index again refers to the NDS, of which we have to point out that it only has a version released for partnership negotiation, but there is no final one! (DESI Hungary, 2022)

Compared to the 2021 results (see Figure 2.), in the 2022 DESI, among the member states examined in the study, the positions of Romania and Poland did not change, Hungary and Slovakia switched places, and the Czech Republic slipped back one place. Technically, this only means "progress" for Hungary, but if we look at the numerical results (Hungary score 2021: 41.2; score 2022: 43.8), we can see that it was not our country that performed really well, only the combined performance of Slovakia (Slovakia score 2021: 43.2; score 2022: 43.4) increased slightly since 2021. (DESI Hungary, 2022; DESI Slovakia, 2022)

Therefore, the 2022 DESI results did not bring any significant changes compared to the study, however, we must also add that in the case of such complex indicators, the outstanding performance of a single indicator is not sure to boost the position of a country. Furthermore, we must also take into account that not only the examined countries are operating and progressing, but also their competitors.

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