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HUMAN CAPITAL FORMATION IN BULGARIA – LESSONS FROM THE PANDEMIC[2]

The COVID-19 pandemic changed substantially economic and social life globally, causing both a health crisis and a deep recession. It had a significant negative impact on the formation of human capital in both quantitative and qualitative terms and highlighted a number of problems in this area. The purpose of the present study is to highlight and systematise more important effects of the pandemic on the formation of human capital in Bulgaria and to direct attention to problem areas that are a starting point for the development of policies and measures to improve the formation, preservation and development of human capital in the country.
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At the beginning of March 2020, the World Health Organization announced a COVID-19 pandemic. The pandemic is a global challenge that has drastically changed economic and social life globally and led to the world's deepest recession in eighty years, "almost three times deeper than the global recession of 2009." (World Bank Group, 2020, p. 3). What is unprecedented in this case is that "at the heart of the recession is the vulnerability of the human factor" (ERI-BAS, 2020). The pandemic situation created both a health and economic crisis, and in 2022 the geopolitical and geoeconomic situation became even more complicated.

As a result of the pandemic, the death rate rose significantly. The lockdown considerably limited access to health and education services. The business could not operate normally. Supply chains were almost cut off, as was the movement of people. The global economy fell into recession, economic growth declined sharply, employment decreased, unemployment rose, and poverty and inequality increased.

Bulgaria is no exception. According to NSI data, in 2020 the real GDP of the country registered a sharp drop of 4.4%, and the increase of 4.2% in 2021 could not compensate for it. In the following years, the growth rate has slowed down. The forecasts are also not very favourable. For example, according to the macroeconomic forecast of the Economic Research Institute at the Bulgarian Academy of Sciences (ERI-BAS, 2024) real GDP growth

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will be slightly over 2% in 2024, i.e. below potential growth, with a gradual recovery to pre-pandemic average levels expected by 2026. The number of employed people significantly decreased, with 2020 being characterised by a substantial drop of 3.6%, and the decrease continued in 2021, although not so considerably (-1.2%).

Various studies highlight the negative consequences of the COVID-19 pandemic on human capital. According to a study from 2022 „Quantifying the macroeconomic impact of COVID-19-related school closures through the human capital channel" (de la Maisonneuve, C., B. Égert and D. Turner, 2022) prolonged school closures can have long-lasting effects on human capital, productivity and per capita income. „The effects of school closures may increase over time and result in a loss of between 0.2% and 0.9% of human capital by the time all affected cohorts will have entered the labour force between 2036 and 2067… These human capital losses will in turn lead to lower productivity by about 0.4% to 2.1% in 2067… School closures will also have an impact on students' mental health and social capital, which would affect productivity and well-being." The paper concludes that this problem is important not only because of the direct economic effects, but also because such losses could have consequences for future generations when the current ones become parents.

Similar conclusions are drawn from a study from 2023 „COLLAPSE and RECOVERY. How the COVID-19 Pandemic Eroded Human Capital and What to Do about It" (Schady, Norbert, Alaka Holla, Shwetlena Sabarwal, Joana Silva, and Andres Yi Chang, 2023), which emphasises that human capital losses not only affect individuals by reducing their future earnings, but have negative consequences for the entire economy. Any interruption in the process of building human capital can have long-lasting effects, with evidence from earlier crises showing that the effects of shocks on human capital can have repercussions on a number of generations, as well as lead to a sharp increase in inequality in the future.

The pandemic has had a direct and significant impact on human capital globally and nationally. The effects can be traced in different directions – a sharp intensification of the continuous gradual decrease in the number of the population in the country, significant increase in mortality, loss of human lives and deterioration of health of both elderly and younger groups of the populations, which, together with the existing demographic crisis in Bulgaria, leads to an even greater reduction of the bearers of human capital; limitation of access and worsening of the quality and outcomes of education and training, i.e. an effect on both the bearer and the formation, accumulation and quality of human capital. The pandemic had an impact on and changed the external migration processes, on which human capital in the country also depends.

The pandemic had a negative influence on people's health, on the one hand, and on their education, on the other. The formation of human capital takes place mainly in the system of education as well as in the system of training.[3]

In an effort to limit the spread of COVID-19, many countries have fully or partially closed educational institutions and switched to distance learning without the possibility of prior preparation. In mid-March 2020, distance learning was also introduced in schools in

[3] The health care system is not a subject of research here.

Bulgaria.[4] The closure of educational institutions had an impact on the access and the quality of education, as well as on the psychological state of the students, while at the same time stimulating innovation in the education sector. A number of investigations confirm that it also exacerbates educational inequalities.

The results of the PISA 2022 show significant educational inequalities in Bulgaria. The share of students from vulnerable social groups achieving high reading scores is one of the lowest among the countries included in the study (6%).

Along with limiting access to education under the influence of the pandemic situation, the participation of the population in lifelong learning has also decreased. Lifelong learning is an important element of the system for developing and improving the quality of human capital.

At the same time, the crises, related to the pandemic, caused an acceleration of the processes started before and related to increasing the role of the knowledge economy and the need to increase investments in human capital, fundamental science, education and training, and to acceleration of the development of digital technologies and skills.

The purpose of the present study is to highlight and systematise more important effects of the pandemic on the formation of human capital in Bulgaria, which direct attention to problem areas, as well as to opportunities and ways for its development. The study is based on official statistics and secondary analysis of empirical studies in the country during that period.

Demographic Effects

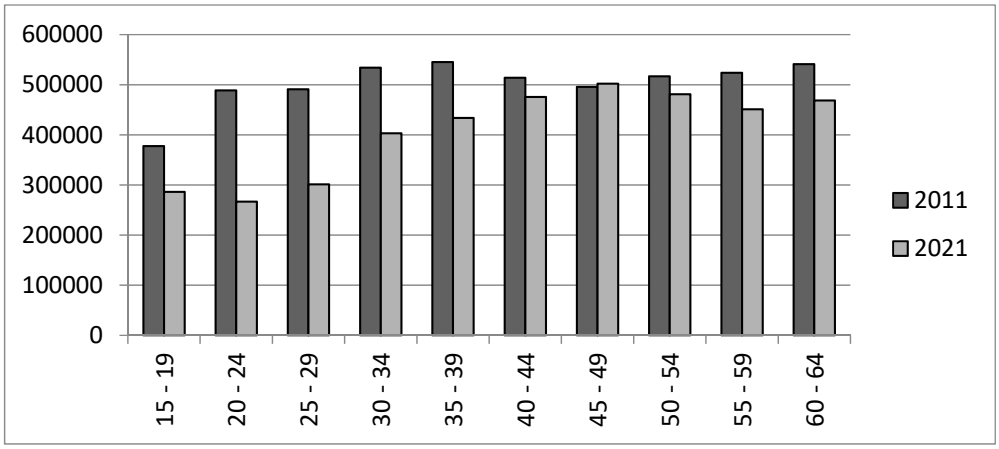
Bulgaria's population has been declining for decades[5], and this trend has intensified significantly during the years of the pandemic. According to data from the 2021 census, its number has reached 6 519 789 persons, or 844 781 persons less compared to the previous census of 2011. If before the COVID-19 pandemic, the population of Bulgaria decreased by about 40-50 thousand persons per year, only in 2021 compared to 2020 the reduction is by more than 77 thousand persons.

The age structure of the population is also deteriorating significantly. The number of persons under 40 (economically active and of reproductive age) is significantly lower in 2021 than that in 2011. The most unfavourable is the change in the age group 20-29 (Figure 1).

[4] On 16.03.2020 the Ministry of Education and Science introduced distance learning, and kindergartens and schools were closed.

[5] According to the National Statistical Institute forecast, the population of Bulgaria will continue to decline steadily in the long run.

Figure 1. Population by age group (number)



Source: National Statistical Institute, Population Census

The alteration in the number of the population is largely determined by the negative natural increase. Natural increase in the country has been steadily declining, but fell sharply during the pandemic, much more significantly than the EU-27 average. There is no lower natural increase in the EU than in Bulgaria. Nearest to Bulgaria (-13.1 for 2021 and -9.6 for 2022) is Latvia with -7.9, followed by Lithuania with -7.4 for 2022. In the absence of sharp changes in the continuously and smoothly decreasing birth rate[6], which in 2022 reaches 8.8 in Bulgaria, the sharp drop in the natural increase is due to a significant rise in the death rate in the country (Table 1).

Table 1. Population and natural increase per 1000 persons of the population

	2010	2015	2018	2019	2020	2021	2022
Population of Bulgaria as of 31.12. (number)*							
	7504868	7153784	7000039	6951482	6916548	6838937	6447710
Natural increase per 1000 persons of the population**							
Bulgaria	-4.7	-6.2	-6.6	-6.7	-9.5	-13.1	-9.6
EU-27	0.6	-0.7	-1	-1.1	-2.5	-2.7	-2.8

* According to National Statistical Institute data, current statistics (as of 17.02.2024)
** According to Eurostat data (as of 17.02.2024)

The mortality rate in Bulgaria is almost twice as high as the EU-27 average level, which is determined not only by the impact of the COVID-19 pandemic. The death rate is constantly growing in the country, but under the influence of COVID-19, it rises sharply in 2020 and 2021 (Table 2). There is no higher mortality rate in the EU-27. Closest to Bulgaria is Latvia with 16.4, followed by Lithuania with 15.1 for 2022.

[6] A certain increase in the birth rate was observed in the period 2000-2009 from 9.0‰ to 10.7‰, after which it started to decrease again. This rate is lowest in 2020 and 2021, when it drops to 8.5‰.

Table 2. Mortality per 1000 persons of the population

	2010	2015	2018	2019	2020	2021	2022
Bulgaria	14.9	15.3	15.4	15.5	18	21.7	18.4
EU-27	9.9	10.4	10.5	10.4	11.6	11.9	11.5

Source: Eurostat (as of 17.02.2024)

The number of deaths increased significantly during the pandemic from about 110 000 in the period 2010-2019 to 124 735 in 2020 and 148 995 in 2021 (Table 3), decreasing to 118 814 in 2022. However, this jump is both a consequence of the Coronavirus itself and its complications, as well as of the restriction of access to health services, the reduction in visits to health professionals and in the treatment of the chronically ill and persons with other serious illnesses.

Table 3. Deaths from COVID-19 in Bulgaria – overall and by age groups

Age groups	Number	Relative share of all deaths in age group	Number	Relative share of all deaths in age group	Number	Relative share of all deaths in age group
	2020		2021		2022	
Total	8554	6,9	27588	18,5	8993	7.6
10-14	2	3,0	4	6,3	1	1.6
15-19	7	5,6	11	7,6	2	1.6
20-24	6	3,1	27	11,1	4	2.3
25-29	10	4,1	57	16,5	10	4.2
30-34	34	7,3	108	18,2	17	4.2
35-39	60	7,3	180	18,7	40	5.1
40-44	124	8,2	363	21,2	67	5.0
45-49	206	8,1	608	20,1	105	4.6
50-54	328	8,6	962	20,4	170	4.7
55-59	594	9,7	1397	19,9	323	6.2
60-64	990	10,7	2475	22,6	570	6.9
65-69	1281	10,0	3761	24,1	964	8.2
70-74	1625	9,3	5333	24,4	1559	9.5

Source: National Statistical Institute.

Nearly a quarter of all deaths in the country in 2021 are due to COVID-19. Over 27.5 thousand people died from it. It hit not only the older generations, but also the under- and working-age population, in other words, the bearers of human capital and those forming human capital (mainly children and young people), which are of primary importance for the future – both for the development of society and the economy.

Changes in population size are determined by alterations in both natural and migration increases. The pandemic and restrictions on the movement of people have also seriously affected external migration (Table 4), with migration processes considerably limited, although temporarily. Negative migration increase has been characteristic of Bulgaria for more than ten years. The number of persons settled in the country is growing, a trend that has been more clearly defined since 2016, but accelerated during the pandemic. The number of emigrants is greater than that of immigrants, characterized by an increasing trend in the last

10 years. In 2020, however, it dropped significantly (about 6 times) from 39 941 in 2019 to 6 649 in 2020, but in 2021 it rises again to 26 755 persons, approaching that of the pre-pandemic period. In the midst of the health crisis, the number of emigrants decreased drastically, as a result of which the migration increase of the population went from negative to positive and exceeded 30 000 persons in 2020. In 2021, with the loosening of anti-epidemic measures worldwide, the process of emigration from the country intensified again, and the migration increase notably declined, although it still remains positive.

Table 4. External migration – migration increase (number)

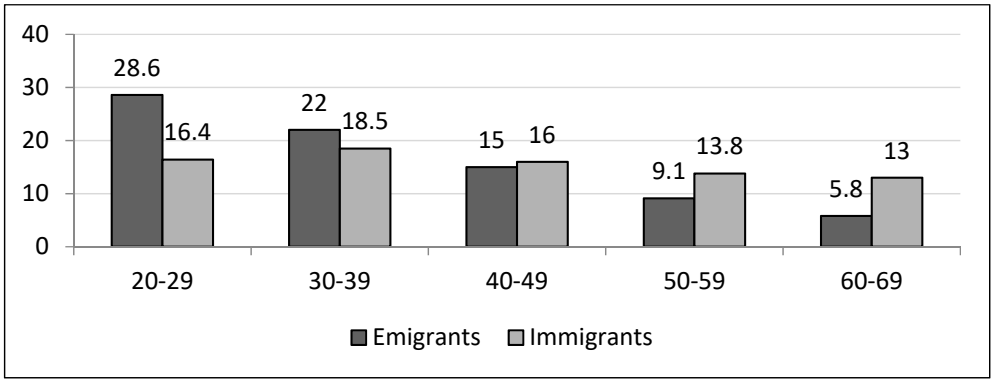
	2015	2018	2019	2020	2021	2022
Migration increase	-4247	-3666	-2012	30715	12706	27444
Immigrants with Bulgarian citizenship	10722	16169	23555	24007	22087	19032
Emigrants with Bulgarian citizenship	24487	31263	37931	3658	24442	11972

Source: National Statistical Institute (as of 24.02.2024).

It should be emphasised that the number of immigrants with Bulgarian citizenship (Bulgarian citizens who have returned to the country) has shown an increasing trend in recent years, and during the pandemic, due to the travel ban, its change is not very considerable (2020 compared to 2019), and in 2022 it declines. However, a drastic decrease was observed in the number of emigrants with Bulgarian citizenship (which is also characterised by an increasing trend) in 2020, after which it started to grow again. According to data from the 2021 population census, the largest number of Bulgarian citizens returned to the country in 2020 and 2021 – 49 377 persons. In other words, the lockdown during the pandemic significantly affected the emigration processes of the Bulgarian population, but only for a short time.

Current statistics from the National Statistical Institute show that in 2021 and 2022 about two-thirds of emigrants are aged 20-49, while among immigrants this age group makes up 50% (Figure 2). The emigration of the population of this age group cannot be compensated by immigration, which in turn contributes even more to the reduction of the country's human resources, especially in its most productive and reproductive age.

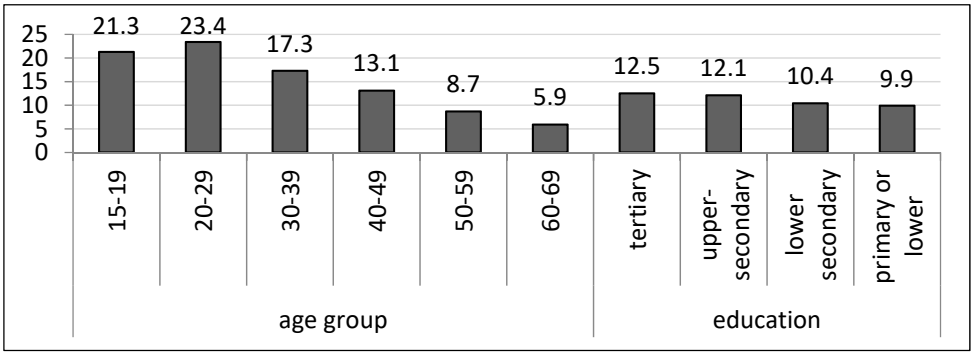
Figure 2. External migration by age groups (%), 2021



Source: National Statistical Institute.

According to the sample study of migration and migratory behaviour of the population accompanying Census 2021, the share of potential migrants increased compared to 2011 in all age groups, with 11.9% of persons aged 15-74 very or somewhat likely to move to live abroad. Potential migrants are mainly persons from the younger age groups. The realisation of their intentions would have an impact both on the available human capital in the country at the time of their emigration and in the future, as it would also lead to a decrease in the fertility quotas and the birth rate in Bulgaria. A no less unfavourable phenomenon is the larger share of highly educated persons – potential emigrants compared to the less educated, which would also affect the quality of human capital in the country (Figure 3).

Figure 3. Potential emigrants by age groups and by education, 2021 (%)



Source: National Statistical Institute, Migration and migration behaviour (Sample survey accompanying Census 2021).

The results of a migration survey by the "TUK-TAM" association[7] (a global online network) on the attitudes of Bulgarians around the world, conducted at the end of 2021[8] among Bulgarians living abroad or who returned to Bulgaria in the last two years (during the pandemic) show that the majority of respondents do not plan to change their place of residence, especially those over 36 years old. Young people aged 18-24 who are studying and have not permanently settled abroad are more likely to go back to the country. Intentions to return are rather long-term (after 5-6 years), while in the short term one-third of those living abroad plan to get back. The main reasons for the return of those living in Bulgaria under two years are their relatives and the COVID-19 pandemic.

As a consequence of the outlined processes in the natural and migration increase of the population, its number drops significantly.[9] The change is extremely unfavourable for the

[7] Association of Bulgarians with experience and education abroad.
[8] The survey was conducted among persons aged 18 and over, with 2 329 interviews carried out in the period November-December 2021, https://tuk-tam.bg/migration/results.
[9] The country's labour force is also decreasing – significantly and continuously, including during the pandemic period, from 3447.9 thousand persons in 2007 to 2965.4 thousand in 2022 according to National Statistical Institute data (https://infostat.nsi.bg/infostat/pages/reports/result.jsf?x_2=828). Analysis of the influence of COVOD-19 on the Bulgarian labour force is done by Borissova-Marinova, 2023.

lower age groups and especially for those under 40 years of age (this is the population of reproductive age, and also a large part of the economically active population of the country), the decrease in the number of whom is greater than that of the age groups over 55 years. Such a change, with a non-increasing birth rate in the country, conditions a long future period of population reduction, i.e. of the bearers of human capital. According to National Statistical Institute forecasts, the country's population will decrease continuously in the long term, and in about fifty years its number is expected to fall below five million people.

The pandemic had a significant impact on the population of Bulgaria by sharply deepening the negative demographic processes in the country – it led to a considerable increase in the mortality rate, which, with the constantly decreasing birth rate, predetermined a drastic decline in the natural increase of the population. At the same time, the positive changes in the migration increase were short-term. The migration attitudes of Bulgarians living in the country and abroad are not changing in a positive direction. In other words, the effect of the pandemic situation on the bearers of human capital was extremely unfavourable, and a large part of its consequences are long-term.

Education/Quality Effects

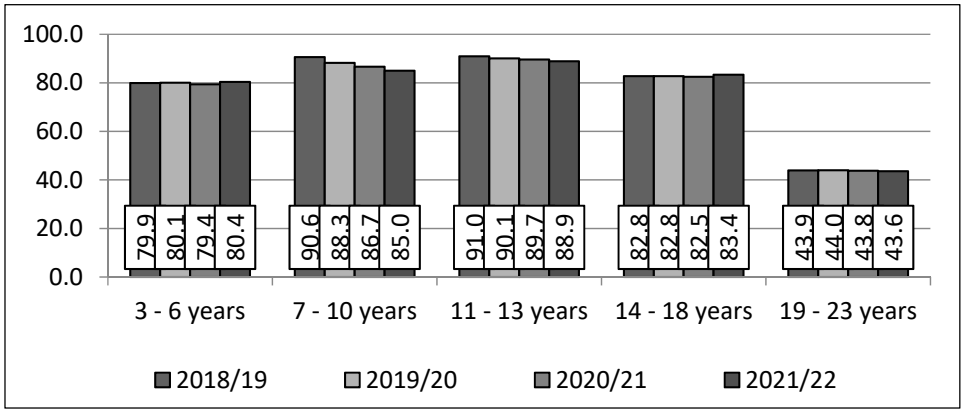
The pandemic has had a direct impact on human capital, worsening the health status of the population and taking lives, but also in a qualitative aspect, affecting education and training processes by limiting access and worsening the quality of education and learning outcomes due to the closure of educational institutions and problems with distance learning, especially for poorer groups of the population and in smaller settlements, largely due to limited access to the internet and information technology.

At the beginning of 2020, in the conditions of a rapidly growing pandemic, it came to the closure of kindergartens and educational institutions and the transition to distance learning from home. However, there was no prior preparation for this. Both teachers[10] and students were unprepared.

As a result of this drastic change, the participation of some students in the educational process was limited. The net enrolment rate of the population in primary education, for example, marked a significant decrease, although not only during the pandemic period, reaching 83.6% for the academic year 2021/2022. By age group, a continuous decline is observed for children aged 7-10 and 11-13. During the pandemic, the rate for the age group 19-23 also decreased (Figure 4).

[10] According to National Statistical Institute data, half of the teaching staff in general education and vocational schools is over fifty years old. For the academic year 2022/2023, 14% of the teaching staff in general education schools is aged 60 and over, and 18% in professional schools (NSI, 2023).

Figure 4. Net enrolment rates of the population in the education system by age group (%)



Source: National Statistical Institute.

Distance learning has also highlighted some significant problems related to the quality of education, the perception of learning material, physical activity, social isolation and the psychological consequences for learners. The most affected were the vulnerable groups of children. The results of a number of studies have shown that a major problem for these learners is the lack of electronic devices and the Internet. Not a small share of students did not participate in distance learning or did not participate regularly. A large share of students claim that they had worse academic results than before, and that class attendance has not been insufficiently monitored.

In 2020, a Global Metrics survey was conducted on the opinion of Bulgarian students from fifth to twelfth grades on the implementation of distance learning "Assessment of the impact of COVID-19 on preschool and school education in Bulgaria – students' point of view". According to its results, 3.5% of students did not have a stationary computer, tablet, laptop or mobile phone at home, which means that at that moment they were not covered by the education system. Particularly affected in this regard are children of Roma origin, those with parents with a low level of education, as well as from small settlements. The data shows that 8.5% of students participated in some form of distance learning, but not regularly, and just under 3% did not participate in any form of learning (p. 9). The main reasons why part of the students did not participate in distance learning are lack of access to the internet, inability to buy the necessary equipment, and according to 23% – "remote classes are boring" (p. 19). In addition, nearly a third (over 28%) of the surveyed students say that their teachers "do not cope well with remote work", and according to a fifth – "teachers do not monitor attendance in class". As a result of these, as well as a number of other problems related to insufficiently well-prepared distance learning, for 28.7% of learners "online learning is just standing in front of a computer", 27.3% of the respondents "now understand less of the taught material" (p. 28), 21.6% claim that they have lost all desire to study, and 19.3% – that they perform worse than before.

A study by the Institute for Education Research "Analysis of the consequences for the learning process, students and teachers of distance learning in an electronic environment in the academic year 2020/2021" (Hristova, Petrova, Tosheva, 2021) conducted among students of grades V to XII and their teachers in June 2021 (a sample of 200 schools), largely confirms the results of the Global Metrics survey and provides insight into the problems with distance learning and its quality during the pandemic.

A significant share of teachers do not have sufficient experience in distance learning. The research shows that every second teacher has more than 5 years of experience using digital technologies in their work, about 43% of teachers with more than 20 years of experience have used such technologies for less than 5 years, and nearly 6% have not used them at all before distance learning. Teachers in villages have significantly more limited experience in the use of such technologies, with about 2.3% of them having not conducted training in an electronic environment in the academic year 2020/2021. About half of the teachers consider that their students need additional help to assimilate the learning material in an electronic environment, i.e. significant "targeted pedagogical support for students to assimilate the learning material in distance learning in an electronic environment is needed, especially at the primary stage and in schools located in rural areas" (p. 46). At the same time, a third of the teachers do not feel that they are sufficiently capable of establishing an appropriate e-learning climate that includes, stimulates and engages students in learning, as well as monitoring student progress, identifying and responding appropriately to emerging learning difficulties (p. 69).

According to the teachers, the main problems facing distance learning are related to: "students' access to quality internet and electronic devices, their motivation and commitment to learning, ensuring the regular presence of some students in online classes and their insufficient digital skills" (p. 52). Despite some observed improvement, regularly missing classes is a serious problem, creating a risk of dropping out of school. According to half of the teachers, some of the students were often not fully present in online classes, and every third had students who were regularly absent from classes (p. 76). Every second teacher reports a deterioration in the motivation and engagement of their students, and 40% – in the knowledge of students in the subject area in which they teach. A positive effect of learning in an electronic environment is the improvement of students' skills to work with digital technologies.

The results of the research show a high degree of provision of students with electronic devices and access to the internet for home learning, although there are significant differences in resource provision according to the type of electronic devices, mother tongue, educational level of parents, type of settlement where the school is located, which creates conditions for deepening educational inequalities, increasing the risk of dropping out of school and worsening the results and effectiveness of learning.[11]

[11] According to data from a previous study by the Institute for Educational Research, conducted at the end of the 2019/2020 school year, the share of parents who do not indicate the presence of their own electronic devices for educational purposes amounts to 16% in cities, while in villages it reaches 30%. The differentiation is similar according to the language spoken in the family – Bulgarian, Romani, Turkish, another. Over 50% of parents with less than primary education claim that they do not have an

In terms of students' assessment of their e-learning, a fifth of them give a low self-assessment of their digital skills, mainly those from vulnerable groups. Of particular concern for the educational process and its quality is the fact that the share of students who participated relatively regularly in classes (every day or most days) is declining – from 88% in 2020 to 79% in 2021, and the students who participated in the learning process every day decreased most significantly (p. 100). Along with this, there is a "decrease in students' emotional, behavioural, cognitive and metacognitive engagement; their approaches to learning; their self-management skills in learning contexts and their self-assessment of their learning abilities in 2021 compared to 2020 data, and a significant increase in the share of students with low engagement and self-assessment of learning abilities" (p. 112). One in four students find it difficult to learn in an electronic environment and believe that they did not do very well, with around 17% stating that they did not manage to absorb the learning material well (p. 137).

The pandemic has had a significant impact on the schooling of learners by deteriorating its quality, which may have long-term negative consequences for the country's human capital. The results of the latest PISA 2022 study, which is conducted among students aged 15 and covers the areas of mathematics, reading and natural sciences, are indicative in this regard. They show that Bulgaria ranks last in mathematics in the EU and second to last in reading, and the results are significantly lower than in the previous years of the study. The average score of students in mathematics is 417 (OECD average of 472) against 436 in 2018, in reading it is 404 (OECD average of 476) against 420 in 2018 and in science – 421 (485 on average for the OECD) against 424 in 2018. Fifty-four percent of the Bulgarian students have a result lower than the basic score for mathematics skills, 53% for reading and 48% for natural sciences (Table 5).

Table 5. Results of the Bulgarian students according to PISA (score)

	Mathematics	Reading	Science
PISA 2012	439	436	446
PISA 2015	441	432	446
PISA 2018	436	420	424
PISA 2022	417	404	421

Source: PISA 2022.

It is true, of course, that student results started to deteriorate much earlier, since the 2015 study, which shows that the problems of education in Bulgaria are much deeper, but those caused by the pandemic, further strengthened the negative trend.

The situation is slightly different in the field of higher education, where young people with already acquired certain knowledge, relatively better digital skills and, due to the age group,

electronic device for learning purposes and no internet at home, and less than 30% of children from such families have participated in distance learning in an electronic environment every school day. Based on the results of the research, a forecast was also made for the impact of the pandemic on learning in the country, according to which the share of functionally illiterate students will increase by 7 pp. in the post-COVID period compared to the last PISA survey of 2018, from 47% to 54% respectively (For details see Hristova, 2021).

with a supposedly higher degree of responsibility towards the educational process and of concentration are trained. According to the results of a survey conducted in the period April-June 2020 among nearly 25 000 Bulgarian students for the purposes of the Rating System of Higher Schools in Bulgaria,[12] 19% of respondents believed that their professors did not conduct lectures and exercises regularly, and 17% declared that the students themselves were not regular in the online classes. Between 14 and 21% of students participating in this form of education express dissatisfaction with online learning. In addition, 3.8% claimed that there was no online learning in their specialty, although face-to-face classes were interrupted.

Human capital is formed, of course, mainly in the education system, but also in the training system. Gaps in schooling during the pandemic are likely to have to be compensated at a later stage in the training system. However, the share of the population aged 25-64 in education and training in Bulgaria is almost insignificant and without any notable trend of growth in the last 10 years – from 1.7% in 2012 to 1.8% in 2021, with a multiple times higher average EU-27 rate, amounting to 10.8% in 2021 and characterised by a continuous upward trend from 8.2% in 2012. Bulgaria is in the last place in the EU in terms of this indicator, with Greece coming closest with 3.5% in 2021. The pandemic had an impact on this process as well, and in 2020, the year of the lockdown, the rate decreased by 0.6 pp. (Table 6). The participation of the population in education and training decreased in general in the EU in 2020, including in Bulgaria, where it again remained with the lowest share.

Table 6. Participation rate of the population aged 25-64 in education and training (%)

	2012	2015	2018	2019	2020	2021	2022
Bulgaria	1.7	2	2.5	2	1.6	1.8	1.7
EU-27	8.2	10.1	10.6	10.8	9.1	10.8	11.9

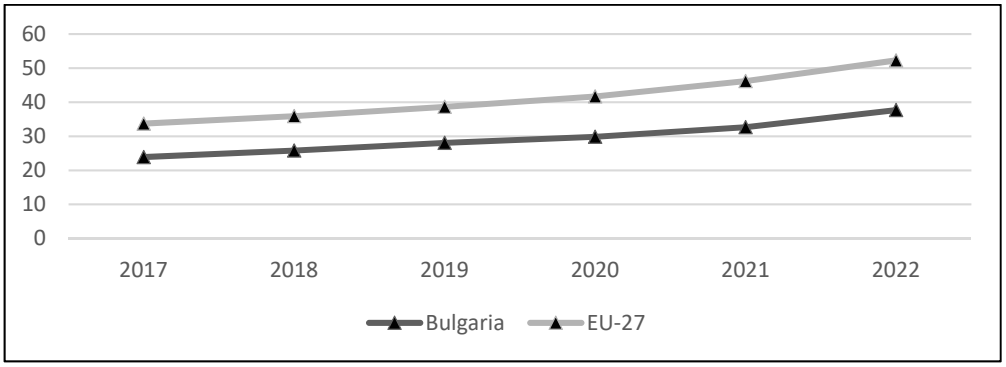
Source: Eurostat (as of 24.02.2024).

The pandemic has had a significant negative impact on access to and quality of education and training, i.e. on the formation of human capital in the country and its quality. However, it also had a positive effect – it has stimulated digitalisation and the development of digital skills of the population.

An idea of the state and progress in the field of digital technologies, although not specifically in the field of education, is provided by the reports of the European Commission on the Digital Economy and Society Index (DESI)[13]. According to the ranking of this index, Bulgaria ranks 26th among the EU member states – penultimate place, being able to overtake only Romania. Bulgaria's DESI score is 37.7 (DESI 2022) against the EU average of 52.3. Despite the increase for the last five years (23.9 for 2017), it is not enough to catch up with the rest of the member states, and even from 2020, the lag starts to increase (Figure 5).

[12] https://rsvu.mon.bg/rsvu4/#/media-article/113.
[13] The DESI ranks member states according to their level of digitalisation.

Figure 5. Digital Economy and Society Index (DESI) 2022



Source: DESI 2022.

As for human capital, Bulgaria again occupies the penultimate 26th place. According to the digital skills indicator, Bulgaria achieves a score of 32.6 compared to an EU average of 45.7. The country lags significantly in terms of the share of persons aged 16-74 with at least basic digital skills, and especially of those with above basic digital skills (Table 7).

Table 7. Share of persons with at least basic digital skills and with above basic digital skills (%)

	Share of persons aged 16-74 with at least basic digital skills	Share of persons aged 16-74 with above basic digital skills
Bulgaria	31.2	7.8
EU-27	53.9	26.5

Source: DESI 2022.

Due to the backwardness of the country in the field of digitalisation and digital skills, especially in the conditions of the pandemic, which clearly showed their increasing importance for all spheres of public life, in 2020 a National Strategic Document "Digital Transformation of Bulgaria for the period 2020-2030" was developed and adopted[14], in which the goals for digital transformation of Bulgaria until 2030 are determined. One of the areas of impact, according to this document, is "education and training". In fulfilment of the objectives and measures in this area, the national budget for 2021 allocated financial resources in the amount of two million euros for academic staff training projects, as well as 2.9 million euros for the creation of twenty-one personal development centres, digital skills training for students and young people; over eighty-five thousand electronic devices were purchased; a national programme was approved to integrate information technology classes into non-computer science curricula.

[14] The document was adopted by Decision No. 493 of the Council of Ministers of 21.07.2020, https://www.mtc.government.bg/sites/default/files/cifrova_transformaciya_na_bulgariya_za_perioda_2020-2030.pdf.

The share of households with internet access shows a continuous upward trend – from 45% in 2011 to 83.5% in 2021 and 87.3% in 2022, according to National Statistical Institute data. The share of households with children has increased by 30 percentage points over the same period, reaching 96%. However, the differences in access by region of the country are not small: in the Southwestern region this share reaches 90.5% and in the Northwestern region it is 83.1% in 2022 (respectively 86.2 and 73.5% for 2021). Similar are the differences in terms of access to the internet in cities and villages. In cities, the share of these households reaches 88.8% in 2022 (87.4% in 2021), and in villages – 82.4% in 2022 (71.5% in 2021). The restrictions of the pandemic and the shift to remote work and distance learning stimulated the development of this process – the share of such households in villages, although lower than that in cities, grew significantly faster – by 22.4 percentage points for the period 2019-2022 (11.5 p.p. for 2019-2021) with an increase in cities by 9.1 p.p. for the same period (7.7 p.p. respectively). According to the Digital Economy and Society Index (DESI) 2022 in the area "Connectivity" Bulgaria shows significant progress in coverage with optical lines to buildings (85% of households compared to 50% in the EU), but the overall spread of fixed (63% vs. 78% EU average) and mobile (73% vs. 87% EU average) broadband access remains below the European average.

Against the background of improving access to the internet, data on the share of persons with digital skills is of interest. For the period 2015-2021, it varies around 40%. The share of enterprises that provide their employees with ICT training is also not big – about 9% in recent years, being the highest in large enterprises – about 40%. Despite the observed more substantial growth, the share of employed persons in enterprises using the Internet reaches 40% in 2022. The Digital Economy and Society Index (DESI) 2022 shows that the use of digital technologies by small and medium-sized enterprises fails to reach half of the EU average (25% of SMEs with at least a basic level of digital intensity against 55% for the EU).

Conclusions

COVID-19 struck human beings massively and proved their vulnerability in terms of existence/life and health, including psychological. It had a substantial negative influence on the formation of human capital both quantitatively and qualitatively. COVID-19 considerably increased mortality, affecting both older and younger groups of the population, i.e. reduced the already limited human resources of the country as a whole. This effect was most pronounced during the pandemic, but the consequences are still being felt, and it is possible that they will have a long-term impact. By affecting younger people, those of reproductive age, the virus set the stage for a future decline in the birth rate and for further limitation of the people of the country – bearers of human capital. However, it could not have a more significant long-term influence on the external migration processes and migration behaviour of the population, characteristic of Bulgaria. The restriction of emigration from the country was for a short time.

The pandemic also had a notable negative effect on access to education and training, as well as on the quality of schooling, affecting to a greater extent vulnerable groups of students who already face major challenges in the accumulation of human capital. In addition, negative

consequences are the change in the attitude of students towards the educational process, as well as the effect on the psychological state of children, youth and the older population. All this had its impact on the quality of the newly formed human capital, as well as on maintaining and increasing the quality of the already formed human capital.

The gaps in the education process during the pandemic could be further compensated by participation in the lifelong learning system. This, however, is an additional expense for society and individuals and as practice shows, the participation of the population in training is minimal, and not only during the pandemic. In this case, the negative consequences may have a long-term nature.

The COVID-19 pandemic taught its lessons and spotlighted a number of problems facing the formation of human capital in Bulgaria. It also proved the benefits of digitalisation and stimulated its development. A number of measures in this direction were taken in the country, some of which were more successful. Despite this, Bulgaria is still significantly behind in this regard not only the EU average, but also almost all EU member states.

The pandemic also highlighted the negative consequences of distance learning (digitalisation), especially on the younger generation, but not only. The influence on the psychological state of children and their lower receptivity to the learning material and distraction during distance learning negatively affects both their health and the quality of their schooling, and this also means the quality of the newly formed human capital.

The lessons given by the pandemic provide a starting point for the elaboration of policies and measures not only for the evolvement and implementation of digitalisation, including in education, but also for the preservation and development of the country's human capital.

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