

INTERNAL AUDITING & RISK MANAGEMENT



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THE COVID-19 PANDEMIC: LABOUR MARKET IMPLICATIONS FOR YOUTH WOMEN

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Abstract: *The 2019 Coronavirus pandemic dramatically disrupted the workforce in early 2020, as a result of restrictions imposed to reduce the spread of the virus. The rapid decline in economic activity has resulted in massive and widespread job losses. According to the statistics of the International Labor Organization, the employment of women worldwide decreased by 4.2% in 2020 compared to 2019, much more pronounced than that of men by 3%. Younger women, especially, experienced a disproportionately higher share of employment losses. The decrease in female employment, together with the low participation of women in the labor market, represents a major setback for the efforts made in the last two decades to increase gender equality.*

The paper presents a brief analysis of the evolution of the main indicators of the female labor market, aged between 15-34, under the impact of the Covid-19 pandemic, at the level of the European Union and Romania.

Keywords: *employment of young women, young NEETs, impact, health crisis, gender equality*

JEL Classification: *E24, J13, J16, J21*

1. Introduction

The onset of the health crisis dramatically disrupted the labor market at the beginning of 2020, as a result of the closure or reduction of activities. Young people are among the groups that have been disproportionately affected by the current pandemic, both in the short and long term.

Employment of young women fell at a faster rate than that of men in most global economies in the first half of 2020, when the impact of the pandemic on the labor market was hardest. This is due to the fact that some of the sectors most affected by Covid-19 were those where the share of female employment in relation to their total employment is higher than that of males. In most economies, young women are more likely to dominate sectors such as hospitality, food service and personal care (sectors that were some of the hardest hit in the first half of 2020, when strict social distancing measures and consumer concerns about health affected sales and employment).

As a result of the periods of isolation, unemployment developed in waves both for young people in general and for young women in particular. The unemployment rate among young EU-27 women aged 15-24 started to rise from 15.1% in March 2020 and peaked at 18.4% in Q3/2020 and Q1 /2021 of 18.6%. It then fell again to 14.3% by Q1/2022.

At the start of the pandemic, the average rate of young NEET women aged 15-29 was 15.5% by the end of 2020 - up one percentage point on the previous year, and falling slightly in 2021, reaching 14.5%.

Employment opportunities for young women remain strongly affected by the Covid-19 crisis, and new entrants to the labor market account for a large part of the increase in unemployment among them. On-the-job learning opportunities and apprenticeships have been severely affected. For working female students, the lack of temporary work opportunities can pose challenges for financing education and living costs. Statistics and recent research on the labor force indicate that some young women may choose to withdraw completely from the labor market, with negative consequences both at the individual and societal level.

2. Specialty Literature

The effects of the Covid-19 pandemic on different socio-economic groups are uneven, with vulnerable employees being more at risk of losing their jobs (Chetty et al. 2020, IMF 2021). The specialized literature analysed the differential effects of the consequences of the Covid-19 crisis on the labor market according to gender. Thus, in some studies the authors supported the idea that the health crisis caused a segregation, in which the results and prospects of women on the labor market deteriorated disproportionately (Albanesi and Kim 2021, Alon et al. 2020, Caselli et al. 2020, Fabrizio and others 2021 and Shibata 2020, etc.). These results, however, are in contrast to the “segregation” observed after the 2008-2009 financial crisis, where men appeared to be much more strongly affected (Wall 2009; Hoynes, Miller, and Schaller 2012) by it.

Among the factors underlying the asymmetric impact of the health crisis on the labor market according to gender, the following can be mentioned:

- in the sectors of activity that were more seriously affected by Covid-19, women occupied a significant share (Mongey, Pilososph and Weinberg 2020 and Albanesi and Kim 2021, Coibion, Gorodnichenko and Weber 2020);
- women tend to bear a greater burden of childcare when schools have been closed (Adams-Prassal et al. 2020, Fuchs-Schündeln et al. 2020, Hupkau and Petrongolo 2020, Russell and Sun 2021, and Zamarro and Prados 2020);
- women are more often employed in temporary and/or part-time jobs, with higher risks of being terminated in a crisis (Petrongolo 2004 and Bahn and Sanchez Cumming 2020);
- many of the occupations that have faced increased pressure and demand for their services during the pandemic - such as frontline nurses, aged care workers, mental health workers, education and training workers - are dominated by women. This presented a greater risk of distress, mental ill health and burnout among the female workforce. Collectively, these factors meant that the pandemic risked stalling or even exacerbating progress in closing gender gaps that already existed in Australia's workforce (Cassells and Duncan, 2021; WGEA, 2020; World Economic Forum, 2021).

Also, these factors, along with other socio-economic-cultural factors specific to each country/region, contributed in the first months of the pandemic to the increase of women's unemployment more than men's in several countries, or even to the reduction of progress in eliminating the gaps of the kind that already existed on the labor market in many countries (Cassells and Duncan, 2021; WGEA, 2020; World Economic Forum, 2021).

The study by Bluedorn et al (2021) analyzes the negative difference between the employment rate of women and that of men, quantifies the role of the sectoral composition of employment by gender in labor market outcomes, but also the recent dynamics of the labor market depending on gender.

Also, the analysis and interpretation of the conducted surveys indicate that women can rethink their career decisions in the light of the pandemic (Romei 2021), which could mean that the health crisis leads to a future decrease in women's participation in the labor market.

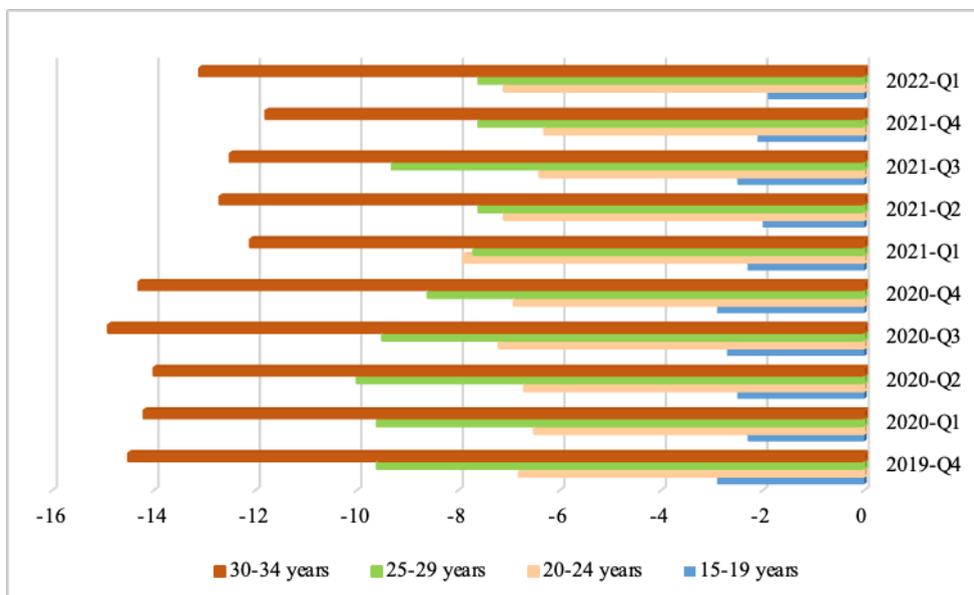
Women's career interruptions due to the Covid-19 crisis could have a negative impact on long-term earnings and employment prospects (Albrecht et al. 1999, Aisenbrey, Evertsson, and Grunow 2009).

3. Gender Gaps In Youth Labour Market

Young people have been disproportionately affected by the loss of jobs during the health crisis, as they are more often employed on temporary contracts and with the easing/lifting of social distancing restrictions access to jobs has remained difficult for new market entrant’s work.

The pandemic caused large job losses for women in 2020. In absolute numbers, across the EU-27, women aged 15-34 lost 1.44 million jobs in Q2/2020. The health crisis is in contrast to the global financial crisis of 2008-2009, where men were hit harder than women, with a smaller magnitude of total job losses. However, women’s employment took longer than men’s to recover. According to Eurostat statistics, employment for both young women and young men started to recover in 2021, but at different speeds depending on the age segment and gender (Figure 1).

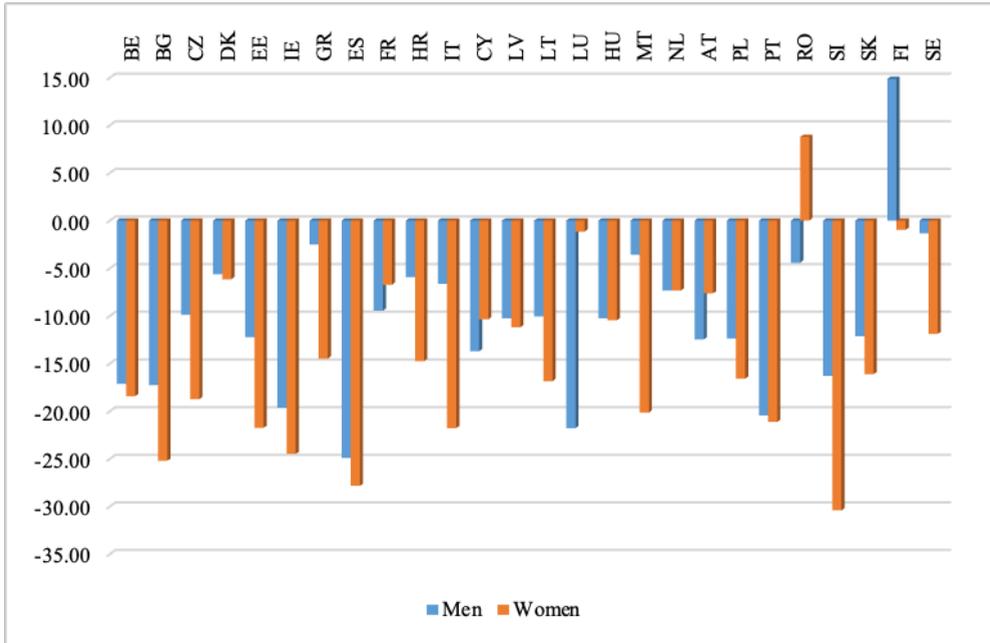
Figure 1. The gap between the employment rate of young women and men, by age group, (%)



Data source: Eurostat statistics, [LFSQ_ERGAN]

The comparative analysis of the evolution of employment among young people aged between 15-24 in the member states highlights those young women on the labor market suffered more than men in the first phase of the pandemic (Figure 2).

Figure 2. Job losses for women in the first phase of the pandemic was higher than for men in member states



Data source: Eurostat statistics, [LFSQ_ERGAN]

For example, in Slovenia, Italy, Malta, Greece and Sweden, the employment of young women decreased by 32.42%, 21.79%, 20.14%, 14.7% and 11.88% respectively between quarter 4/2019 and quarter 2/2020, being much higher than the decrease of 16.3%, 6.65%, 3.57%, 2.5% and 1.33% of the employment of young men in these countries. In countries such as Luxembourg, France, Cyprus, and Austria, the loss of jobs during the analysed period was significant among young men (Figure 2). The exceptions were Romania, where employment among men aged 15-24 decreased by 4.43 pp, and among young women it increased by 8.78 pp (Figure 2) and Finland, with an opposite situation to Romania: an increase in youth employment by 14.87% and a slight reduction in employment among young women by 0.97 pp.

The outbreak of the health crisis determined that, at the EU-27 level, the unemployment rate among young women increased by 4.1 percentage points for the 15-24 age group (Figure 3), compared to a 3.3 pp increase in the unemployment rate among men of the same age group.

By age group, in general, young women registered a higher unemployment rate than that of men (Table 1).

Table 1. Comparative evolution of the unemployment rate among young women and men at EU-27 level, (%)

	Men				Women			
	15-19 years	20-24 years	25-29 years	30-34 years	15-19 years	20-24 years	25-29 years	30-34 years
2019-Q4	17.8	14.1	9.1	6.1	18.0	13.5	8.9	7.7
2020-Q1	18.7	14.5	9.7	6.5	18.2	13.7	9.7	7.9
2020-Q2	21.1	15.6	9.6	6.9	23.0	15.0	10.0	7.2
2020-Q3	22.9	16.9	11.0	7.4	22.5	17.4	11.6	9.0
2020-Q4	20.6	16.0	10.6	7.3	20.5	15.7	10.5	8.7
2021-Q1	21.6	17.4	11.4	8.0	22.4	18.2	10.9	8.5
2021-Q2	23.6	15.5	9.9	6.7	24.4	15.9	9.7	8.0
2021-Q3	20.7	14.2	8.9	6.2	21.7	14.6	9.8	7.5
2021-Q4	18.6	13.7	9.3	6.2	19.1	12.3	8.9	6.8
2022-Q1	18.2	13.3	9.0	5.8	18.5	12.7	8.8	7.0

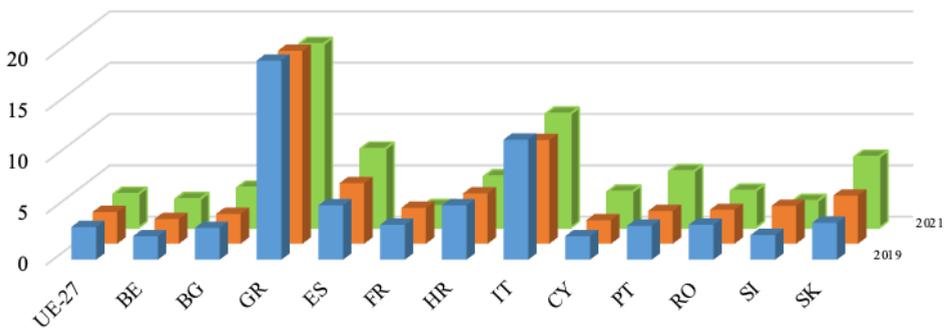
Data source: Eurostat statistics, [LFSQ_URGAN]

Countries particularly hard hit during the financial crisis once again recorded an above-average increase in the youth unemployment rate. Thus, in Greece, the unemployment rate of young women aged between 15 and 24 reached 45.5% in quarter 1/2022, in Spain at 30.1% and in Italy at 29.0%, much higher values than young people in the same age segment.

In Romania, the unemployment rate among women and young people aged between 15-24 registered significant variations as a result of the Covid-19 pandemic (and with values well above the EU-27 average), reaching 24.0% in the 1st quarter /2022, above the 22.8% value recorded for young men. As a result of the health crisis, long-term unemployment among young women, regardless of age group, registered a slight increase. The most affected countries were those with high unemployment: Greece and Italy (Figure 3).

Another particularity of the impact of the health crisis on the labor market of young people in general and women in particular compared to the Great Recession was that it differentially affected the sectors of the economy.

Figure 3. Youth women long-term unemployment rate (12 months or longer), age 15-29 years, 2019–2021



Data source: Eurostat statistics, [YTH_EMPL_120]

The comparative sectoral analysis of the quarterly data from 2020 and 2022 at the EU-27 level shows that young women, aged between 15-24 years, employed in Accommodation and food services and in the Wholesale and Retail Trade sector suffered the most reductions in the year quarter 2/2020 compared to quarter 4/2019 (-206.7 thousand people and -135.6 thousand people, respectively) (Table 2). The end of 2020 brought an improvement in the loss of jobs for women, and in some sectors, such as Education and Health, there was even an increase in employment. Compared to the first quarter of 2021, the end of the year was characterized by an increase in employment among young women in economic activities, with the exception of the Financial and Insurance Activities Sector, as well as Transport and Storage, which continued to record job reductions for women in the 15-24 age group (Table 2).

Table 2. Quarterly reductions in jobs for young women (15-24 years old) employed in economic activities

	Q2 2020-Q4 2019	Q4 2020-Q2 2020	Q4 2021-Q1 2021	Q12022-Q4 2021
Agriculture, forestry and fishing	14.7	-8.3	2.6	7.1
Manufacturing	-51.1	2	20.1	3.9
Construction	-4	9.7	16.4	-11
Wholesale and retail trade; repair of motor vehicles and motorcycles	-135.6	41.6	44.9	-30.5
Transportation and storage	-12.5	-2.4	-22.8	-4.1
Accommodation and food service activities	-206.7	-27.9	170.6	-53

	Q2 2020- Q4 2019	Q4 2020- Q2 2020	Q4 2021- Q1 2021	Q12022-Q4 2021
Information and communication	-6.7	-0.2	21	21
Financial and insurance activities	-16.2	-11.6	-27.8	-0.1
Real estate activities	11.9	6.2	19.3	-17.9
Professional, scientific and technical activities	-62.6	13.4	40	-0.4
Administrative and support service activities	-7.4	-46.1	16.8	9.5
Public administration and defence; compulsory social security	17.3	34.3	45.1	3.7
Education	-81.4	109.9	18.6	37.9
Human health and social work activities	-25.9	57.7	55.8	19.8
Arts, entertainment and recreation	-48.1	-22.2	51.1	-8
Other service activities	-46.1	-20.9	23.8	-24.5

Source: Authors' own calculations based on Eurostat Statistics [LFSA_EGAN2]

NEETs represent a group of young people who are at risk of poverty, social exclusion and mental health problems. Those who were already in this situation at the start of the pandemic were among the most vulnerable to the effects of travel restrictions, which moved them further away from jobs, either near their home or in other geographic locations. The pandemic diminished the opportunities for education and professional training for young people, they were also limited.

According to the latest Eurostat estimates, in 2021, the percentage of young women who are not professionally employed and do not follow an education program in the EU-27, varied from 6.4% for the 15-29 age group, to 22, 9% for young women aged 30-34. The difference between the NEET rate of young women and that of men in the 25-29 and 30-34 age groups is significant: 7.6 pp, respectively 11.2 pp.

Regardless of the age segment of NEET girls, this indicator varies significantly from one Member State to another. Thus, for the 15-24 year old group, the NEET rate among young women varies from 4.7% in Sweden to 21.5% in Romania, or 20% in Italy. In Romania, in any age category, young women registered a NEET rate well above the EU-27 average, both in the period before the pandemic and during the pandemic, often reaching the highest value in the hierarchy of the member states.

Based on Eurostat statistics, it can be stated that the majority of NEETs in the Member States are women mainly because of the family responsibilities they have: more women spend time looking after children compared to other

family members, and young women spend almost three times as much time in unpaid childcare or household work compared to men.

Also, the statistical data highlight the fact that, at the European level, the NEET rate among women aged 15-34 has increased for all levels of education, the highest increase being registered at the level of post-secondary and vocational high school graduates.

Surveys conducted by various researchers (Daphne et al. in 2021) or specialized institutions highlighted the fact that, regardless of the age segment analysed, young women were more often exposed to the risk of depression. If at the beginning of the pandemic they were among the groups with the lowest mental well-being scores, as the pandemic progressed, the frequency of negative feelings increased. The poor mental health of young people, and especially of young women, can have a negative impact on their access to the labor market.

4. Conclusions

The COVID-19 crisis has severely affected the labor market around the world, with stronger negative effects on young people than on other age groups. A characteristic of the health crisis, for all age groups, is that unemployment data reflect only a small proportion of total job losses: inactivity has increased rather than unemployment.

Young Europeans have been particularly affected by reduced working hours and increased inactive periods. The effects of the pandemic on the labor market are differentiated according to gender. The sectors of the economy that were most affected by the restrictions (especially accommodation and food services) employed, before the onset of the pandemic, mostly young people, with a high share among young women.

Job losses among young women due to the pandemic have mostly translated into an increase in inactivity in 2020. The unemployment rate among young women, for various age segments, has increased relative to that of young men, with the outbreak of the health crisis.

Although there was a rebound in the employment of young women in the first quarter of 2022, this recovery was slower in the employment rate of young women, and their unemployment rate remained higher than before the crisis. The lack of jobs has particularly affected young women about to start a career (15-24 years old). Also, the number of young NEETs registered significant increases compared to young people in this category, the NEET rate for the 25-29 age segment reaching 21.2% in 2021. In Romania, the NEET rate of young women reached values among the highest in the EU-27, along with

Italy and well above the European average. If young women's labor market participation does not fully recover from the pandemic, it will exacerbate youth labor market trends in the longer term and pose challenges for economies in the years to come.

References

- Adams-Prassl, A., Boneva T., Golin M. and Rauh C. (2020). Inequality in the impact of the coronavirus shock: Evidence from real time surveys. *Journal of Public Economics*, 189: 104245.
- Aisenbrey, S., Evertsson S. and Grunow D. (2009). Is There a Career Penalty for Mothers' Time Out? A Comparison of Germany, Sweden, and the United States. *Social Forces*, 88 (2): 573–605.
- Albanesi, S., and Kim J. (2021). The Gendered Impact of the COVID-19 Recession on the US Labor Market. *NBER Working Papers 28505*. National Bureau of Economic Research: Cambridge, MA.
- Albrecht, J., Edin P., Sundström M. and Vroman S. (1999). Career Interruptions and Subsequent Earnings: A Reexamination Using Swedish Data. *Journal of Human Resources*, 34 (2): 294–311.
- Alon, T., Doepke M., Olmstead-Rumsey J., and Tertilt M. (2020). This Time It's Different: The Role of Women's Employment in a Pandemic Recession. *NBER Working Paper 27660*. National Bureau of Economic Research: Cambridge, MA.
- Bahn, K. and Sanchez Cumming C. (2020). How the coronavirus recession is impacting part-time U.S. workers. *Equitable Growth* (blog).
- Bluedorn, J., Caselli F., Hansen N-J., Shibata I., Tavares M. (2021). Gender and Employment in the COVID-19 Recession: Evidence on "She-cessions." *IMF Working Paper*, WP/21/95,
- Caselli, F., Grigoli F., Sandri D. and Spilimbergo A. (2020). Mobility under the COVID-19 Pandemic Asymmetric Effects across Gender and Age. *IMF Working Paper 20/282*. International Monetary Fund, Washington, DC.
- Cassells, R. and Duncan, A. (2021). Gender Equity Insights 2021: Making it a priority, Bankwest Curtin Economic Centre and Workplace Gender Equality Agency, *Gender Equity Series*, Issue 6.
- Chetty, R., Friedman J., Hendren N., Stepner M., and The Opportunity Insights Team. 2020. The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data. *NBER Working Paper 27431*. National Bureau of Economic Research: Cambridge, MA
- Coibion, O., Gorodnichenko Y. and Weber M. (2020). "Labor Markets during the Covid-19 Crisis: A Preliminary View, *NBER Working Paper 27017*. National Bureau of Economic Research: Cambridge, MA
- Daphne, A., Massimiliano M., Sanna N., Eszter S. (2021). Living, working and COVID-19 (Update April 2021): Mental health and trust decline across EU as pandemic enters another year. <https://www.eurofound.europa.eu>.

- Eurostat. (2021). Youth unemployment ratio by sex, age and NUTS 2 regions, <http://appsso.eurostat.ec.europa.eu>.
- Fabrizio, S., Gomes D. and Tavares M. M. (2021). COVID-19 She-cession: The Employment Penalty of Taking Care of Young Children. *IMF Working Paper 21/55*. International Monetary Fund: Washington, DC.
- Fuchs-Schündeln, N., Krueger D., Ludwig A. and Popova I. (2020). The Long-Term Distributional and Welfare Effects of COVID-19 School Closure, *NBER Working Paper 27773*. National Bureau of Economic Research: Cambridge, MA.
- Hoynes, H., Miller D. and Schaller J. (2012). Who Suffers During Recessions? *Journal of Economic Perspectives*, 26 (3): 27–48.
- Hupkau, C. and Petrongolo B. (2020). Work, Care, and Gender During the COVID-19 Crisis. *Fiscal Studies*, 41 (3): 623–51.
- ILO. (2021). An update on the youth labour market impact of the COVID-19 crisis. Statistical brief, June 2021. <https://www.ilo.org/>.
- International Monetary Fund (IMF). (2021). Recessions and Recoveries in Labor Markets: Patterns, Policies, and Responding to the COVID-19 Shock. In *World Economic Outlook* April 2021.
- Mongey, S., Pilossoph L. and Weinberg A. (2020). Which Workers Bear the Burden of Social Distancing Policies? *NBER Working Paper 27085*. National Bureau of Economic Research: Cambridge, MA.
- OECD. (2021). *Employment Outlook 2021*. Paris: OECD Publishing. <http://www.oecd.org>.
- Petrongolo, B. (2004). Gender Segregation in Employment Contracts. *Journal of the European Economic Association*, 2: 331–45.
- Romei, V. (2021). “I am close to quitting my career”: Mothers step back at work to cope with pandemic parenting.” <https://www.ft.com>.
- Russell, L. and Sun C. (2020). The effect of mandatory childcare center closures on women’s labor market outcomes during the COVID-19 pandemic. *Covid Economics*, 62: 124–54.
- Shibata, I. (2020). The Distributional Impact of Recessions: The Global Financial Crisis and The Pandemic Recession, *IMF Working Paper 20/96*. Washington, DC: International Monetary Fund.
- Statistici Eurostat, www.eu.europa.eu.
- Wall, H. (2009). The Man-Cession of 2008-09: It’s Big, But It’s Not Great, *The Regional Economist*, 2009 (October): 4–9.
- Workplace Gender Equality Agency (WGEA). (2020). Gendered impact of COVID-19, 11 May 2020, <https://www.wgea.gov.au>.
- World Economic Forum. (2021). Global Gender Gap Report 2021: Insight Report. <http://www3.weforum.org/>.
- Zamarro, G. and Prados M. (2021). Gender Differences in Couple’s Division of Childcare, Work and Mental Health, *Review of Economics of the Household*, 19: 11–40.

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EXTERNAL PUBLIC AUDIT, A TOOL TO IMPROVE THE DECISIONS BY THE MANAGEMENT OF PUBLIC FUNDS FOR SUSTAINABLE DEVELOPMENT

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Abstract: *The topic of the study tries to answer the question, „Is external public audit a lever to identify vulnerabilities in the way how the public funds for sustainable regional and local development are managed?” In this respect, the approach started from the analysis and re-treating of the disfunctions found by the Supreme Audit Institution in the management of public funds of the ministry under review. Thus, with the help provided by the global diagnostic grid of the public funding management of the ministry, the disfunctions were addressed in the hierarchical order of the entities which receive public funds and also according to the typology of the deviations. The disfunctions were re-treated on the basis of the trinomial criterion of financial accounting - budget execution - internal management control system.*

Keywords: *external public audit, financial accounting, budget execution, internal control, sustainable development*

JEL Classification: *M4, G3, H7*

1. Introduction

In Romania, the external public audit is carried out annually, in the form of a financial audit at the main authorising officers, and at least once every three years at the other authorising officers, as well as at the public entities in which the state or the administrative-territorial units are major shareholders.

As a result, the external public audit missions carried out between 2015 and 2019, at the ministry under review (MDRAP), are of a limited nature due to the fact that not all entities under the ministry’s subordination, coordination or authority were included in the audit each year, so that disfunctions in the management of public funds could have been found.

In this context, this scientific approach identified the financial and compliance audit missions that were carried out during the period under review and made an overall diagnosis of the system of the public funding management of the ministry under review.

2. Problem Statement

The external public audit, through its specific activities, is a tool for improving decisions related to the management of public funds that are intended for sustainable development. Thus, the purpose of using the criteria for assessing the impact of the disfunctions identified by the external public audit was to demonstrate the vulnerability of the current information-accounting system in the management of the public funds that allocated for regional and local development.

The interpretation of the results obtained from the impact assessment of the identified disfunctions was based on a series of inequations and was completed by determining and interpreting the indicator "Degree of disfunction impact assessment".

3. Research Question

The topic of the study tries to answer the question „Is external public audit a lever to identify vulnerabilities in the way how the public funds for sustainable regional and local development are managed?“ In this respect, the approach started from the analysis and re-treating of the disfunctions found by the Supreme Audit Institution in the management of public funds of the ministry under review.

The vulnerability of the public funding management was assessed through the value of the indicator "Degree of disfunction impact assessment" and its significance, in the context of validating or invalidating the research hypothesis "Is external public audit a lever to identify vulnerabilities in the way how the public funds for sustainable regional and local development are managed?"

4. Research Methods

The assessment of the deficiencies the external public audit found while being carrying out by the Supreme Audit Institution went through the steps set out in the evaluation grid method, according to the literature in the field (Niculescu, 2003).

Thus, the degree assessment of the impact of the disfunctions (I_i) was determined as the multiplication of the score given to the assessment criteria (N_i) and their related significance coefficient (Q_i), in relation to the nature of the disfunction (Niculescu, 2003).

The formula for calculating the disfunction impact rating (I_i), which was used in the analysis, was as follows:

$$I_i = \sum N_i \times Q_i$$

N_i = score given to the assessment criteria
 Q_i = significance coefficient of the assessment criteria
 i = kind of disfunction found that was found at a consolidated level

The assessment of the disfunctions was made on a scale from 1 to 3, in relation to their impact on the audited financial statements (Niculescu, 2003).

5. External Public Audit, a tool to improve the decisions by the management of public funds for sustainable development

The average value for the 2015-2019 period was determined on the basis of the value of the indicator "Degree of disfunction impact assessment", as shown in the table below:

Table 1. Assessment of disfunction impact within period 2015-2019

Financial year	Indicators (I_i)	Value of disfunction impact	Significance of disfunction impact
2015	I_{2015}	1.2183	Medium vulnerability
2017	I_{2017}	2.8315	High vulnerability
2018	I_{2018}	3.0000	High vulnerability
2019	I_{2019}	2.3260	High vulnerability
2015-2019	I_{medium}	2.3439	High vulnerability

Source: data processed by the author

The average value of the indicator "Degree of disfunction impact assessment" ($I_{\text{medium}} = 2.3439$) shows that the ministry under review has a high vulnerability in terms of the public funding management for regional and local development. This phenomenon was found and quantified by the external public audit in terms of financial and compliance audits.

The value of the indicator "Degree of disfunction impact assessment" by domains, i.e. in financial accounting, budget execution, and managerial internal control system, was determined on the basis of the following data, by reference to the nature of the identified disfunction:

Table 2. Disfunctions re-treated from the 2015-2019 period

Name of audited entity during the period 2015-2019	Amount of disfunctions identified between 2015 and 2019			Total amount of disfunctions 2015-2019
	Financial accounting	Budget execution	Internal control system	
MDRAP	22	19	12	53
ANRSC	12	8	11	31
ANL	22	11	18	51
ISC	10	5	9	24
ANCPI	20	10	9	39
CNI	8	8	6	22
Total 2015-2019	94	61	65	220

Source: data processed by the author

The analysis of the dysfunctions reported from 2015 to 2019 revealed that, out of the 220 deviations that the external public audit found, 94 disfunctions were of a financial accounting sort, 61 deviations were of a budgetary accounting sort, i.e. the budget execution process, and 65 disfunctions were of an internal control system kind – the internal control system implemented within the ministry under review, including the subordinate entities, under its coordination or authority.

Thus, the impact of disfunctions in the financial accounting was quantified on the basis of the following information:

Table 3. Financial accounting disfunctions in the 2015-2019 period

Disfunction impact assessment criteria on financial accounting in the 2015-2019 period	2015-2019	
	N_i	Q_i
MDRAP	2	23.40%
ANRSC	1	12.77%
ANL	2	23.40%
ISC	1	10.64%
ANCPI	2	21.28%
CNI	1	8.51%
Degree of impact assessment of financial accounting disfunctions - I_{CF}	1.6808	100.00%

Source: data processed by the author

The financial accounting disfunction impact assessment, I_{CF} , was 1.6808 and it was determined on the basis of the following calculation:

$$I_{CF} = 0.468 + 0.1277 + 0.468 + 0.1064 + 0.4256 + 0.0851 = 1.6808$$

The value of 1.6808 shows that the ministry's financial accounting was highly vulnerable during the 2015-2019 period due to the disfunctions the external public audit identified.

The impact of the disfunctions in the budgetary accounting was quantified based on the following information:

Table 4. Budgetary accounting disfunctions in the 2015-2019 period

Assessment criteria for the impact caused by disfunctions on budget implementation in the 2015-2019 period	2015-2019	
	N_i	Q_i
MDRAP	2	31.15%
ANRSC	1	13.11%
ANL	1	18.03%
ISC	1	8.20%
ANCPI	1	16.39%
CNI	1	13.11%
Degree of impact assessment of budgetary accounting disfunctions - I_{EB}	1.3114	100.00%

Source: data processed by the author

The assessment degree of the budgetary accounting disfunctions' impact, noted I_{EB} , had a value of 1.3114 and it was determined on the basis of the following calculation:

$$I_{EB} = 0.623 + 0.1311 + 0.1803 + 0.082 + 0.1639 + 0.1311 = 1.3114$$

The ministry's budget execution activity was medium vulnerable during the period under review as a result of the disfunctions the external public audit identified. Vulnerability was determined on the basis of the impact assessment value of the disfunctions in the budgetary accounts of 1.3114.

The impact of the disfunctions found in the functioning of the internal control management was quantified on the basis of the following information:

Table 5. Internal control management disfunctions from 2015 to 2019

Assessment criteria for the impact caused by disfunctions in the internal control management in the 2015-2019 period	2015-2019	
	N_i	Q_i
MDRAP	1	18.46%
ANRSC	1	16.92%
ANL	2	27.69%
ISC	1	13.85%
ANCPI	1	13.85%
CNI	1	9.23%
Degree of impact assessment of disfunctions in the internal control management - I_{SCIM}	1.1384	100.00%

Source: data processed by the author

The assessment degree of the disfunction impact in the operation of the internal control management, I_{SCIM} , was of 1.1384 and it was determined on the basis of the following calculation:

$$I_{SCIM} = 0.1846 + 0.1692 + 0.5538 + 0.1385 + 0.1385 + 0.0923 = 1.1384$$

The internal control managerial, which was designed and implemented within the ministry, had a medium vulnerability during the period under review due to the disfunctions that the external public audit identified.

In terms of the overall financial-accounting activity that was subject to external public audit, for the period under review, the impact of the identified disfunctions was quantified on the basis of the following information:

Table 6. Disfunctions of the current accounting information system during the 2015-2019 period

Disfunction impact assessment criteria of the current accounting information system, 2015-2019	2015-2019	
	N_i	Q_i
MDRAP	2	24.09%
ANRSC	1	14.09%
ANL	2	23.18%
ISC	1	10.91%
ANCPI	1	17.73%
CNI	1	10.00%
Degree of disfunction impact assessment - I_{Total}	1.4727	100.00%

Source: data processed by the author

The impact assessment degree of evaluation of the disfunctions that were found in the current accounting information system, noted I_{Total} , was of 1.4727, and it was determined on the basis of the following calculation:

$$I_{Total} = 0.4818 + 0.1409 + 0.4636 + 0.1091 + 0.1773 + 0.10 = 1.4727$$

The financial-accounting activity of the ministry that manages the public funding allocated to regional and local development was highly vulnerable during the period under review due to the disfunctions the external public audit identified.

6. Conclusions and perspectives of scientific research

The analysis of the external public audit from 2015 to 2019 showed that, following the assessment of the disfunctions' impact in the financial-accounting activity of the ministry that was the subject of the scientific research, the vulnerabilities of the current information-accounting system, that manages the public funding for sustainable development, were identified.

The conclusion resulting from the application of the grid for the global diagnosis of the management of public funding for regional and local development, by establishing the average value of the indicator "Degree of disfunction impact assessment", validates the research hypothesis "Is external public audit a lever to identify vulnerabilities in the way how the public funds for sustainable regional and local development are managed?".

In the literature, in terms of the international regulations related to the external public audit by Supreme Audit Institutions, there are guidelines on the evaluation of public policies, namely INTOSAI GOV 9400 "Guidelines on the evaluation of public policies", renamed "Guide 9020, Public Policies Assessment (2019)", which aims to improve them, including in the implementation process, so that strategic development objectives can be implemented. There are also limitations in the assessment of a public policy. They are mainly generated by the mandate given to the Supreme Audit Institution, in the sense of going beyond or not going beyond it, which is a matter of 'political discussion'.

The experience of the Supreme Audit Institutions in evaluating public policies has shown that an independent approach to the evaluation of public policies, with the aim of an independent study, enables citizens and other stakeholders to form their own opinion on the public actions. The decision-makers are also able to make relevant decisions on whether to continue, correct or abandon a public policy based on scientific evidence, *i.e.* objective analyses and recommendations.

From the external public audit point of view, the assessment of a public policy can be carried out ex-ante, at the same time as its implementation or ex-post. However, practice has shown that such evaluations are usually carried out ex-post, less at the same time as the implementation of a public policy, and not in any way ex-ante. The arguments in favour of an ex-post evaluation are mainly based on the existence of sufficient data to assess long-term effects and indirect effects, which are essential components of a meaningful evaluation. All these approaches are future research directions if external public audit will focus its activities on the evaluation of public policies.

References

- Bécour, J.Ch. and Bouquin H. (2008). *Audit Opérationnel*, 3^e édition. Paris: Economica.
- Fabre, P., and Bessire D. (2006). Enseigner la conception des systèmes de comptabilité de gestion. *Comptabilité Contrôle Audit*, 12(2): 67-85.
- Gavard Perret, M.L., Gotteland D., Haon Ch., and Jolibert A. (2011). *Méthodologie de la recherche*. Paris: Pearson Education.
- INTOSAI GOV 9400 'Guidelines on the evaluation of public policies' approved in 2016, renamed and re-titled Guide 9020 'Public Policy Assessment', with editorial changes in 2019, available online at www.intosai.org
- Law no 94/1992 on the organisation and functioning of the Court of Accounts, republished, Official Gazette, Part I, No 238 on 3 Aprilie, 2017.
- Morariu, A., Stoian, F., and Suci, Gh. (2008). *Audit intern și guvernare corporativă*. Bucharest: Universitară Publishing House.
- Niculescu, M. (2003). *Diagnostic Economic*, pp.70-71. Bucharest: Economică Publishing House.
- Public Report of Romanian Court of Accounts for 2015.
- Public Report of Romanian Court of Accounts for 2016.
- Public Report of Romanian Court of Accounts for 2017.
- Public Report of Romanian Court of Accounts for 2018.
- Public Report of Romanian Court of Accounts for 2019.

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AN ANALYSIS OF THE EVENTS THAT LED TO THE EXACERBATION OF THE BLACK SEA CRISIS IN THE LAST DECADE AND THE ROLE OF DISINFORMATION AND MISINFORMATION

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Abstract: *The joint defence and security of the Black Sea basin is a fundamental instrument of international security policy. Applying the principle of subsidiarity in the organization of security in this area, which is characterized by chronic conflicts dating back to the Cold War, involves taking into account a multi-storey security system, based on cooperation between EU (European Union), OSCE (Organization for Security and Co-operation in Europe), NATO (North Atlantic Treaty Organization) and UN (United Nations). Engagement at one or more of these levels will depend on the specific security tasks being considered. In the context of the Ukraine crisis, the need for a correlation that means optimizing cooperation between the various security institutions is becoming more evident than ever. Developments in the EU, competition between Russia (Russian Federation) and NATO, the possibility that the national interests of some Western states prevail over the common ones, the assessment of security from ideological and non-financial positions, as well as the lack of a correct division of labour between the participating states are the main factors influencing the construction of an efficient system in the field of security in the Black Sea area. The level of interoperability on which*

relations between the states in the area are based gives content to the collective European and Euro-Atlantic crisis management capacity.

Keywords: *disinformation, information security, war, vulnerability, resilience*

1. Introduction

In the early 1990s, the states of the Black Sea region (Ukraine to the north, Russia to the northeast, Georgia to the east, Turkey to the south, and Bulgaria and Romania to the West (Encyclopædia Britannica, 2022) faced a multitude of problems, generated by the new situation offered by the end of the Cold War. There were problems arising from the many differences of internal origins, held in check by totalitarian systems of government and management, institutions and procedures that, once obsolete, gave free rein to vindictive solutions.

At the same time, interstate differences, shaped by the system of “fraternal states,” became differences caused by either unresolved historical problems or economic disparities, or differences in military potential resulting from the arbitrary and forced division of the former USSR (Union of Soviet Socialist Republics) legacy, the former Warsaw Pact, the former COMECON (The council for Mutual Economic Assistance) and many more.

It was a time when the conduct of states was too little conditioned by morality and law. Only the tendency to defend one’s interests mattered, which highlighted a dramatic reality: cooperation is the exception, and competition the rule. An analysis, even a brief one, of the Black Sea states leads to the conclusion that they are not the same size, have not reached the same level of progress and development, do not have the same level of organization, leadership and democratic conduct, and the list of differences may keep going.

They don’t even have to be aligned with the same geopolitical and economical interests. The differences are necessary. They give individuality and personality. They result from the accumulation of values, from the personality of the states and of the entities that are created in the space of human activity. The problem is not the differences themselves, but the way they separate or unite the individual nations involved.

The last decade and a half have brought countless changes to the Black Sea area. States, in their struggle for assertion, have held a fierce competition to promote their national interests, economic interests in particular have been promoted and protected with great care. After a long period of centralized economies, existing in almost all states in the area (except Turkey), the economies of the states of the Black Sea zone represent not only a universe in itself, but entities that tend to become strong, stable, performing, and competitive.

And even if, for the time being, these are just trends and not far-reaching achievements, there is no doubt that the economies of the Black Sea countries will soon play an important role in the European economy, with repercussions on the world economy.

2. The context and events that led to the crisis situation

At the heart of an information war lies the Internet. Moscow's massive disinformation and propaganda machine has been activated not only locally, to paint a different light on the world for the Russian people, but also abroad, as "robots" in the form of autonomous or semi-autonomous programs and machines are pushing Russian propaganda by intruding on conversations on Twitter and Facebook and other on-line platforms.

Russia is known to host several hacker groups, and a few attacks carried out since the start of the conflict deserve special attention.

The largest virtual strike against Russian services would be an attack on the K-ST satellite, which is used primarily by the Ukrainian army but also by Internet service providers and European businesses. The attack carried out at the start of the invasion (and thus using malicious software installed beforehand) notably affects access to the satellite Internet in Ukraine, but also 10,000 customers of French Internet service. ce. Three thousand wind turbines located in Germany can no longer be controlled remotely since this attack (but they continue to produce energy). The main Russian attack, however, appears to have been averted.

Another malicious software was discovered a few hours before the start of the Russian invasion in the servers of many Ukrainian ministries and financial institutions. This one, named FoxBlade, was meant to erase the contents of the various servers that it had infected and could have hurt Ukraine badly even before any fiscal intrusion. As The New York Times reports, it took Microsoft and the Ukrainian government three hours to clear the virus before it was activated.

On the Ukrainian side, the government has recently tried to replicate the successes of the Army of Ukraine with the launch of its Internet Army of Ukraine, accessible on Facebook, Instagram, and Telegram. The leaders offer particular war images in an attempt to alert the Russian population to the situation in Ukraine but also collages aimed at convincing various Western companies to withdraw from Russia.

Among the group's other operations, note that its members hid in restaurant reviews on Yandex (the Google of Russia) information about the invasion in Ukraine, to alert the Russian population. Overall, Ukraine

emerges as the winner on the computer in front of the war. This could be what compelled Vladimir Putin's government to significantly reduce Internet access in his country for a few days. The government has indeed withdrawn access to the main Western social networks, such as Facebook and Twitter. The noose has also been tightened around the foreign media presence in the country to prevent them from presenting the conflict as an invasion or other facts that contradict the state propaganda surrounding the conflict, and foreign channels such as the BBC have been cut off.

Foreign information and dissenting voices are therefore louder than ever in Russia. But the Internet can never be fully controlled, no matter how much Vladimir Putin wants. The more time passes, the more difficult it will prove to impose the state propaganda. Most of the major Russian political think-tanks, such as Stanislav Belkovskiy's National Strategy Institute, M. Deliagin's Institute of Globalization, or Sergei Markov's Institute for Political Research, have, however, made rather balancing remarks on the Ukrainian presidential elections. The day after the second round, Belkovskiy denounced the Russian and Ukrainian campaign managers' "poor electoral strategy," assuring them that it could only lead to a revolution that only mediation between Russia, Poland, and the United States could avert.

However, Markov, also a member of Viktor Yanoukovich's campaign team, underlined after the second round the need for Polish intervention, which seeks to push Ukraine into the European camp. Finally, in a Russian political landscape dominated by nationalist diatribes or declarations of support for Ukrainian power, political figures such as Boris Nemtsov and Irina Khákamada did not hesitate to sharply criticize the Kremlin's stance. Nemtsov will also be appointed on 14 February 2005, as economic adviser to President Viktor Yushchenko.

Major Russian groups have either not expressed an official position or played the card of neutrality in regards to this matter, however a few key well established Ukrainian partners have taken a stance on the matter:

- Alliance between Russian oligarch Roman Abramovich (oil, metals, and so on) and Alexander Volkov, a member of the Ukrainian group Bakay & Volkov, which is barred from entering the United States and Europe;
- Between Mikhail Fridman, president of the Giant Alfa (oil, banks, services, and so on), and the "Dnepropetrovsk clan," Ukraine's second political and financial group, led by Viktor Pinchuk, President Kuchma's son-in-law;
- Anatoliy Tchoubais, the president of the Russian European Defence Fund (EDF), with the group of Leonid Derkach, the ex-head of the secret services, sacked in April 2001.

The Westerners, for their part, like the Russians, were very involved both publicly and behind the scenes. According to Andrei Kokochin, chairman of the Duma Commission for CIS Affairs, approximately fifteen Western foundations and institutes lobbied against the power in place in Ukraine during the presidential elections. Most sources agree with these statements. Viktor Yushchenko was reportedly supported by former US national security adviser Zbigniew Brzezinski and his two sons. The presence of Lech Walesa and Alexandre Kwasniewski in Kyiv, seen several times alongside Yushchenko, adds to the impression of a strong American-Polish involvement.

The Viktor Yushchenko camp has also made contact with the Serbian Otpor and Georgian movements of Kmara, which have been organized as veritable SMEs of the “peaceful revolution” since the overthrows of Slobodan Milošević and Eduard Shevardnadze, respectively. According to several sources, the American Freedom House Foundation of Andrian Karatnitsky and James Woolsey, the former director of the CIA, funded their activists’ trips to Ukraine. The press also traces the activity of several other Western organizations, primarily American: The National Democratic Institute, the International Republican Institute, some major American parties, the United States Agency for International Development (USID), and, of course, the Soros Foundation (Monde-diplomatique, Interview with Régis Genté, 2022).

However, most of these organizations have been present in Ukraine since its independence and have worked there to create a civil society. It should be noted that Ukraine is the top five beneficiaries of American financial aid, following Israel (3 billion dollars), Egypt, and Pakistan (2 billion each).

Proof of American aid, on December 10, 2004, American Senator Ron E. Paul declared before the House of Representatives that Yushchenko’s electoral campaign had been “partially financed by the American government” (quoted by Interfax-Ukraine of December 12, 2004) and requested an investigation into the amount of this aid. Russia, for its part, would have funded Yanukovich’s campaign with \$300 million (Andrew Kuchins, director of the Carnegie Moscow Center, 2004). In reality, the Russian boost mainly took the form of a restructuring of the energy debt.

The fundraising was real, in addition to the name of an official. There is an online initiative with this title on the GlobalGiving platform, but it did not have the cryptocurrency as its payment method, nor did it specify as a contact date the field used in sending such e-mails.

Russian involvement in the Ukrainian presidential elections would not be surprising. Kyiv is indeed central to national security strategy and the fundamental interests of the Russian state and economy. Beyond the obvious historical and “carnal” ties that bind the two countries, Russian interests can be classified into seven major areas. The transit of hydrocarbons, the

interconnection of technologies and the industries that implement them (large groups, but also thousands of SMEs and SMIs), the presence of strategic Russian military infrastructure in Crimea, Orthodox religion, which is shared by both countries, and the Russian language, a factor behind which stands out implicitly the presence on Ukrainian soil of a very large Russian and Russian-speaking diaspora.

The last two areas, while less visible, are no less important. This is the future of the Common Economic Space (EEC), the creation of which was decided in Yalta in September 2003, and will only take on its meaning with the full participation of Kyiv and Moscow's apprehension of the territory of its neighbour, like a Limes against NATO forces. If Ukraine comes to join the North Atlantic Organization and Russia sees its border with the latter expand by 1,576 km, NATO ships will come to Crimea to anchor opposite its own, and a large part of the Russian diaspora-several million people-will find themselves in "adverse territory."

Thus, current Russian military strategy against NATO would be disrupted, as Russian nuclear weapons are the last vectors of power of an army that does not stop decaying, rendering them ineffective in this theatre. These numerous factors explain the very high frequency with which the presidents of the two countries have met since the arrival of Vladimir Putin in the Kremlin. Since 2000, the latter has met Leonid Kuchma every three weeks on average (Kuzio, 2015).

The Russian policy vis-à-vis Ukraine is measured by the yardstick of these meetings: this country does not harbour a real pro-Russian lobby, nor in the industrial field - even if it is the most involved in cooperation with the Russian Defense Industrial and Technological Base (BITD) - neither political nor media (Kochetkov, 2004, Director of the Institute of National Strategy in Moscow). There is no open political party or region advocating rapprochement or union with Russia, as in Belarus, Moldavia (Transnistria), or Georgia (Abkhazia, South Ossetia). As a result, Crimea, despite being populated by more than 60% Russians, voted for independence from Ukraine in 1991.

3. Post-cold war: A policy of balance between the Euro-Atlantic area and the Russia-CIS entity

Despite paying attention to its large neighbours, and their common interests, Kyiv has always had a "multidirectional rhetoric" foreign policy that strove to strike a balance between East and West, between Russia, the CIS countries, Brussels and Washington. This delicate balance is reflected first of all in Ukraine's attitude towards the CIS - a supranational structure of which it

was nevertheless, on 8 December 1991, one of the inspirations, along with Russia and Belarus - and, in general, of the various organizations created in recent years in the former Soviet space. Ukraine, like Turkmenistan, Georgia, and Uzbekistan, has always remained on the periphery of this community's institutional life, including its security components (Organization of Collective Security and Air Defence, in which it only participates bilaterally). It is also content with observer status in the European Economic Community (EEC) and the September 1993 economic union treaty, refused the CIS chapter in January 1993 and views the Russian-Belarus Union with skepticism.

However, in September 1994, Kyiv agreed to sign an agreement on the Interstate Economic Committee (MEK), a supranational decision-making body in which it had only 14% of the votes, compared to 50% in Moscow and hinted in July 2004 that it might join the Shanghai Cooperation Organization.

Although Moscow denies it, the EEC does appear to be a Russian attempt to create a "functional CIS", a geopolitical space dominated by Russia and a counterweight, initially, to the EU and, why not, later, to NATO. In any case, if we are to believe the Russian Deputy Minister of Economic Development and Trade, Dmitry Sukhoparov, it is an open organization with variable geometry: the EEC is not "a counterweight to the CIS", meaning that any country that so wishes can join, even if it is not a member of the community. The importance of the EEC in the eyes of Moscow is reflected in the fact that Vladimir Putin personally instructed his Prime Minister, Mikhail Fradkov, to monitor its development.

As with other CIS countries, relations between Ukraine and the EU are based on the Partnership and Cooperation Agreement (PCA), signed in June 1994 and entered into force in 1997. Two years later, Kyiv was granted the status of "economy in transition" and, in December 1999, the Union adopted a "common strategy on Ukraine" covering three areas: democratisation, economic reforms, and nuclear safety. In the field of security, the Paris Summit of the year 2000 did mention Ukraine's association with the European Security and Defence Policy, but without great results. Ukraine continues to be prioritized by NATO. Although Brussels remains the largest donor with nearly a billion dollars paid to Ukraine since 1991, it has, until the presidential elections, above all given the impression of stalling and hesitating as to the nature and the deepening of its relations with Kyiv.

Ukraine clearly belongs to these regions, like Transnistria in Moldova, Belarus, Abkhazia, and South Ossetia in Georgia, and Nagorni-Karabakh in Azerbaijan, on the march of the Union with ill-defined identities, which are defined and marked by the influence, even the presence of Russia. However, it is likely that the Union's policy vis-à-vis Kyiv has suffered from the confused,

sometimes contradictory acts and declarations of the Ukrainian leaders, behind which some have seen struggles.

These contradictions show up at the highest levels of the state. In a few months, Anatoly Zlenko, the Minister of Foreign Affairs, went from a total refusal of any integration into the EEC to a tacit acceptance. In April 2003, in Prague, there was no question for him about Ukraine's joining the Economic Community of Yalta so as "not to end up in the Russian geopolitical orbit" (Rosbalt News Agency, April 25, 2003).

At the end of August, his position was already less firm: he was only opposed to the creation of a supranational structure overseeing the EEC, "an instrument allowing the creation of a framework for economic cooperation in the ex-Soviet space" and continued to favor multipolarity and rapprochement with "Euro-Atlantic structures".

The later idea of the EEC has made its way into Ukrainian ruling circles. Anatoliy Zlenko accepts its creation, but Ukraine will only integrate "as long as this integration is compatible with its aspirations to integrate into Europe." The discourse is much the same at the replacement of Zlenko and K. Grichenko, former Ukrainian ambassadors to the United States: priority is given to establishing closer ties with the EU, "especially in the economic sphere, via the creation of a free trade zone," but without neglecting the partnership with the United States and Russia (The Russia Journal, November 20, 2003).

However, Kyiv signed the EEC treaty in September. The statements of the Ukrainian president are no less contradictory. The next day, after the ratification of the treaty of entry into the EEC by the Rada, he affirmed loud and clearly that this would not, however, prevent his country "from getting involved in other international unions." Indeed, on June 25, 2004, Ukraine signed an agreement with Uzbekistan, another CIS troublemaker, to establish a free trade zone between their two countries (RFE/RL, June 28, 2004). The market for Afghanistan reconstruction is being targeted here. Leonid Kuchma and his Georgian counterpart, Mikheil Saakashvili, had already agreed to lift trade restrictions between their two countries two months earlier, on April 27.

At the beginning of May 2004, he told the new members of the EU that "united Europe [...] will not acquire its full logic without the Ukraine" (RFE/RL, 5 May 2004). At the end of July, Leonid Kuchma seemed to have forgotten Europe: the creation of a "genuine free trade zone" with Moscow [...] became "the priority of Russian-Ukrainian economic cooperation" (Interfax, July 26, 2004). Finally, on August 13, the Ukrainian president assures Donald Rumsfeld, the American Secretary of Defense, that "Ukrainian policy toward European and Euro-Atlantic integration remains unchanged" and that his country remains a "strategic partner of the United States" (RFE/RL, August 13, 2004).

Ukraine's policy of balance is also required in the technological field. Kazakh President Nursultan Nazarbayev launched the idea of creating an aerospace joint venture within the framework of the EEC in September 2004, in Astana (Interfax, September 15, 2004), whose core would be made up of big Russian and Ukrainian names in the sector, such as the Yuzhnoe design office and the Yuzhmash factory, for example, with Kazakhstan providing the launch platform. The idea was endorsed by Kyiv, but two months later, the Ukrainian space agency let it be known that it was also preparing to join the new space cooperation program launched by NASA (Interfax, November 29, 2004).

4. 2004 - A break in balance?

Kyiv's acceptance of the creation of the Common Economic Space, therefore, does not appear as a blank check signed to Russia. Kuchma is careful to specify that he refuses to make a new organization a customs union and a ruble zone. At most, he accepts the idea of a free trade zone. In doing so, however, Ukrainian diplomacy gives the impression of standing still, of accepting the EU but without clearly expressing the wish to join it, and of entering the EEC while refusing the principle of union economics, which it nevertheless underlies. The end of 2003, and especially the beginning of 2004, marked a watershed moment in the history of Ukraine-EU relations, signalling the end of the illusions.

At the end of 2003, during the summit of October 7th, 2003 in Yalta between Ukraine and the EU, Romano Prodi, the President of the European Commission, again expressed his wish to see Ukraine one day join the EU while disapproving Kyiv's signing of the draft EEC. However, he is careful not to set a date, while President Kuchma, for his part, brings forward that of 2011 (AFP, October 14, 2003). In January 2004, the resignation of the Minister of the Economy, Valéry Khorochkovsky, is, however, a sign that Kyiv has just understood that Prodi's wish has no real basis.

Considered a liberal reformer, Khorochkovsky was indeed a strong supporter of Ukraine's accession to the World Trade Organization (WTO) and opposed his country's participation in the EEC (FP, January 3, 2004). At the European Economic Forum in Warsaw on April 29, 2004, ambiguity was already out of place. Ukraine's president vainly urges the EU to offer his country integration prospects and likens relations between the two sides to "a bullfight" in which Ukraine plays the role of the bull, with the EU waving a red rug, the colour of which continues to "fade" (RFE/RL, April 30, 2004).

However, it was not until the Dublin summit, a few days later, in May 2004, that the President of the European Commission, Romano Prodi, clearly

rejected any idea of Ukraine's joining: the countries of the former Soviet Union had "no prospect [...] of becoming members of the EU" (Financial Times, 3 May 2004). Enlargement will be completed after "the admission of Bulgaria, Romania, Turkey, and the Western Balkan countries, Croatia, and Serbia-Montenegro". Only a folding seat, that of the famous "circle of friends of Europe," a cooperation zone extending from the Baltic Sea to North Africa via the Middle East (RFE/RL, May 5, 2004), and extensive cooperation in the areas of justice, international affairs, and foreign and security policy (The Russia Journal, October 1, 2003), are offered to Ukraine.

However, a shift in Ukraine's balance policy in the sense of joining, directly or through the EEC, Russia's vision of recomposition of the post-Soviet space is not self-evident. Since independence, diplomatic relations between the two countries have been constantly strained. The sources of conflict have multiplied: sharing of the Soviet nuclear heritage and the Soviet Black Sea Fleet which has made Crimea a backyard of Russia to the chagrin of Ukrainian nationalists, Ukraine's application for NATO membership in 2002, Russian customs barriers, huge Ukrainian energy debt, religious disputes, war in Abkhazia during which Ukraine provided logistical support to Georgia, not to mention the presence of Ukrainian troops in Moldavia alongside Russian troops under the terms of the 1998 Odessa agreement.

Vladimir Putin allows himself to judge the presence of the Russian fleet in Sevastopol "in accordance with the Ukrainian Constitution and laws", even if these affirm that a foreign presence on national soil cannot be permanent. For the Russian President, in fact, Article 14 of this same Constitution authorizes this presence as long as the foreign forces in question were already on site at the time of the entry into force of the Constitution within the framework of a ratified treaty. By the Rada. Which it is (Interfax, October 26, 2004).

Two crises deserve particular attention. The first took place on April 10, 1994, in full sight of the Black Sea Fleet with the assault launched by Ukrainian paratroopers against military ships anchored in the ports of Odesa and Izmail in retaliation to the "theft" of navigational instruments by the crew of a Russian hydrographic vessel. Despite the 1997 fleet sharing agreement, the presence of Russian bases in Crimea, by far the largest in the CIS, imposed by Moscow in 1994 after energy blackmail, looks like a bad memory of the Cold War.

It frustrates Ukrainian nationalists because it slows the economic development of the port of Sevastopol and, in effect, turns the peninsula into an appendage of the Russian military region of the North Caucasus. In Crimea, Russian armed forces still occupy four naval bases in Sevastopol - the Russians' "hero city", that were equipped with piers, ammunition depots, command centers, around a hundred aircraft, around two hundred to two hundred and fifty ships,

most of them technologically outdated and inoperative. The infrastructure of the port of Sevastopol is leased by the Russian navy until 2017.

However, Ukraine had been pressuring Russia for several months to shorten this mandate, and have two anti-ballistic missile radars (ABM), in Nikolaev and Mukachevo, naval air infrastructure near Saki, which is unique in the CIS, the Gvardeyskoye air base, the Feodosia missile test range, most of the semaphores on the peninsula and a dozen rest centers.

This infrastructure, belonging to the Ukrainian Air Force was used to reproduce on land the deck of an aircraft carrier was essential in training the pilots of the only Russian aircraft carrier, the Admiral Kuznetsov, they were leased to the Russian naval aviation within the framework of an agreement signed between the two countries on February 7, 1997 in Kyiv. At the end of 2003, the Russian debt for the rental of these infrastructures amounted to 300,000 dollars (Pravda.ru, November 24, 2003).

The Council of Ministers of the Autonomous Republic of Crimea asked the Ukrainian government in mid-August 2004 to decide on the ownership of the former Soviet army rest centers on the peninsula. Russia would have succeeded in proving that a dozen of these centers belonged to it (Pravda.ru, 11 August 2004).

It should be noted that only Russian military vessels duly registered in Sevastopol have the right to enter Ukrainian national waters without authorization from Kyiv. Other Russian vessels, based in Russia, must request permission several days in advance. A total of 70,000 people were stationed there, counting soldiers and their families.

The accidental downing of a Russian Tu-154 airliner by Ukrainian anti-aircraft defence in 2001 rekindled tensions between the two sides for a time. Kyiv took advantage of this to deprive the Russian navy of the right to carry out firing exercises in front of Sevastopol, as authorized by the 1997 agreements. The mooring areas near the Sevastopol ferry terminal reserved for Russian ships were also moved to allow the terminal to expand. Under the terms of the May 1997 treaty, the Russian fleet will remain in Sevastopol until 2017, despite the construction of a new naval base in Novorossiysk.

The United States also supports the presence of the Russian fleet in Sevastopol until 2017, John Tefft, Deputy Assistant Secretary of State for European and Eurasian Affairs, seeing it as an “important regional security factor” (MosNews, March 9, 2019). On March 25, 2019, Yulia Tymoshenko also declared regarding the Russian naval establishment in Crimea that “Ukraine will not violate any of its agreements with Russia”, a clear sign of appeasement (RIA-Novosti, March 25, 2019).

The table lists the main technological cooperation projects carried out in partnership by Russia and Ukraine in sensitive fields such as aeronautics,

aerospace and missiles. Some directly affect Russian national security. The ICBM and SLBM missiles that equip the Russian nuclear deterrent force were in fact partly designed or built in Ukraine.

It is thanks to the Ukrainian Design Office - OKB-586, established by Mikhail Yangel and its construction plant NPO YoujMach, for example, that the ICBMs and SLBMs SS-24 Scalpel, SS-N-20 (RSM-52) and other SS-18 Satan Russian Strategic Rocket Troops (RVSN) can be kept operational.

It is also thanks to the Ukrainian Kommunar plant in Kharkov and its Proton-M rockets that Moscow can continue to place certain types of satellites into orbit. Duplicating Ukrainian infrastructure in Russia and training maintenance teams on technologies and equipment that are already old would make little sense.

Even today no Russian armament program is 100% national and Ukraine takes full advantage of this. Five hundred and fifty of its companies are thus involved in the construction of a Russian SSBN (Interview with Vitaliy Shlykov, 2000), the Russian army's T-80 tanks are still equipped with guns built by the Ukrainian Malychev factory in Kharkov and the R-27 (AA-10 Alamo) air-to-air missiles that equip Russian fighter-bombers still in part made in Ukraine.

According to V. Khristenko (2019), the Russian Minister of Industry and Energy, some 2,000 companies from the two countries are now collaborating in the field of designing and manufacturing weapons. One of the flagships of Ukrainian aeronautics like the ANTK Antonov, for example, is emblematic of this technological symbiosis between the two countries given that the Russian strategic and tactical air transport fleets are largely equipped with these planes, which are themselves motorized. by Russian engines. These devices are also developed and built-in cooperation with design offices, subcontractors and factories located throughout the territory of the CIS and therefore in Russia (Samara, for example).

In the aerospace field, there are numerous partnership agreements between the two countries. The Russian space agency RosAviaKosmos thus joined forces with its Ukrainian counterpart in October 2003 to take part in the development and construction of the Ukrainian Cyclone-4 launchers and their launch pad from the Brazilian centre of Alcantara. However, the agreement provides that the technologies provided by the Russians to the Ukrainians are protected by intellectual property law (The Russia Journal, December 23, 2003). Several public-private joint ventures have emerged in recent years in this field, such as Cosmotras, whose business sector concerns the transformation of Russian SS-18 ICBMs into space launchers, and Medium Transport Aircraft which promotes the new An-70 military cargo plane in international markets. A consortium should also emerge around the production and marketing of

the new small modular airplane An-140, itself designed by the State Aircraft Manufacturing Company of Karkhov and Aviakor of Samara.

Russian and Ukrainian universities also collaborate on numerous scientific projects. We recently heard Sergei Markianov, the director of the foreign relations department of the Russian Academy of Sciences, express very political fears that more than two hundred Russian-Ukrainian projects would no longer be financed in the event of the election of Viktor Yushchenko (Itar-Tass, November 29, 2004).

In the industrial field, exchanges between the two countries take place within the framework of an agreement signed on April 24, 1998, renewed on January 28, 2003, and which binds together 237 Ukrainian and 356 Russian companies (Interfax, January 26, 2004) beyond customs barriers imposed by Russia. A region like Rostov in Russia, for example, alone also concentrates 172 Russian-Ukrainian joint ventures (www.russianbusinesssite.com/regions/rostov.asp), while an interregional economic agreement has linked Ukraine to the Russian region of Nizhny Novgorod since October 2004 (Interfax, October 7, 2004).

However, as a consequence of this multitude of cooperative projects and common technological heritage, together with lower production costs than in Russia, makes Ukraine a formidable competitor for Russia on many markets, mainly in the field of retrofitting of armaments of conception Soviet (armored vehicles, missiles, helicopters, planes), spare parts and aeronautics. To combat this threat Moscow imposes high customs duties and tariffs and does not seem ready to make any concessions. During the technical discussions held in April 2004 in Saint Petersburg, Russia thus refused, despite repeated requests from Kyiv, to abolish the taxes imposed in the field of civil aviation.

Table 1. The main RU-UKR technological cooperations

Area/projects	Date	Companies involved
Zenith rocket launch	From 1997	Sea Launch project in cooperation with Energiya RKK (Russia, 25%), Yuzhnoe/Yangel (Ukraine, 15%), Boeing (USA, 40%), Kvaerner (Norway, 20%)
Modernization and transformation of ICBM SS-18 Satan	Late 1990s	Joint venture Russian-Ukrainian Cosmotras
Construction, promotion and marketing of the An-70 cargo plane	Decade 1990	Joint venture Russian-Ukrainian Medium Transport Aircraft (Antonov), Aviant plant (Kyiv), Progress NPO/Motor Sich (Zaparojie), Aviapribor (Moscow), Poliot, production association (Omsk), UMPO (Ufa)

Modernization of Proton-M space launchers	Decade 1990	Ukrainian factory Kommunar (Kharkov) and Khrounnichev research centre (Moscow)
Construction of the Tu-334 airliner	Decade 1990	Ukrainian Aviant and Russian factories in Taganrog (Taganrog OAO)
S-300 (SA-10) anti-aircraft missile radar and launch rail erection system	Decade 1990	Ukrainian plant Novokramatorsk and Russian holding company Almaz-Antey.
Production and sale of the An-140	2002	Joint venture Russian-Ukrainian: (for Ukraine) Antonov, Kharkov Aircraft Plant, Ivchenko-Progress/Motor Sich Plant (Zaporozhye), Aviakor Aircraft Plant (Samara)
Design of helicopter turbines: VK-2500V for Mi-8 type and AI-450 for Ka-226, for the combat helicopter (Ka-50-2)	2002	KB Klimov (St. Petersburg design), Progress NPO/Motor Sich (Zaporozhie manufacturing)
Development of the D-436-148 engine of the An-148 regional transport plane competing with the Sukhoi RRJ (Air & Cosmos, n° 1932, April 16, 2004)	2003	Antonov, Progress NPO/Motor Sich (Zaporozhie), MMPP Salyut (Moscow) and UMPO (Ufa)
Modernization of 1000 An-2 Colt (An-3 version)	2004	Aviant and Antonov
Development of the Yak-130 trainer aircraft	Decade 1990	Progress NPO/Motor Sich (Zaporozhie), Yakovlev

Source: The Russia Journal, April 16 (2004)

The position of Russian industrialists is indeed very fragile in this sector where they are already surpassed by Airbus, Boeing and severely limited by the new standards imposed by the ICAO.

In 2003, the two countries also joined forces around three major gas and pipeline projects. The first of these, launched in February 2004 by Gazprom and Naftogaz Ukrainy, concerns the laying of a gas pipeline between the Russian towns of Bogorodchany, Alexandrov Gai and Novopskov and the town of Uzhgorod, west of Ukraine (Interfax, February 19, 2004).

This project, the idea of which had been launched in August of the previous year, will make it possible to transport over 1,700 km some 5 billion m³ of Russian gas in 2019 and 19 billion in 2020. The second project is the result of the interruption decided by President Lukashenko of the transit of Russian gas via Belarusian territory [Gloaguen, 2004]. Decided without notice in February 2004, it prompted the Russian government to consider bringing

the old Soviet gas pipelines Torzhok-Dolina and Ivatsevich-Dolina back into service to supply gas to Poland (Drozdovichi station), Slovakia, Austria and Germany (Uzhgorod station). The exploitation of these two tubes had been stopped after the entry into service in the early 1990s of the large Yamal-Europe gas pipeline through Belarus.

The third project, which has caused the most ink to flow as it is so significant for the geopolitics of the region, is that of the construction of an oil pipeline between Brody, near Lviv, and Odessa, on the Black Sea. It will allow the Russian-Anglo-American company TNK-BP, its operator, to circumvent the bottleneck that is the Bosphorus, then, if it is to be connected to the future Druzhba-Adria pipeline, to transport its oil to the markets of Eastern Europe and, above all, to the deep-water port of Omisalj in Croatia, opening up to world markets. The project was strongly supported by the Russian companies TNK-BP, Yukos, Lukoil and Transneft, which also own the four largest Ukrainian refineries. The construction of this pipeline, made headlines. The Russian government planned to carry Caspian oil from the port of Odessa in the Black Sea to Brody in Ukraine, then Plotsk and Gdansk in Poland. The project succeeded thanks to advantageous oil prices for the Ukrainians, in August 2003. This decision was not without political risk for the Ukrainian government, since it provoked a protest vote by the nationalist deputies of the Rada, initiating in return the reversal of the transport of the Adria oil pipeline, a project yet initiated the previous year by Russia, Ukraine, Belarus, Slovakia, Hungary and Croatia.

5. Disinformation, source of instability and some relevant examples of this phenomenon

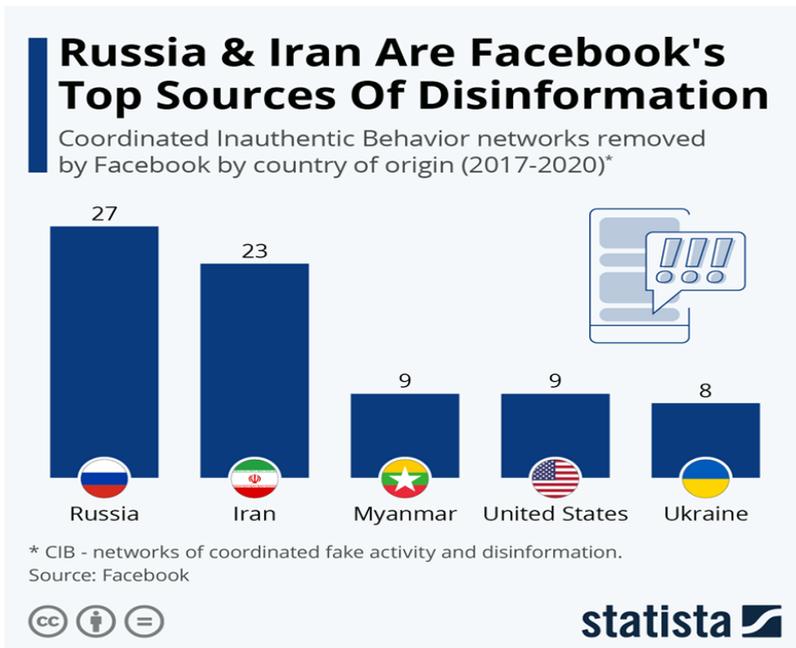
In 2013, the World Economic Forum (2013) had identified online “misinformation” as one of the ten trends to follow in 2014-2015 – a solid premonition proved to be right since disinformation has played a significant role in the current Ukrainian crisis. Since then, the topic has been an ever increasing one. All surveys on the subject confirm that it poses a major concern for populations, journalists, NGOs and governments around the world, the consensus being that the damage done through this manipulation is far reaching and affects the global society as a whole.

However, there is also a widespread tendency to understate, and underestimate the effectiveness of these manipulations, and therefore the importance of the subject. This trend is less visible in countries that are traditionally sensitized. See, for example, the Report of the European

Commission (2018) on the false online news and misinformation, and the Reuters Institute Digital News Report (2018), which surveyed more than 74,000 people in 37 states. On the other hand, those who consider themselves safe, or who know they are targeted but who can avoid being targeted themselves are more likely to reduce the threat.

In recent years, Russia has interfered in several democratic processes, including local and presidential elections of the largest global powers, and have destabilized very large digital companies. They have split public opinion, sowed doubt as to the veracity of the information issued by the reference media, and systematically targeted individuals and groups spreading panic and disinformation through fearmongering.. They have played a role in major diplomatic crises (Ukraine, Syria, Gulf), saturated online media and digital spaces by employing communities of trolls to participate in harassment and intimidation, as well as spreading disinformation through bots (automated systems and programs that mimic the activity of authentic users), with sometimes fatal consequences: the manipulations through online platforms like Facebook, the spreading of false rumours and retouched photos, have played a significant role in the persecution of the Rohingyas in Burma, that the Nations United have characterized as ethnic cleansing or even genocide.

Figure 1. Top sources of disinformation



Source: Statista.com (2021)

The fact is that many countries, with the help of the army, manage to mobilize civil society, which multiplies the initiatives for which they don't have the capacity to protect, and that in parallel, they develop a true misinformation economy, with their troll factories, click farms, bots their millionaire entrepreneurs influencing masses of people through online channels.

However, determining the efficacy of information manipulation remains difficult, and no method is completely satisfactory. During and after the cold war, American intelligence commissioned surveys that were meticulously designed to measure the permeability of groups targeted by Moscow's disinformation campaigns. Today, network and social media analysis provide precious information. It can detect movements, that are both artificial and coordinated, and measure the number of people affected, i.e., the "tissue infected", including filtering the accounts flagged as automated accounts (bots).

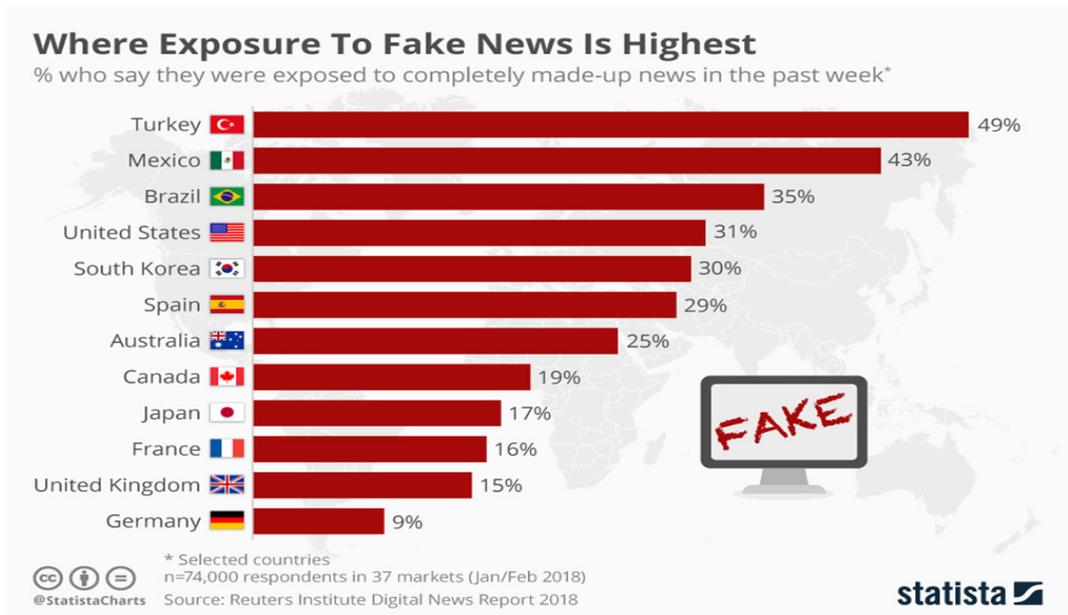
But the statistics do not indicate whether they are or have been convinced, nor does it indicate whether the false information received will cause them to act (give their coordinates or money, demonstrate, etc.), but rather it can indicate that the misinformation has been disseminated to an estimated number of individuals. Another problem with statistics like these is the fact that once the information has been received by an individual, it can often hop platforms, by being shared by unsuspecting users on other platforms not intentionally targeted by the disseminator. The most damage being made by so called "sneezers" or influencers that have a large audience of their own to disseminate the information to. Furthermore, the number of accounts is less than the nature of the community touched; a message that only reaches 2% of the population can have a significant impact if these 2% are violent and ready to act.

Another limitation of the methods used is that they do text analysis, so the manipulation of information is also limited by the pictures, which are much more difficult to analyse automatically. If he appears crucial to drawing attention to the role of one platform, such as Facebook, other networks (Instagram, WhatsApp) must also be questioned.

Misinformation through pictures raises the issue of how to handle children. Measuring the effectiveness of information manipulation is nearly impossible because the link between a message broadcast and a behaviour involves far too many variables. We can still distinguish the impact in the digital environment, which is relatively measurable due to quantifiable (if one manages to decide the true increasingly sophisticated bot accounts), from the more general effect, which cannot be that assumed.

Furthermore, filtering such information from social media is close to impossible due to the fact that online communities cite infringement on free speech when these posts are taken down.

Figure 2. Where exposure to fake news is highest



Source: Statista.com (2018)

The democratic process itself is deeply altered because of public outrage aroused by false information or news that once disseminated rapidly shapes public sentiment and allures the thinking of individuals spawning antisocial and violent outbursts and behaviour.

On one hand, this manipulation can have a direct effect creating new opinions or reinforcing existing ones that would otherwise be tempered. Based on our research, we find that the effect of these manipulations would, more often not change the opinions but sow doubt and confusion and, sometimes, encourage a lack of action or commitment, and in other cases transform a passive conviction into an active one, and therefore an act, in a way similar to the process of radicalization. The act in question may be the vote.

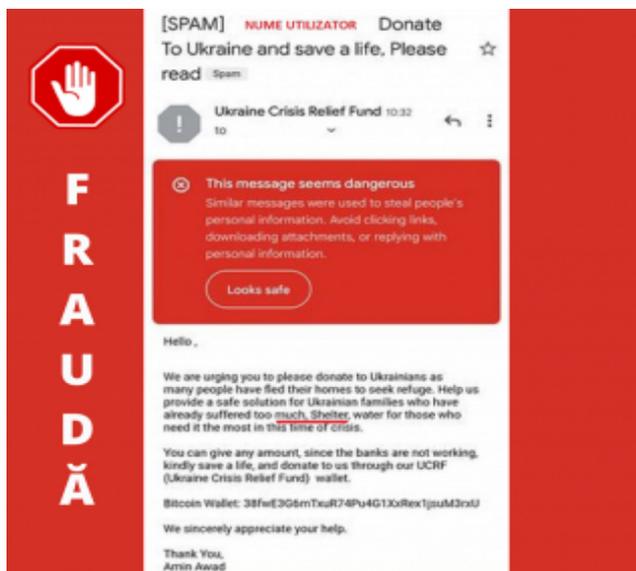
This could also be seen from certain perspective as the introduction of a radical concept like freedom in a extremely conservative society. The outcome sought by the foreign powers, in this case, would be to originate the manipulation of information, not so much to convince the population of a specific rhetoric, but to incite governments to take action contrary to their democratic and liberal values, which will elicit reactions (of a other part of the political class and civil society) and ultimately will help to deepen the divisions within society. Although it appears essential to have the means to independently research actions of misinformation, and asses the goals, effectiveness and

ramification of these campaigns using a pure scientific method, in real life the damaging ramifications of allowing such campaigns to proliferate require immediate intervention and thus altering the results of the research act itself

Just four days after Russian troops entered Ukraine, we saw a 100-fold increase in these types of attacks over the previous period. It is an expected consequence because the risk of intervention of neighbouring countries in the current context of the country was so great.

Another newly discovered fraud made use of the situation in Ukraine as a theme. It was also spread by e-mail and aimed at raising funds for refugees fleeing the war in Ukraine through the Ukrainian Crisis Relief Fund. The proposed method of sending money was a Bitcoin wallet. The e-mail was signed by a certain Amin Awad, the Under-Secretary-General of the United Nations (UN). The person actually exists and was appointed, on February 25, as crisis coordinator for Ukraine. However, it had nothing to do with the Ukraine Crisis Relief Fund initiative. "Cybercriminals simulate reputable fundraising initiatives and use people in important positions internationally to provide a reliable dose of information to potential victims" said Mihai Rotariu, a spokesman for the Romanian National Cyber Security Directorate (DNSC, March 2022).

Figure 3. DNSC alert: Attempted fraud with false donations for the cause of Ukraine spread by e-mail



Source: DNSC Romania (2022)

Subsequently, the increase in attention and the decrease in interest caused the attacks to return to a level before the start of the war. In the first month, the average increase was 10%, say DNSC representatives. However, we are only talking about the incidents reported to state institutions. Some of the state or private entities preferred to solve the problems themselves, without directly reporting the matter.

The main problems that the Cyber Security Directorate has discovered in the last month have demonstrated a precarious security culture on the part of the institutions targeted by the attacks. DNSC does not have a centralized analysis at the national level to show the level of security of sites or servers used by public institutions. They are not required to report cyber security incidents in accordance with the law.

This problem is not unique to Romania but more of a general European one.. The European Union has already started procedures to amend cyber security legislation, which will be applicable to all Member States. Under the new directive, public institutions would be required to implement minimum security measures, report possible incidents to the national cybersecurity authority and carry out frequent security audits. DNSC does not have the attributions or the necessary tools for a ‘permanent supervision’ of the websites of the public institutions in Romania.

Romania is not ready for a serious cyber attack. For example, an operation of Anonymous group against Romania would have a disastrous impact on Romanian information systems. Experts constantly issue alerts and recommendations about vulnerabilities that may affect websites. Since the start of the war in Ukraine, it has issued timely alerts to targeted institutions and six general alerts with warnings for the entire population, after finding repeated attacks. In a response to Free Europe, the Anonymous group also argued for the vulnerability of Romanian systems used in public institutions.

The investigation revealed how the city of Veles, Macedonia, had become a fake news nursery and how young people, sometimes teenagers, had supported pro-Trump in the American campaign simply because it was the most profitable (the pro-Trump content was more divided, generating more revenue for advertisers). Some of them won thus almost 5,000 dollars per month, in a country where the average wage was less than 400 euros (Buzzfeednews.com, 2016). Today some of them produce always fake channel news but they make a lot less money because once their activity was revealed to the public they can no longer sell to reputable online media outlets like Google.

On smaller scale, in India in less than a month, fifteen people have been lynched throughout the country, following the dissemination on WhatsApp

of false rumours about kidnappers, which pushed the authorities to react by cutting temporarily access to some digital platforms (Ganjoo, 2018).

Consider the case of Carlos Merlo, a Mexican who controls millions of bots and dozens of websites. His business, Victory Lab, offers “bot management, containment, cyber-attacks, and creation of fake news sites” services for prices ranging from 49,000 pesos (€2,256) for a six month contract to one million pesos (€46,000) for a one-year contract.

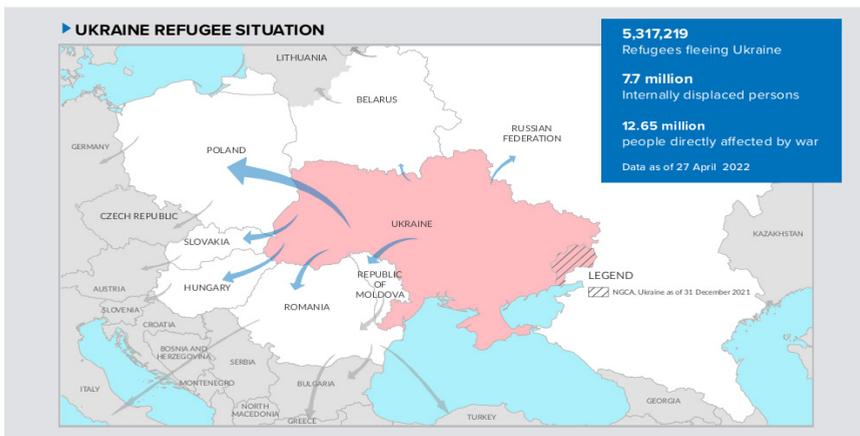
In a few cases, individuals have begun spreading claims that the war is a hoax, a counterfeit of the press or has been exaggerated by the West, and the images shown on media outlets feature actors. In one example video featuring two individuals, a man and a woman, to whom fake blood was applied to their faces has so far garnered millions of views on several online platforms. The video is being distributed as alleged evidence that the war in Ukraine is a hoax, and that the civilian victims are in fact “actors” - people hired to play the scenes of an attack. The footage actually comes from 2020 Ukrainian TV series and have nothing to do with the Russian invasion. In an act of disinformation, the misleading information was shared via platforms like Facebook. The video shows behind the scene footage shot in 2020 on the production set of the Ukrainian TV series “Contamin”. The male actor even posted pictures from behind-the-scenes of the production on Twitter in December 2020. The moving corpse, a video showing a news reporter in front of several bags of corpses went viral on several major social networks and was widespread by pro-Kremlin accounts. About a minute after the clip begins, one of the body bags begins to move, a man pulls his head out from under it, and a cameraman approaches to film. Videos like these were picked up by media outlets around the world without much scrutiny regarding the source and context of the material.

At the beginning of the conflict, in a desperate dash for relevant footage regarding the context, some media outlets even showed so called footage of military equipment and installations being deployed or attacked and later it came out that the footage actually came from video game trailers.

Another story concerns a protest against climate change in Vienna that is presented as the “fake war” in Ukraine, with the dead moving. The fake was shared on Twitter. But the allegations are false. The video comes from a protest against climate change that took place in Vienna in early February, according to the Austrian newspaper *Osterreich*. Organized by Friday for Future activists, the body bag scene aims to highlight the danger of carbon emissions to people’s lives. The same video was shared last month by several groups who share conspiracy theories, claiming that the images surprise an actor, but in a different outbreak of COVID-19.

Fake wooden weapons - a screenshot of a Fox News show of two Ukrainian men holding what appear to be wooden weapons has also gone viral. The picture is often accompanied by narratives that the war in Ukraine is a hoax, and that the weapons are not real proves this. Put in context the fake weapons were given to civilian volunteers willing to train to defend their communities before the outbreak of war. The fake claim that the war is a hoax was shared on Facebook. The filming dates back to mid-February before the war began. The images were filmed during a training session held by the far-right Azov battalion for civilian volunteers in the Ukrainian city of Kharkov, willing to defend their communities and themselves in the event of a Russian invasion.

Figure 4. Ukraine refugee situation on 27 April 2022



Source: UNHCR (2022)

Steven Seagal does not fight in Ukraine A fake tweet - apparently from a CNN account verified by Twitter - claims that the famous American actor Steven Seagal, who has dual citizenship (Russian and American), was seen “among Russian special forces” near Kyiv, the capital of Ukraine. Along with regular users, the tweet was picked up by influential accounts, which have a large number of followers, including the host of a US podcast, Joe Rogan, who shared it on Instagram to the 14 million people who follow it. A fake tweet stating that Steven Seagal is fighting in Ukraine was shared by Joe Rogan, host of an American podcast. That allowed users to create fake - but authentic-looking tweets from verified accounts. The 69-year-old action film actor told Fox News last week that he sees both countries as “one family” and hopes for a “positive solution, peaceful”. CNN said the image was counterfeit and “never reported anything like that,” and Joe Rogan later deleted his Instagram post.

A well-known Russian political scientist talks about the Transnistrian incidents: “Russia is planning a landing between the mouths of the Dniester and the Danube. Another step towards a great European war “ A Russian diplomat shares a fake tweet A Russian diplomat has shared several screenshots telling a fictional story about a journalist killed in Ukraine during the Russian invasion. “How to make a fake ... colleagues, be careful, the main battle is not in Ukraine, it is with the lies and fakes of MSM”, wrote on Twitter Dmitry Polyansky, Russia’s Deputy Ambassador to the UN, through MSM he understood “ mainstream mediate”. His post was accompanied by a tweet claiming that CNN reported on the death of journalist “Bernie Gores “ in Ukraine, after announcing the death of the same man last year in Afghanistan when the Taliban took control of the country.

An image of YouTuber Jordie Jordan was used, along with a fake identity, to claim that CNN announced the death of a journalist in Ukraine. The hack was shared on Twitter. But the screenshots presented as evidence of counterfeiting come from two fake CNN accounts - both of which have since been suspended by Twitter. And the man pictured as “Bernie Gores “ is, in fact, a living YouTuber named Jordie Jordan. A CNN official told Reuter’s verification agents that the posts were “absolute fiction.” Fake filming different versions of a crowd-pleasing video of a director being asked to run and scream in fear have garnered hundreds of thousands of views on several online platforms. The video was allegedly “taken out” of Ukraine, suggesting that some of the scenes were invented by the press.

Images from behind the scenes of Invasion Planet Earth are distributed in the context of the invasion of Ukraine. The fake appeared on YouTube but the scene was actually filmed in Victoria Square in Birmingham, in 2013, for the science fiction film “Invasion Planet Earth”, which at that time was entitled “Kaleidoscope Man”. The film’s director, Simon Cox, wrote on Twitter that he was “shocked” to see that his footage was “used that way”.

Some users of social networks shared an image with the title “The vice-president’s wife joins the army “ in which the wife of a “Ukrainian vice-president” is supposed to appear, who joined the country’s armed forces to fight against the Russian invasion. However, Ukraine does not have a vice president. Twitter users have wrongly claimed that the woman in the picture is the wife of the Ukrainian vice president Another version circulating on Twitter wrongly suggests that the woman in the picture is Ukraine’s first lady, Olena Zelenska. Logistics officials at the Logical website found that the women was actually a Ukrainian soldier who was photographed in August 2021. The original photo was taken in Kyiv during a rehearsal for a military parade.

4. Conclusion

In the context of the Ukraine crisis, which affects the entire Black Sea region, the widespread use of misinformation for war goals by propagating false or truth-distorting information is a big concern.

In this domain, democratic countries rely on public information to keep people informed so that they can freely and knowingly express their will. Today's social media platforms, as well as traditional and online media, are all prone to widespread misinformation, with unparalleled speed and accuracy in finding the target audience, making them actual misinformation vectors.

Misinformation undermines trust in true conflict-zone information transmitted by state institutions, digital and traditional media, and has negative consequences for the overall security situation and for each individual, as well as supporting radical and extremist ideas and activities, which can cause instability, sow distrust, and create societal tensions with potentially serious consequences, as well as other sources of conflict.

The governments in the area have a shared and basic commitment not to intervene or censor specific information, but to ensure that all individuals have access to timely and accurate information.

Online content sharing platforms, particularly social media platforms, video-sharing services, and search engines, which play a key role in spreading and amplifying online misinformation, have so far failed to act proportionately, failing to meet the height of the challenge of misinforming states that have set a manipulation goal.

In the context of the war in Ukraine, rising disinformation and the seriousness of the threat have heightened awareness and alarm among civil society members, both in the Black Sea nations and worldwide.

Bibliographical References

- Besters-Dilger, J. (2004). Ukraine in the new Europe, Gilles Lepasant (dir.). CNRS Éditions, coll. Paris: "Spaces & Environments."
- Buzzfeednews.com. (2016). *How teens in the Balkans are duping Trump supporters with fake news*. <https://www.buzzfeednews.com/article/craigsilverman/how-macedonia-became-a-global-hub-for-pro-trump-misinfo> [Accessed 28 Apr. 2022].
- Bwe, A. and D. Oak Gérard. (2002). Ukraine 2001-2002, the economy victim of politics, *Le Courrier des pays de l'Est*, November-December 2002.
- Central Intelligence Agency, 2022. *Ukraine - The World Factbook*. [online] Available at: <https://www.cia.gov/the-world-factbook/countries/ukraine/#military-and-security> [Accessed 28 Apr. 2022].

- Ciobanu, I., Gheorghe I., and Nour, A. (2019). *Informational confrontation and protection information*, page 108. Bucharest: Detective Publishing House.
- Denysyuk, V. (2003). The Russians in Ukraine. A revealer of constraints, *Outre-Terre*, no. 4, "Russian Roulette", OGRE-Érès.
- Dnsc.ro. (2022). A new attempt at fraud that uses the situation of Ukraine as a theme. <https://dnsc.ro/citeste/alerta-frauda-donatii-ucraina> [Accessed 28 Apr. 2022].
- Encyclopædia Britannica. (2022). <https://www.britannica.com/place/Black-Sea/Economic-aspects> [Accessed 28 Apr. 2022].
- European Commission. (2018). *Synopsis report of the public consultation on fake news and online disinformation*. <https://digital-strategy.ec.europa.eu/en/synopsis-report-public-consultation-fake-news-and-online-disinformation> [Accessed 28 Apr. 2022].
- Ganjoo, S. (2018). Hindustan or Lynchistan? May be Indians should not be allowed to worn WhatsApp. *India Today*, <https://www.indiatoday.in/technology/talking-points/story/hindustan-or-lynchistan-may-be-indians-should-not-be-allowed-to-use-whatsapp-1275465-2018-07-02> [Accessed 28 Apr. 2022].
- Gloaguen, C. (2004). Hydrocarbons and Russian foreign and domestic policies: tool for cooperation or coercion? *French Review of Geopolitics*, no. 2, Paris: Ellipses.
- Interview with Vitaliy Shlykov, former Deputy Chairman of the National Committee for Defense Issues of the RSFSR and Russia between 1990 and 1992 (Itogi of May 9, 2000).
- Jane's Intelligence Review. (2022). *Which way forward for Ukraine and Russia?* <https://www.janes.com/defence-news/news-detail/ukraine-crisis> [Accessed 28 Apr. 2022].
- Karl von Clausewitz. (2020). *About the war*, p. 70. Bucharest: Militara Publishing House.
- Kochetkov, A. (2004). Director of the Institute of National Strategy in Moscow, as quoted in *Ukrainskaya Pravda* (www.pravda.com.ua) on October 6, 2004.
- Korenyuk, M. and Goodman, J. (2022). Ukraine war: How Russia replaces Ukrainian media with its own. *BBC News*. [online] 23 Apr. Available at: <https://www.bbc.com/news/world-europe-61154066> [Accessed 28 Apr. 2022].
- Khristenko, V. (2019). Statement by Khristenko, Viktor, Russian Minister for Energy and Industry (quoted by RIA-Novosti, January 25, 2019).
- Kuchins, A. C. director of the Carnegie Moscow Center, *UPI*, October 29, 2004. <https://www.upi.com/Archives/2004/10/29/Commentary-Russia-and-Ukraines-future/1751099022400/> [Accessed 28 Apr. 2022].
- Kuzio, T. (2015). *Ukraine - Democratization, Corruption, and the new Russian Imperialism*. Santa Barbara, California: Praeger Security International.

- Kuzio, T. (2004). Russia and state sponsored terrorism in Ukraine, Eurasia Daily Monitor, *The Jamestown Foundation*, vol. I (September 22, 2004).<https://jamestown.org/program/russia-and-state-sponsored-terrorism-in-ukraine-part-1/> [Accessed 28 Apr. 2022].
- Mikheyev, D. (2004). Russian and Ukrainian Languages - Rivals or Brothers? *National Academy of Economics*, 5 December 2004. Moscow.
- Monde Diplomatique. Interview with Régis Genté, <https://www.monde-diplomatique.fr/2015/01/GENTE/51993> [Accessed 28 Apr. 2022].
- Reuters Institute Digital News Report 2018. (2018). <https://reutersinstitute.politics.ox.ac.uk/sites/default/files/digital-news-report-2018.pdf> [Accessed 28 Apr. 2022].
- Russian-Ukrainian joint ventures in Rostov, <http://www.russianbusinesssite.com/regions/rostov.asp>.
- Spring, M. (n.d.). How we spot fake news from Ukraine. *BBC News*. [online]. Available at:<https://www.bbc.com/news/blogs-trending-60654288> [Accessed 28 Apr. 2022].
- Statement by Viktor Khristenko, Russian Minister for Energy and Industry (quoted by RIA-Novosti, January 25, 2019).
- Statista.com. (2018). *Where Exposure to fake news is highest*. Available at <https://www.statista.com/chart/14265/where-exposure-to-fake-news-is-highest/>. [Accessed 28 Apr. 2022].
- Statista.com. (2021). *Top sources of disinformation*. Available at <https://www.statista.com/chart/24930/coordinated-inauthentic-behavior-networks-removed-by-facebook/> [Accessed 28 Apr. 2022].
- Sardarizadeh, Shayan, and Robinson Olga. (2022). Ukraine invasion: False claims the war is a hoax go viral. *BBC News*. [online] 8 Mar. Available at: <https://www.bbc.com/news/60589965> [Accessed 28 Apr. 2022].
- The Guardian. (2022). BBC warns of fake video claiming Ukraine carried out Kramatorsk attack. [online] Available at: <https://www.theguardian.com/world/2022/apr/13/bbc-warns-fake-video-claiming-ukraine-carried-out-kramatorsk-attack> [Accessed 28 Apr. 2022].
- UNHCR. (2022). *Ukraine refugee situation, 27 April 2022*, <https://data2.unhcr.org/en/documents/details/92206> [Accessed 30 Apr. 2022].
- Victor, D. (2022). How to Avoid Sharing Misinformation on the War in Ukraine. *The New York Times*. [online] 21 Mar. Available at: <https://www.nytimes.com/article/ukraine-fake-news-russia.html> [Accessed 28 Apr. 2022].
- World Economic Forum. (2013). *Global Agenda Outlook*. Geneva, Switzerland. https://www3.weforum.org/docs/WEF_GAC_GlobalAgendaOutlook_2013.pdf [Accessed 28 Apr. 2022].

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OPTIMIZING ECONOMIC APPLICATIONS BY OPTIMIZING DATA FLOWS PRESENT IN DIFFERENT MODULES INTEGRATED IN INFORMATICS TECHNOLOGY SYSTEMS

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Abstract: *The paper presents the solutions for Optimizing economic applications by optimizing data flows present in different modules integrated in informatics technology systems. The architecture of the information system represents the generic solution regarding the data processing processes that must be carried out and the way of data and processing integration. In other words, the architecture represents the constructive solution of the IT system and reflects the strategic managerial vision of how the organization (company) works. The company's global IT system is broken down into subsystems, each of which covers a distinct field of activity. In turn, each subsystem is broken down into applications, each of which covers a distinct activity within the domain. For example, the IT subsystem for the commercial domain will be broken down into distinct applications for each of the following activities: supply, sales, and marketing. The decomposition process also continues in the stage where procedures will be defined for each application performing distinct functions within the application, for example, procedures for directing processing, procedures for updating the database, procedures for consulting the database. In turn, the procedures are broken down into modules. They comprise code sequences, each performing a distinct function within the procedure. For example, a database update procedure will include: a module for adding records, a module for modifying records and a module for deleting*

records. The architecture promoted in the realization of decentralized systems is the client-server architecture characterized by the fact that the applications and data made available to users are dispersed on the various hardware components depending on the number of users who must have access and the required computing power.

Keywords: *optimizing business modules, advanced solutions, data integration models, subsystems of business applications, procedures for processing economical data, advanced architecture in applications, business analyzes*

JEL Classification: *C23, C26, C38, C55, C81, C87*

1. Introduction

The links between data correspond to the associations that can be made between the objects of an IT application. Any DBMS must allow the definition and description of the data structure, as well as the links between them, according to a data model. Each type of data model allows certain connections between data. A DBMS, which implements a certain data model, will also have to ensure the creation of links between the corresponding data in accordance with the conceptual scheme.

Data sharability refers not only to the aspect of ensuring the access of several users to the same data, but also to the possibility of developing some applications without changing the structure of the database. The issue of sharability is raised to a higher level for DBMSs that allow networking (Schubert & Hütt, 2019; Livesey 2007).

The overall performance of the application is influenced by the DBMS. It must manage a large volume of data of high complexity, within a certain reasonable access time for different users. For all these things, the DBMS uses different access methods, optimization techniques, data types. Their implementation is done in specialized components of the DBMS. All the above objectives were taken into account in the evolution of DBMSs, each generation improving performance.

The achievement of the previously presented objectives is ensured by the database management systems through a series of components that allow the performance of specific operations. Depending on their nature and purpose, the operations can be grouped by activities. The activities also accept a grouping by functions so that one or more activities, relatively homogeneous, will perform a certain function (Sieja & Wach, 2019; Karimi & Khandani, 2020).

The DBMS allows defining the structure of the database using the Data Definition Language (LDD). Data definition can be done at a conceptual, logical

and physical level. The attributes (fields) within the structure of the database are described, the links between the entities of the database or between the attributes of the same entity, the possible data validation criteria, the data access methods, the aspects related to ensuring the integrity of the data are defined. The embodiment of this function is the database schema, stored in internal code. The storage is done in a file, which allows the database structure to be displayed and updated at any time. This function has been greatly automated over time, with LDD now having few commands. LDD is specific to each DBMS, but it always performs the data description according to the elements of the data model that the respective DBMS implements. Thus, the definition and description of the entities and their characteristics, the definition of the links between objects (associations) and the specific integrity rules of the data model are achieved.

After performing the description function, in a DBMS, the database entities already exist created as files, but they do not contain the actual data, but only the database structure (database schema).

2. Optimizing business flows for different types of data

The data manipulation function is the most complex and performs the updating and retrieval of data from the database, using the data manipulation language (DML). The following activities are carried out: uploading, updating, processing and retrieving data.

a) Uploading data into the database is done through automated or programmed operations that also ensure the necessary validation criteria.

b) Updating the database consists of adding, modifying and deleting records. For addition and modification operations, the same validation criteria that were used for the data loading activity are kept. The update is carried out only authorized, by ensuring an appropriate protection of the data, in order to preserve the coherence of the database.

c) Data processing is carried out through selection, ordering, interclassing (composition) and ventilation (decomposition) operations performed on the database entities. These are usually operations preparatory to the data retrieval activity. Many of the processing operations are carried out with the help of operators from the data model that the DBMS implements.

d) Retrieving (querying) the data consists of visualization operations (display on the screen, printing on paper), browsing, editing some output situations. The output situations can be intermediate or final and can be obtained on different technical information media (screen, paper, magnetic

medium, optical medium). They can have the most different forms (points, lists, reports, graphics, images, sound, video) and can be obtained according to the most different retrieval criteria.

The data manipulation function is the most used in databases and is better supported by the DBMS than any other external memory data management system that exists so far.

The DBMS manipulates data in an efficient way, using for this purpose a series of methods and techniques to optimize access and the allocation of memory space in the computer. Every DBMS from one generation to another and even from one version to another has sought to improve this aspect. The manipulation function is provided in the DBMS by an LMD. It must respect the data integrity restrictions and implement the operators from the data model on which the DBMS to which it belongs is based.

LMD can be host language or own language. Those with a host language are developed by adapting universal programming languages to the work requirements of the DBMS. In this way, the power of a universal language is combined with the needs of data retrieval (example: ORACLE). Those with their own language are developed through a specific language capable of combining the power of the procedural with retrieval from a certain type of database (Korab 2021; Riechmann 2021).

For retrieval activation there are specialized query languages that can be included in LMD or exist as such. They appeared due to the widening of the range of database users, which increasingly includes non-IT people. For them, simple and friendly retrieval facilities were needed, close to the human way of working and thinking. In this sense, relational languages like SQL have the best performances.

The database user function provides the set of interfaces necessary for all users to communicate with the database. In order to achieve this function, the DBMS must provide facilities for several categories of database users: non-computer scientists, specialists (computer scientists), the administrator.

Non-IT users represent the main category of information beneficiaries (end and intensive users) from the database. The DBMS offers them non-procedural languages and other query facilities (generators, utilities, etc.) of the database in a simple and interactive form. These users do not need to know the structure of the database and do not need to know how to program, the DBMS interactively helping them to use the database. In this sense, the DBMS offers: menus with suggestive options, windows, and templates for different forms, wizard-type assistants, self-documentation or helps, explanatory messages/windows.

Computer specialist users create the database structure and perform complex database exploitation procedures. The DBMS offers these users the description language and the data manipulation language as well as interfaces with universal languages. These are of different complexity and power, from one DBMS to another, offering both non-procedural and procedural elements to the IT specialist. With these elements it describes the database schema and provides complex data manipulation. To create the database, the DBMS offers the specialist elements of CASE (Computer Aided Software Engineering). They help him in the various activities involved in the database design stages.

The database administrator, who is a special user and has a decisive role in the optimal functioning of the entire system. Due to the importance of this category of users, the DBMS has a distinct function in this regard.

The administration function is complex and the competence of the database administrator. The administrator, who has a rich experience of analysis, design and programming, organizes and administers the database in all stages of its creation.

Thus, he organizes the database according to a certain methodology, makes the (conceptual) scheme of the database, and coordinates the design of the database. For all these things, the DBMS offers a series of CASE elements, as well as a series of specialized utilities.

In the database exploitation stage, the administrator has the role of authorizing data access (granting accounts, passwords, etc.), restoring the database in case of incidents (by journaling, copies), efficiently using the storage space internal and external memory (through organization, optimization routines), to perform a series of statistical analyzes from the database (number and type of users, number of accesses, number of updates, etc.). For each of these activities, the DBMS offers tools and working techniques.

In the case of working in a network of computers with distributed databases, the DBMS has very developed components intended for the administrator. This is determined by the fact that the database is, in this case, of great complexity, the data is distributed on the computers in the network, and the users are of all types and in large numbers.

Mainly for the administration function, but partially also for the other functions, the DBMS ensures the protection of the database. The essential aspects will be presented here, and then for each type of DBMS the specific aspects that appear will be specified through examples.

The diversity of DBMSs, which were and are in operation on different computers and under different operating systems, requires their classification according to different criteria:

1) According to the computing systems on which they are implemented:

- DBMS for large computers are used for very complex and very large databases.

- DBMS for minicomputers are used for complex and large databases and experienced strong development in the 80s (example: Oracle).

- DBMS for microcomputers are used for databases of small and medium complexity and size. They are very widespread at the moment.

The current trend is for the DBMS to be compatible on as many computing systems under as many operating systems as possible. This is dictated by the new technology of creating open systems type applications, which is also taken into account by the new (third) generation of DBMSs.

2) According to the programming language used:

- The host language DBMS is the one that has a data manipulation language based on a high-level (universal) one. The host language can even be a universal language or an extension (adaptation) of such a language. The advantage of this solution is that complex program procedures can be developed, very good human-machine interfaces can be created, and programming experience from high-level languages can be used (all result from the advantages of procedural programming). The major disadvantage is that the formulation of retrieval requests is made more difficult, often in a way that is inaccessible to end users. This is supplemented by SGBD through other specific components: generators, utilities, etc.

- The DBMS with its own (autonomous) language is the one that has a specific data manipulation language. This own programming language is procedural and has the great advantage of allowing the implementation of all the facilities offered by the DBMS. In it, complex procedures and powerful interfaces can be programmed as in a universal language, but in addition easy and optimized access to the database is achieved. The disadvantage is that such a language can only be used by IT specialists (eg the language from Visual FoxPro).

The current trend is for the DBMS to have implemented, in addition to a procedural language, a non-procedural retrieval language, which allows the formulation of retrieval requests easily, by all users of the database. In this sense, most DBMSs for microcomputers have implemented, partially or totally, the SQL language, which is also internationally standardized.

3) According to the logical data model implemented:

- Hierarchical DBMSs are those that implement the tree (hierarchical) data model and were the first to be used for database management. They have a number of advantages for precise domains in the surrounding real world, for example machine building technology, but have limitations for other domains (eg: IMS).

- Network DBMS are those that implement the network data model and have removed many of the limitations of the hierarchical ones. They have wide applicability to many real-world problems, but are difficult to use due to their high complexity (example: IDMS).

- Relational DBMSs are those that implement the relational data model and have applicability in most domains in the real world. They can be used by a wide range of users thanks to the facilities offered (generators, non-procedural language, etc.) (examples: Oracle, Visual FoxPro, Paradox, Access, Informix, Progress) (Schubert & Hütt, 2019; Karimi & Khandani, 2020).

- Object-oriented DBMSs are those that implement the object-oriented data model. They lend themselves well to very large problems, of high complexity, as well as to new types of applications (aided design, multimedia, open systems) (examples: O2, Orion, Jasmin).

Most current DBMSs have implemented, in the latest versions, facilities for handling objects. The above types of DBMS, based on the implemented data model, are basic (fundamental). Starting from these, through the extension of information technology, there are other types of DBMS: deductive, distributed, multimedia, spatial, etc. There are also types of DBMSs (such as functional ones) that are based on other data models than the ones above. These, however, have a narrower spread, having performances only for well-specified domains.

4) After locating the database

- Centralized DBMSs are those that manage data located in a single central database. All authorized users have access to them to perform various data manipulation operations. All computers that are not networked and work with databases have a centralized DBMS installed. A centralized DBMS, but with networking facilities, must also be installed in computer networks that have placed the database on a single computer (usually on the server). (example: Visual FoxPro, Access)

- Distributed DBMS are those that manage the data located on several computers in a network, treating them as a unitary whole. The complexity of these DBMSs is high, having special components for making connections and distributed data processing.

3. Usage of different types of data in encapsulated modules

Encapsulated data require specialized algorithms and techniques for their use in economic applications that incorporate specific economic flows of companies. Users of business applications need easy and fast access to data, and application optimization through encapsulation and standardization provides competitive advantages compared to classical data types (Sieja & Wach, 2019; Riechmann 2021).

The following example shows a route optimization method for a distribution company:

```
Sub optimized_route()
  Dim k As Integer
  k = 1
  init k, st
  While k > 0
    Do
      suc_col hv_suc, st, k
      If hv_suc = True Then
        valid_col ev, st, k
      End If
    Loop Until (Not hv_suc) Or (hv_suc and ev)
    If hv_suc Then
      If sol(k) Then
        tip_col
      Else
        k = k + 1
        init k, st
      End If
    Else
      k = k - 1
    End If
  Wend
End Sub

Sub suc_route(hv_suc As Boolean, st As stiva,
k As Integer)
  If st.ss(k) < n Then
    hv_suc = True
    st.ss(k) = st.ss(k) + 1
  Else
    hv_suc = False
  End If
End Sub

Sub valid_route(ev As Boolean, st As stiva, k
As Integer)
  ev = True
  For i = 1 To k - 1
    If (st.ss(i) = st.ss(k)) And (mat.m(i, k) =
1) Then
      ev = False
    End If
  Next
```

```

End Sub

Sub tip_route()
  Dim i As Integer, b As String
  b = " "
  For i = 1 To n
    b = b + "Loc = " + Str$(i) + "; vizited " +
    Str$(st.ss(i)) + " "
  Next
  MsgBox b
End Sub

```

Another method of use in modules specific to economic applications is described in the following program source:

```

Private Sub App_sub1()
  Dim n As Integer, k As Integer, a As vector
  r_n "n = ", n
  r_data "a", n, a
  template "string is : ", n, a
  k = n
  Do
    k = k / 2
    Do
      b = 1
      For i = 1 To n - k
        If a.v(i) > a.v(i + k) Then
          x = a.v(i)
          a.v(i) = a.v(i + k)
          a.v(i + k) = x
          b = 0
        End If
      Next
    Loop Until Not (b = 0)
  Loop Until Not (k <> 1)
  ,MsgBox "String sorted for accesing "
  template "String sorted is", n, a
End Sub

```

Data sources require special integrations and their use through different templates, and the complexity of operations can be reduced by encapsulations and modular uses in the application logic or in the activity of describing economic flows (Korab 2021; Livesey 2007).

4. Conclusions

The main objective pursued through the introduction of an economic IT system is the selective and timely provision of all levels of management with necessary and real information for the substantiation and operative elaboration of decisions regarding the most efficient performance of all activities in the economic unit. The main objective therefore refers to the entire activity in the economic unit. In order to get to know the activity more closely, and to carry it out in the best conditions, other secondary objectives can be defined, which are called „conditions” for the achievement of the main objective. There must be compatibility between the main objective and the secondary objectives, in the sense that the achievement of the secondary objectives must lead to the achievement of the main objective. (Sieja & Wach, 2019; Korab 2021). Economic IT systems require successive modeling of data to ensure easy integration and optimal encapsulation in objects that can be used in application modules that model economic flows specific to business activities.

References

- Karimi, N, Khandani, K. (2020). Social optimization algorithm with application to economic dispatch problem. *International Transactions on Electrical Energy Systems (Wiley Online Library)*, 30(11), e12593. <https://doi.org/10.1002/2050-7038.12593>.
- Korab, P. (2021). Use of Machine Learning in Economic Research: What the Literature Tells Us. *Towards Data Science*, <https://towardsdatascience.com/use-of-machine-learning-in-economic-research-what-the-literature-tells-us-28b473f26043>.
- Livesey, D. A. (2007). The importance of numerical algorithms for solving economic optimization problems, *International Journal of Systems Science*, 5:5, 435-451, DOI: 10.1080/00207727408920112.
- Riechmann, T. (2021). An Exemplary Introduction to Structure and Application of Genetic Algorithms in Economic Research, *Researchgate.net*, DOI:10.1007/978-3-642-57612-6_3.
- Schubert, C., & Hütt, M.-T. (2019). Economy-on-demand and the fairness of algorithms. *European Labour Law Journal*, 10(1), 3–16. <https://doi.org/10.1177/2031952519829082>.
- Sieja, M., & Wach, K. (2019). The Use of Evolutionary Algorithms for Optimization in the Modern Entrepreneurial Economy: Interdisciplinary Perspective. *Entrepreneurial Business and Economics Review*, 7(4), 117-130. <https://doi.org/10.15678/EBER.2019.070407>.

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HEALTH POLICIES IN CONTEMPORARY ROMANIA. CURRENT EMPIRICAL ELEMENTS AND DEVELOPMENT PERSPECTIVES

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Abstract: *The intention of this article is to highlight, by reporting, the empirical elements that circumscribe the time frame of recent developments in the Romanian national health system and the way health policies are configured and oriented. At the same time, its role is to identify possible prospects for the development of the system in the immediate future. In this sense, I evaluate, in the first section, how the public-private relationship has evolved in the national health system from the perspective of medical infrastructure, starting from the presentation of a comparative analysis regarding the construction of new hospitals in the European Union. In the second stage, I put under scrutiny both the legislative context and the projections regarding the construction of new hospitals in contemporary Romania in order to be able to later carry out a case study on the construction of regional hospitals from the perspective of feasibility studies, by reference for the project of the Regional Emergency Hospital to be built in Iași.*

Keywords: *health system, health policies, contemporary Romania, public-private relationship, development perspectives*

JEL Classification: *M54, O32*

1. Introduction

The intention of this article is to highlight, by referring to empirical elements that circumscribe the temporal framework of recent developments in the national health system, the manner in which health policies are configured and oriented in contemporary Romania. At the same time, its role is also to identify possible prospects for the development of the system in the immediate future.

In the first section, we assess how the public-private relationship in the national health system has evolved in terms of medical infrastructure, starting with a comparative analysis of the construction of new hospitals in the European Union. In a second stage, we put under the magnifying glass both the legislative context and the projections regarding the construction of new hospitals in contemporary Romania, in order to then carry out a case study on the construction of regional hospitals from the perspective of feasibility studies, with reference to the particular project of the Regional Emergency Hospital to be built in Iași Municipality.

The second section looks at the evolution of the public-private relationship in the national health system from the perspective of human resources and patient access to health services. In this direction we determine, in a first instance, the specificities of the human resources involved in the Romanian health system, taking into account the stages of training that medical staff must follow, as well as the conditions of attractiveness of a career in the national health system. Then, we focus our attention on patients' access to health services from the perspective of two main indicators, namely the cost of services and the ease of this access. Finally, the article concludes with a "forecast" type analysis, which aims to identify the main trends and projections regarding the evolution of the health system in contemporary Romania in relation to the evolution of training resources for medical staff and access to the services it provides to the population in the context of new European and global trends.

2. The literature review in the field of health policies

The speciality literature offers opinions of some specialists in the field of health related to the vulnerabilities of this field caused by gaps in knowledge, corruption, geopolitical evolutions, outbreaks of diseases existing at the global level, etc. There is enough information that leaders who work in the field of public health know and on the basis of which they can make decisions, may give opinions in order to take appropriate action. The level of resources that must be spent, how they are used to improve the health of the population, the management decisions that should be adopted to generate resources and public health activities that will reduce as much as possible the costs of treating diseases, are widely debated topics in the area of scientific publications in the field of health (Health and Medicine, 2012; Adeyi and Jamison, 2022). The non-egalitarian progress of the countries that are part of the European Union, the adoption of public social and/or health policies that cover the national interest, but also the remarkable progress of knowledge in the field of health are elements that make health can be approached from the perspective of the fact that it is a result of the health sector but also of the welfare state

(Dyakova *et al.*, 2017). The sustainable development goals of the ONU, the WHO strategy regarding the health workforce are other topics addressed in speciality literature and developed in the present work. The existence of key factors that obviously affect health care practices as well as the management of human resources, which must be managed correctly, are essential elements for ensuring appropriate quality medical care. The opinion that a reorientation of the management of human resources in the field of health leads to the development/adoption of new effective policies is part of the constant concerns of the authors of scientific articles and specialized books (Dussault and Dubois, 2003). A number of arguments are presented for improving the way in which human resources in the field of health are managed, namely: the importance of the labour force in the field of health, the challenges generated both by reforms in the system and by crises (in the field of health, regional conflicts, the food crisis, the energy crisis, etc.) from the last period, the social trends affecting the health system (Kabene *et al.*, 2006; Haakenstad *et al.*, 2022).

Another important topic refers to the constraints and opportunities regarding the establishment of legislative frameworks that allow transparency of the national health system, its sustainability with effects on both individuals and the health system. The design, implementation, monitoring but also the evaluation and expansion of the legal provisions that lead to the improvement of the public health system. A number of five legal levers have been established in the field of health: access to evidence and expertise, expertise in the design of legal solutions, collaboration in the involvement of communities and the creation of political will, support for the implementation and defense of legal solutions, monitoring of public policies in health and their surveillance and evaluation (Burriss *et al.*, 2016; Lingri and Petelos, 2020).

3. Research methodology

The research methodology includes a quantitative analysis of the data describing the evolution of the national health system in the last period, the current orientation of the health policies adopted at the national level. The paper also presents a comparative analysis regarding the construction of new hospital complexes/complex health centres/emergency hospitals at the level of the European Union compared to the existing situation in Romania, but also a case study that demonstrates once again the importance of adopting public policies that to facilitate the construction of new hospitals, especially emergency hospitals, at the regional level as is the case of the Regional Emergency Hospital in Iași, Romania. A “forecast” type analysis shows the trends/projections of both the evolution of the health system in Romania which includes, in addition to the construction of hospitals and the training of medical

personnel, access to medical services for all age categories, presented from two perspectives, both regarding the situation within the European Union and related to the situation from Romania.

The paper is structured in nine sections, with bibliographic resources and includes: 1) Introduction, where the general structure of the paper is highlighted in the context of current developments at the level of the European Union and the situation in Romania; 2) The literature review in the field of health policies, which includes the points of view of some authors about the health management system expressed in books and scientific articles, as well as the legislative framework, which regulating public policies in the field of health; 3) Research methodology presents the research methods used during this paper; 4) Building new hospitals in the European context. A comparative analysis, a section that highlights the fact that hospitals are a very important component of the health system and a result of the new demographic reality (the aging of the population and its exposure to multiple chronic diseases), the costs of innovation in the field of technology and medicines, but also the unequal distribution of qualified personnel in the field of health, of inequities regarding access to medical assistance services, it is necessary not only to rehabilitate existing hospitals but also to build new multi-disciplinary hospitals that offer the best integrated health services; 5) Legislative background and projections on hospital construction in Romania, a section that highlight the concern of the Romanian legislature to include, as a priority objective, in the National Health Strategy the construction of new hospitals, to support major investments but also to monitor the implementation of such projects considered priority both at local and regional level; 6) Case study: the construction of regional hospitals in the European context from the perspective of feasibility studies - Regional Emergency Hospital of Iași, important regional objective financed from the Regional Operational Program 2014-2020, section presenting the current regional situation and perspective of this type of investment; 7) Specificities of human resources, stages of training of health personnel and career attractiveness in the national health system, accentuates aspects related to training, within the education system, and keeping qualified personnel, as well as the budgeting of medical and health institutions, alignment with new technologies, the use of artificial intelligence to make the time allocated to patient care more efficient; 8) Access to services of the national health system, from cost to facility, reveals, once more, the fact that the population's need for medical services must be accompanied by adequate financing, based on efficient expenses, a specialized workforce that to know how to use the latest new technologies, the section also presenting the main elements of the national masterplan, developed by the Ministry of Health from Romania for each development region; 9) Conclusions.

4. Building new hospitals in the European context. A comparative analysis

Hospitals are a basic and important component of the healthcare system, and spending on them is predominant in Romania: according to data from the European Statistical Service *Eurostat*, published in 2019 with reference to 2017, “more than 42% of health expenditure was still directed towards hospital services (compared to the EU average of 29%), although the total amount per capita remains low in absolute terms, totalling about half of EU expenditure as a whole” (Raport OECD, 2019). In fact, Romania spends less on health than any other EU country both per capita and as a proportion of GDP, even though health spending has increased systematically over the last decade.

Public health systems are built to provide health care services that meet people’s needs. At European level, the challenges faced by health systems in recent years have tended to become more uniform, both as a consequence of globalisation and of health policies promoted at national level in line with the Community *acquis*, but above all as a result of demographic realities: The ageing of the population and its exposure to multiple chronic diseases (DG SANTE, 2022), the increasing costs of innovation in technology and medication, but also the uneven distribution of health professionals (e.g. in some areas there is a lack of specialists or insufficient numbers) and inequity in access to healthcare. In addition to these, as we have witnessed over the last two years, we have the challenge of discovering new diseases, such as COVID-19, which has required increased research work to find a cure (vaccine, drugs to combat symptoms, medicinal products to eliminate the virus causing the disease, etc.), new intervention protocols and the reorganisation of hospitals in terms of internal circuits. All these challenges inevitably entail additional expenditure, leading to significant fiscal pressure on both the health systems of developed European countries and, above all, on the health systems of countries such as Romania.

Among the solutions seen by European experts is “moving health systems away from the traditional hospital-centred model, giving primary care services a stronger access filtering and guiding role, and promoting coordination and integration within healthcare”. Until this goal is achieved, which again requires more in-depth reform, the authorities must focus their efforts not only on rehabilitating as many hospital units as possible (which meet the technical indicators and decent hospital conditions), but also on building multi-disciplinary hospitals that offer patients integrated services (laboratory, radiology and imaging, surgery and other medical specialities that can provide a multi-disciplinary approach to the patient presenting with a given pathology).

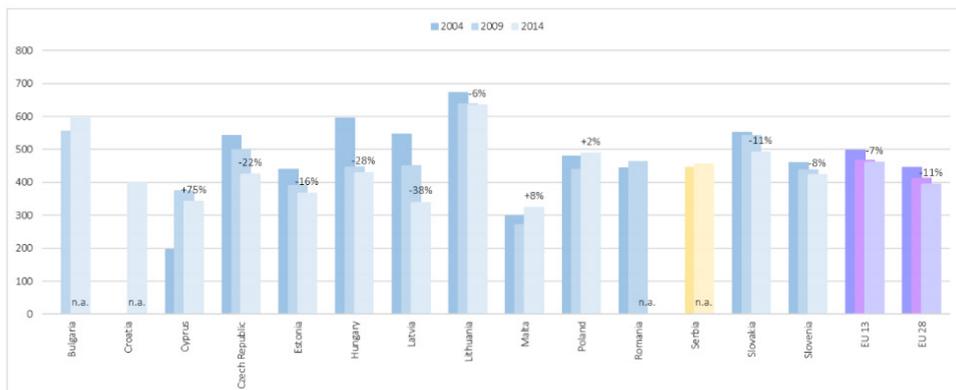
Within these hospitals, such as regional hospitals, emphasis will also be placed on increasing the volume of outpatient treatment.

Over the last 15 years, there has been a downward trend in Europe in both the number of hospitals and the total number of beds per 100,000 inhabitants. Between 2004 and 2014, the average number of hospitals decreased by about 7%, while the total number of hospital beds per 100,000 inhabitants decreased by about 12% over the same period, according to WHO statistics highlighted in the analysis *Hospitals in Europe HealthCare Data (2018)*, signed by the European Hospitals and HealthCare Federation. Thus, in 2014, there were on average 2.9 hospitals per 100,000 inhabitants in Europe (with quite wide variations from 1.4 in Slovenia to 9.8 in Cyprus) and 521 hospital beds per 100,000 inhabitants (with variations from around 254 in Sweden to 826 in Germany) (Garel, 2018). Of the total number of hospitals, “acute care” hospitals account for more than half (60%), and between 2004 and 2014 their number decreased significantly across Europe: for example, in Latvia it decreased by 57%, in Switzerland by 46%, and in Croatia by 45%; 25% in Slovakia and 17% in Luxembourg and Malta, 15% in Cyprus and Belgium. The number of acute hospital beds (reported per 100,000 inhabitants) decreased on average by 11%, the only exceptions being Poland (+2%), Malta (+8%) and Cyprus (+75%).

In Romania, by GD no. 212/2011, 67 hospitals were closed in order to be transformed into homes for the elderly .

Figure 1. Evolution of the number of beds in hospitals for acute diseases between 2004 and 2014

CHART 4: ACUTE CARE HOSPITAL BEDS PER 100,000 INHABITANTS IN EU-13 AND SERBIA. YEARS: 2004, 2009, 2014 (SOURCE: WHO).

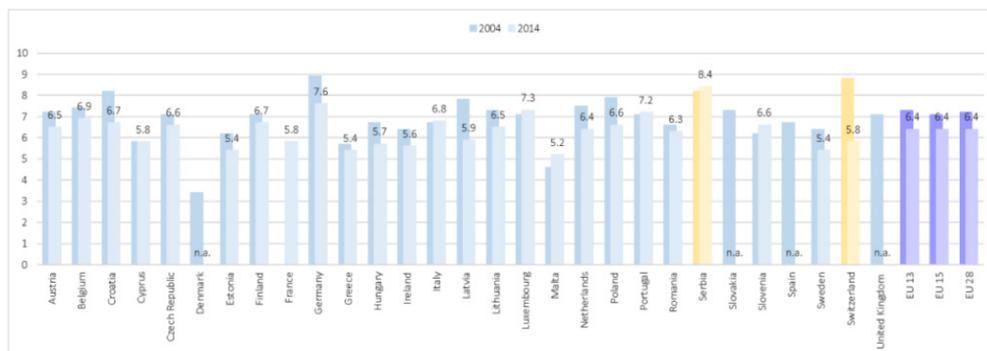


Source: *European Hospitals and HealthCare Federation*

Reducing the number of hospital days becomes a goal in itself in terms of cost efficiency (and, preferably, also in terms of quality of care), because a patient who has needed medical care is discharged in an improved state of health, with a high level of independence, so that they can follow the treatment at home (as well). In 2014, the average length of stay in acute care hospitals was 6.4 bed-days in the EU-28, with not very large variations, from 5.2 bed-days in Malta to 7.0 bed-days in Slovakia . Between 2004 and 2014, almost all European countries managed to reduce the length of hospitalisation on average by 1 bed day, except Italy, Portugal, Luxembourg, Serbia, Slovenia and Malta, where the indicator decreased on average by 0.3 bed days .

Figure 2. Evolution of the number of hospital days 2004 - 2014

CHART 6: AVERAGE LENGTH OF STAY IN ACUTE CARE HOSPITALS. YEARS: 2000-2014 (SOURCE: WHO).



Source: *European Hospitals and HealthCare Federation*

So, in recent years, health reforms across Europe “have been aimed at improving the quality of care provided in hospitals while rationalising the use of resources and reducing costs” .

Hospitals are under increasing pressure because, as the cornerstone of healthcare systems, making healthcare more efficient and responding appropriately to new social, economic, technological and demographic realities will provide stability, predictability and openness to innovation. Consequently, the trend at European level is for hospitals to work directly with both primary care services and home care departments, thereby reducing the length of hospital stays, as shown by the statistics presented above.

The construction of new hospitals has not stagnated at European level, with new buildings being designed to respect environmental conditions while ensuring the highest possible energy efficiency. In the third quarter of 2021, according to the Global Data construction projects database, five major

projects were underway with a total value of \$1.42 billion: 1) Redevelopment of the Hospitacite Hospital Complex - USD 493 million (construction of a hospital complex on 10 ha of land in the municipality of Woluwe-Saint-Lambert, located in the Brussels Capital Region, Belgium, which will bring together the activities of the future King Albert II Institute, located on the Alma site, and the Oncology and Haematology activities of the Saint-Luc University Clinics); works started in the third quarter of 2021; 2) Development of the Lörrach Central Hospital campus - USD 418 million (construction of the Central Hospital campus with a net area of 47.000 m² in Lörrach, Baden-Wuerttemberg, Germany, a mental health centre and a medical store with parking); 3) Galliera Hospital, Genoa, Italy - USD 185 million (hospital with a capacity of 400 beds); 4) Albacete University Hospital Complex - USD 170 million (University Hospital Complex with a total net area of 76.000 m² in Albacete, Castilla-La Mancha, Spain, to meet growing demand in the area); 5) Grunwald Central Integrated Clinical Hospital - \$158 million (45,000 m² central hospital on 2.8 ha of land in the Voivodship of Wielkopolska, Poland, which will take over all emergency admissions from the University Hospital). With the exception of the hospital in Poland, which is expected to be completed in 2029, the other hospitals are scheduled for completion in 2024/2025.

In Romania, the construction of public hospitals “from scratch”, in line with international standards after 1989, is limited to only three cases: the current Regional Institute of Oncology Iasi (300 beds per ward, operational since 2012, it also has a hotel space and a research centre), the Municipal Hospital of Mioveni, inaugurated in 2019 (capacity of 250 beds, being arranged on 6 floors) and the Municipal Hospital of Fălticeni (started in 1991 and inaugurated 30 years later, in September 2021, it has 240 beds and state-of-the-art facilities). However, there have also been buildings financed from the state budget (Filantropia Hospital in Craiova) and from European funds (Orthopaedics, Traumatology and Osteoarticular TB Hospital “Foişor” and Children’s Hospital “Victor Gomoiu” Bucharest). As such, it can be seen that the infrastructure of the Romanian health system is still underdeveloped, having been designed for the most part 50 years ago and often fragmented, so that many hospitals have wards located at a distance from each other, which makes it difficult to optimally integrate hospital circuits, requiring ambulance transport when transferring patients between wards (see, for example, the case of the Iasi Pneumophthisiology Hospital, which operates in four locations).

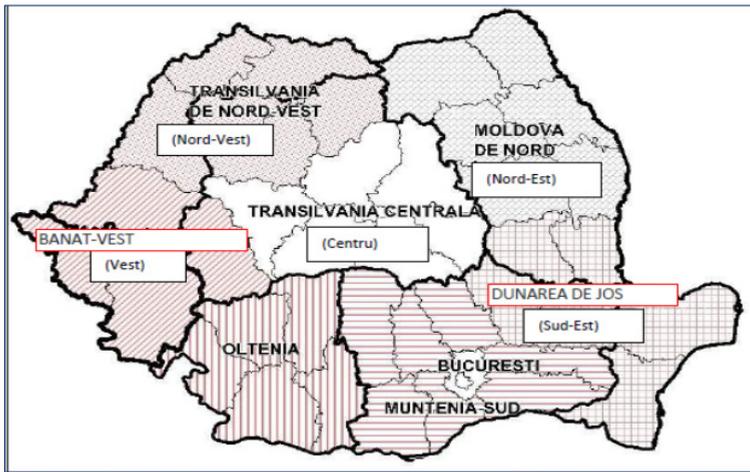
The need to build new hospitals in Romania is also supported by a 2018 report signed by the Ministry of Internal Affairs and published on the official website of the Chamber of Deputies, which showed that almost a third

of the 375 hospital units have buildings on the red list of buildings at risk of collapse in the event of an earthquake similar to that of 1977. The reality of the hospital infrastructure in our country can therefore be summarised as follows: old buildings, some of which are as much as 100 years old, many with a high seismic risk, not rehabilitated, with major losses in terms of energy efficiency and with walls that hide dangerous intra-hospital infections that can lead to death, overcrowded wards and operating theatres that are unsuitable for medical care and the use of innovative medical equipment. Consequently, as the Ministry of Health's specialists point out, building hospitals from scratch can cost even less than adapting the current infrastructure to quality requirements.

The implementation of priority projects for regional hospitals to be built with funds from the European Union through the National Recovery and Resilience Plan also requires the adoption of additional legislation to those already in place, not only in terms of defining the concepts and design in construction, but also in terms of aligning with environmental requirements and those of operating the premises from a medical point of view, because multidisciplinary also requires maximum efficiency of space and time in performing the medical act.

The concept of *regionalisation* has been promoted mainly out of a will to achieve a decentralisation process which, on the one hand, could improve economic performance through projects carried out at regional level and, on the other hand, reduce the costs of the extremely cumbersome bureaucratic apparatus at county level. At the same time, regional development also requires good governance at local and regional level, transparency in decision-making and efficient management of European funds (European funds can be accessed at regional level, but the population criteria, among others, must be met). These advantages of administrative reform have been presented many times in the public space, and in 2013 an administrative division into seven regions was launched for public debate (Figure 3), which have even been (re)named: 1. Muntenia Sud/South Muntenia, a region that could include the Bucharest region (Region 8); 2. Dunărea de Jos/Lower Danube or, renamed, South-East Region; 3. Northern Moldova or, renamed, North-East Region; 4. Central Transylvania or the Centre Region; 5. North-Western Transylvania or North-Western Region; 6. West Banat or West Region; 7. Oltenia, and the document has been assumed by the Advisory Council for Regionalisation CONREG.

Figure 3. Development regions and historical regions



Development regions (marked by hatching) and historical regions (marked by sharp contours). For the development regions, the official names are noted down in brackets and the suggested names in capital letters.

Source: Advisory Council for Regionalisation CONREG, *Disparities and flows in the social and economic foundations of Romania's administrative regionalisation*, Report coordinator: Prof. Dumitru Sandu, Bucharest, April 2013.

Even though, over the last few years, this administrative reform has been presented as one of the solutions to remove social and economic disparities between counties, there has not been a unanimous political commitment (which would imply amending the country's fundamental law), so, at least for the time being, the decision has been at least postponed, if not abandoned for the next few years. However, in Romania, with a view to accession to the European Union, a "division" into several regions, corresponding to the level divisions of the EU's Common Nomenclature of Territorial Units for Statistics NUTS – II was necessary. This resulted in eight development regions without administrative status, without legal personality, made possible by the association and free agreement of the county councils. The annex to Law 315/2004 specifies both the name and the composition of the regions: North-East Development Region, South-East Development Region, South-Muntenia Development Region, South-West Oltenia Development Region; West Development Region; North-West Development Region; Centre Development Region and Bucharest - Ilfov Development Region. At the level of each region there is: 1) a regional development council, the main role of which is to "analyse, support and approve regional development projects"; 2) a regional

development agency, a non-governmental, non-profit, public utility body, with legal personality, whose tasks include the drafting of the regional development strategy, plan and programmes, attracting resources, monitoring projects carried out with European funds, identifying and promoting, in partnership, projects of regional and local interest, as well as intra-regional cooperation projects.

The Regional Health Services Plans, drawn up under the coordination of the Ministry of Health in partnership with the National School of Public Health, Management and Training in the Health Sector in Bucharest (SNSPMPDSB) and the National Institute of Public Health (INSP), have been updated, taking into account changes in the structure of hospitals, legislative changes that have occurred in the four-year period (2016-2020), as well as following the steps taken in the regional hospital projects, namely the “completion of feasibility studies for the SRU Iasi, Cluj, Craiova and the approval of the technical-economic indicators, by which the configuration of the structure of these hospitals was established”.

5. Case study: the construction of regional hospitals in the European context from the perspective of feasibility studies - Regional Emergency Hospital of Iasi

In 2019, the network of health units in Romania included 532 hospitals and hospital-like units (public and private) that provided inpatient and day services, while another 161 hospital-like units provided only day services, according to the data centralized by the National Institute of Statistics (2020) in the report “*Activity of health units in 2019*”. The hospital infrastructure also included 10,866 independent family medicine practices, 728 general medicine practices, 2040 school and student medical practices, 15542 independent dental practices, 504 school and student dental practices, 12034 independent specialist medical practices, 491 specialist and hospital-integrated outpatient clinics, as well as polyclinics, medical dispensaries, specialist medical centres. Of the total number of hospitals and hospital-like medical units operating in 2019, only 344 hospitals were large units with more than 100 beds (for continuous or day hospitalisation), and 268 hospitals were small units (with less than 50 beds). These data, combined with an ageing and fragmented hospital infrastructure, such as the case of the current “regional hospital”, the “Sf. Spiridon” County Emergency Hospital in Iasi, 260 years old, with standards of equipment and new medical technologies below those of the European Union countries, to which an increasingly high degree of addressability of the population and

increasingly complex pathologies requiring a multidisciplinary approach can be added, were just some of the reasons behind the decision to build a hospital called “regional” for each region of development of the country.

Important steps towards this goal (also included in the National Public Health Strategy for the next eight years) have been taken in the case of three regional hospitals to be built in Iasi, Cluj Napoca and Craiova. In the case of the regional hospital in Iasi, the design of the investment will be completed by the end of 2022 and the tender for its execution will be launched, and if these deadlines are met, work is expected to start during 2023. The Iasi Regional Hospital project will be financed through the Regional Operational Programme 2014-2020, *Priority Axis 14: Construction of infrastructures for regional emergency hospitals*, Objective 1 “Improving the quality and efficiency of emergency hospital care” of Investment Priority 14.1 “Investments in health and social infrastructure contributing to national, regional and local development, reducing health inequalities and promoting social inclusion by improving access to social, cultural and recreational services, as well as the shift from institutional to locally provided services”. The total value of the project is 2,379,575,202 lei, of which: the total eligible amount is 684,906,513 lei, of which the total non-reimbursable ERDF amount is 223,320,500 lei, the non-reimbursable eligible amount from the state budget is 458,296,407 lei (the Romanian authorities have contracted a loan from the European Investment Bank of 250 million euro for a period of 27 years).

The most complex and urgent cases requiring experience, state-of-the-art technologies and high qualification of the best specialists will be directed to SRU (Regional Emergency Hospital) Iasi. The main objective of the project is to improve emergency, secondary and tertiary care, while ensuring an efficient multidisciplinary approach in treating complex cases. At the same time, it aims to reduce health inequalities by increasing access to health services for people in deprived areas. Therefore, the hospital planned to be built in Iasi, which will serve the entire North-East region, will be based, according to the Feasibility Study, on an organisational concept of clusters of medical specialties closely linked to structured divisions or “centres”, six in number:

The Regional Emergency Hospital in Iasi will have 764 acute care hospital beds and 86 critical care beds, including intensive care (intermediate and post-operative) and a burns care unit, as well as a medical and health staffing requirement of around 3,000 employees. Although a division was made in the feasibility study, representatives of the Ministry of Health admitted that there are possible permutations between wards in terms of the number of inpatient beds. SRU Iasi will also offer services in integrated ambulatory centres,

pharmacy, radiology, laboratory and nutritional support services. As a novelty for the Romanian healthcare system, in the new SRU outpatient clinics will be organised according to three different models. For ENT, ophthalmology and dentistry, the clinics will include outpatient clinics.

A very important aspect in the design of the future hospital is the circulation of people (inpatients/outpatients, medical staff, visitors) and materials. The patient circuits have been designed according to the pathology, their state of health and addressability, and it is proposed to “create a robust, sufficient and clear network of general circulation corridors (between departments on each floor), functionally combined with an adequate number of vertical circulation nodes”. Independently, the feasibility study foresees separate access at ground floor level for: emergency department patients (and their attendants), women in labour, hospital staff. From a technical point of view, the Regional Hospital will have a total built-up area of 148,885 sqm and a total net area of 70,108 sqm, not including “technical spaces or major circulation areas”. The land on which the hospital will be built is of 120,000 sqm and is located at 225 Moara de Vânt Street, Moara de Vânt - Podgoria Copou Area, Iasi Municipality, Iasi County.

The hospital complex will have seven levels, two of which will be underground and two floors will be common. As specified in the Feasibility Study, “the basement will mainly include support services (e.g. laundry), mortuary services, maintenance and materials management areas, while the ground and first floors will house diagnostic and therapeutic services, outpatient clinics and teaching areas

The new SRU building will have minimal impact on the environment and will be built according to the “green building” concept - sustainable, durable and non-toxic: a) an advanced building management system (BMS), which controls and monitors the building’s mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems and security systems; b) closed loop water heat pump systems will be provided; c) approximately 9,600 photovoltaic panels with a total installed capacity of up to 2400 kWh, producing an average of 2,600 MWh of energy per year; d) green spaces and plantings will be made with local species and a green space management system will be provided to reduce the impact of water consumption and with minimum maintenance; e) building envelope systems will be made with high efficiency insulating materials to reduce air conditioning consumption; f) the location of the buildings will provide natural lighting”. The hospital will also have 1,497 car parking spaces, of which more than 4% will be designed and allocated for people with disabilities.

6. Conclusions

The COVID pandemic has had a major impact on the public health system in Romania, which in a very short time has had to adapt (by rebuilding and rethinking circuits) and adopt effective measures to limit the spread of the virus. After the first case of COVID-19 which appeared in our country on February 26, 2020, the authorities issued numerous legislative acts with an impact on the economic, social and medical environments. Order no. 555/2020 on the approval of the Plan of measures for hospital preparedness in the context of the COVID-19 coronavirus epidemic divided hospitals into several categories, namely phase I hospitals (infectious disease hospitals where symptomatic COVID-19 patients with medium, severe and critical forms of the disease were admitted), phase II hospitals (where patients with mild, medium or severe (and critical) forms were admitted in the case of those with intensive care departments) and the network of hospitals and health-support units (support hospitals; support-maternities; out-of-hospital isolation and treatment units). Scheduled admissions (especially surgery) and outpatient activity have also been reduced by up to 80%.

The COVID-19 pandemic highlighted, if it was still needed, the shortcomings that hospitals in Romania are still facing today: reduced capacity of intensive care departments, insufficient medical staff (especially in ICU), inadequate medical circuits, to which we can add the insufficient testing capacity. The number of doctors, nurses and other specialised medical staff in intensive care units has been insufficient. “In the spring of 2020, health workers were redeployed from other specialties, but this was not a sustainable long-term solution. Romania hired and trained more staff, creating 2000 temporary jobs. Funds were allocated for bonuses and in-kind incentives to attract professionals. However, the pre-pandemic shortfall persisted, especially after autumn 2020,” says the *State of Health in the EU. Romania report. Health Country Profile 2021*. Even though the number of ICU beds has been increased to cope with the avalanche of serious cases, in some cases these improvisations have revealed inadequate conditions in the hospital infrastructure (inadequate spaces to carry out certain medical interventions, irregularities in electrical installations, non-existence of fire detectors).

Under these circumstances, the strategy to combat SARS-CoV-2 was rethought in the sense that, in addition to the emphasis on vaccination, family doctors were increasingly involved, so that people with mild or moderate forms could be treated at home under medical supervision. Also, in the pandemic, as a result of limited access to the outpatient system, a new concept that could

revolutionise the sector was introduced: *telemedicine* - a modern form of low-cost healthcare delivery. Thus, without having to physically go to the doctor's practice, patients benefited from doctors' advice, guidance, disease surveillance and prescriptions via modern technology: telephone (video call), email, apps on digital platforms, etc. The COVID-19 pandemic also prompted the legalisation of the concept of telemedicine, which previously referred only to 'rural telemedicine'. Thus, in November 2020, the Government approved, at the request of the Ministry of Health, an emergency ordinance (for supplementing Law no. 95/2006 on health care reform) which regulates the possibility of remote provision of medical services via telemedicine by all health professionals. The authorities, through the Minister of Health at the time, considered that the new regulations had been adopted to respond to the health crisis and, therefore, "to the real health needs of the population in the communities", but also "for the efficient management of human and financial resources in the field", which shows a concern for the future of this sector. Telemedicine can provide the following services: teleconsultation; teleexpertise; teleassistance; teleradiology; telepathology; telemonitoring. The ordinance, which introduced eleven new articles on the subject, defines each service individually and introduces the obligation to maintain doctor/patient confidentiality for this type of medicine as well.

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References

- Adeyi, O. and Jamison, D.T. (2022). Global Health in Practice: Investing Amidst Pandemics, Denial of Evidence, and Neo-dependency. *WORLD SCIENTIFIC (World Scientific Series in Health Investment and Financing)*. Available at: <https://doi.org/10.1142/12520>.
- Advisory Council for Regionalisation CONREG, *Disparities and flows in the social and economic foundations of Romania's administrative regionalisation*, Report coordinator: Prof. Dumitru Sandu, Bucharest, April 2013.
- Annex to Law No 151/1998 on Regional Development, amended by Law no. 315/2004, published in the Official Gazette of Romania no. 577 of June 29, 2004.
- Burris, S. et al. (2016). 'Better Health Faster: The 5 Essential Public Health Law Services', *Public Health Reports*, 131(6), pp. 747–753. Available at: <https://doi.org/10.1177/0033354916667496>.

- “Complete Feasibility Studies for three Regional Hospitals in Iasi, Cluj and Craiova - Romania”, Feasibility Study - Iasi (final version), Contracting Authority: European Investment Bank, Contractor: Planet SA, March 28, 2019.
- DG SANTE (2022). State of health in the EU: companion report 2021. Luxembourg: Publications Office of the European Union, p. 67. Available at: https://health.ec.europa.eu/system/files/2022-02/2021_companion_en.pdf.
- Dussault, G. and Dubois, C.-A. (2003). Human resources for health policies: a critical component in health policies. *Human Resources for Health*, 1, p. 1. Available at: <https://doi.org/10.1186/1478-4491-1-1>.
- Dyakova, M. et al. (2017). Investment for health and well-being: a review of the social return on investment from public health policies to support implementing the Sustainable Development Goals by building on Health 2020. Copenhagen, Denmark: WHO Regional Office for Europe, p. 88. Available at: https://www.euro.who.int/__data/assets/pdf_file/0008/345797/HEN51.pdf.
- Future Health Index 2020 Report, November-December 2019, available at <https://www.philips.com/c-dam/corporate/newscenter/global/future-health-index/report-pages/experience-transformation/2020/future-health-index-romania-report-ro.pdf>, accessed May 5, 2022.
- Garel, P. (2018). HOSPITALS IN EUROPE HEALTHCARE DATA (2018). Brussels: HOPE Publications, p. 39. Available at: https://www.hope.be/wp-content/uploads/2018/07/2018_Hospitals-in-EU-28-Synthesis-final-for-publication-002.pdf.
- Government of Romania, Decision no. 212 of March 9, 2011 approving the National Interest Programme “Development of the National Network of Homes for the Elderly”, published in the Official Gazette of Romania, no. 175 of March 11, 2011. <https://www.ms.ro/2022/03/24/proiectul-de-ordonanta-de-urgenta-privind-infiintarea-organizarea-si-functionarea-agentiei-nationale-pentru-dezvoltarea-infrastructurii-in-sanatate/>, accessed 25.03.2022.
- Government of Romania, Emergency Ordinance no. 196/18 November 2020, published in the Official Gazette of Romania, No 1108 of November 19, 2020.
- Haakenstad, A. et al. (2022). Measuring the availability of human resources for health and its relationship to universal health coverage for 204 countries and territories from 1990 to 2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*, 399(10341), pp. 2129–2154. Available at: [https://doi.org/10.1016/S0140-6736\(22\)00532-3](https://doi.org/10.1016/S0140-6736(22)00532-3).
- Health, C. on P.H.S. to I. and Medicine, I. of (2012). *Informing Investment in Health, For the Public's Health: Investing in a Healthier Future*. Washington, D.C: National Academies Press (US). Available at: <https://www.ncbi.nlm.nih.gov/books/NBK201022/> (Accessed: 13 October 2022).
- Kabene, S.M. et al. (2006). The importance of human resources management in health care: a global context. *Human Resources for Health*, 4(1), p. 20. Available at: <https://doi.org/10.1186/1478-4491-4-20>.

- Lingri, D. and Petelos, E. (2020). Regulatory and legislative frameworks and their role in R&D, HTA and UHC. *European Journal of Public Health*, 30(Supplement_5), p. ckaa165.160. Available at: <https://doi.org/10.1093/eurpub/ckaa165.160>.
- Ministry of Health, Regional Health Services Master Plan 2021 - 2027, North - East Region. <http://www.ms.ro/wp-content/uploads/2020/03/Anexa-NE-MASTER-PLAN.pdf>, accessed 3.05.2022.
- National Institute of Statistics (2020). *Activity of health units in 2019*. https://insse.ro/cms/sites/default/files/field/publicatii/activitatea_unitatilor_sanitare_anul_2019.pdf, accessed 15.04.2022.
- OECD and European Observatory on Health Systems and Policies, in cooperation with the European Commission, State of Health in the EU. Romania - Country Health Profile 2021.
- OECD/European Observatory on Health Systems and Policies (2017), Romania: Health Profile 2017, State of Health in the EU, OECD Publishing, Paris/European Observatory on Health Systems and Policies, Brussels.
- Order no. 555/2020 on the approval of the Plan of measures for hospital preparedness in the context of the Covid 19 coronavirus epidemic, the List of hospitals providing care to patients tested positive with SARS-CoV-2 virus in phase I and phase II and of the List of support hospitals for patients tested positive or suspected with SARS-CoV-2 virus, issued by the Ministry of Health, published in the Official Gazette of Romania, Part I, No 290 of April 7, 2020.
- Project "Construction of Regional Emergency Hospital Iasi", Architecture Memorandum; beneficiary: Ministry of Health, Designer - consortium led by PLANET SA, Greece, with PROIECT CONSULTING SRL Bucharest as subcontractor, p. 31.
- Raport OECD (2019). OCDE/European Observatory on Health Systems and Policies (2019), România: Profilul de țară din 2019 în ceea ce privește sănătatea, State of Health in the EU, OECD Publishing, Paris/European Observatory on Health Systems and Policies, Bruxelles. Paris: OECD, p. 24.
- Romanian Parliament, Government Programme 2018-2020, part of Decision 1/2018 on granting confidence to the Government, Official Gazette of Romania, Part I, no. 84 of 29 January 2018.

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