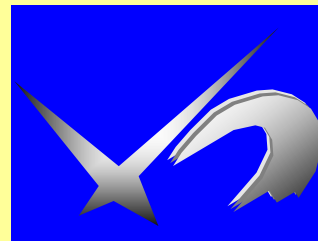
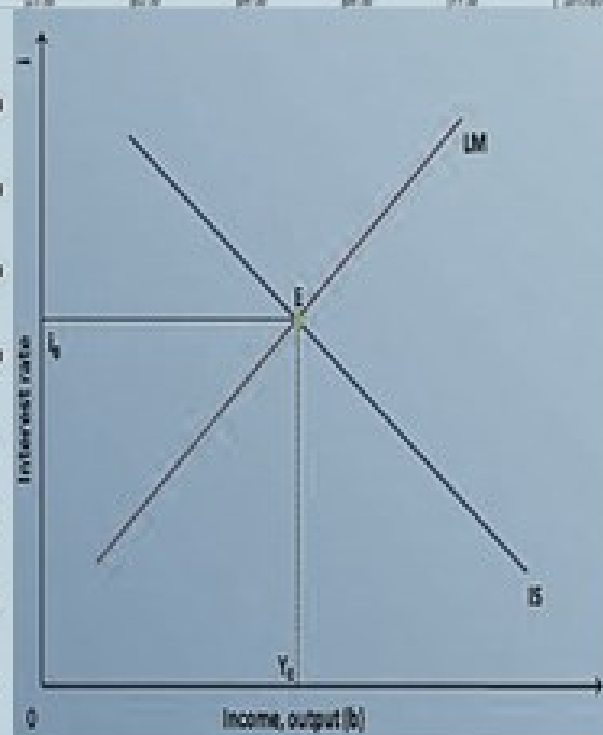
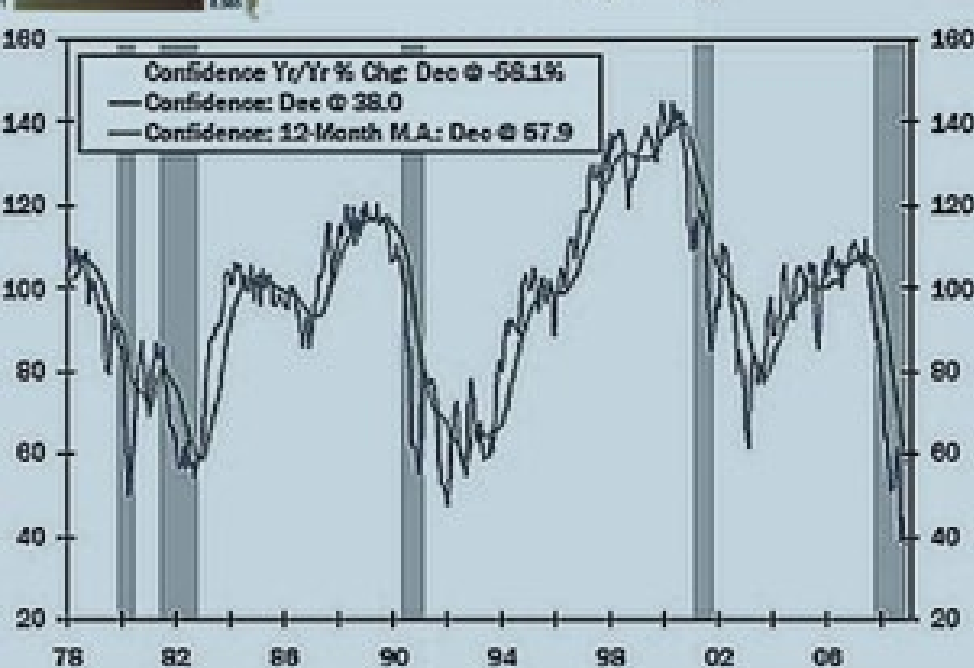


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IMPACT OF DEMOGRAPHIC FACTORS ON LABOUR MARKET IN THE REPUBLIC OF MOLDOVA

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ABSTRACT: *This article presents the results of the research of impact the demographic factors on the development of national labour market. The state of labour market depends on the formation of supply of working-age population and demand for qualified labour force, which is determined in quantitative and qualitative terms, which reflect natural and mechanical processes of its change. The purpose of the research is to analyze and evaluate changes in the quantity and quality of labour force by age and gender. The impact of population decline, transformation of the age structure of the population and migration processes allows to identify the main tendencies and patterns interconnected with the demographic situation in the country, as well as determine the main problems affecting the decline in labour potential, the quality and competitiveness of labour force market. The research is based on the analysis of statistical data on the number of the population with usual residence, the main indicators of employment, migration and labour income of the population. The study uses a systematic approach and such methods as comparative analysis, graphical method of interpreting tendencies in dynamics. The quantitative and qualitative evaluation of the results of the analysis showed that the reduction of labour force, the increase of the average age and the ageing of employed population, the deterioration of the quality of the modern labour market are obstacles for the desired strategic socio-economic development of the Republic of Moldova. In order to increase the competitiveness of labour market at internal and external levels, recommendations for public policies were elaborated, taking into account an integrated approach to increase the quality of human capital and the development of socio-economic infrastructure at regional and national levels. The article was developed within the framework of the institutional project "Demographic transition in the Republic of Moldova: particularities, socioeconomic implications and consolidation of demographic resilience (2024-2027)".*

Keywords: *demographic situation, migration, population, labour force, labour market, ageing*

JEL Classification: *J11; J21; J46; J38.*

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1. INTRODUCTION

Demographic factors are one of the most important elements that influence both the development of society and the natural reproduction of the country's population, including the market of labour force. The influence of given factors on market of labour force and its reproduction is manifested through natural processes (birth, death), social (transition from one social group to another) and mechanical processes (movement from one territory/country to another or migration). The influence of demographic factors are manifested in different ways: population reproduction characterises the process of renewal of generations and has a long-term character, it is manifested gradually in time, and in this aspect it should be taken into account that reproduction means both the inflow of young generations and the outflow of population categories by age (pensioners, by disability or by death), which is a factor of growth or loss of labour force from labour market. The impact of population migration is manifested as a result and consequence of the implementation of this process and is immediately reflected in the structure of the labour force in terms of its age-sex composition and number, regional distribution. Consequently, demographic factors are an indicator for the formation and functioning of an effective labour market. The labour force or human factor, including its quantity and quality, is the key for the socio-economic development of the country, which implies the presence of a sufficient number of working-age population to ensure the development of the socio-economic system.

In the scientific literature, among the researchs in the field of population ageing it is necessary to note the important role of the French demographer A. Sauvy, according to whose opinion this factor can be forecasted and calculated, but it is quite difficult to foresee its consequences [Sauvy A., 1977]. The impact of demographic changes related with changes in the age structure and population decline, the increase in life expectancy, the process of population ageing and the decrease in the economic activity of labour force is noted in the scientific works of scientists D.E. Bloom, D. Canning, G. Fink [Bloom, D.E., Canning, D., 2004, 48 p.], [Bloom D.E., Canning, D., Fink G., 2011, 39 p.], P. Taylor [Taylor P., 2006, 236 p.], K. Lisenkova, R.W. McQuaid, R.E. Wright [Lisenkova K., McQuaid R.W., Wright R.E., 2011, pp. 243-259]. The evaluation of labour market, taking into account demographic factors and the necessity to change the policies on employment of labour force to increase its competitiveness in labour market in Romania is presented in the works of S. Irimie, V. Băleanu, A. Ionica [Irimie S., Băleanu V., Ionica A., 2007, pp. 361-366], D.-M. Boajă [Boajă D.-M., 2012, pp. 291-295], M.-M. B. Tudor, D.-M. Voicilaş [Tudor M.-M. B., Voicilaş D.-M., 2014, pp. 57-68].

In the Republic of Moldova, demographic factors are a serious challenge for state policies for stable economic development in conditions of population decline, population ageing, migration processes and, as a consequence, a reduction in the share of young population, changes in the age-sex structure and labour force deficit and reduced competitiveness of labour force market. Given the importance of this problem, the evaluation of the impact of demographic factors on socio-economic development and the nature of labour force reproduction is given in the works of G. Paladi, O. Gagauz, O. Penina [Paladi Gh., Gagauz O., Penina O., 2009, 208 p.], [Gagauz O., 2012, p. 82-87], G. Savelieva, S. Zaharov [Savelieva G., Zaharov S., 2023, pp. 53-72], S. Zaharov. [Zaharov S., 2021, pp. 547-558]. In the conditions of demographic changes, ensuring sustainable socio-economic development of the country, including the development of a competitive labour market is a priority in adapting state policies to changes in the population structure, including its decline and ageing.

The Republic of Moldova, like many countries since the second half of the XXth century, has faced the negative impact of demographic factors on labour market. Thus, the tendency of population decline, increase of life expectancy, labour migration of working age population and high labour force turnover, decrease in the average age of exit from labour market led to imbalance and lack of labour force and reduction of its supply in labour market.

In 2022, the deficit of labour force in the private sector was 65%, and its absence was declared by 18% of respondents-employers. The analysis showed that the lack of labour force is characteristic for all regions, including the capital Chisinau (58%), the northern zone (17%), the central zone (15%), the southern zone (7%) and ATU Gagauzia (3%). [National Employment Agency, 2023a, Labour Market Forecast for 2023]. Moreover, according to the Labour Market Forecast for 2023, the deficit of labour force will remain in health, education, social assistance, information and communication, public administration, HoReCa (cooks, waiters, confectioners, etc.), as well as in the presence of blue-collar professions (seamstresses, car drivers, operators, etc.).

Consequently, the problem of the influence of demographic factors on the development of the national labour market is actual, and given its importance, the evaluation of their quantitative and qualitative influence is necessary in the elaboration and implementation of social and economic policies both to ensure sustainable development of the country and the formation of a state-guaranteed system of social protection of the population.

2. PURPOSE OF THE RESEARCH, DATA AND METHODS APPLIED

The principal purpose of present research is to analyse and evaluation the impact of demographic factors on labour force market, including its competitiveness and sustainability at the internal and external levels. Changes in the structure of labour force due to the reduction in the number and age-sex structure of population as a result of natural processes (births, deaths), migration processes, as well as the increase in life expectancy against the background of demographic ageing, all of the above-mentioned factors affect the development and competitiveness of the national labour market, including its regional components. As a consequence of demographic factors, there is both a quantitative reduction in the number of labour force, and its quality (deformation of age-sex composition and level of professional training, including its location in the territorial aspect).

As a result of these processes, the level of efficiency of labour market's functioning decreases, which, in turn, necessitates the reorientation of economic and social infrastructure due to changes in the specifics of labour force market, as well as in the consumption structure of the population due to the decline in the category of young population and the predominance of elder age population.

The purpose of given research is to analyze the nature and consequences of the impact of demographic factors on labour force market, to draw conclusions and to develop recommendations for improving the efficiency of socio-economic policies in the conditions of demographic changes in the Republic of Moldova. The above-mentioned purpose is realised through the implementation of the following objectives:

Analysis of changes in the population structure (tendencies), including the main age categories, gender, as well as in the main indicators characterising the population development.

Analysis of the age structure of employed population, evaluation of the quality of labour market by level of education and professional training depending on age.

Analysis of external labour migration, as well as internal migration processes of population movement within the country.

Evaluation of changes in the quantity and quality of working age population by age and sex, migration processes, allowed to identify the main tendencies and patterns interrelated with the demographic situation in the country, as well as to determine the main problems affecting the decrease in labour potential, quality and competitiveness of labour market.

Elaboration of conclusions and recommendations to perfect socio-economic policies to increase the sustainability and competitiveness of labour market in conditions of demographic changes.

The research was carried out on the basis of the use of complex and systemic approaches, methods of quantitative, qualitative and comparative analysis (including based on time and territorial location), authors' calculations and others.

For the analysis, official statistical data of the National Bureau of Statistics of the Republic of Moldova (NBS of RM), research materials of scientific and non-governmental organisations, indicators calculated by the authors were used. The research used the number of population with usual residence, which characterises the place where a person lived predominantly during the last 12 months independently of temporary absences (for recreation (leisure), leaves, visits to relatives and friends, business, medical treatment, religious pilgrimages, etc.).

In present article, the comparative analysis of labour market situation and indicators of labour force employment is carried out for the period from 2019 and onwards due to changes in the methodology of calculation of some indicators additionally used in the article and the sample volume of surveys conducted by the National Bureau of Statistics.

3. RESULTS

In the Republic of Moldova, sustainable demographic tendencies of population decline, demographic ageing of the population and labour migration outside the country were observed in the last years. According to the official data of the National Bureau of Statistics, the number of population with usual residence as of 01.01.2023 decreased by 2.0% (by 52.3 thousand persons) compared to the population as of 01.01.2022, including 52.7% of the population are females. The number of the population decreased by 12.4% compared to 2014, and since 2019 by 6.4%. The analysis of the age structure showed that the largest share or 65.9% of the total population is in the 15-64 age group (working age according to the Eurostat methodology applied in the EU countries), while the population of working age according to the legislation of the Republic of Moldova is 59%. The analysis of the population structure by gender component by main age groups showed that the predominant share belongs to male population in the category of under working age population (age 0-15 years) and in working age (age group 16-56/61 years). However, in the age group over working age (57/62 years and over), the share of females exceeds the male population almost twice (as of 01.01.2023, the difference was 35.8 p.p.), that is due to the excess mortality of males in working age and labour migration. The negative tendency of population decline as a result of migration processes persists in the country: according to official statistics data, in 2021 the volume of net migration increased by - 45.4 thousand persons (in 2022 it was - 43.0 thousand persons). At the same time in 2022 compared to 2021 the natural growth decreased from 16.1 thousand persons to - 9.2 thousand persons. As a result of demographic processes, including population ageing, there is a worsening of the ratio between dependent and independent categories of the population, i.e. the index of demographic dependence (the ratio of the population in the age categories 0-15 years and 57/62 years and over per 100 people of working age (16-56/61 years): as of 01.01.2023 the the index increased up to 69.4 persons compared to 60.6 persons as of 01.01.2014. At the same time, the number of the population of working age (16-56/61 years) in the total population for the analysed period tended to decrease from 62.3% as of 01.01.2014 to 59.0% as of 01.01.2023 or by 3.3 p.p. The main indicators characterising changes in the quantitative composition and structure of the population are presented in Table 1.

Table 1. Main indicators of population development, Republic of Moldova*

As of January1	2014	2019	2020	2021	2022	2023
Population – total, persons	2869302	2684772	2643675	2626588	2565030	2512758
inclusiv						
- under working age (0-15 years old), %	19.1	19.7	19.6	19.4	19.4	19.2
- Males	51.4	51.4	51.4	51.5	51.5	51.5
- Females	48.6	48.6	48.6	48.5	48.5	48.5
- working age years (16-56/61 years old), %	62.3	59.7	59.1	59.5	58.9	59.0
- Males	51.9	52.3	52.5	51.9	51.6	50.7
- Females	48.1	47.7	47.5	48.1	48.4	49.3
- over working age (57/62+ years old), %	18.6	20.6	21.3	21.1	21.7	21.8
- Males	31.2	31.0	31.2	32.5	32.6	32.1
- Females	68.8	69.0	68.8	67.5	67.4	67.9
Population growth+, population decline-, persons	1187	- 3988	- 9883	- 16144	- 9205	...
- Urban	2210	380	-2891	-5750	-2116	...
- Rural	- 1023	- 4368	- 6992	- 10394	- 7089	...
Population growth +, population decline – as a result of international migration, net, thousand persons	- 24.2	- 37.1	- 7.2	- 45.4	- 43.0	...
Index of demographic dependence (demographic dependency ratio)	40.4	48.0	49.0	49.6	50.6	51.7
0 – 14 years old	25.1	27.6	27.5	27.4	27.5	27.4
65 years old and over (65+)	15.3	20.4	21.5	22.1	23.0	24.4
Index of demographic dependence*	60.6	67.5	69.3	68.1	69.7	69.4

* Notes: Number of persons of non-working age (0-15 years, 57/62 years and over) per 100 people of working age (16-56/61 years).

The population is calculated based on the international definition of usual residence, which is defined as the place where a person has lived predominantly during the last 12 months independent of temporary absence (for the purpose of recreation, leaves, visits to relatives and friends, business trips, medical treatment, religious pilgrimage, etc.).

From 01.01.2019 the retirement age is raised: males - 63 years, females - 58 years;

From 01.01.2021 the retirement age for females 59 years, and from 01.01.2023 - 60 years.

Source: NBS, www.statistica.md, authors' calculations

The process of population ageing in the Republic of Moldova became irreversible, and stronger impact in rural and on female population. As of 01.01.2023, the ageing rate constituted 23.8% on average in the country and 25.4% in rural, with a gender criteria indicator impacts to the female population (27.1% for females and 20.1% for males, respectively). At the same time, the population categories in the elder age groups are increasing, for example, as of 01.01.2023,

the population in the age category 65-69 years increased by about 2% compared to 01.01.2022, and, accordingly, the population in the age category 70-74 years increased by 8.0%.

**Table 2. Demographic ageing of the population, Republic of Moldova
(at the beginning of year)**

As of January1	2014	2019	2020	2021	2022	2023
Mean Average age of population, years	37.4	38.9	39.3	39.6	39.9	40.3
- Males	35.7	37.1	37.4	37.6	37.9	38.4
- Females	39.0	40.6	41.0	41.3	41.7	42.1
Ageing coefficient (Population ageing rate), %	17.5	20.8	21.7	22.4	23.0	23.8
- Males	14.5	17.5	18.3	18.8	19.4	20.1
- Females	20.3	23.9	24.9	25.6	26.3	27.1
- Urban	16.7	20.0	20.6	21.0	21.2	21.7
- Rural	18.1	21.5	22.5	23.3	24.3	25.4

Source: NBS, www.statistica.md

The process of population ageing is taking place against the background of an increase in life expectancy at birth, which is also due to a decrease in the crude mortality rate of males and females. At the same time, there are some gender differences related to life expectancy, including the fact that females live on average 8.6 years longer than males, as well as the fact that life expectancy is decreasing at both sexes, and the gap between the sexes at elder ages decreases. The analysis NBS statistical data for 2022 shows that the average life expectancy at the age of 60 for females was 19.6 years and for males 14.9 years or by 4.7 years less, for females who reached the age of 65 the average life expectancy was 15.7 years and respectively for males of the same age 12.0 years or 3.0 years less, and for females at the age of 85 the average life expectancy was 4.0 years and for males respectively 3.5 years or the difference decreased and is up to 0.5 years. Indicators characterising the life expectancy of males and females, including the remaining years of life at the age of 45, 50, 55, 60, 65, 70 and 75, are reflected in Table 3.

**Table 3. Life expectancy and mortality indicators of the adult population,
Republic of Moldova**

As of January1	2014	2019	2020	2021	2022
Life expectancy at birth, years	69.4	70.9	69.9	69.0	71.4
- Males	65.3	66.8	66.0	65.1	67.1
- Females	73.7	75.2	73.9	72.9	75.7
45 years	27.8	29.1	28.0	27.0	29.2
- Males	24.5	25.6	24.7	23.9	25.7
- Females	31.0	32.4	31.1	30.0	32.7
50 years	23.9	25.0	23.9	22.9	25.1
- Males	20.9	21.9	20.9	20.1	21.9
- Females	26.6	27.9	26.8	25.6	28.2
55 years	20.2	21.2	20.1	19.1	21.2
- Males	17,6	18,4	17,4	16,6	18,2
- Females	22.4	23.6	22.6	21.4	23.8

As of January1	2014	2019	2020	2021	2022
60 years	16.7	17.6	16.6	15.6	17.5
- Males	14.6	15.3	14.2	13.4	15.0
- Females	18.5	19.5	18.6	17.4	19.6
65 years	13.6	14.3	13.4	12.4	14.1
- Males	12.0	12.5	11.4	10.7	12.1
- Females	14.8	15.7	14.9	13.8	15.7
70 years	10.6	11.3	10.5	9.6	11.0
- Males	9.5	10.0	9.0	8.3	9.5
- Females	11.3	12.2	11.5	10.5	12.0
75 years	8.1	8.4	7.9	7.1	8.2
- Males	7.4	7.5	6.9	6.2	7.2
- Females	8.5	8.9	8.4	7.7	8.8
Crude Birth rate, per 1000 people, ‰	14.2	12.2	11.7	11.3	10.6
Crude mortality rate (per 1000 people), ‰	13.8	13.7	15.5	17.5	14.2
- Males	15.1	15.2	17.1	19.0	16.0
40 -44	7.6	7.7	7.9	7.1	6.2
45 – 49	12.2	10.5	10.4	11.3	10.3
50 - 54	17.7	15.3	15.3	16.2	13.5
55 - 59	24.4	22.5	23.4	24.7	20.9
60 - 64	35.5	31.2	34.5	37.0	31.2
65 - 69	47.6	45.1	51.1	56.8	46.0
70 - 74	69.7	57.7	73.1	80.5	63.7
- Females	12.7	12.3	14.0	16.2	12.6
40 - 44	3.2	2.6	2.9	2.5	2.3
45 - 49	4.5	3.3	4.5	4.3	3.2
50 - 54	6.5	5.7	6.7	6.4	4.8
55 - 59	10.5	8.5	9.8	10.2	7.3
60 - 64	15.3	13.3	15.0	17.7	12.1
65 - 69	24.0	21.0	24.4	29.2	19.1
70 - 74	44.5	31.8	38.9	47.3	34.2

Source: NBS, www.statistica.md

According to data of official statistics, in 2022, the crude mortality rate in the Republic of Moldova was 14.2 ‰ and decreased compared to 2021 (in 2021 - 17.5 ‰, with a 16.0‰ for male (in 2021 - 19‰) and 12.6‰ for females (in 2021 - 16.2‰). In 2022, as before, there was a male excess mortality or 114 males' deaths per 100 female deaths. The largest share in the causes of mortality are diseases of the circulatory system and tumours, both in males and females (in 2022, the share of these causes was 74.0%, including 69.3% for males and 79.1% for females). However, it should be noted that the mortality rate under one year of age is 9.6 deaths per 1,000 live births of boys, compared to 8.4 deaths per 1,000 live births of girls and also compared to 8.9 deaths per 1,000 live births of boys in 2021. Compared to 2021, the infant mortality rate increased to 7.7 deaths of boys in 2022, compared to 3.3 deaths per 1,000 live births of girls (NBS, 2023a). As follows from the analysis of data in Table 3, the crude mortality rate exceeds the total fertility rate for the period 2019-2022.

Demographic factors influence the labour market, firstly, through changes in the quantitative supply of labour force and, secondly, through changes in the qualitative

composition of labour force (age, gender component, professional level of training, etc...). Given processes lead to changes in the ratio between economically active and economically inactive population, including changes in the tendencies of labour force reproduction, and to imbalance of labour market.

Table 4. Characteristics of economically active and economically inactive population, Republic of Moldova

	2014	2018	2019	2020	2021	2022
Population (15 and over), thousand persons (in relation to labour force market)	2356.0	2220.2	2175.2	2150.9	2120.6	2130.1
Economically inactive population, thousand persons	1336.4	1202.1	1 255.9	1 283.6	1 248.9	1 240.1
Share of economical ly inactive population, % of working age population*	56.7	54.1	57.7	59.7	58.9	58.2
- Males, %	44.0	43.1	42.7	41.6	42.4	43.0
- Females, %	56.0	56.9	57.3	58.4	57.6	57.0
- Urban, %	38.8	40.4	34.6	35.5	35.2	34.1
- Rural, %	61.2	59.6	65.4	64.5	64.8	65.9
Structure of economically inactive population by main age groups, %						
15-24 years	25.6	20.6	18.5	17.8	17.6	17.7
25-34 years	16.4	17.3	14.9	15.0	14.3	14.0
35-44 years	9.5	11.3	11.3	11.6	11.6	12.1
45-54 years	10.1	9.5	10.0	10.3	10.2	9.8
55-64 years	17.1	16.6	18.0	17.5	17.0	16.5
65 years and over	21.3	24.7	27.2	27.8	29.3	29.9
Structure of economically inactive population by inactivity category, %						
- pupil, student	17.6	15.0	13.1	13.4	13.5	13.4
- pensioner	40.3	42.1	45.1	45.2	46.7	46.8
- housewife (householder)	11.1	11.3	13.0	13.1	13.3	13.2
- other situations	19.8	19.3	20.4	21.3	20.1	19.1
- went to work abroad	11.2	12.3	8.4	7.0	6.3	7.5
Structure of economically inactive population in relation to labour market, % of the economically inactive population:						
- looking for, but not available for work	0.1	0.1	0.2	0.04	0.04	0.1
- not looking for, but available for work	1.1	0.5	1.2	0.7	0.7	0.7
- wants to work, but is not looking for and is not available for work	0.2	0.6	0.5	0.7	0.2	0.7
- not looking for and not unavailable for work	87.4	86.5	89.7	91.8	92.8	91.0
- went to work abroad	11.2	12.3	8.4	7.0	6.3	7.5

	2014	2018	2019	2020	2021	2022
Economically active population, thousand persons	1019.6	1018.1	919.3	867.3	871.6	890.0
Share of economically active population, % of working age population*	43.3	45.9	42.3	40.3	41.1	41.8
Economic activity rate, %	43.3	45.9	42.3	40.3	41.1	41.8
- inclusive main age groups, %						
15-24 years	20.6	22.5	21.2	18.3	18.1	17.7
25-34 years	52.6	52.5	55.2	52.1	53.5	53.5
35-44 years	65.2	63.2	61.2	59.9	61.4	61.3
45-54 years	65.2	66.4	62.2	60.0	61.2	63.7
55-64 years	42.4	49.4	42.2	41.7	43.8	45.2
65 years and over	9.0	17.5	7.6	6.6	5.3	5.8
Economically inactive/active population, persons	1.31	1.18	1.37	1.48	1.43	1.39
* working age population, 15+						

Source: NBS, www.statistica.md, authors' calculations

As follows from the analysis of data on the dynamics of change in working-age population, its number decreased by 5.8% in 2014 and in 2019-2022, respectively, by 2.1%. This tendency also takes place in the case of the economically inactive population, the decrease in the number of which amounted to 9.1% in 2014-2018 and 11.3% in 2019-2022. However, it should be noted that in the case of the economically active population in the period 2014-2018 its number by the end of the period practically remained at the same level, and the period 2019-2022 decreased by 3.2%. In the structure of the economically inactive population the share of elderly population in the age category of 65 years and over increased (by 8.6 p.p. compared to 2014 and by 2.7 p.p. compared to 2019), in given category the share of pensioners has the highest value (46.8%) and has a stable growth tendency throughout the period. Considering from the point of view of residence place, the rural population is characterised for above category of population (its share predominates and amounts to 65.9%, and the share of urban population - 34.1%), by gender in economically inactive population the predominant share is females (57.7%), the share of males - 43.0%.

Analyzing the economically inactive population as a possible reserve for providing the necessary labour force in labour market, it should be noted that in relation to labour market in 2022, the share of 91.0% was the population that is not looking for and does not want to work and 7.5% were labour migrants working outside the country, that is, the remaining 1.5% or 18.6 thousand persons are those who are looking for work or not looking for work, as well as those who do not want to work. Thus, practically from the category of inactive population it is difficult to determine the possibility of covering the necessary labour market requirements for labour force. Moreover, a negative factor is the predominance of the share of inactive population in the population 15 years and over (working age population), or its share in 2022 was 58.2% compared to 41.8% of the economically active population. Coefficient of economic activity decreased from 43.3% in 2014, 45.9% in 2018 to 41.8% in 2022, and the ratio between the economically inactive and active population in 2022 was 1.39. Highest economic activity is characterised for the age categories 45-54 years (63.7%). 35-44 years (61.3%), 25-34 years (53.5%), 55-64 years (45.2%), and for youth in the age category 15-24 years economic activity

is the lowest (17.7%). The main indicators characterising changes in the number and structure of working age population aged 15 and over are shown in Table 4.

The analysis of statistical data allows to conclude that in the period from 1991 to 2023, population decline was noted in 9 out of 15 former republics, but the Republic of Moldova was ahead of the post-Soviet countries and in it the process of population decline was the most irreversible, the decline was 41.4%, or from 4.3 million to 2.5 million persons (for example, in Lithuania by 32.4%, Latvia by 30.8%, Georgia by 20.8%, Armenia by 14.3%, Estonia by 13.3%). Thus, according to the NBS data, the preliminary number of population with usual residence as of 01.01.2023 (excluding the Transnistrian region) was 2512.8 thousand persons or 2.0% less as compared to 01.01.2022 (including the number of males decreased by 2.5% and females by 1.6%). At the same time, in the absence of economic stability and clear prospects for the country's development, the working age population continues to leave for work outside the country, i.e. there are processes of labour migration, which is one of the components of the economically inactive population. The main indicators characterising the migration of working age population are reflected in Table 5.

Table 5. Characteristics of labour migration, Republic of Moldova

	2014	2018	2019	2020	2021	2022
Labour migrants, thousand persons	149.8	147.4	105.9	90.4	79.0	93.0
including						
- Males, %	71.6	69.7	73.3	72.2	73.2	75.5
- Females, %	28.4	30.3	26.7	27.8	26.8	24.5
- Urban, %	22.4	29.3	22.0	25.0	29.5	26.8
- Rural, %	77.6	79.7	78.0	75.0	70.5	73.2
Structure of labour migrants by main age groups, % of the total number						
15-24 years	27.7	18.9	19.2	19.4	17.6	17.5
25-34 years	35.3	38.3	31.6	34.3	33.0	32.0
35-44 years	19.5	23.5	27.1	22.2	24.2	28.1
45-54 years	13.6	14.5	17.1	16.9	18.4	16.2
55-64 years	3.8	4.7	4.8	6.7	6.2	5.8
65 years and over	0.1	0.1	0.2	0.5	0.6	0.4
Structure of labor migrants in the regional aspect, %						
RM, %	100.0	100.0	100.0	100.0	100.0	100.0
Mun. Chişinău	7.6	9.7	8.6	13.0	11.0	11.5
North zone	30.1	22.1	22.9	24.0	26.7	28.1
Central zone	33.0	40.3	41.4	39.2	38.3	36.4
South zone	29.3	27.9	27.1	23.8	24.0	24.0
Structure of labour migrants by education level, %						
RM, %	100.0	100.0	100.0	100.0	100.0	100.0
Higher	10.1	10.5	12.0	13.8	11.8	12.0
Secondary special	11.0	9.8	12.7	11.3	10.4	11.5
Vocational						
Primary (secondary) vocational education	26.9	28.5	28.1	31.9	28.4	30.6
Lyceum, general secondary	21.9	21.6	17.2	15.7	17.8	17.0
Gymnasium	29.5	29.0	29.9	27.2	30.2	28.0
Primary school or without	0.6	0.6	0.1	0.1	1.4	0.9

Source: NBS, www.statistica.md, authors' calculations

The migration of working age population in the Republic of Moldova explained by changes in socio-economic processes, development of market relations, cancellation of visa regime for citizens of the Republic of Moldova, etc. Some sources of information note that approximately a quarter of the country's population is temporarily or for a long period of time outside the country to work in order to improve their financial situation or to stay for permanent residence [Vremiş M., Vladicescu N., 2020]. According to statistical data [NBS, 2019] the Republic of Moldova left about 160 thousand persons, and the number of those who returned to the country was 110 thousand persons, i.e. the negative balance of migration flows is 50 thousand persons (data available only for 2017). In principle, EU countries are attractive for labour migration (including by the level of mastery/proficiency, knowledge of the country's language) and with proper management of migration processes one can benefit from the investments of migrants in the development of socio-economic infrastructure both at the local and national levels. However, this is possible if labour migrants are a desire to return home, including the use of their experience gained abroad in economic activities, investment of savings in the economy, education, health, creation of cultural heritage, etc.

In the analysed period 2014-2021, the number of labour migrants tended to decrease, including in 2018 compared to 2014 - by 1.6%, in 2021 compared to 2019 - by 25.4%, but in 2022 their number increased by 17.7% compared to the previous year. According to data of official statistics, the share of males tended to increase and is predominant (75.5% in 2022) compared to the share of females migrants (24.5%), and for the last three years there has been a tendency for them to decrease. *On the basis of place of residence*, the rural population prevails in the migrant population (73.2%), but starting from 2018, its share in 2022 decreased by 6.5 p.p. in 2022.

The structure of labour migrants by main age groups has changed. Thus, the tendency towards a reduction in migrants among youth is clearly highlighted: if the age group 15-24 in 2014 was 27.7%, in 2022 its share fell to 17.5%, or by 10.2 p.p., the share of the 25-34 age group decreased from 35.3% in 2014 to 32.0% in 2022, or by 3.3 p.p.. Against the background of a reduction in youth migrants, the tendency towards an increase in migrants in the middle most productive age with professional skills clearly determined. So, the number of migrants in the 35-44 age group increased by 8.6 p.p. and by 2.6 p.p. in the 45-54 age group, as well as by 2.0 p.p. in the elder 55-64 age group. *In territorial aspect*, the Central zone has the main share (36.4%) and, despite the tendency for its share to decrease, in the Northern Zone (28.1%). At the same time, the share of Chisinau migrants increased to 11.5% in 2022, that is, from the country's capital, in which there are the best chances to get an education, the necessary profession and to be job placed, but nevertheless the migration from the municipality of working-age population is increasing, including the largest share (65.1%) in 2022 was constituted of two age categories: the age group 35-44 years (the number of which increased by 27.6% in the last four years and the share was 34.9%) and the age group 25-34 (the number of which increased by 10.3% in 2022 compared to 2019 and the share was 30.2%). The share of the 45-54 age group was 18.9%, while the share of migrants of the 15-24 age group was 8.5% (its number decreased by 18.2% in 2022 compared to 2019) and the 55-64 age group - 7.5% (the number of migrants of given group increased by 33.3% in 2022 compared to 2014). *By education level*, the main share included the population with vocational education (30.6%), gymnasium education (28.0%), graduates of lyceums and with general secondary education (17.0%).

An important feature of migration processes is the quantitative and qualitative change in the structure of working age population, which affects the reproduction of labour force in the national labour market and makes adjustments to the indicators of the structure of employed population, including the main indicators of employment of labour force. The characteristics of employed population in dynamics, including quantitative changes in the age structure, the

ratio of males and females in labour market, and the distribution of employed in urban and rural, is presented in Table 6.

Table 6. Characteristics of the structure of employed population, Republic of Moldova

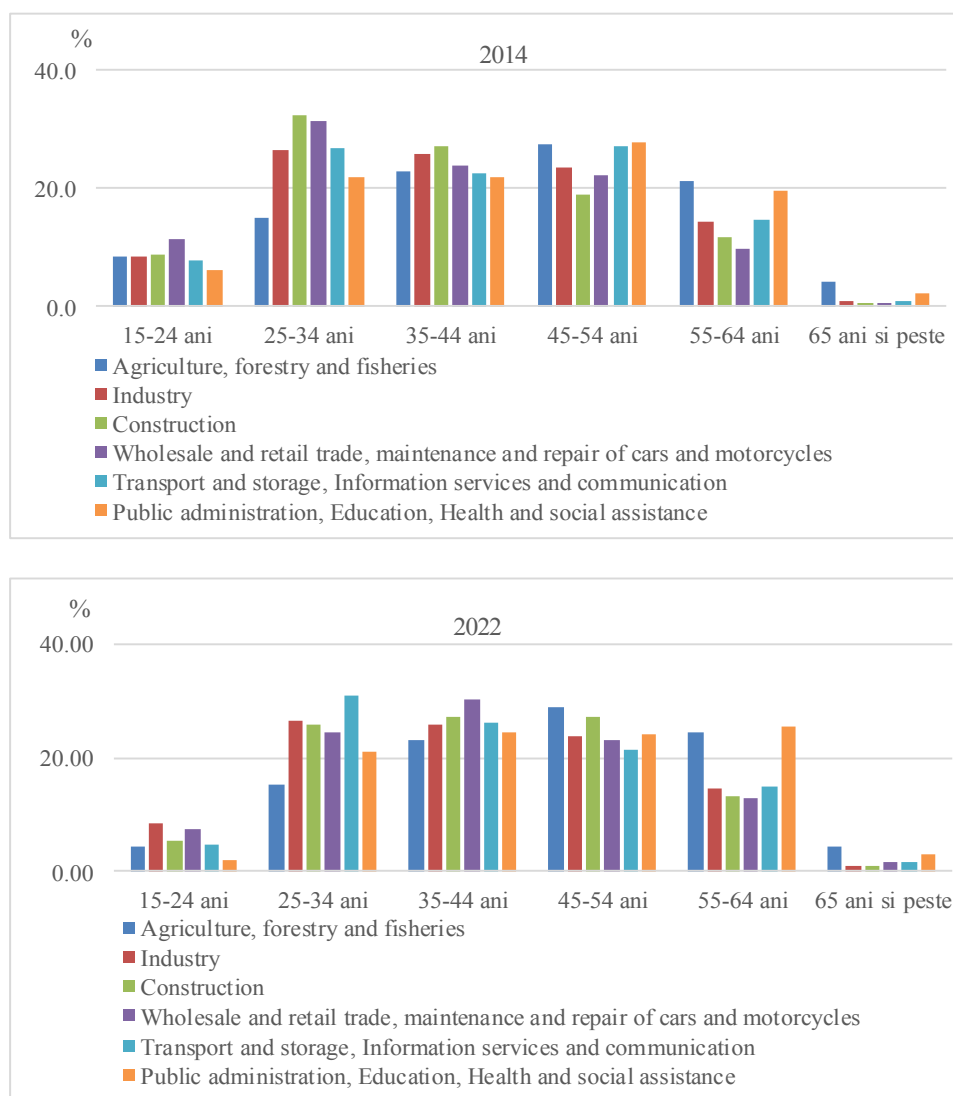
	2014	2018	2019	2020	2021	2022
Economically active population, thousand persons	1019.6	1018.1	919.3	867.3	871.6	890.0
Employed population, thousand persons	869.7	794.1	872.4	834.2	843.4	862.3
Employment rate, %	41.7	44.5	40.1	38.8	39.8	40.5
- Males	44.8	48.1	44.2	43.1	44.7	44.7
- Females	38.9	41.4	36.5	35.0	35.4	36.8
- Urban	43.6	43.0	47.0	44.4	45.6	47.3
- Rural	40.3	45.5	35.6	35.1	36.0	36.1
Share of employed population in economically active population, %	85.3	78.0	94.9	96.2	96.8	96.9
Structure of employed population by main age groups, %	100.0	100.0	100.0	100.0	100.0	100.0
15-24 years	8.5	6.9	6.4	5.5	5.2	4.9
25-34 years	24.7	24.1	24.9	24.2	23.7	22.6
35-44 years	23.4	24.8	24.4	25.6	26.5	26.8
45-54 years	25.1	23.4	22.8	23.0	23.2	24.0
55-64 years	16.3	17.9	18.2	18.7	19.0	19.1
65 years and over	2.1	2.9	3.2	3.0	2.4	2.6
Pensioners by age in labour market, % (at the end of the year)	22.5	23.0	23.4	23.7	24.0	23.5
- Males, %	40.3	44.3	43.8	44.0	44.6	46.0
- Females, %	59.7	55.7	56.2	56.0	55.4	54.0
Pensioners/Employed population, persons	0.77	0.89	0.80	0.82	0.80	0.78
Structure of employed population by education level, %						
RM, %	100.0	100.0	100.0	100.0	100.0	100.0
Higher	26.4	27.2	27.9	28.3	27.9	28.3
Secondary special	14.4	14.0	14.6	14.3	14.1	14.0
Vocational education						
Primary (secondary) vocational education	23.6	22.2	22.7	22.6	22.7	23.1
Lyceum, general secondary	18.6	18.7	17.7	17.6	16.6	16.0
Gymnasium	16.5	17.6	16.7	17.0	18.5	18.3
Primary school or without	0.5	0.3	0.4	0.2	0.2	0.3

Source: NBS, www.statistica.md, authors' calculations

Against the background of the general tendency of population decline, the employed population also tends to decrease, including in 2018 by 8.7% compared to 2014, in 2022 by 1.2% compared to 2019. However, during the period 2020-2022, there was an growth tendency in employed population, including in 2022 by 3.3% compared to 2020 and by 2.2% compared to 2021. The main share of employed population includes males (51.5%) and rural population (54.4%). Analyzing the employed population (or labour force in labour market) by main age groups, it can be noted that as a result of demographic processes (population decline, male excess mortality, increase in life expectancy, migration processes), the employed population is ageing, including a decrease in the share of youth in the age categories 15-24 years (in 2022,

by 3.6 p.p. compared to 2014 and by 1.5 p.p. compared to 2019) and 25-34 years (in 2022 by 2.1 p.p. compared to 2014 and by 2.3 p.p. compared to 2019). At the same time, the tendency of population growth in the age categories 55-64 years and 65 years and over became irreversible (labour force in the above age categories in 2022 increased by 16.3% and by 25.6% in compared to 2014), including an increase in the share of employed population in the 55-64 age category (by 2.8 p.p. in 2022 compared to 2014 and by 0.9 p.p. compared to 2019), and also the share of employed population aged 65 and over in 2022 increased by 0.2 p.p. in compared to the previous year. The share of pensioners by age in labour market over the last three years is about 24%, with a predominant share of females (54%). According to the National Bureau of Statistics [NBS, 2023b], 20.8% of labour force was occupied in agricultural sector in 2022, and 79.2% in non-agricultural economic activities, including 14.8% of employed population in industry (14.4% in 2021), in construction (7.7% in 2021), and the share of employed population in services increased by 0.3 p.p. compared to the previous year and accounted for 56.7% of total employed population (56.4% in 2021). Figure 1 shows the characteristic of changes in the structure of employed population by the main sectors of the national economy in 2022 compared to 2014.

Figure 1. Structure of employed population by age groups in the context of the main types of economic activity, 2014, 2022



Source: authors' calculations on the basis of NBS data, www.statistica.md

An analysis of labour force structure by the main types of economic activities allowed to formulate the following conclusions: in 2022 compared to 2014, the reduction in the share of youth group is characteristic of almost all types of economic activities. The most significant decrease of employed in the age group 15-24 years is registered in the field of agricultural activities, forestry and fisheries (by 4.41 p.p.), wholesale and retail trade, accommodation and public catering activities (by 4.01 p.p.), construction (by 3.29 p.p.). The decrease in the share of youth aged 25-34 is mainly characteristic of the construction sector (by 6.87 p.p.) and wholesale and retail trade, accommodation and public catering activities (by 6.97 p.p.), it explains the possibility of job placement of population given age group abroad (as labour migrants, the data in Table 5 confirm this supposition, as given age group remains the largest share or more than 30% of total number of migrants throughout the analysed period). Against the background of a decrease in employed population in youth age groups, the process of ageing of labour force is going, including an increase in the share of employed population in the age groups 55-64 years and 65 years and over. Thus, the share of the 55-64 age group in the field of agriculture, forestry and fisheries in 2022 increased by 3.01 p.p. as compared to 2014 and its share is 24.37% of total number of employed in the mentioned sphere, in industry, respectively, it increased by 2.39 p.p. and is 16.93%, in wholesale and retail trade, activities in the sphere of accommodation and public catering - its growth was 3.07 p.p. and its share constitutes only 13.03%, in the sphere of public administration, education, health and social assistance - the growth of 5.84 p.p. was registered and the relative share of this group is 25.43% and is one of the prevailing ones in total number of employed in this sphere. Moreover, it should be noted the tendency of increase of employed population in the age group of 65 years and over in 2022 compared to 2014, including in industry (by 0.94 p.p., the share of employed 1.33%), in wholesale and retail trade, in the sphere of accommodation and public catering activities (respectively, by 0.94 p.p., share of the employed 1.70%), in the field of public administration, education, health and social assistance (respectively, by 0.97 p.p., share of the employed 3.09%), and in the field of agricultural activity, forestry and fisheries the share of employed in the age group of 65 years and over remains the highest throughout the period 2014-2022 and constitutes the relative share - 4.29%. As follows from the analysis, the largest share of employment in elder age groups is characteristic of the types of activities with predominance of professional skills and knowledge, education level, and for the types of economic activities that are in connection with health risks, with physical loading, i.e. with the health factor, there are softer tendencies of increase in the number of employed workers and their predominant share compared to the younger age categories of workers.

Ageing of labour force market and its age structure are a challenge for public policies to ensure stability and competitiveness of labour market, a balanced of supply and demand for labour force in the conditions of transformational economy. Given situation is confirming by the analysis of the structure by education level. Thus, in labour market, the labour force with higher education has the main relative share (28.3%), including throughout the analyzed period the share of specialists with vocational and secondary special education practically remains at the same level. One of the reasons for given situation is labour migration, the share of labour migrants with the above-mentioned levels of education is 42% (Table 5, 30.6% and 11.5%, respectively). At the same time, blue-collar professions have an advantage in job placement of unemployed. Thus, for example, in 2022, 7.1 thousand persons or 34.5% out of 20.6 thousand unemployed job placed in *blue collar professions*, in 2019, 6.5 thousand or 36.3% out of 17.9 thousand persons job placed, and only 1.1 thousand persons or 15.5% out of 4.1 thousand persons job placed in *white collar professions* [NBS, 2023c, p.105]. Moreover, according to the National Employment Agency data, during 2022, 35 thousand unemployed persons were registered in the presence of 32.1 thousand vacancies, including 81% of the total number of

vacancies were intended for professions for workers (*blue collar*) in the service sector and real economy sector [National Employment Agency, 2023b, p. 2-3].

It should be noted a positive tendency of reduction in the number of employed in the informal sector: in 2022, there are 16.4% employed population or 0.5 p.p. less than in 2021 (16.9%), and the share of employed in informal work places decreased by 0.8 p.p. (22.0% compared to 22.8% in 2021). The main share of employed in informal sector is in the agricultural sector or 63.4 per cent (65.0 per cent or 1.6 p.p. more in 2021). In the non-agricultural sector, informal employment in 2022 decreased insignificantly (by 0.2 p.p.) to 11.1% compared to 11.3% in 2021, including mainly in the construction sector (66.3% of employed in given type of economic activity) [NBS, 2023d].

Table 7 presents the characteristics of employed population in the informal sector.

Table 7. Structure of employed population, informal sector

	2014	2018	2019	2020	2021	2022
Employed population, informal sector, thousand persons	160.2	145.9	146.8	139.5	142.9	141.3
Share of employed population, informal sector:						
- Males, %	61.6	60.4	66.6	68.3	67.9	68.0
- Females, %	38.4	39.6	33.4	31.7	32.1	32.0
- Urban, %	18.9	19.9	21.0	18.8	19.8	21.1
- Rural, %	81.1	80.1	79.0	81.2	80.2	78.9
Structure of employed in the informal sector by main age groups, %						
Total, %	100.0	100.0	100.0	100.0	100.0	100.0
15-24 years	9.4	7.5	6.9	5.9	7.2	4.5
25-34 years	22.2	23.6	24.5	22.4	21.3	21.9
35-44 years	23.6	24.7	21.7	25.2	25.9	24.7
45-54 years	23.6	21.5	22.8	22.5	24.4	26.6
55-64 years	16.7	17.1	17.8	19.7	17.6	17.7
65 years and over	4.5	5.6	6.3	4.3	3.6	4.6
Structure of employed population in the informal sector by economic status, %						
Total, %	100.0	100.0	100.0	100.0	100.0	100.0
Hired workers	5.1	4.5	5.4	4.6	3.9	4.9
Self-employed	82.9	75.4	76.4	76.1	76.1	77.6
Unpaid family workers	12.0	20.1	18.1	19.2	20.0	17.5
Patrons, members of cooperatives	-	-	0.1	0.1	-	-
Structure of employed population by type of organizational and legal form, %						
Total, %	100.0	100.0	100.0	100.0	100.0	100.0
Formal sector enterprises	72.0	65.3	82.8	83.1	82.9	83.3
Informal sector enterprises	16.3	14.8	16.8	16.7	16.9	16.4
Households that produce products for their own needs	11.4	19.7	-	-	-	-
Households that use hired labour (hired labour force)	0.3	0.2	0.4	0.2	0.2	0.3

Source: NBS, www.statistica.md, authors' calculations

In the informal sector, there is a clear marked tendency of raising in the share of males (by 1.4 p.p. over the past four years), which is 68.0% in 2022 (the share of females decreased by 1.4 p.p. over the period 2019-2022 and is 32%). The main employment in the informal sector is specific to rural areas (about 80% of employed in informal activities are in rural). The analysis of employed in the informal sector by economic status over the period 2014-2022

allowed to conclude that the decreasing tendency of the relative share of self-employed workers in 2018 by 7.5 p.p. compared to 2014 remained almost at the same level or 77-78% in 2019-2020. The share of employees has acquired a decreasing tendency, but in 2022 compared to 2019 again it can be note its growth by 1.0 p.p. The structure by main age groups has an important role in the maintenance and functioning of informal activities. The main relative share in the number of employed in the informal sector or 73.2% constitute the most productive age groups, including 45-54 years (26.6%), 35-44 years (24.7%) and 25-34 years (21.9%), which, in turn, contributes to the reduction of labour force in the formal labour market in conditions reduction in number and ageing labour force. Considering the fact that the specific of employment in the above-mentioned sector is, as a rule, the absence of individual labour contracts and work by oral agreement, social insurance contributions for social and health insurance are not transferred, no payment for workers' leave and disabled are not paid, all this is a lack of guarantees for the provision labour activities and social protection, a risk to poverty and the possibility of obtaining the right to pension insurance (if the worker does not have an individual agreement on the transfer of insurance contributions to social security). Consequently, the presence of informal employment in the country under conditions of demographic changes, which affects the labour market, is a challenge for the implementation of adequate public policies aimed at stabilizing and increasing the competitiveness of national labour market.

Demographic factors influence both the labour force market and indirectly the income received and, consequently, the standard of living of working age population. Thus, the age composition of the working age population, the place of residence (urban, rural), gender (male, female) largely affects the source of income receipt and the sphere of economic activity.

The analysis of disposable incomes of the population by the main age groups allowed to achieve the following conclusions:

- the growth of income per household member over the last four years on average in the country is registered by approximately 1.5 times, which is characteristic of almost all main age groups;

- the main source of household income in age groups up to 59 years is wage, the share of which is 60 % and more, depending on the age of the household head;

- in elder age groups, the predominant source of income is social benefits, including pensions. However, in the 60-64 age group, the share of wages (up to 39%) remains as a source of income, while social benefits is 36.2% as a source of income and pension, respectively, has only a share of 30.7%. In the elder age group of 65 years and over, the main source of income is social benefits (70.6%), the share of pension is predominant and amounts to 63.3% in the structure of total income;

- for all age groups the source of non-labour income is remittances from labour migrants, which allow to cover the requirements of households in priority needs (payment of utilities, children's education, medical service, etc.), given source has the largest share in income in the age groups of 30-39 years (18.6%), 40-49 years (15.1%) and under 30 years (14.3%);

- the lowest income per household member is registered in the households of pensioners in the age group of 65 years and over: the income is 91.5% of the national average, 88.1% for the age group of 60-64 years and 75.5% for the income of households in which the head of household is in the age group under 30 years of age.

The structure of disposable average monthly income of one household member is presented in Table 8.

Table 8. Structure of average monthly disposable income of one household member by main age groups of the household head and sources of income*

	Total	Up to 30 years	30 - 39 years	40 - 49 years	50 - 59 years	60 - 64 years	65 years and over
Average monthly disposable income of one household member, MDL							
2019	2880.6	3511.8	2 816.4	2 739.5	3 098.0	2 864.7	2 602.6
2020	3096.6	4129.2	2 971.5	2 839.4	3 409.5	3 132.7	2 794.8
2021	3510.1	4108.3	3 318.3	3 472.1	3 839.5	3 627.9	3 047.8
2022	4252.6	5153.1	4 390.6	3 956.9	4 440.9	4 417.5	3 891.3
Including - wages, % of total income							
2019	50.2	56.6	60.8	57.4	59.2	36.4	16.4
2020	50.2	62.6	58.9	60.0	56.8	39.7	14.0
2021	50.8	60.3	58.6	58.7	59.2	44.0	13.7
2022	50.7	62.2	59.9	59.4	60.8	38.9	14.3
- from social benefits / from its pension, % of total income							
2019	18.7	3.9	6.4	6.3	11.0	35.6	61.8
	14.4	0.2	1.0	3.2	7.9	30.7	55.4
2020	19.4	4.6	6.7	6.7	11.6	34.7	65.0
	14.5	0.3	1.0	3.2	8.7	28.5	56.8
2021	18.5	6.3	7.0	4.8	10.1	32.7	66.3
	14.0	0.7	1.2	2.0	6.5	28.3	59.0
2022	20.3	5.9	5.7	6.5	9.2	36.2	70.6
	15.8	0.3	0.6	3.1	6.5	30.7	63.3
- from other sources / from its - remittances, % of total income							
2019	15.7	26.3	19.2	16.1	13.1	12.5	11.1
	12.4	20.5	14.2	13.8	11.6	9.6	6.7
2020	15.6	22.7	17.5	15.7	16.2	10.6	11.3
	12.9	18.4	14.3	13.3	14.9	8.6	7.2
2021	15.0	23.6	16.4	17.2	13.4	10.4	10.8
	12.5	20.1	13.2	15.3	11.8	8.3	7.6
2022	14.8	20.0	22.5	18.4	11.3	8.9	6.2
	12.0	14.3	18.6	15.1	10.0	7.5	4.2
Absolute poverty rate depending on the age of the head of household, %							
2019	25.2	12.9	19.2	24.5	22.0	28.8	40.8
2020	26.8	16.7	22.3	23.3	26.2	28.5	41.1
2021	24.5	15.4	18.6	23.3	21.1	26.6	39.7
2022	31.1	22.2	21.3	28.5	30.4	34.2	48.1
Absolute poverty rate depending on a person's age, %							
	Total	Up to 18 years	18-29 years	30-39 years	40-49 years	50-59 years	60 years and over
2019	25.2	24.0	21.6	19.2	23.8	20.7	36.8
2020	26.8	26.0	21.6	21.2	23.1	24.8	37.2
2021	24.5	24.4	18.1	19.6	21.3	19.3	35.9
2022	31.1	28.4	23.6	23.1	29.3	28.5	43.9
- including distribution of poor population, age group, 2022, %	100,0	20,3	7,2	9,1	13,5	16,4	33,5

Characteristics of age structure of household member, place of residence, 2022, %							
	Total	Up to 18 years	18 - 29 years	30 - 39 years	40 - 49 years	50 - 59 years	60 years and over
Total	100.0	22.2	9.6	12.3	14.4	17.8	23.7
-Urban	100.0	25.4	12.9	16.5	13.4	13.0	18.7
-Rural	100.0	20.1	7.4	9.5	15.0	21.0	27.0

**Note: Data are not comparable with the previous period due to the change in the NBS methodology since 2019.*

Source: NBS, www.statistica.md

Table 8 shows that the absolute poverty rate increased over the analysed period, including the absolute poverty rate of households with the age of its head in the age group 60-64 years and, especially, 65 years and over exceeds the national average (by 3.1 p.p. and by 17.0 p.p., respectively, in 2022). These households are mainly located in rural areas (27%). Considering the more pronounced process of population ageing in rural areas (25.4% compared to 21.7% in urban areas) and the poverty of the elderly population, public policies should be adequate to the ongoing demographic changes and, especially, taking into account the requirements of labour force market, the possibilities of using the above-mentioned categories to cover the labour force needs of the rural infrastructure and provide additional sources of income through employment in labour market, including improving the standard of living of given categories of population.

The low level of labour income and the desire to improve the material well-being of the family and provide a possibility to receive a quality education for children is one of the main factors of labour migration. It should be noted that migration processes directly affect the labour force market. At the same time, considering the migration as a means of exchanging professional skills acquired abroad is a positive factor for the socio-economic development of the country. However, on the other hand, given processes lead to a reduction in the economically active population due to changes in the age and sex structure of population, to an increase in the requirements to use earned money, which contributes to the violation of monetary and consumer balances. At the same time, it can be note such factors - consequences of migration as the desire to hide income received outside the country, deterioration of migrants' qualifications and the necessity to retrain them taking into account the changed needs of the country. The above-mentioned factors are negative and require effective decisions on the part of state authorities to prevent undesirable consequences for the economy, including to ensure demand for qualified personnel and sustainable equilibrium in labour market. One of the solutions to the above-mentioned problems is the organisation of effective management in the field of labour remuneration organisation. This is due to the fact that in the conditions of market economy the development on labour market there is competition between market and non-market principles, which allow employers to hire professionally trained workers based on the use of attractive rates and bonus systems, additional rewards for the quality of work and various benefits. At the same time, the low level of wages according to the legally adopted remuneration system and existing restrictions in the labour legislation on the recruitment of workers in the Republic of Moldova continue to be one of the main factors of labour migration. Table 9 presents the characteristics of wages by sector, main types economic activities and gender.

Table 9. Characteristics of average gross monthly wages

	2014	2018	2019	2020	2021	2022
Average monthly wage (gross), MDL	4 089.7	6 268.0	7 233.7	7 943.0	8 979.8	10 447.3
Budget/real wage, %	87.3	88.7	89.8	90.7	83.6	81.2
Wage index, compared to previous year, %	111.3	112.2	115.4	109.8	113.1	116.3
Real wage index, %	105.9	108.9	110.1	105.8	107.6	90.4
Consumer price index (CPI), %	105.1	103.0	104.8	103.8	105.1	128.7
Gender Gap, p.p. (Gender inequality level, p.p.)	12.4	14.4	14.1	13.7	13.6	15.5
Average monthly wage by main types of economic activity, MDL						
Agriculture, forestry and fisheries, MDL	2 708.9	4 188.7	4 768.7	5 022.9	5 691.1	6 700.7
<i>Gender Gap, %</i>	9.5	11.8	10.9	11.1	10.8	8.5
Industry, MDL	4 388.1	6 485.7	7 151.0	7 564.2	8 242.0	9 541.2
<i>Gender Gap, %</i>	18.3	20.9	20.9	19.8	20.0	18.2
Construction, MDL	4 165.7	6 198.2	7 155.3	7 608.1	8 136.5	9 363.0
<i>Gender Gap, %</i>	9.5	15.9	15.6	12.0	11.2	13.0
Wholesale and retail trade, maintenance and repair of cars and motorcycles, MDL	3 367.5	5 414.9	6 543.9	6 881.9	7 609.9	8 960.6
<i>Gender Gap, %</i>	8.9	14.4	15.5	17.0	15.6	15.4
Transport and storage, MDL	3 939.5	5 985.6	6 836.2	6 533.1	7 201.2	8 794.9
<i>Gender Gap, %</i>	1.5	4.4	10.6	10.8	10.8	7.5
Financial and insurance activities, MDL	7 505.3	12 090.2	13 203.5	13 619.0	15 746.9	19 795.9
<i>Gender Gap, %</i>	27.6	38.0	42.9	44.6	41.4	32.5
Public administration and defense, obligatory social insurance, MDL	5 243.4	8 449.5	9 118.6	9 985.4	10 501.3	12 054.3
<i>Gender Gap, %</i>	10.8	6.8	2.1	8.0	7.5	12.4
Education, MDL	3 391.1	5 155.7	6 327.6	7 016.8	7 462.3	8 445.5
<i>Gender Gap, %</i>	7.7	-1.3	-1.1	-1.8	-3.5	-4.3
Health and social assistance, MDL	4 068.8	6 161.5	7 024.8	8 668.6	11 109.1	11 729.7
<i>Gender Gap, %</i>	10.9	18.6	19.6	23.3	17.9	22.4

Source: NBS, www.statistica.md, authors' calculations

From the analysis of data on the wages evolution, it can be note that there is the growth tendency both in the country as a whole and in the main types of economic activity. However, with a sharp growth in the Consumer Price Index (CPI) in 2022 (by 28,7% compared to the previous year), despite its nominal growth, real wages in this year decreased by 9.6% compared to 2021. In some sectors of economy, the average monthly wage is lower than the national average, including agriculture, forestry and fisheries (64.1% of the national average), education (80.8% of the national average), transport and storage (84.2% of the national average), wholesale and retail trade, maintenance and repair of cars and motorbikes (85.7% of the national average). The labour remuneration exceeds the level of average monthly wage in such service sectors as financial and insurance activities (1.9 times higher than the national average), public administration and defence, obligatory social insurance (15.4% higher than the national

average), health and social assistance (12.3% higher than the national average). Over the last two years, the gap between average monthly wages in the budget and real sectors has increased (by 16.4% and 18.8% respectively in 2021-2022). By type of economic activity, it can be noted that the largest gender gap between female's and male's wages are observed in financial and insurance activities (32.5%), health and social assistance (22.4%), industry (18.2%), wholesale and retail trade, maintenance and repair of motor vehicles and motorbikes (15.4%). In conditions of rising prices and tariffs for goods and housing and communal services, the low level of wages does not ensure the reproduction requirements of labour force, including it lost its stimulating factor to continue of labour activity, which forces the working age population to seek additional sources of income, including by going to work outside the country, joining the ranks of labour migrants. Given the fact that it is mainly the population in the most productive working age goes to work - males (see Table 5.), including those with professional skills, the labour force market is losing its stability and competitiveness, which confirms the relevance and importance of research and evaluation of the impact of demographic factors on the socio-economic development of the country, including the labour market for the scientific substantiation of public policies in the above-mentioned areas.

4. CONCLUSIONS AND RECOMMENDATIONS

Demographic processes (birth, death, life expectancy, population natural increase/population decline, migration) affect the age-sex structure of population and, as a consequence, on the quantity of labour resources, i.e. on labour market, including migration contributes to the reduction of unemployment rate and changes in supply/demand for labour force. Reproduction of population is the principal component of labour force market, the carrier of certain qualities necessary for economic activity and labour market development. Demographic processes also affect on social and labour relations, which in turn also affect the specifics of labour market functioning (ageing of labour force). The demographic structure of population, including the structure of economically active population has an impact not only the labour market, but is also a *determining factor* in the formation of the country's economic potential, the structure of national income, the burden on working age population, the structure of requirements for educational services, the characteristics of working places.

In the Republic of Moldova there are sustainable tendencies of population decline, population ageing and labour migration outside the country. According to data of official statistics, the number of the country's population with usual residence as of 01.01.2023 decreased by 2.0% in one year only (as of 01.01.2022), and compared to 2014, it decreased by 12.4% and 2019 - by 6.4%. In the age structure, the age group 15-64 years old (according to Eurostat methodology) constitutes the largest share or 65.9% and 59% according to the legislation of the Republic of Moldova. At the same time, one of the factors is the negative tendency of population decline as a result of migration processes: in 2021 the volume of net migration was -45.4 thousand persons compared to -43,0 thousand persons in 2022. As a result of demographic processes, the index of demographic dependence (the ratio of population in the age categories 0-15 years and 57/62 years and over per 100 persons of working age (16-56/61 years) as of 01.01.2023 increased to 69.4 persons compared to 60.6 persons as of 01.01.2014, and the index of demographic dependence of the population aged 65 years and over, respectively, as of 01.01.2023 was 24.4 persons compared to 15.3 persons as of 01.01.2014. Population ageing rate (population aging coefficient) as of 01.01.2023 increased to 23.8% (17.5% as of 01.01.2014), including 25.4% in rural (18.1% as of 01.01.2014), the female population (27.1%) is higher by 7.0 p.p. than the male population (20.1%), which is due to the excess mortality of males in working age (in 2022, as before, male excess mortality was 114 male deaths per 100 female deaths). Given processes lead to a change in the ratio between the

economically active and economically inactive population, to an imbalance in labour market. Thus, the share of inactive population in 2022 constituted 58.2% compared to 41.8% of economically active population, while the economic activity rate decreased from 43.3% in 2014, 45.9% in 2018 to 41.8% in 2022, with the highest economic activity rate for the age categories 45-54 years (63.7%), 35-44 years (61.3%), 25-34 years (53.5%), 55-64 years (45.2%), and it is the lowest (17.7%) for youth (15-24 years). Changes in socio-economic processes, development of market relations, structural reforms in the economy, a decrease in standard of living, the abolition of visa regime for citizens of the Republic of Moldova were the main factors of migration of working age population. However, in the period 2014-2021 the number of labour migrants tended to decrease, including in 2018 compared to 2014 by 1.6%, in 2021 - by 25.4%, and in 2022 compared to 2021 their number increased by 17.7%. There is a change in the structure of labour migrants by main age groups, including a decrease in migrants among youth in the 15-24 age group (in 2022 its share fell to 17.5% or by 10.2 p.p. compared to 27.7% in 2014), the share of the 25-34 age group decreased from 35.3% in 2014 to 32.0% in 2022, or by 3.3 p.p. At the same time, an increasing tendency in migrants at the most productive age group with professional skills was registered: the number of migrants in the age group 35-44 years increased by 8.6 p.p. and by 2.6 p.p. in 45-54 years, as well as by 2.0 p.p. in the elder age group 55-64 years.

Against the background of population decline and changes in its age and sex structure, a decrease in number of employed population was registered, including in 2018 by 8.7% compared to 2014, in 2022 by 1.2% compared to 2019. However, during the period 2020-2022, an increase in number of employed population was registered, including in 2022 by 3.3% compared to 2020 and by 2.2% compared to 2021. At the same time, it is necessary to be noted the tendency of labour force ageing: the share of youth aged 15-24 (in 2022 by 3.6 p.p. as compared to 2014 and by 1.5 p.p. as compared to 2019) and 25-34 (in 2022 by 2.1 p.p. as compared to 2014 and by 2.3 p.p. as compared to 2019) is decreasing. At the same time, the number of employed population in the age categories 55-64 years and 65 years and over is increasing (by 16.3% and 25.6%, respectively, in 2022 compared to 2014). The share of pensioners by age in labour market for the last three years is about 24%, with a predominant share of females (54%).

Changes in the structure of labour market as a result of demographic processes, including population ageing in conditions of a market economy, low labour income increase the risk of social exclusion, including poverty.

Depending on the age of the household head, the main sources of income are wages (up to 60 % and more in the age group up to 59 years), while in elder age groups social benefits, including pensions, are predominant (for example, in the age group of 65 years and over it is 70.6% and the share of pensions is 63.3% in the structure of total income). For almost all age groups, remittances from labour migrants are an important source of income replenishment, which allow pay for utilities, children's education, medical service and others (share in the age group 30-39 years is 18.6%, 40-49 years - 15.1% and under 30 years - 14.3%). Low amount of wages as the main source of income of working age population, in turn, is the main motive for labour migration. For example, in conditions of a sharp increase in the Consumer Price Index in 2022 (by 28.7% compared to the previous year), despite its nominal growth, real wages for this year decreased by 9.6% compared to 2021. In some sectors of economy the average monthly wage is lower than the national average (in agriculture, forestry and fisheries it is 64.1% of the national average, in education - 80.8%, in transport and storage - 84.2%, in wholesale and retail trade, maintenance and repair of cars and motorbikes - 85.7%). During the past two years, the gap between average monthly wages in the budget and real sectors increased (by 16.4% and 18.8% in 2021-2022, respectively), and the gender difference between female's and male's wages remains, which is 15.5 p.p. in 2022.

Demographic processes and its impact on labour force market, including the reduction in the number and changes in the age and sex structure towards the ageing of labour market, are a challenge to improve the effectiveness of ongoing public policies. In order to ensure the stability and competitiveness of labour force market at the internal and external levels, to balance the supply and demand for labour force in the conditions of the transformational economy, it is necessary to carry out the following measures:

- reduction the deficit of highly qualified workers, training specialists in professions in accordance with the requirements of modern labour market and increasing the level of interaction between labour market and educational sphere, implementation of new approaches and programmes for training specialists in according to the requirements of labour market;

- to elaborate a new methodological approach to motivation of labour, increasing labour productivity and develop the productive power of the worker, interest in increasing production efficiency and saving working time, including ensuring the saving of traditional forms of labour, taking into account the use of scientific and technological progress and information technologies;

- elaboration and implementation of a labour migration mechanism, including analysis and forecasting of migration processes, elaboration of criteria and indicators to observe and assess the impact on labour market, demand for labour force, efficiency of migration management, attraction of foreign labour force and its use, as well as intellectual migration programmes with aim of studying foreign advanced practices, scientific developments and its implementation in the country;

- reforming the wage system in accordance with the implementation of effective methods and approaches to organizing the remuneration of labour applied in foreign practice, including taking into account the specifics of economic activity (grade system, tariff-free system, floating salary system, commission-based remuneration, SBP-systems (skill-based payment system), universal system of key performance indicators - KPI or Key Performance Indicators and others), which will make it possible to really assess the contribution of each worker, strengthen the role of the stimulating function of wages, and make it possible to more react quickly to changes in market conditions of socio-economic development and competition in labour market.

- elaboration of short- and medium-term forecasts of labour force market, taking into account changes in the structure of population by sex and age and place of residence to estimate and regulate national and local labour markets.

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ROMANIA'S FOREIGN TRADE IN A EUROPEAN CONTEXT

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ABSTRACT: *The main economic argument for EU single market expansion was to enlarge the free trade area and thus create a larger single market where domestic production could capitalize on scale economies. As a result, unit production costs were reduced, productivity increased, and citizens had access to a wider range of products. Intra-community trade represents the most important part of our country's trade with the countries of the world. As a member state of the European Union, Romania benefits from countless legislative and commercial advantages. Romania's imports from European Union countries in the last ten years have increased in value much more than our country's successful exports. This evolution led to a strong deepening of Romania's intra-community trade deficit during the mentioned period.*

Keywords: *International trade, European Union, imports, exports*

JEL Classification: *F10, O24*

1. INTRODUCTION

The statistics of the international trade of goods represent an important element both in the calculation of the balance of payments, the Gross Domestic Product (GDP), and for the realization of short-term economic studies, at national and international level. Foreign trade statistical data are important elements considered by the Government both for establishing global trade policies and for generating initiatives regarding new trade markets. These statistics are also used by associations from various branches of the national economy, international organizations or private firms and companies for monitoring to explore new markets and find development opportunities.

The European Union (EU) occupies a leading position in world trade. The openness that characterizes its trade agreements has made the Union the biggest player on the world trade stage and a reliable trading partner.

The value of goods exported and imported daily by the EU is hundreds of millions of euros. It is the largest exporter of manufactured goods and services worldwide and the largest export market for approximately 80 countries. Together, EU countries account for 16% of world imports and exports [6].

2. THE RECENT TRENDS OF ROMANIA'S INTRA-COMMUNITY TRADE

The mitigation of trade deficits, in the conditions in which the process of globalization of markets and the growth of interdependencies between economies intensifies, and international value chains offer new opportunities for specialization and cooperation between

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economic agents, depends on the diversification of the geographical orientation on Romania's commercial partners, aiming at target markets to which foreign trade is to be carried out as a priority, corresponding to the technological advances and the modernization of the structures of the Romanian economy, as well as maintaining its attractiveness for foreign investors, who can make a major contribution to balancing the country's trade balance.

Romania respects the trend announced by the European Commission, which shows that EU member states have reversed their EU trade balance. On average, EU member states export more between themselves than outside the common area. This after in 2022, the balance was negative, with exports worth 436 billion euros more outside the borders of the European Union. Over 70% of Romanian exports and imports go to the other 26 member states of the European Union.

In 2023, Romania's exports reached 93.09 billion euros, registering a modest increase of 1.3%, while imports registered a value of 122.04 billion euros, down 3.2% compared to 2022 [3].

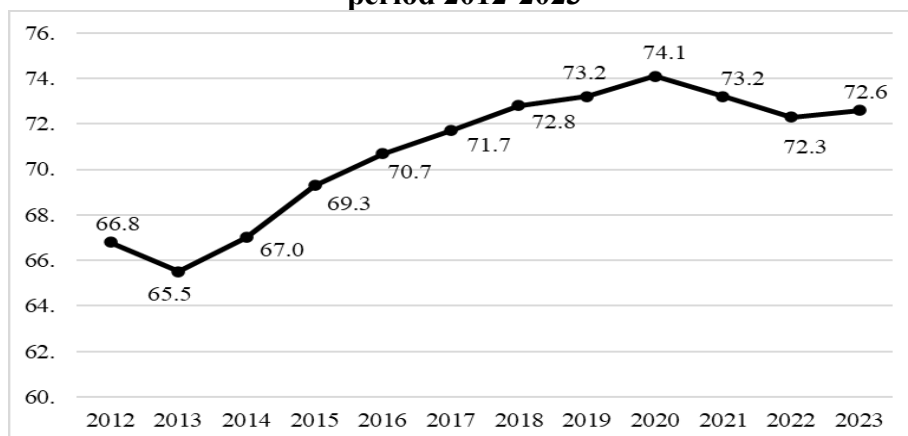
Out of exports of 93 billion euros, the value of exchanges of goods within the European Union was 67.574 billion euros, representing 72.6% of total exports. Of the 122.04 billion euros of imports recorded last year, the goods brought from the common European area were 89.500 billion euros for imports, representing 73.3% of the total imports.

The common market of the 27 member states of the European Union have become the main source of exports, but also the source of imports. In 2023, Romania's trade balance deficit recorded a value of 28.947 billion euros, reflecting a decrease of 5.142 billion euros (-15.1%) compared to the level of 2022, according to data provided by the National Institute of Statistics [6].

In 2023, the product groups with significant weights in the structure of exports and imports were machinery and transport equipment, which represented 44.8% of total exports and 36.8% of total imports, and other manufactured products, which contributed 29.8% to exports and 28.7% to imports.

Regarding the exchange of goods with non-EU27 states, the value of exports was 25.523 billion euros, and the value of imports was 32.544 billion euros, representing 27.4% of total exports and 26.7% of total imports. Romania's export and import are mainly carried out with European countries (88.3% of total export, respectively 87.4% of total import). Intra-community trade (Romania with the 26 EU member countries) represents a share of 72.6% for export and 73.3% for import [1].

Figure 1. The share of Romania's intra-community export in total exports, in the period 2012-2023



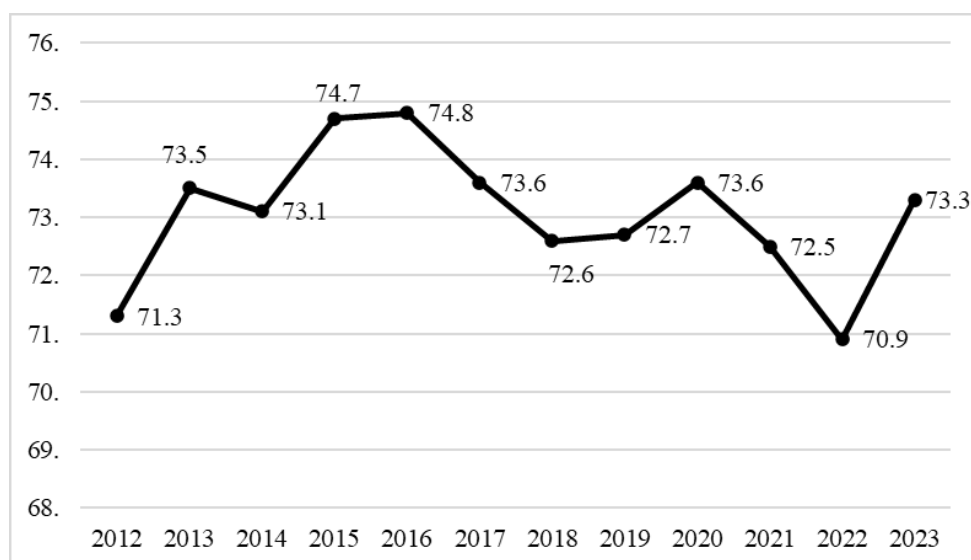
Source: Author owns processing based on Eurostat data (2024)

Analyzing the data presented in Figure 1, we can see that the share of Romania's intra-community export in the total of our country's exports has increased constantly in the last 10 years, except for the years 2021 and 2022, years marked by the COVID-19.

Romanian companies export increasingly large quantities to Europe, recording a 20% increase in the volume of goods transported to foreign markets in 2023 compared to the previous year. According to data provided by DSV Road, part of the Danish DSV group, the third largest freight transport services company in Europe, the most transported goods are in the categories of food, clothing and footwear and light industry. Thus, a significant increase in the exports of Romanian SMEs can be observed from year to year. This demonstrates not only the ability of these companies to adapt to the European competitive environment, but also their desire to contribute to the development of the Romanian economy by expanding their activity on international markets.

According to the DSV Road report, Romanian SMEs carry out monthly transports with quantities between 2000 and 5000 tons of goods, totaling 900 transports per month. The main destinations of goods exported by Romanian SMEs are Germany, Italy, Poland, Slovakia, the Czech Republic and Hungary, which indicates a diversification of markets and the ability of Romanian companies to adapt to international requirements [5].

Figure 2. The share of Romania's intra-community import in total imports, in the period 2012-2023



Source: Author owns processing based on Eurostat data (2024)

The share of Romania's intra-community import in total imports had a fluctuating evolution in the last 10 years, with a significant decrease during the Pandemic period.

The common market of the 27 member states of the European Union has become the main source of exports, but also the source of imports. The data shows us that EU imports exceed exports. Of the 122.04 billion euros of imports recorded last year, the goods brought from the common European area were 89.500 billion euros for imports, representing 73.3% of the total imports [2].

Regarding imports, the main partner countries of Romania from the European Union are Germany, Italy and Hungary. Germany is Romania's most important economic partner, and the way the German economy works directly impacts the local economy. With a direct economic dependence, trade between Germany and Romania increased by 6% in 2023, to over 40 billion euros. Thus, Romania reached the 17th place among Germany's commercial partners,

which means a rise of three positions compared to the previous year, according to AHK Romania data. Imports from Romania are 10% lower than Germany's exports to Romania, but they have a growth rate 3 times higher. Thus, Imports from Romania amounted to 19.4 billion Euros, and Germany's exports to Romania reached 21.5 billion Euros. With such a volume of economic exchanges, Germany remains Romania's first trade partner.

In 2023, Romania's trade balance deficit recorded a value of 28.947 billion euros, reflecting a decrease of 5.142 billion euros (-15.1%) compared to the level of 2022, according to data provided by the National Institute of Statistics [3].

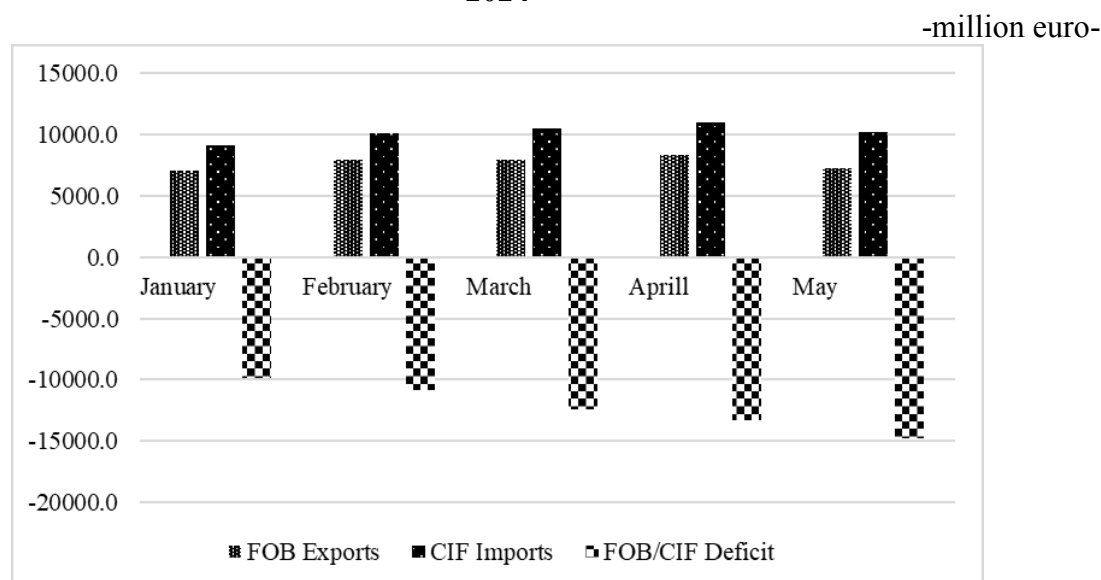
The analysis by product groups reveals a strong dependence on machinery and transport equipment, which constituted 44.8% of exports and 36.8% of imports, followed by other manufactured products, with shares of 29.8% in exports and 28.7% in imports. This structure emphasizes Romania's orientation towards advanced industrial sectors with high added value.

Interaction with the European Union remains the pivot of foreign trade. It highlights not only the importance of the EU bloc as a main commercial partner, but also the deep integration of the Romanian economy into European value chains.

Specific segments such as food, beverage and tobacco have seen impressive growth, reflecting both evolving consumer tastes and the industry's ability to respond to these changes. In contrast, the mineral fuels and raw materials sectors suffered significant declines, illustrating vulnerabilities to changes in the global energy market.

According to the available data provided by the National Institute of Statistics, the trade balance deficit (FOB/CIF) in the period 1 January 1 – 31 May 2024 was 12.288 billion euros, higher by 1.230 billion euros (+11.1%) than the recorded in the same period last year.

Figure 3. Exports, imports and trade balance (FOB/CIF) in the period January – May 2024



Source: Author owns processing based on National Institute of Statistics data (2024)

In the first five months of this year, FOB exports totaled 38,536 billion euros, recording a decline of 2.9%, and CIF imports totaled 50,824 billion euros, after an increase of 0.2%, compared to the period January 1 - May 31, 2023. According to the INS, between January 1 and May 31, 2024, important shares in the structure of exports and imports are held by the groups of products: machines and transport equipment (47.1% for export and 36.5% for import) and other manufactured products (29.6% for export and 28.5% for import). In May 2024, FOB exports totaled 7.241 billion euro and CIF imports totaled 10.213 billion euro, resulting in a

deficit of 2.971 billion euro. Compared to May 2023, exports in May 2024 decreased by 16.2%, and imports decreased by 5.6% [4].

3. CONCLUSIONS

The evolution of our country's international trade was decisively influenced by the integration into the European Union. Romania's trade with EU member states constitutes over 70% of Romania's total international trade, generating a high degree of dependence on these markets, which represents a vulnerability in the event of an economic crisis.

Romania's imports from European Union countries in the last ten years have increased in value much more than our country's successful exports. This evolution led to a strong deepening of Romania's intra-community trade deficit during the mentioned period. The evolution of Romanian exports will depend, to a significant extent, on the way in which the authorities will support the relaunch of the economy. There is a need for a sustained effort by the business environment and the state towards an economic reconstruction on a sustainable and predictable basis, which offers an alternative to imports and a competitive offer to exports

Also, digitization, robotization and new technologies represent an area that must become strategic for Romania, constituting an area with excellent export potential.

Therefore, Romania has an important potential to increase competitiveness on foreign markets, by deepening inter- and intra-sectoral specialization, promoting intelligent specialization policies, identifying export niches that allow the capitalization of competitive and comparative advantages, based on innovative processes, international cooperation and more effective anchoring in global value-added chains, enabling trade deficits to be mitigated.

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INCOME INEQUALITY AND ECONOMIC DEVELOPMENT IN THE EUROPEAN UNION: IS THE KUZNETS CURVE VALID?

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ABSTRACT: *The aim of the present paper is to test the Kuznets hypothesis, regarding the quadratic dependence of income inequality (Gini index) on the economic development (Gross Domestic Product per capita) in the European Union. Using data from World Income Inequality Database (WIID) and World Bank in a panel data approach, the findings show that the Kuznets curve is validated in the panel of 25 European Union countries, but the results are not maintained in different countries groups. When Gini index is positively correlated with GDP per capita, the Kuznets hypothesis is validated but in the group of countries with a negative correlation between these variables, the hypothesis is not valid. Also, in the countries with higher income inequality (above the EU's average) the hypothesis is valid, while in countries with lower income inequality (under the EU's average), this is not the case. The findings are valuable for policy makers in order to conceive public measures, differentiated by the level of income inequality.*

Key words: *economic development, income distribution, Kuznets Curve, European Union*

JEL Classification: *O11, O15, O52*

1. INTRODUCTION

Income inequality has become a concern in all countries of the world, due to its increasing trend in recent decades. This has influenced not only economies with a history of relatively high inequality, but also countries where traditionally there has been low inequality. International organizations, researchers and world leaders around the globe recognize the threat that inequality poses to the prosperity of nations. In general, an unequal distribution of any kind of resources, for example income or wealth, is associated with lower confidence, lower life and/or work satisfaction, lower happiness, leading in turn to lower growth. However, despite governments seeking to address inequality of all kinds, the problem is still persistent in both developed and developing countries.

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Income inequality raised in almost of the European Union countries in the period of 1990 -2022 (WIID, 2023). The highest growth is registered in Bulgaria (14.48 percentage points), followed by Romania (10.09 percentage points). The average level of the Gini Index increased from 28.46% in 1990 to 30.86% in 2022. Above the average EU level of the income inequality (for the period of 1990-2022)

The European Union is committed to reducing economic, social, political and environmental inequality by 2030, which is Goal 10 under the 17 Sustainable Development Goals set out in the United Nations 2030 Agenda (United Nations, 2015). The main directions for action at European level concern: increasing inclusion, decent work and income growth, improving social services and access to social protection, creating opportunities for women, young people and disadvantaged communities, pro-poor fiscal policies and transparent and fair tax systems, stimulating private sector development in the economy.

The considerations for placing income inequality at the centre of the European Union's social policies are the following: (1) *from a moral perspective* - inequality can be seen from the perspective of the Universal Declaration of Human Rights; thus, it is morally wrong that a wide gap persists between rich and poor, between those in the centre and those on the margins, the moral and political duty of governments is to ensure that every individual has equal access to opportunities; (2) *from a poverty perspective* - inequality is an obstacle to poverty elimination: 'less' inequality means that the benefits of economic growth reach the poorest members of society; conversely, when resources are unequally distributed in the economy, investment favours the rich and the benefits of economic growth are harder to reach the poor and marginalized communities; (3) *from an efficiency perspective* - policy interventions often face trade-offs between efficiency and equity. However, several studies show that even if some policy measures favour the already wealthy on the one hand, the distribution of firms and communities that perform better economically is more equitable on the other hand; (4) *from the Kuznets perspective* – of the economist Simon Kuznets (1955), who sees inequality as an inevitable part of the development process. In the early stages of development inequality is expected to increase and then, over time, to decrease; Kuznets predicted that inequality would decrease in rich societies, but he was contradicted by reality, as recent changes in the labour market and new technologies have generated a new wave of inequality that seems to be difficult to manage; (5) *from a 'political economy' perspective* - inequality is a barrier to economic growth and a 'poison' for democracy; resources are captured by elites, leading to market and government failure; rising inequality implies social instability and threatens what economists call 'social capital' or the ability of communities to share common values and coordinate local action to improve their lives; inequality also undermines public trust in governments and politicians in general (European Commission, 2022).

Literature focused on the relationship between the income inequality and economic growth is extremely extensive, and somewhat inconclusive, being a debate that is far from settled. First of all, the basic studies of Lewis (1954), Kuznets (1955) and Kaldor (1956) suggest that income inequality is, mainly, determined by the level of economic development. They analysed how the economic development influences the income distribution on the long term, by demonstrating the growth potential of the income inequality in the first stages of the economic development and after, a decreasing effect in the further stages (the U-inversed hypothesis). The neoclassical growth model provides the theoretical basis on which Kuznets and his followers built their model.

The economist Simon Kuznets, winner of the 1971 Nobel Prize in economics, developed the hypothesis regarding how income inequality is affected by economic growth. According to his hypothesis (Kuznets, 1955), the relationship between income inequality and economic growth has the form of an inverted U-curve. Thus, in the initial stages of economic development (the pre-industrialization stage) income inequality increases up to a maximum

corresponding to a threshold of economic development. When the threshold is exceeded, income inequality starts to decrease, so that the unequal distribution of income in the economy improves as a result of public policy measures in the industrialization and post-industrialization stage.

The aim of the present paper is to test the Kuznets hypothesis, regarding the quadratic dependence of income inequality (Gini index) on the economic development (Gross Domestic Product per capita) in the European Union. Using data from World Income Inequality Database (WIID) and World Bank in a panel data approach, the findings show that the Kuznets curve is validated in the panel of 25 European Union countries, but the results are not maintained in different countries groups. When Gini index is positively correlated with GDP per capita, the Kuznets hypothesis is validated but in the group of countries with a negative correlation between these variables, the hypothesis is not valid. Also, in the countries with higher income inequality (above the EU's average) the hypothesis is valid, while in countries with lower income inequality (under the EU's average), this is not the case. The findings are valuable for policy makers in order to conceive public measures, meant to reduce inequality in income distribution, differentiated by the level of income inequality.

The article is structured as follows. After a brief literature review, data and methodology are described. This is followed by a section outlining the main findings, and finally, conclusions are presented.

2. THE KUZNETS HYPOTHESIS: A SHORT LITERATURE REVIEW

A plethora of empirical studies have focused on investigating the existence of the Kuznets curve, using both panel and cross-sectional data. However, the results are not uniform, some support the hypothesis and others contradict it.

For example, Paukert (1973) confirmed Kuznets' hypothesis on the basis of data from 56 countries, 40 of which were developing countries, concluding that income inequality increases in countries with low levels of GDP per capita and decreases in those with high levels of GDP per capita.

Ahluwalia (1976) concluded the same for a sample of 60 countries. Later, two other studies (Anand and Kanbur, 1993; Deininger and Squire, 1998) could not provide complete information to support the validation of the Kuznets hypothesis. Similar conclusions were reported by Ram (1997) as well as Bruno et al. (1996).

A group of studies have shown the link between the Gini coefficient and real GDP per capita in the form of an inverted U-curve, as hypothesized by Kuznets (Nielsen et al., 1995; Forbes, 2000; Barro, 2000; Thornton, 2001; Bhandari et al., 2010).

Kiatrungwilaikun and Suriya (2015) conclude that the relationship between economic growth and income inequality is in the form of a U-shaped curve for a panel dataset of 91 countries thus invalidating the Kuznets hypothesis. Jovanovic (2018) also found that the Kuznets curve is not valid for a sample of 26 former socialist countries from the former Eastern Bloc. Kavya and Shijin (2020) could not identify a valid inverted U-curve relationship for a panel of countries including 28 high-income, 41 middle-income and 16 low-income countries. Similar results are reported by Erauskin and Turnovsky (2022) for a panel dataset including 80 countries.

Recently, in their study of Canadian provinces, Breau and Lee (2023) identified an S-shaped curve between economic growth and income inequality. In the initial stages of development of the provinces, the inverted U-shaped Kuznets curve is confirmed, but as one moves to higher levels of development, the curve has transformed into a U-shaped one, resulting in an overall S-shaped graphical representation.

The Kuznets curve hypothesis is less studied in the European Union economies, the present study intending to fill this gap.

3. METHODOLOGY AND DATA

Given the aim of the present study to analyse the Kuznets Curve hypothesis regarding the dependence of income inequality on the development level, the panel data approach is used with based on time series on the European Union economies, for the period of 1996-2022. Malta and Cyprus were excluded due to incomplete data series. Income inequality is expressed by the Gini index, its values have been extracted from the World Inequality Income Database (WIID). The Gini index is calculated in this database taking into account annual household disposable income. Gross Domestic Product per capita data series are extracted from the World Bank database for the same period.

The model used in our study is as follows:

$$\text{Gini} = f(\text{GDP}_{pc}, \text{GDP}_{pc}^2) \quad (1)$$

where: Gini is the income inequality index, and GDPpc is Gross Domestic Product per capita.

In order to mitigate the multicollinearity between variables and to avoid heteroscedasticity of errors in the regression equations, the model variables will be converted to natural logarithms.

The methodological strategy will consist of the following steps:

- descriptive analysis of the variables included in the study;
- verification of the stationarity of the time series, with Levin, Lin & Chu (LLC, 2002);
- estimating the econometric models using the Least Squares method, in the two variants (with fixed effects and with random effects);
- applying the Hausman test to select the appropriate model;
- interpretation and discussion of the estimation results of the selected model;
- applying the Dumitrescu-Hurlin (2012) test to identify causality relationships between variables.

The model 1 is translated into the regression equation below:

$$\ln \text{Gini}_{i,t} = \alpha + \beta_1 \cdot \ln \text{GDPpc}_{i,t} + \beta_2 \cdot (\ln \text{GDPpc}_{i,t})^2 + \epsilon_{i,t} \quad (2)$$

where: i stands for section (country), t stands for time, β_1, β_2 are regression parameters, and $\epsilon_{i,t}$ is the error.

In order to confirm the Kuznets hypothesis, it is expected that β_2 has a negative value. The variables considered for the study are detailed in the Table 1.

Table 1 The study's variables

Variable	Name	Description	Source
Gini	Gini index	The Gini index is an expression of the distribution of the population by disposable income per equivalent adult. It takes values between 0 and 100.	World Database on Income Inequality (The World Income Inequality Database - WIID)

Variable	Name	Description	Source
GDPpc	Gross Domestic Product per capita	Gross Domestic Product per capita is a macroeconomic indicator that reflects the sum of the market value of all goods and services for final consumption produced in all branches of the economy within a country in a given year, relative to the number of inhabitants. Unit of measure: Purchasing Power Parity (PPP), international \$, 2017 constant	World Bank

Source: World Income Inequality Database (WIID), World Bank

The descriptive statistics of the variables displayed in Table 2 shows that the standard deviation is relatively small, between 3% and 16% of their maximum, suggesting dynamics without large deviations from the mean.

Table 2. Descriptive statistics of variables

	<i>lnGini</i>	<i>lnPIBpc</i>	$(\ln PIBpc)^2$
Mean	3.3669	10.4237	108.8721
Median	3.3655	10.4596	109.4048
Maximum	3.6558	11.7006	136.9048
Minimum	3.0864	9.2062	84.7549
Standard deviation	0.1223	0.4666	9.7221
Skewness	-0.0119	-0.0578	0.1055
Kurtosis	1.9739	3.4096	3.5328

Source: data processing with EViews 12.0

4. MAIN FINDINGS

The application of the Levin, Lin & Chu test (Table 3) shows that, for all three variables, the Prob value is less than 0.05 (the chosen significance level), thus rejecting the null hypothesis of a unit root, and concluding that the data series are stationary, at their first level.

Table 3. Results of the variable stationarity test (LLC)

Variable	Statistics	Prob. value	Observations
<i>lnGini</i>	-2.17149	0.0149	The series is stationary
<i>lnGDPc</i>	-3.14200	0.0008	The series is stationary
$(\ln GDPpc)^2$	-2.76655	0.0028	The series is stationary

Source: data processing with EViews 12.0

As a result of Hausman test we selected the random effects model as appropriate.

Table 4 Estimation of equation 2

Dependent variable *lnGini*

Method: Panel EGLS cross-section random effects

Sample: 1996-2022

Variable	Coefficient	Standard Error	t-statistic	Prob.
<i>lnGDPpc</i>	1.09354	0.2235	4.8613	0.0000
<i>lnGDPpc</i> ²	-0.05615	0.0119	-4.9685	0.0000
C	-1.84624	1.1852	-1.8203	0.0692
R squared	0.09463			
F-statistic	2.4093			
Prob (F-statistic)	0.0001			

Source: data processing with EViews 12.0

Thus, the equation obtained is:

$$\ln Gini = -1.8462 + 1.09354 * \ln GDPpc - 0.05615 * \ln GDPpc^2$$

The equation reveals the quadratic dependence of the income inequality index on the level of GDP per capita. The Prob values for the coefficients *lnGDPpc* and *lnGDPpc*² are less than 0.05, and the free term (-1.8464), the Prob value is less than 0.1. Thus, for a significance level of 0.1, the coefficients of the regression parameters are statistically validated. Also, the model is statistically validated for a significance threshold of 0.01 (Prob F-statistic=0.0001).

In order to check the stability of the estimated model, we identified the type of distribution of the errors series as well as their stationarity. By applying the Jarque-Bera test we found a normal distribution of errors. The LLC test for the residuals concluded their stationarity.

In order to test the robustness of the obtained results, the regression equation 2 will be estimated for two types of EU countries groups, as follows: a) three sub-groups of countries, according to the values of the correlation coefficient between the Gini index and GDP per capita data series; b) two sub-groups of countries, according to the level of the Gini index of each country compared to the EU average.

We calculated the correlation coefficient between GDPpc and the Gini coefficient for each country over the period considered (1996-2022). Thus, we divided the panel of 25 European countries into three sub-panels: 1) countries with a high positive correlation between GDPpc and Gini (greater than 0.5); 2) countries for which this correlation is lower and 3) countries for which the correlation is negative. The first group includes: Austria, Bulgaria, Germany, Denmark, Finland, France, Lithuania, Luxembourg, Latvia, the Netherlands, Romania, Slovenia, Sweden, and the Netherlands. In the second group are: Belgium, Spain, Croatia, Hungary, and Poland. The third group includes: the Czech Republic, Estonia, Greece, Ireland, Italy, Portugal, Slovakia, and Spain.

For each of them we estimated the regression equation 2 and selected the appropriate model according to the results of the Hausman test.

Table 5 Estimation results of equation 2, by three groups of countries, according to the correlation between the Gini index and GDP per capita**Group 1: strong and positive correlation between Gini and GDP per capita**Dependent variable $\ln Gini$

Method: Panel Least Squares fixed effects

Sample: 1996-2022

Variable	Coefficient	Standard Error	t-statistic	Prob.
$\ln GDPpc$	1.411283	0.38226	3.6918	0.0003
$\ln GDPpc)^2$	-0.07199	0.01986	-3.6246	0.0003
C	-3.43694	1.18231	-1.8852	0.0603
R squared	0.90563			
F-statistic	74.3746			
Prob (F-statistic)	0.0000			

Group 2: weak and positive correlation between Gini and GDP per capitaDependent variable $\ln Gini$

Method: Panel Least Squares random effects

Sample: 1996-2022

Variable	Coefficient	Standard Error	t-statistic	Prob.
$\ln GDPpc$	2.919397	0.780967	3.73818	0.0003
$\ln GDPpc)^2$	-0.15106	0.038505	-3.92317	0.0003
C	-10.58193	3.95867	-2.67309	0.0088
R squared	0.8636			
F-statistic	20.1926			
Prob (F-statistic)	0.0000			

Group 3: negative correlation between Gini and GDP per capitaDependent variable $\ln Gini$

Method: Panel Least Squares fixed effects

Sample: 1996-2022

Variable	Coefficient	Standard Error	t-statistic	Prob.
$\ln GDPpc$	0.09390	0.278421	0.337276	0.7364
$\ln GDPpc)^2$	-0.0089	0.013362	-0.673176	0.5018
C	3.45844	1.454843	2.67309	0.0187
R squared	0.9533			
F-statistic	92.460			
Prob (F-statistic)	0.0000			

Source: data processing using EViews 12.0

For the first two groups of countries (for which the correlation coefficient between the Gini index and GDP per capita is positive) the Kuznets curve is validated, the coefficient for $(\ln PIBpc)^2$ ($\ln PIBpc$ sq) is negative and the value of Prob for all estimated coefficients is less than 0.1. Thus, for a 1% significance level the models are statistically valid. Also, the Prob value associated with the F-statistic is 0.000, which indicates model validity. For the third group of countries for which the correlation between the Gini index and GDP per capita is negative, the Prob. value of the estimated coefficients being greater than 0.1 (the chosen significance threshold), the Kuznets curve is not validated.

The group of countries with a Gini index above the EU average includes: Bulgaria, Spain, Estonia, France, Greece, Ireland, Italy, Lithuania, Latvia, Poland, Portugal and

Romania, while the other group (with a Gini index under the EU average) includes: Austria, Belgium, Czech Republic, Germany, Denmark, Finland, Croatia, Hungary, Luxembourg, the Netherlands, Slovakia, Slovenia, Spain, Sweden, the Czech Republic, Finland, Hungary, Luxembourg, the Netherlands, Slovakia and Slovenia.

Table 6 Estimation of equation 2, in two groups of countries

Group 1: Gini index above the EU's average

Dependent variable *lnGini*

Method: Panel Least Squares fixed effects

Sample: 1996-2022

Variable	Coefficient	Standard Error	t-statistic	Prob.
<i>lnGDPpc</i>	2.63176	0.203064	12.96027	0.0000
<i>lnGDPpc</i> ²	-0.127983	0.0110176	-12.57633	0.0000
C	-10.03554	1.014244	-9.894511	0.0000
R squared	0.7920			
F-statistic	29.10672			
Prob (F-statistic)	0.0000			

Group 2: Gini index under the EU's average

Dependent variable *lnGini*

Method: Panel Least Squares random effects

Sample: 1996-2022

Variable	Coefficient	Standard Error	t-statistic	Prob.
<i>lnGDPpc</i>	-1.919753	0.287173	-6.68500	0.0000
<i>lnGDPpc</i> ²	0.085953	0.014271	6.02277	0.0000
C	13.94030	1.446145	9.639631	0.0000
R squared	0.5307			
F-statistic	12.9864			
Prob (F-statistic)	0.0000			

Source: data processing with EViews 12.0 software

According to the results shown in Table 6, the Kuznets curve hypothesis is valid only in the group of countries with a level of income inequality above the EU's average. In countries with a Gini index below the EU's average, the Kuznets hypothesis is not confirmed, the coefficient of the GDP per capita has a negative value, the quadratic dependence between the Gini index and GDP per capita being U-shaped. Income inequality decreases as GDP per capita increases, until the Gini index reaches a minimum level. After this minimum of the Gini index, increasing GDP per capita leads to increasing income inequality levels.

Table 7 Causal relationships between variables (Dumitrescu-Hurlin test)

Pairwise Dumitrescu Hurlin Panel Causality Tests
Sample: 1996 2022
Lags: 2

Null Hypothesis:	W-Stat.	Zbar-Stat.	Prob.
LNPIBPC does not homogeneously cause LNGINI	7.36075	10.3411	0.0000
LNGINI does not homogeneously cause LNPIBPC	1.55526	-1.34223	0.1795

Source: data processing with Eviews 12.0

As we notice in Table 7, the causality relationship between GDP per capita and the Gini index is validated for a significance level of 0.01, directed from GDP per capita to the Gini index, with a time lag of 2 years.

5. CONCLUSIONS

We validated the Kuznets hypothesis, meaning the dependence of income inequality on the dynamics of GDP per capita, in a panel of 25 European Union countries, for the period of 1996 to 2022. Income inequality increases as GDP per capita increases, until GDP per capita reaches a value from which the dynamics of income inequality reverses, i.e. income inequality begins to decrease, as GDP per capita further increases. This turning point reflects the situation when the level of development of the economy supports the existence of the necessary means (policies, norms and institutions) to prevent the increase of inequality in the distribution of income. For the 25 EU countries panel data, the turning point corresponds to the value of $\ln\text{GDPpc}=9.74$, respectively to a value of 16983.4 USD.

Analysing the robustness of the results, we discuss two aspects: (i) if the results are maintained when we divide the panel of the 25 EU countries into groups based on the correlations between Gini index and GDP per capita, and (ii) when we split the panel into groups according to the level of Gini index (above /under the EU's average).

In the first situation, when the Gini index is negatively correlated with GDPpc, the Kuznets hypothesis is not validated. In the countries with a positive correlation between the two variables, the findings are nuanced. When the correlation is strong and positive, the turning point is reached later (within the economic development process) than in the panel of the 25 EU countries. When the correlation is positive and moderate, the turning point is earlier reached as in the 25 EU panel and previous group. Thus, the weaker positive correlation between income inequality and economic growth, the faster the level of economic development is reached at which income inequality starts to fall.

In the second situation, of grouping countries according to level of the Gini index, we found that in the group of countries with a Gini index above the EU's average, the maximum level of income inequality is reached for $\ln\text{GDPpc}=10.95$. This turning point corresponds to a higher level of development compared to the panel of 25 EU countries, suggesting that these countries need to reach a higher threshold in economic development, where they have the required capacity to act for reducing the inequality of income distribution in the economy. Countries with high income inequality are those with development levels under the EU's average. In this respect, the results of our study are in line with the studies of Bhandari et al. (2010). In countries with income inequality under the EU's level, high-income countries, the

inverted Kuznets Curve is validated. This result is similar to Kiatrungwilaikun & Suriya (2015), and Erauskin & Turnovsky (2022), and is in line with that Breu and Lee (2023) had found for the Canadian provinces, namely that in the early stages of development, the Kuznets curve hypothesis was validated, and then, at higher levels of development the curve reverses. Finally, it should be noted that in both groups of countries, as Lyubimov (2017) and Thomas Piketty (2014) emphasize, the solution to reduce income inequality consists of appropriate fiscal and redistributive policies.

The identified causal relationship, where the evolution of GDP per capita is the cause of the change in the Gini index, with a time lag of two years, suggests that the process of economic growth induces changes in income inequality, the effects manifesting with a delay of two years.

The study's results must be placed in the European context of social and cohesion policies, specifically regarding the inequality of income distribution in the European Union. The persistence of income inequality jeopardizes the economic growth, can lead to social conflict, reduced participation of citizens in the public life, reduced trust in public institutions and policies, and extension of social exclusion. The concept of inclusive growth is at heart of the EU policy on income inequality and its decrease is a clear priority. Employment incentive policies need to be further developed, in order to support the level of GDP per capita, effective labour market institutions and measures targeting low and very low-income groups and workers. Much more effective tax and redistributive policies are required in order to reduce income inequality, with a particular focus on pre-distributive and less on the redistributive side.

The paper's findings highlighting the invalidation of the Kuznets Curve hypothesis in countries with lower income inequality suggest the public policies targeted on reducing income inequality must be tailored on the specific economic and social context of a country, and also framed in the European Union social and cohesion policies. Moreover, the increase in income inequality cannot be seen only as a result of economic growth, as it was predicted by Kuznets (1955), the complexity of other factors that can influence inequality, such as: investment in the economy, government spending, institutional and public policy factors, equal access to opportunities, population growth, urbanization, financial development, trade openness or globalization.

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MAKING A GRAMMAR CHECKER WITH AUTOCORRECT OPTIONS USING NLP TOOLS

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ABSTRACT: Our natural language approach concerns syntactic analysis using a dedicated Javascript library - wink-nlp - and semantic analysis based on Prolog programming language, facilitated by another Javascript library - tau-prolog - that allows defining logical programs, declaring rules and checking for goals inside Javascript language. Firstly, our program splits the original text into sentences, then into tokens and identifies each part of the sentence, dynamically maps entities into Prolog rules, then check the spelling accordingly to the Definite Clause Grammar (DCG) by querying the pre-defined program for initial goals (the sentence itself). Basically, we let the parser infer its own rules from the syntactic point of view, then check the grammar from a semantic perspective against the DCG inside the same work flow or pipeline of steps. The provided article combines the usage of wink-nlp and tau-prolog packages for natural language processing (NLP) and understanding (NLU).

Keywords: *grammar; natural language; logic programming; syntactic analysis*

JEL Classification: *C88; L86*

1. INTRODUCTION

Two of Chomsky's ideas were crucial for the development of our research: first, there is a basal grammar innate to the child that provides the very structures the language is built upon, and second, the recursive nature of the human language Chomsky had noticed that allows us to build an indefinite amount of statements from a finite set of grammar rules, plus the composable character of grammar that begets infinite long verbal structures. The last observation gave us the idea to establish isomorphic relations between natural language and formal systems to prove our theorems (future work).

In 1957, Noam Chomsky noticed this would be the generating principle of sentences with the famous example "Colorless green ideas sleep furiously". It follows that pairs of words have a meaning taken separately and provide grammatical structure to the sentence, even if the whole is meaningless, as shown in the following sequence (Kok & Brouwer, 2023):
[["Colorless", "green"], ["green", "ideas"], ["ideas", "sleep"], ["sleep", "furiously"]]

Grammar proofreaders fall into two categories, those that perform syntactic analysis of the sentence and ensure the identification of sentence parts in order to establish the correct

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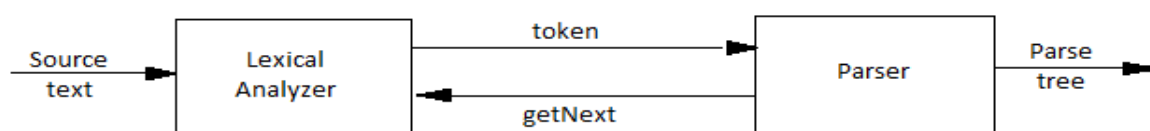
relationship between them according to a predefined linguistic model, and those that are based on AI, e.g. Grammarly, and which can learn step by step the correct structure of a sentence and transform a grammatically wrong sentence into a correct one. For learning, training sets are used, such as C4_200M made and provided by Google and which contains examples of grammatical errors along with their correct form (NLP, 2023).

Syntactic analysis shows the following aspects of the sentence (Syn, 2023):

- Word order and meaning - syntactic analysis aims to extract the dependence of words with other words in the document. If we change the order of words, then it will be difficult to understand the sentence;
- Retention of stop words - if we remove stop words, then the meaning of a sentence can be changed altogether;
- Word morphology - stemming, lemmatization will bring words to their basic form, thereby changing the grammar of the sentence;
- Parts of speech of words in a sentence - identifying the correct speech part of a word is important.

Identifying entities and their relationships in text is useful for several NLP tasks, for example creating knowledge graphs, summarizing text, answering questions, and correcting possible grammatical mistakes. For this last purpose, we need to analyze the grammatical structure of the sentence, as well as identify the relationships between individual words in a particular context. Individual words that refer to the different topics and objects in a sentence, such as names of places and people, dates of interest, or other the same, are referred to as "entities" (W1, 2023), see Figure 1:

Figure 1. The interaction between lexical analyzer and parser



Source: <https://www.analyticsvidhya.com/blog/2021/06/part-11-step-by-step-guide-to-master-nlp-syntactic-analysis>

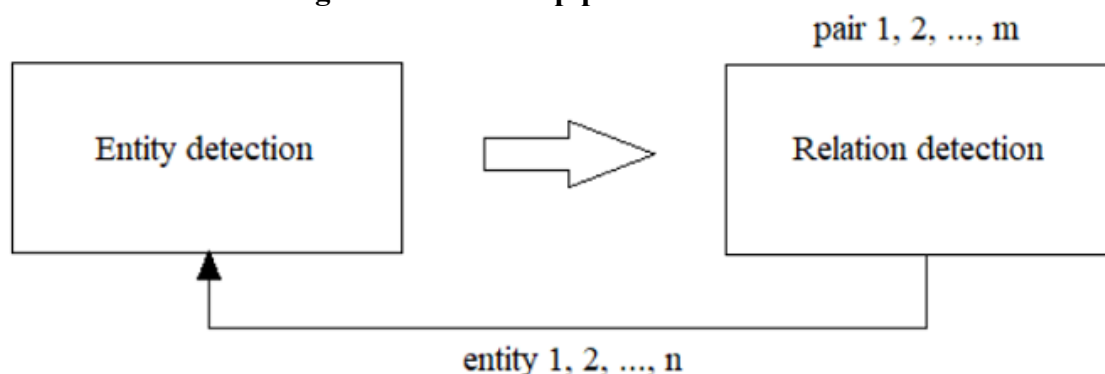
The new ES6 streaming process of transforming a text was another aspect similar to the pipeline style of the human brain in processing data. The two-way parsing on texts calculating the frequency of pairs' appearance proved to be of significant importance in dead language studies or searching for anagrams. The use of the Wink software package language model allowed us to create predicates like verbs (subject, object) based on the SVO structure of IE languages, the future knowledge base for our next proofing language system.

The agglutinative mechanism of making both sensical or not-sensical verbal content drew our attention to the Fibonacci series of numbers that is fundamental for developing living structures both at the molecular and macro level (e.g. breeding of rabbits, use of the phi constant in architecture, and so on). This way the bigrams (from n-grams) can result from concatenating strings one after another creating entities in a coherent, linked-list style, rational manner. These collocations may be interpreted either as new concepts (e.g. military-doctor) or camouflaged predicates built upon identity principles (e.g. is or exists).

Relationships are established by means of verbs or simple joining, as is the case with collocations. In the case of the latter, bigram trees can be used in the form of linear development

on the agglutinative principle or the Fibonacci sequence, resulting in simply chained lists, please see Figure 2:

Figure 2. Inference pipeline architecture



Source: <https://nikhilsrihari-nik.medium.com/identifying-entities-and-their-relations-in-text-76efa8c18194>

The main unit of content mapping is the sentence or statement. This way we are getting closer to a Natural Language Understanding (NLU) component responsible for extracting information at a single step throughout a pipeline process consisting of several stages (Bercaru et al, 2023): tokenization, syntactic analysis and generating the semantic grammar lexicon on the fly, based on the original term redexes, i.e. reduced forms.

2. MATERIALS

Factors such as openness, simplicity, flexibility, full browser integration, and attention to the security and privacy concerns that naturally arise in executing untrusted code have helped the Javascript language gain very significant popularity despite its low initial efficiency. Overall, it allows for a disruptive paradigm shift that gradually replaces the development of OS-dependent applications with web applications that can run in a variety of devices, some completely portable.

It should be noted that functional languages make no distinction between a fundamental parameter and a functor, moreover, most of the time (e.g. Javascript) the type is dynamically inferred. Thanks to this observation, language models have been created for the NLP based on pairs of words (bigrams), which by the order of their chaining within sentences justify a grammatical structure (Morales et al, 2012).

Javascript immutability (eg. freeze() method for objects) and local scope for variables it uses (declared with let keyword) are natural consequences of this philosophy. Generalizing the use of functors was another functional concept that merged data and functions into a single parameter, suitable for both data and behaviour interchange between objects. The arrow functions facilitated this even more by declaring a functor and initializing it in one single line of code. Another major role played here is anonymous and immediate functions (Kok & Brouwer, 2023).

Nesting functions, a feature available before ES5, were gradually replaced by currying, a special way to employ binding, a concept introduced first by the Haskell programming language. In this respect, parameters are introduced one after another inside individual parenthesis "()" suffixing the called function name, and being passed in the same order as arguments of nested anonymous functions.

All these premises made way for callback style use of Javascript that made even more room for asynchronous/event use with the advent of Promises. In this style, the nesting is achieved at the args level, explicitly providing arrow functions with anonymous

implementations instead of parameters. Implicit arguments (e.g. "a=1"), a variable number or parameters (e.g. "...args"), and memoizing, a technique enabled by closures (accessing out-of-context variables by functions) and higher order functions, which, alongside tail-calling, dramatically improve the performance of recursive functions.

Corroborating data with Popularity of Programming Language Index (PyPL) - Python, 27.7%; Java, 16.79%; Javascript, 9.65%, shows that the multi-paradigm Javascript language meets the qualities necessary for an Open source approach to natural language analysis (W2, 2023).

WinkNLP is a Javascript library for natural language processing (NLP). Specifically designed to make NLP application development easier and faster, winkNLP is optimized for the right balance between performance and accuracy. It is built from the ground up with a weak code base that has no external dependence. The `.readDoc()` method, when used with the default instance of winkNLP, splits text into tokens, entities, and sentences. It also determines a number of their properties. They are accessible by the `.out()` method based on the input parameter — its.property. Some examples of properties are value, stopWordFlag, pos, and lemma, see Table 1:

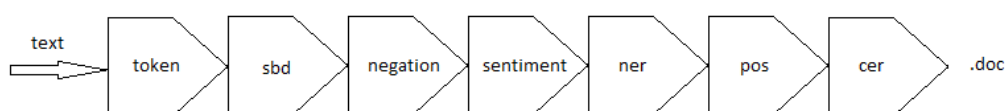
Table 1. Common its.properties that become available at each stage

Stage	Description
tokenization	Splits text into tokens.
sbd	Sentence boundary detection — determines span of each sentence in terms of start and end token indexes.
negation	Negation handling — sets the negation Flag for every token whose meaning is negated due a "not" word.
sentiment	Computes sentiment score of each sentence and the entire document.
ner	Named entity recognition — detects all named entities and also determines their type and span.
pos	Performs part-of-speech tagging.
cer	Custom entity recognition — detects all custom entities and their type and span.

Source: <https://winkjs.org/wink-nlp>

The `readDoc()` API processes input text in several stages. All steps together form a processing channel/flow, also called pipes. The first stage is tokenization, which is mandatory. Later steps such as sentence limit detection (SBD) or part-of-speech (POS) tagging are optional. Optional steps are user-configurable. The following figure and table illustrate the actual Wink flow, see Figure 3:

Figure 3. Wink processing flow



Source: <https://winkjs.org/wink-nlp/processing-pipeline.html>

According to (W1, 2023), there is a need for a compiler from Prolog (and extensions) to Javascript, that may use logical programming (constraint) to develop client-side web applications while complying with current industry standards. Converting code into Javascript

makes (C)LP programs executable in almost any modern computing device, with no additional software requirements from the user's point of view. The use of a very high-level language facilitates the development of complex and high-quality software.

Tau Prolog is a client-side Prolog interpreter, implemented entirely in Javascript and designed to promote the applicability and portability of Prolog text and data between multiple data processing systems. Tau Prolog has been developed for use with either Node or a seamless browser.js and allows browser event management and modification of a web's DOM using Prolog predicates, making Prolog even more powerful (W3, 2023). Tau-prolog provides an effective tool for implementing a Lexical-Functional Grammar (LFG): a sentence structure rule annotated with functional schemes such as $S \rightarrow NP, VP$. to be interpreted as (Frey & Reyle, 1983):

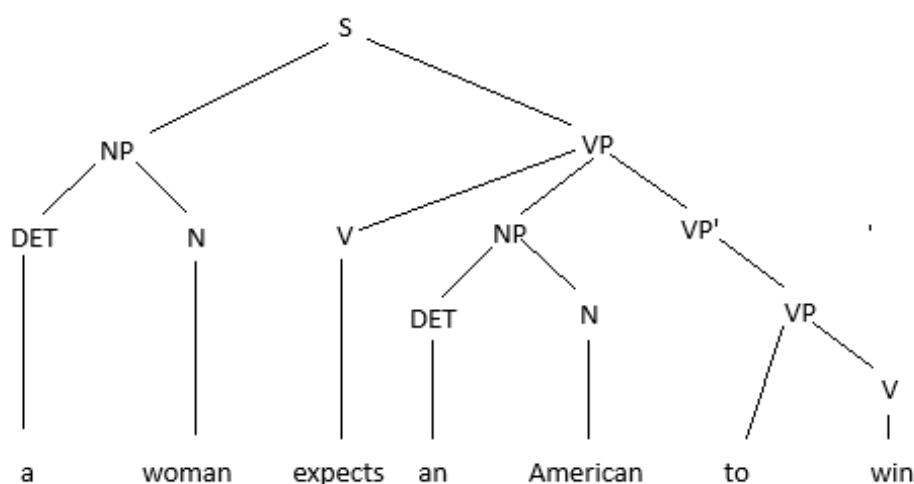
- the identification of the special grammatical relation to the subject position of any sentence analyzed by this clause vis-à-vis the NP appearing in it;
- the identification of all grammatical relations of the sentence with those of the VP.

The procedural semantics of the Prolog are such that the instantiation of variables in a clause is inherited from the instantiation given by its sub-scopes, if they succeed. Another way to deal with logic programming is using a dedicated library (W4, 2023) allowing us to declare facts and rules functional style, a step further to constraint programming, an interesting paradigm we aim to explore in our future research.

3. Methodology

After lexical analysis of the text and identification of words with the help of the token function, a first step is to identify the parts of the sentence. Extremely useful again is binary development, this time at the level of sentence, dividing the statement into noun phrase (NF) and verbal phrase (VF). Recursive development is done after the second term, decomposed into a new NF, VF and so on. For example, the process of syntactic analysis rewrites a sentence in a syntactic tree, please see Figure 4:

Figure 4. Syntactic tree



Source: Screenshot of ANTLR4 -gui option by author

The program loads the wink-nlp package, imports an English language model, creates a session with tau-prolog, and performs natural language processing tasks using winkNLP. It also defines a Prolog program, extracts entities from a given text, and queries the Prolog program using tau-prolog against the rules obtained by syntactic analysis (previous step).

1. The required packages and modules are imported using the require function. The wink-nlp package is imported as winkNLP, and the English language model is imported accordingly:

```
// Load required packages and modules
const winkNLP = require('wink-nlp');
const model = require('wink-eng-lite-web-model');
const pl = require('tau-prolog');
```
2. The tau-prolog package is imported as pl, and a session is created with pl.create(1000):

```
// Create a new session
const session = pl.create(1000);
```
3. The winkNLP function is invoked with the imported model to instantiate the nlp object:

```
// Instantiate winkNLP
const nlp = winkNLP(model);
```
4. The its and show variables are assigned to nlp.its and a function that logs the formatted answer from the tau-prolog session, respectively:

```
// Define helper functions
const its = nlp.its;
const showAnswer = x => console.log(session.format_answer(x));
```
5. The item variable is assigned the value of the third argument passed to the Node.js script using process.argv[2]:

```
// Get command line argument
const inputItem = process.argv[2];
```
6. The program variable is assigned a Prolog program represented as a string. It defines rules for sentence structure, including noun phrases, verb phrases, and intransitive verbs. The program also includes rules for intransitive verbs, e.g. "runs" and "laughs" (Kamath, 2015):

```
// Define the program and goal
let program = `
s(S0,S) :- np(S0,S1), vp(S1,S)
.np(S0,S) :- det(S0,S1), noun(S1,S).
vp(S0,S) :- verb(S0,S1), np(S1,S).
vp(S0,S) :- iv(S0,S).
iv(S0,S) :- S0=[walks|S].
`;
```
7. The nlp.readDoc function is used to create a document object from the inputItem. The code then iterates over each sentence and token in the document, extracting the type of entity and its part of speech:

```
const text = 'A boy eats the apples in the back. A woman runs freely on the alley';
const doc = nlp.readDoc(text);
let entityMap = new Map();
// Extract entities from the text
doc.sentences().each((sentence) => {
```

```
sentence.tokens().each((token) => {
  entityMap.set(token.out(its.value), token.out(its.pos));
});
```

8. The extracted entities and their parts of speech are stored in a Map object as Prolog rules:

```
// Add entity rules to the program
const mapEntriesToString = (entries) => {
  return Array.from(entries, ([k, v]) => `n    ${v.toLowerCase()}(S0,S) :-
S0=[${k.toLowerCase()}|S].`).join("") + "\n";
}
console.log(mapEntriesToString([...entityMap.entries()]));
```

9. The generated Prolog rules are appended to the program string:

```
program += mapEntriesToString([...entityMap.entries()]);
const goal = `
s([the, boy, eats,the,apples],[ ]).
`;
```

10. The session.consult function is used to load the Prolog program into the tau-prolog session. Then, the session.query function is used to query the loaded program with the specified goals. The session.answers function is used to display the answers obtained from the query:

```
session.consult(program, {
  success: function() {
    session.query(goal, {
      success: function() {
        session.answers(showAnswer);
      }
    })
  }
});
```

4. Results

Basically, the program measures the impedance between WinkNLP and Tau-Prolog language models. It is a matter of tuning both in order to get the optimum results, this is to map and filter the output of WinkNLP according to the DCG Prolog inference rules, since the lexicon is obtained by consuming its own WinkNLP results, see the results in Figure 5:

Figure 5. The result of *corr*'s execution

```
C:\Users\radub>node corr "the boy eats the apples.the woman runs the alley."

det([the|A],A).
noun([boy|A],A).
verb([eats|A],A).
noun([apples|A],A).
punct([.|A],A).
noun([woman|A],A).
verb([runs|A],A).
noun([alley|A],A).

s([the,boy,eats,the,apples,.],[]).
s([the,woman,runs,the,alley,.],[]).
true
true
```

Source: Screenshot by author

In order to show the possible valid combination of words, it suffice changing the program's goal from 's([\$sentence.tokens().out()],[]).' to 'findall(M,s(M,[],R)).'. The result will be a list of valid sentences according to the dynamic generated DCG lexicon, see Figure 6:

Figure 6. The result of *corr*'s *findall* execution

```
C:\Users\radub>node corr "a woman runs the alley."
s([a,woman,runs,the,alley,.],[]).
R = [[a,woman,runs,a,woman],[a,woman,runs,a,woman,.],[a,woman,runs,a,alley],[a,woman,runs,a,alley,.],[a,woman,runs,the,woman],[a,woman,runs,the,woman,.],[a,woman,runs,the,alley],[a,woman,runs,the,alley,.],[a,alley,runs,a,woman],[a,alley,runs,a,woman,.],[a,alley,runs,the,woman],[a,alley,runs,the,woman,.],[a,alley,runs,the,alley],[a,alley,runs,the,alley,.],[the,woman,runs,a,woman],[the,woman,runs,a,woman,.],[the,woman,runs,the,alley],[the,woman,runs,the,alley,.],[the,woman,runs,the,woman],[the,woman,runs,the,woman,.],[the,woman,runs,the,alley],[the,woman,runs,the,alley,.],[the,alley,runs,a,woman],[the,alley,runs,a,woman,.],[the,alley,runs,a,alley],[the,alley,runs,a,alley,.],[the,alley,runs,the,woman],[the,alley,runs,the,woman,.],[the,alley,runs,the,alley],[the,alley,runs,the,alley,.]]
false
```

Source: Screenshot by author

It is important to notice that a determinant like 'a', i.e. $\exists$, almost triples the area of semantic field, thus emphasizes the importance of the semantic capabilities of the parser. It is obvious we have to run the *findall* method after each sentence not to combine the lexicon of the two sentences. Otherwise, the result is interesting, bring our program closer to generating AI features, e.g. chatGPT, rather than a normal grammatical corrector: the boy eats the boy, the boy eats the apples, the boy eats the woman, the boy eats the alley, the boy runs the boy, the boy runs the apples, the boy runs the woman, the woman eats the apples, and so on. This is most likely the field of AI (e.g. <https://sunilchomal.github.io/GECwBERT/#c-bert>) to choose the appropriate language model in order to get the minimum entropy or information loss.

CONCLUSION

It follows from various studies, including our own, that use of pure functional languages ensures the safe use of programs by guaranteeing there are no state changes in software execution (Khanfor & Yang, 2017). If the required packages (wink-nlp, wink-eng-lite-web-

model and tau-prolog) are not installed, the code will throw an error. Also, if the Node.js script is not executed with a third argument, the item variable will be undefined, which may cause issues later in the code. Our approach aimed to make this class of programs as accessible and useful as possible to achieve the intended purpose. It is a fact that Javascript multi-paradigm language has provided us with a more concise, more familiar, and easier language to program in, allowing the writing of NLP algorithms in a style much closer to that of conventional functional programming languages. In our future research will add error handling to gracefully handle any exceptions thrown during package imports or function invocations, and, eventually, implement additional natural language processing tasks using the wink-nlp package.

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CHANGE MANAGEMENT FOR THE SUSTAINABLE DEVELOPMENT OF ORGANIZATIONS

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ABSTRACT: *Change is an inevitable and necessary component in today's business environment, marked by growing concerns about environmental impact and society's increasingly stringent requirements for corporate responsibility. For this reason, organizations committing to sustainable development can face complex and transformational changes with impacts on their management, customers and stakeholders. This paper intends to present the key concepts: change management and sustainable development, emphasizing their essential link. Change management is the process by which organizations plan, implement, and evaluate structural, technological, or behavioral changes, while sustainable development refers to the ability to meet current needs without compromising the ability of future generations to meet their own needs.*

Keywords: *Sustainable development, sustainability, change management*

JEL Classification: *M10; M14; Q01*

1. INTRODUCTION

In the current context, economic, social, and environmental challenges have transformed and will continue to transform the world we live in. Today, the world faces environmental pressures and, consequently, new challenges on a scale and with a level of interdependence that are unprecedented. Although environmental issues have been in the attention of the specialists for a long time, they argue that “contemporary forms of environmental degradation are more global than ever before in human history and involve the most significant set of risks and threats to human life” [9].

Global ecological threats call into question the very existence of humanity, as it faces extraordinary pressure generated by resource depletion, rising temperatures, extreme weather events, melting glaciers, rising sea levels, the death of coral reefs, the extinction of species, deforestation, soil erosion, desertification, excessive urbanization, waste management issues-phenomena with direct repercussions on the management of all economic organizations. In the near future, these challenges will increasingly question the current production, consumption, business, and the use of natural resources and common goods models [17].

In this context, marked by uncertainties related to climate change and the depletion of natural resources, the concept of sustainable development has become increasingly important. Sustainable development, in its already classic definition as outlined in the Brundtland Report,

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is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." [19]. Munasinghe considers that "sustainable development is an on-going process integrating ecological, economic, equity and ethical considerations for current and future generations of people and other living creatures, without endangering the life support systems of the planet upon which ultimately all life depends" [16].

2. ORGANIZATIONAL CHANGE MANAGEMENT FOR SUSTAINABILITY

Sustainable development is one of the challenges of the century, but at the same time, it can offer viable opportunities to organizations, becoming a development model of that allows them to obtain economic, social and environmental advantages. For organizations that want to streamline managerial processes, it is important to include the sustainable development goals in organizational strategies. These objectives should be treated as a condition of building a sustainable business, involving increasing operational efficiency and gaining competitive advantage.

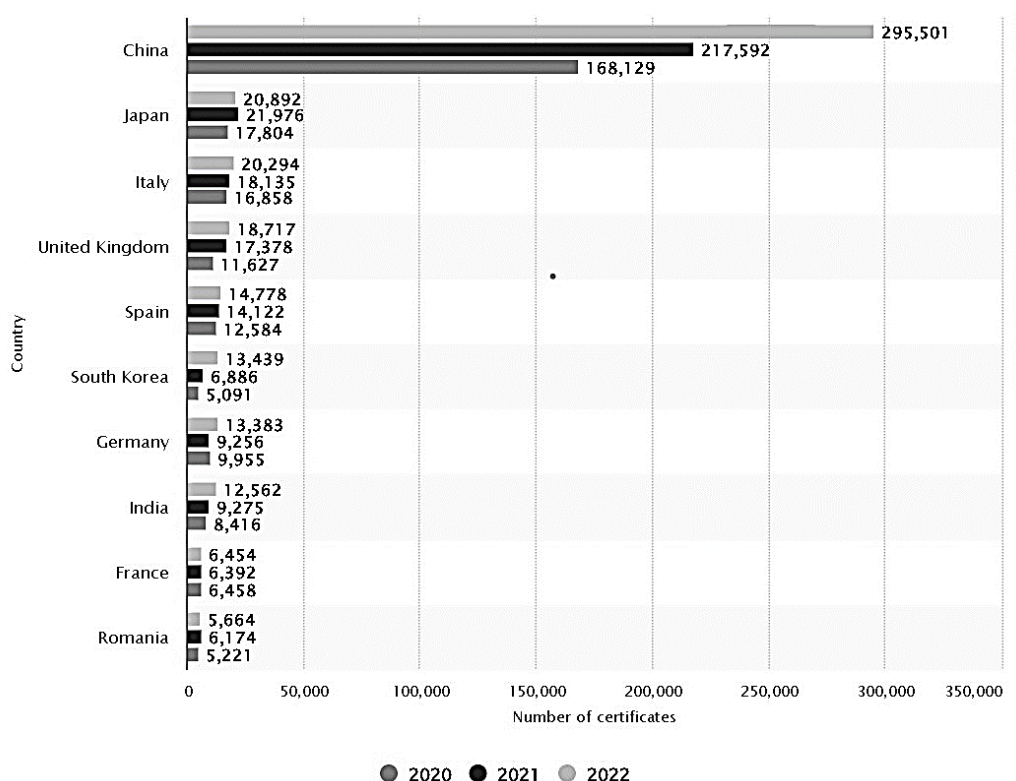
Historically, the term "sustainable" emerged among the specialist concerned with the environmental issues and protection. A commitment to sustainability fundamentally involves recognizing that the social and environmental challenges of the 21st century are real and that they require embedding the global economic and political order in a diverse range of values and practices. The concept of sustainability is the result of a growing awareness of environmental (natural) constraints, correlated with social, cultural, economic, political, ideological, and psychological constraints, according to which human activities should be conducted and managed to ensure that the needs of society and its members are met in stable and long-term conditions [5].

Companies are increasingly aware of their impact on the environment and are reassessing their practices to align with global trends. In this context, developing sustainable businesses becomes an essential framework in which companies can redefine their strategies, implement more socially and environmentally responsible practices, and contribute to building a sustainable society [1].

The importance of developing sustainable businesses is evident from multiple perspectives. Firstly, addressing environmental issues and reducing negative impacts on the environment is crucial for protecting our planet. Climate change, pollution, biodiversity loss are just a few of the major challenges we face, and sustainable businesses have the potential to offer viable and lasting solutions in these areas. Secondly, developing sustainable businesses can bring significant economic benefits. A sustainable approach can lead to increased energy efficiency, reduced operational costs, and the identification of new business opportunities in the green technology sector. In a world where natural resources are limited, adopting sustainable practices can create competitive advantages and ensure the long-term viability of businesses [14].

Consequently, many companies have invested time, effort, and resources in environmental protection activities. Some have already implemented an environmental management system, others are in the process of introducing one, while others have set environmental objectives in their business strategies. As a result of the benefits that can be achieved through the implementation of an environmental management system, the number of companies adopting ISO 14001 has increased year by year. Thus, the number of countries with ISO 14001 environmental management system certifications has grown from 141 countries in 2006 to over 200 countries by 2023.

Figure 1. Countries with the highest number of valid ISO 14001 certificates worldwide from 2020 to 2022



Source: Statista, 2024, <https://www.statista.com/statistics/1266545/iso-14001-certs-globally-by-country/> [18]

Following the global trend, the number of ISO 14001 certifications in Europe has also increased, from 17,941 in 2001 to 529,853 in 2023, with the most certifications recorded in Italy, the United Kingdom, Spain, and Germany. In Romania, the number of ISO 14001 certificates has risen in recent years from 96 certified companies in 2002 to over 5,600 in 2022 [18].

In Romania, three-quarters of companies increased their investments in sustainability last year, with 20% of them reporting that the resources allocated were significantly higher than in previous years, despite economic uncertainties and rising operational costs, according to the Deloitte "CxO Sustainability Report 2023." Climate change ranks among the top three priorities on the agendas of company's managers, closely following the economic context and ahead of areas such as innovation, talent acquisition, supply chain issues, or geopolitical tensions, the study further reveals [7].

The role that sustainability plays in the company's development strategy is becoming increasingly well-defined at the management level, whether it involves managing the overall impact of the company's activities or creating long-term value for stakeholders, concludes a study conducted by EY Romania. According to the survey, 80% of respondents state that integrating sustainability into the decision-making process has a long-term impact on operational performance. Following this, "decision-making transparency" (40%), "energy efficiency" (29%), and "the overall impact of company activities on the environment" (27%) are also considered important. The same EY survey indicates that nearly 74% of respondents believe that integrating sustainability principles into business strategy and operational management is a priority for the companies they represent [15].

Being part of the social environment, which is constantly changing, organizations must continuously adapt to the changing environment. Thus, adaptability to environmental changes

has now become a fundamental condition, not only for the success of an organization, but also often for its survival. The dimension of the environmental changes varies from country to country and region to region, but there are also global changes that affect societies and companies around the world, as is the case of the changes caused by the crisis of energy resources, environmental pollution, etc.

Currently, the studies related to organizational change, emphasize the decisive role of accepting change for the development and progress of organizations and change is treated as a normal condition of organizational life. The father of modern management, Peter Drucker, emphasizes that future managers must focus on change, viewing it both as an opportunity and a threat. He supports this statement by explaining that "if you start by seeing change as a threat, you will never innovate anything. We should not dismiss something just because it is outside our plans. Often, the unexpected is the best source of innovation." [8].

Aligning with sustainability principles must begin with changing of the organization's visions, values, and beliefs. Specifically, by transforming the organizational culture of companies, it becomes possible to integrate this concept into business strategies. Sustainable development management requires modifying organizational culture to ensure the implementation of sustainability at all levels of a company and evaluating organizational performance through the lens of sustainability [6].

To achieve sustainable development, organizations need to integrate change management practices so that they become components of sustainable development. According to Eugen Burduş, organizational change management consists of the set of processes of foresight, organization, coordination, training and control of measures to replace, modify, transform or transform the organization into form and content, in order to increase its efficiency and competitiveness [2].

Change management facilitates the elimination of risk situations and the maintenance of the organizational environment in a situation of balance, thus contributing to ensuring continuous development. The ultimate goal of organizational change is success, that is, a better match between the organization and the environment in which it evolves, as well as a more efficient and effective way of working. The success of organizational change depends both on the quality of the solution found and on the effectiveness of its implementation [4].

Organizational change management involves a continuous process of renewing the direction, structure, and capacity to meet the ever-changing needs of internal and external customers [13]. Furthermore, sustainable organizations continuously renew their processes and products, adapting them to the new context [10]. This is particularly important in the context of sustainability, where the necessary organizational change is more profound and cannot be achieved quickly or in a single stage. Organizational change must be implemented both from the top down, to create the necessary structure and provide a sustainable vision, and from the bottom up, to encourage participation from all employees.

Hirschhorn suggests, that change processes should be organized not as one big task, but divided into three tightly linked, but still different approaches: the political approach, which includes the coalition forming and change of the organizational structure; the marketing approach, which involves key employees and listens their ideas; the military approach, which provides the attention and the commitment of managers by building insurgent initiatives. These approaches should run simultaneously in order to achieve success [11].

Kotter analyzed the possible failure factors of change processes, and identified 8 steps of the change management process [12]. The required condition is the feeling of urgency for change that is able to start the change process by giving power to step out of the status quo. The other steps are the followings: forming a good team (supportive coalition), create a vision of change, communicate the vision, remove obstacles, change fast (create short term wins), consolidate results and keep on changing while embedding changes into culture.

In order to implement a change, it is necessary to go through the change in a planned manner. Rational planning allows decision-makers to carefully weigh the consequences of alternatives and choose an action plan that maximizes the achievement of goals [3].

The pressures exerted on organizations regarding change are permanent, but at the same time, they also externalize a resistance to change, representing the complex difficulty faced by managers. The main causes that generate a person's resistance to change are: selective attention and memory, habits, addiction, fear of the unknown, economic reasons, security [2].

A change cannot be made without identifying a problem that the system or part of the system has. Change is required when there is a vulnerability. Once the problem has been identified, it is necessary to analyze it extensively and formulate the most optimal solutions to solve the problem.

After formulating the solutions, the people responsible for implementing the change choose the most tangible and easy-to-accept solution, so that the implementation and acceptance of the change is fully realized.

Change must be both effective and effective. All the changes made must also be evaluated. Following the evaluations carried out by specialists, the impact of the changes can be perceived.

3. CONCLUSIONS

In the current context, characterized by unprecedented economic, social, and environmental challenges, organizational change management becomes essential for the transition towards sustainable development practices. This paper has demonstrated that integrating sustainability into organizational strategy is no longer just an option, but a necessity for the long-term survival and success of companies.

The organizational change required to adopt sustainability principles is profound and must be approached systematically. Transforming organizations towards sustainable development cannot be achieved quickly or in a single stage; it involves a continuous process of renewal and adaptation. This change must be managed both from the top down, by creating the necessary structure and clear vision, and from the bottom up, by actively involving all employees in the transition process.

Moreover, the paper highlights the importance of viewing change not only as a threat but also as an opportunity for innovation. Accepting change and continuously adapting to new realities are essential conditions for organizations to remain competitive in a dynamic environment and to contribute to building a sustainable society.

In conclusion, effective organizational change management in the context of sustainable development requires a profound transformation of organizational culture, a clear and long-term vision, and an integrated approach that includes all stakeholders. Only in this way can companies achieve their economic, social, and environmental objectives, while ensuring their resilience and success in the future.

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RELATIONSHIPS AMONG ERP POST-IMPLEMENTATION SUCCESS CONSTRUCTS: AN ANALYSIS AT THE ORGANIZATIONAL LEVEL OF FOREXEBUG PLATFORM

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ABSTRACT: *Success factors in the implementation of public sector financial reporting systems have been widely researched. However, few have investigated post-implementation ERP success in organizational contexts, an analysis of the FOREXEBUG platform. The lack of research on ERP system success evaluations, a reporting platform, partially motivates this research. In this paper the object of study is the success of the ERP system, which was developed from previous relevant frameworks. This research adds to the body of knowledge in assessing the success of implementing a public sector financial reporting system. Structural equation modeling was used to test several relevant hypotheses. The results showed that the hypotheses have significant, positive associations. Namely, the constructs of system quality, service quality, individual impact, workgroup impact, and organizational impact have a strong relevance in elaborating the success of ERP, a reporting platform. The advantages of the study findings for evaluating the success of a reporting platform, namely FOREXEBUG, and its implications for practice and research are discussed. FOREXEBUG is an online IT platform (computer program) (with Internet access) with the help of which the public institution reports electronically the financial statements related to the patrimonial and budget accounting.*

Keywords: *ERP, system quality, information quality, technology adoption, national reporting system, accounting, forexebug.*

JEL Classification: *M41, H61, M35*

1. INTRODUCTION

Data is the lifeblood of today's efficient and effective entities. Data management is valued as an integral part of the strategy of public institutions. After 1990, the state annually issued the Public Budget of revenues and expenses, we often heard about the irregularities of economic agents, bank frauds and mutual funds, but very little was said about how public

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money is managed; the legality of its expenditure, the organized internal control, the distribution, transparency and efficiency of material and human resources (Morariu, Suciu, 2004: 4).

The public sector includes institutions from various fields of activity. We can list the field of health, public order, social, cultural and sports activities, tourism, economic activities. The specific actions carried out by each of them are aimed at the efficient use of budgetary resources. Regardless of the way of classification, operation and organization, these institutions have as their objective the efficient use of budget resources, in accordance with the law in force. Unlike a private company, public institutions do not have the main purpose of obtaining profit, they are financed from the state budget or from extra-budgetary revenues, using financial resources in compliance with the law and under conditions of maximum efficiency and effectiveness (Tabirca and Radu, 2020).

Digitization will help us address the needs of accountants in fundamental ways, using "outside-the-box" thinking to digitize end-to-end processes so that they truly meet our needs. The need and importance of adopting integrative applications that contain a good performance and flexibility of processes, appears in a globalized environment with increasingly different platforms, reporting programs and accounting records (Radu and Tabirca, 2019).

As an opportunity, digital tools can cooperate for a good structuring of procedures as well as for accelerating, automating the administration of standardized and uniform tasks. Through the aforementioned, they increase the efficiency and effectiveness of the preparation and reporting of accountants statements (BinSaeed et al., 2023).

The object of the presentation also consists in challenging the improvement of the digitized system in carrying out the process of reporting the accounting statements. A digitized system must be efficient, stable, fast and modern.

An ERP (Enterprise Resource Planning) software is defined as an IT platform, used for the monitoring, control and integrated management of all operations, processes and activities carried out by an institution. An ERP application, by definition, can be used in any business area (Cucui et al., 2009). The important role of an ERP application is to greatly improve collaboration between institutions, as well as to automate and streamline activities within institutions (Radu, 2009).

These ERP systems establish and bring together the way of working and the circuits within the institutions. They enable an integrated flow of data exchange between institutions. The introduction of accounting data with the help of a computer system, a platform, ensures access to a single correct, complete and updated database, which contains a single truth available to all public institutions. The basic principle of the operation of an ERP software is that of centralized collection of data with the aim of distributing it on a large scale, thereby providing access to data collected from several institutions. Through this IT system, data is recorded, validated, processed, transferred or exported in the form of accounting reports (Stefan et al., 2010).

Table 1. The advantages and benefits of implementing an ERP program

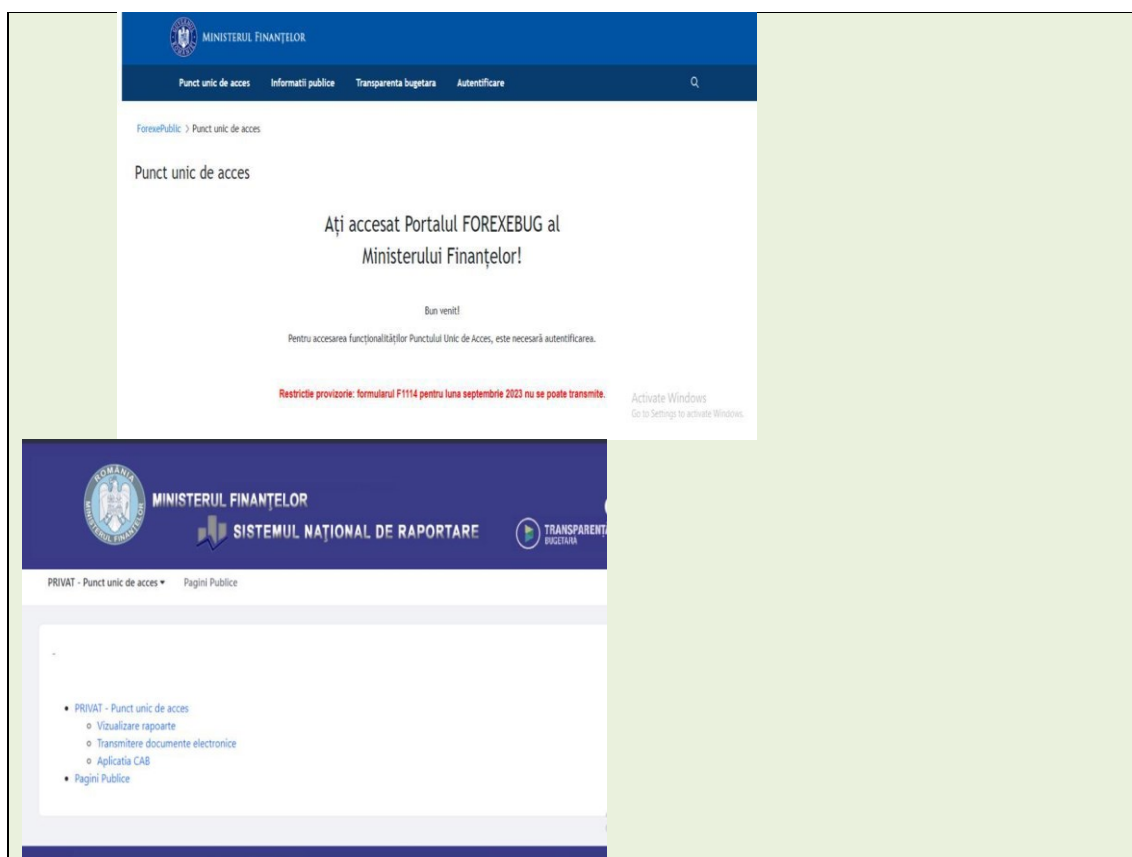
✓	Unique and transparent system that integrates all activities within public institutions
✓	Improves the ability of the management team to make decisions faster, based on reports generated in real time, based on accurate and complete information
✓	Automating, standardizing and optimizing work circuits and increasing employee productivity by significantly reducing manual operations
✓	Significantly improves inter-departmental collaboration and speed of data and information transfer using a single common database

✓ Ensures stability, security and control over the correctness of data and operations
✓ Through the rapid transfer of documents between institutions, the reporting time decreases

Own source

FOREXEBUG – The electronic system for reporting financial statements in the public sector is an online computer platform (computer program) with access via the Internet, with the help of which the entities will report electronically the financial statements within the patrimonial and budget accounting.

Figure 1. Accessing the FOREXEBUG platform



Source: <https://mfinante.gov.ro/web/forexepublic>

The FOREXEBUG platform was born out of the need to implement the combination of growth and stability. Similarly, the acceptance of some measures to guarantee budgetary discipline, the progress of European economic stability and the prevention of a new economic crisis in the European Union. The electronic reporting system works on the website of the Ministry of Public Finance. Through which public institutions enter the revenue and expenditure budget, on each budget item. Open budget commitments, make budget reservations for subsequent payments, submit online payment orders to the State Treasury, report financial statements, including the monthly trial balance, view online receipts and payments to/from own accounts. Basically, its purpose is to ensure budget transparency.

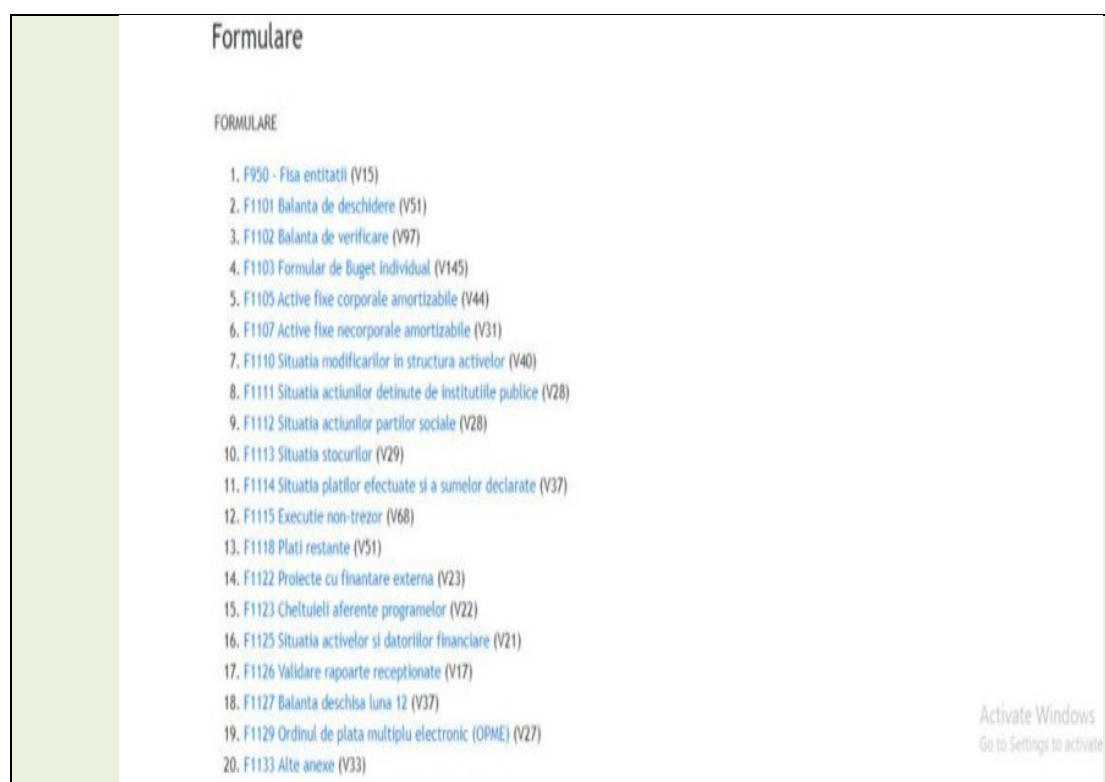
In figure 1 we have the presentation of accessing the FOREXEBUG platform where it asks us to log in with the help of a username and a password.

The national reporting system - FOREXEBUG was financed from the European Social Fund through the Operational Program for the Development of Administrative Capacity, the

beneficiary being the Ministry of Public Finance in 2012-2013.

Through the implementation of the project "Increasing the accountability of the public administration by modernizing the IT system for reporting the financial statements of public institutions (FOREXEBUG)" support is provided to the Ministry of Public Finance, consisting in increasing the efficiency of the central and local public administration and administrative transparency by providing public institutions with tools modern, standardized, for reporting financial statements and publishing detailed information on the use of public funds. In figure 2 we have the presentation of how to load data, financial statements, budgets, payment orders in the FOREXEBUG platform.

Figure 2. Access to loading data, financial statements, budgets, payment orders

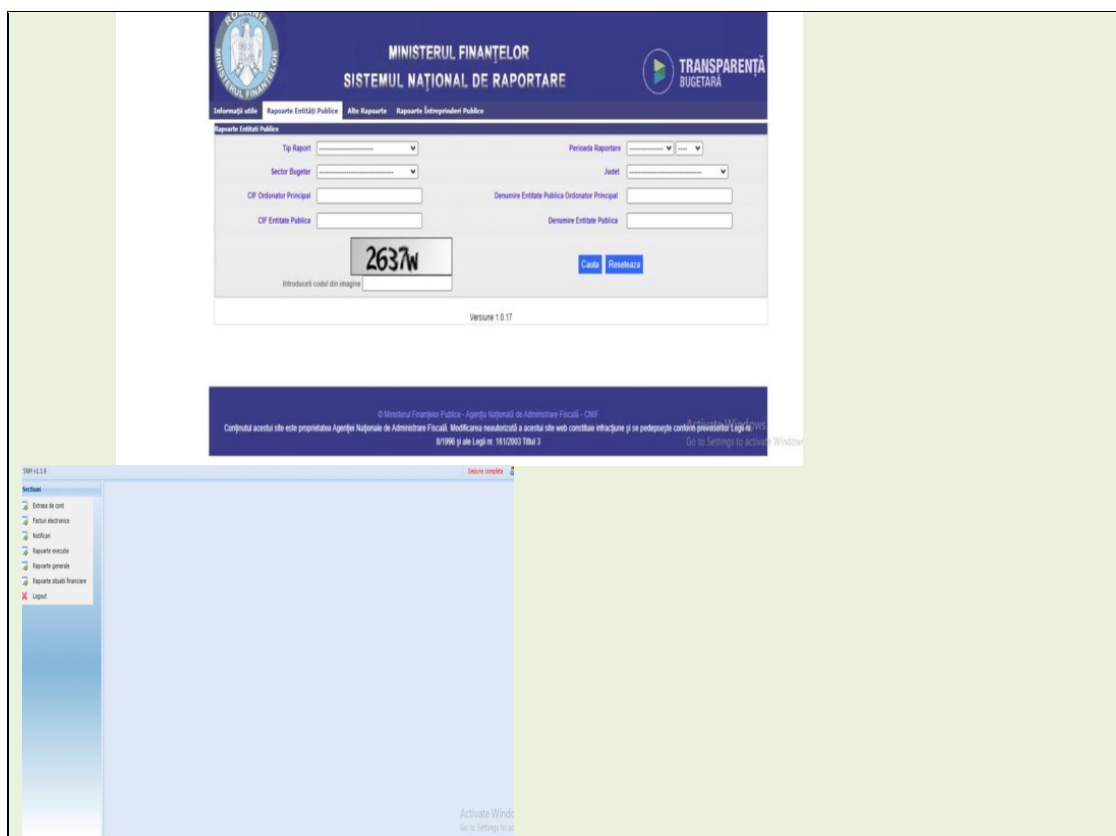


Source: <https://mfinante.gov.ro/web/forexepublic>

This paper presents how user motivation, managerial attitude and ease of use can influence the perception of accountants in budget institutions regarding the success of using a national computerized reporting system. The approach to the success of the national reporting system - FOREXEBUG, proposed, constitutes the theoretical framework for conceptualizing the success of the IT system, the influence of user motivation, managerial attitude and ease of use.

The national reporting system is a type of computer system that takes internal data from the system into meaningful and useful forms as reports.

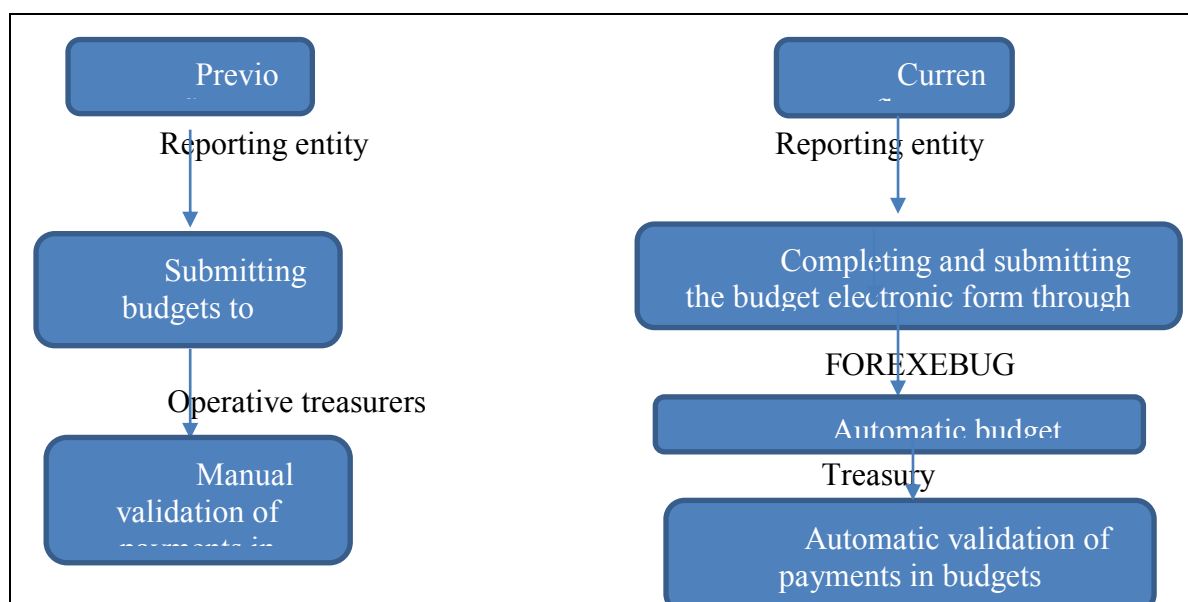
Figure 3. View accounting documents, reports, account statements, budget transparency



Source: <https://mfinante.gov.ro/web/forexepublic>

This implies that user satisfaction and perceived usefulness are used as criterion variables. The findings have implications for managers and accountants. There are ICT-based processes in the system of budgetary institutions, as shown in figure 4.

Figure 4. The budget collection process



Own source

2. THE BENEFITS OF THE FOREXEBUG IT PLATFORM IN ACCOUNTING

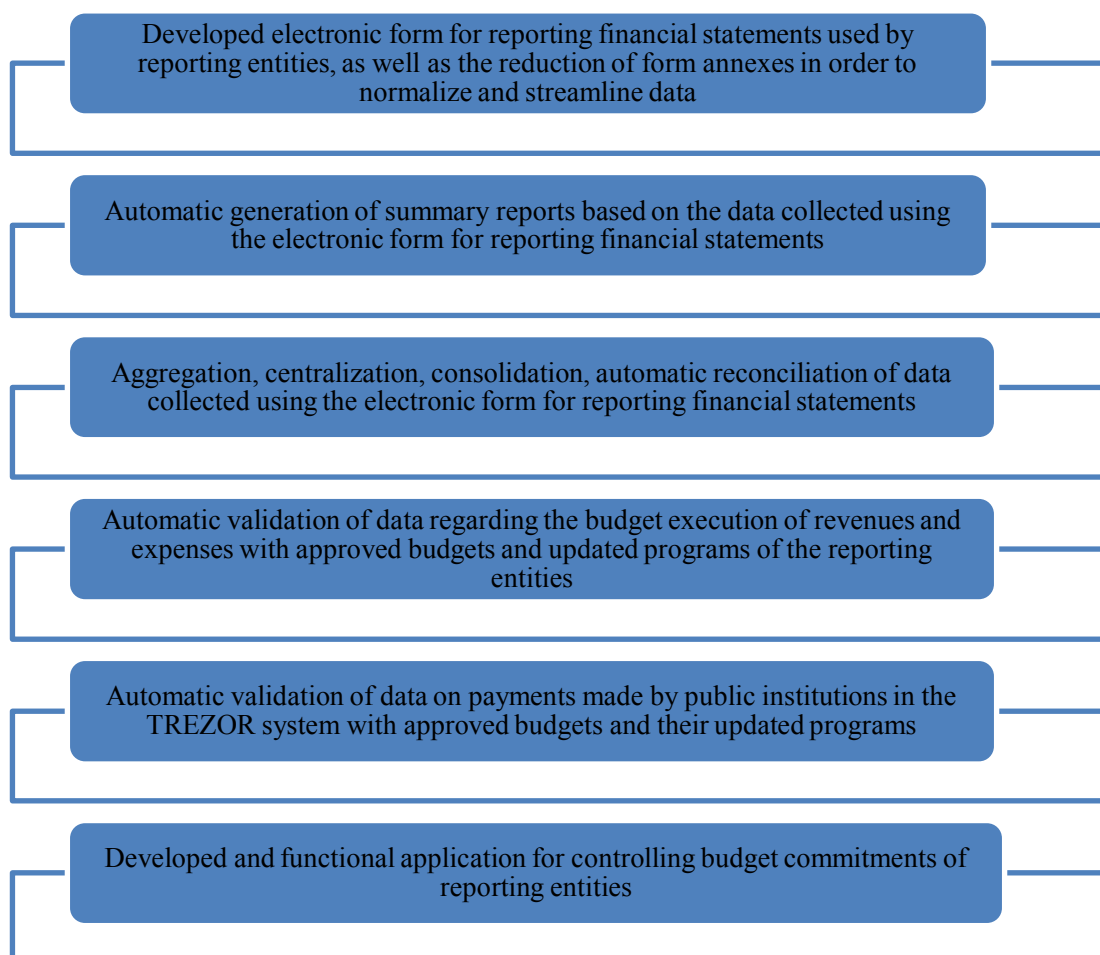
With the help of modern, standardized tools for reporting financial statements and publishing detailed information on the use of public funds in accordance with the budget classification, the efficiency of central and local public administration as well as administrative transparency increases.

By implementing a form for reporting Financial Situations in the public domain, i.e. a unique electronic, secure and standardized form, the degree of trust of the collected data increases. It eliminates working with physical documents as well as online backup and data loss solutions.

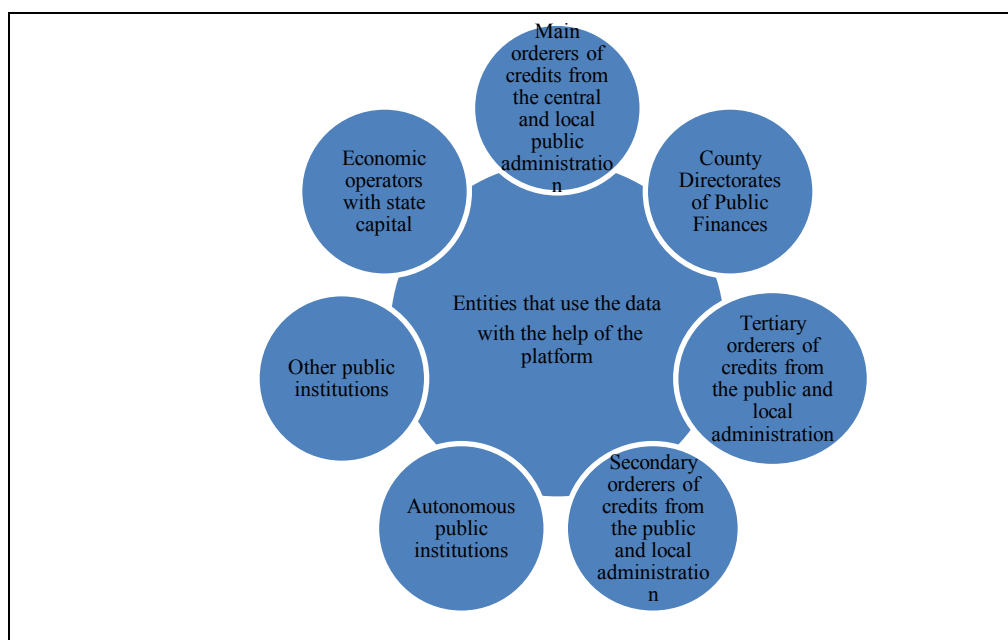
The advantages of the Forexebug system in accounting reporting are the automatic aggregation and consolidation of financial statements, the accuracy of data, as well as the reduction of working time regarding the preparation of financial statements.

Also within the advantages of the Forexebug system, we can say that it is an electronic system for management of commitments, control of commitments according to the available budget and monitoring of payments made (in the treasury) at the level of reserved engagement, as shown in figure 5.

Figure 5. The advantages of the FOREXEBUG IT platform



Own source

Figure 6. The degree of confidence of the collected data

Own source

As significant aspects to remember when using the FOREXEBUG system we have:

- Expenses with salaries, pensions are not reserved within this flow;
- Utility expenses are not booked initially, but only definitively;
- Reservations of commitment credits, in order to fit them into the available budgets, will be checked.
- The payment operations carried out through the treasuries will automatically be attached to the appropriately reserved budget commitments;
- The payment orders will include the reference to the commitment number in the system to have the possibility of automatic verification.

3. CONCLUSION

Based on the analyzes undertaken we can conclude that an ERP software and a formal platform is changing the accounting profession. It will lead to a considerable improvement in the way accounting activities are carried out, the interaction with other institutions and the speed and efficiency of responding to their needs.

Accounting processes are to be highly automated, supporting transparent information, which makes accounting professionals reconsider their position and perceive analysis and consulting as the basis of their role.

Also, the study undertaken by us and presented in this work analyzed the possibility of specific operations for the flow of accounting processing (monthly, semi-annual and annual). With new technology an accountant can provide reports in real time.

As important benefits of ERP as well as the FOREXEBUG platform we have, higher productivity, deeper insights, accelerated reporting, lower risk, simplification of IT technology, improved agility. Quickly monitor financial reporting and easily share results. With efficient operations and ready access to real-time data, you can quickly identify and react to new opportunities.

Receipts and payments made by public institutions are transparent, they are carried out through units of the State Treasury through the FOREXEBUG platform.

The control of the activity at the level of public institutions is carried out on three main levels of control, to ensure an efficient use of budgetary resources and to minimize the risks arising in the activity of public institutions (preventive financial control, internal audit and managerial internal control standards).

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THE ROLE OF TAXATION IN SUSTAINABLE DEVELOPMENT – NECESSITY AND LIMITS

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ABSTRACT: *The involvement of taxation in sustainable development is a complex and increasingly important topic in the context of the economic, social, and environmental challenges faced by modern societies. Taxation can play a crucial role in supporting sustainable development through various fiscal policies and instruments.*

Keywords: *Eco-friendly investments, Carbon taxes, Green certificates*

JEL Classification: *Q52, Q58, H23*

1. INTRODUCTION

The means analyzed in this article through which taxation can contribute to sustainable development are: promoting green investments, internalizing external costs, redistributing resources, and generating revenue for sustainable projects. Governments can use fiscal policies to encourage investments in sustainable technologies and practices, such as renewable energy, through tax reductions, subsidies, or tax credits. Internalizing external costs. Pollution taxes or carbon taxes are examples of fiscal instruments that can be used to reflect the true costs of negative environmental impacts in market prices. This can discourage harmful behaviors and promote more eco-friendly alternatives.

Fiscal policies can be used to reduce economic and social inequalities, ensuring a more equitable distribution of resources, which is essential for long-term sustainable development. Taxes and levies can be used to finance projects that contribute to sustainable development, such as green infrastructure, education, and public health.

Although taxation can be a powerful tool, there are certain limits and challenges. The most important ones are:

Efficiency and equity: Implementing green taxes or other fiscal measures can have a regressive impact on low-income populations if appropriate compensatory measures are not introduced. This can create social and political tensions.

International coordination: In a globalized economy, national fiscal measures can be limited by the lack of international coordination. For example, carbon emissions taxation could be ineffective if not applied uniformly on a global scale, as economic activities might relocate to countries with more lenient regulations.

Another limitation is the administrative and compliance costs. Implementing and monitoring fiscal policies for sustainable development can involve significant administrative costs for both the government and taxpayers.

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The risk of **tax evasion** is another limitation. High taxes on resources or polluting activities may encourage tax evasion or the relocation of these activities to economies with more lenient regulations, thereby undermining sustainability goals.

It is essential for fiscal policies to be well-designed, adapted to the national and regional context, and integrated into a broader policy framework for sustainable development. This requires:

1. Continuous evaluation and adjustment: Fiscal policies must be regularly monitored and adjusted to ensure they remain effective and equitable.

2. Transparency and public consultation: Engaging communities and stakeholders in the fiscal policy-making process can enhance their acceptance and help avoid adverse effects.

3. International collaboration: Countries must collaborate to ensure that fiscal policies for sustainable development are coordinated and effective on a global scale, avoiding distortions in international markets.

In conclusion, taxation has significant potential to contribute to sustainable development, but this potential can only be fully realized if policies are carefully designed and implemented, taking into account specific economic, social, and environmental contexts.

2. PROMOTING GREEN INVESTMENTS

This concept refers to the implementation of policies and measures that stimulate the financing and development of projects aimed at protecting the environment, reducing carbon emissions, and promoting the sustainable use of natural resources. It is an essential component in achieving sustainable development goals.

Fiscal policies play a crucial role in promoting green investments. Through these policies, governments can create a favorable environment for sustainable investments [1].

Examples include:

-Subsidies and tax exemptions: Direct subsidies for green projects or tax exemptions for companies investing in green technologies are effective measures to encourage investment in this field.

-Carbon taxes: Imposing taxes on carbon emissions can discourage investments in polluting industries and redirect capital toward more environmentally friendly solutions.

-Tax credits for renewable energy: Offering tax credits for investments in solar, wind, or other forms of renewable energy encourages companies to allocate resources in these areas.

Governments can also introduce regulations that support the development of green projects.

-Energy efficiency standards: Improving energy efficiency in buildings, vehicles, and equipment through regulations can stimulate investment in more efficient technologies.

-Environmental impact reporting requirements: Requiring companies to report their environmental impact can increase transparency and encourage investment in projects with a positive environmental impact.

The development of specific financial instruments to support green investments is essential. These include:

-Green bonds: These are financial instruments issued by governments or corporations to finance environmental projects. Funds raised from green bonds are used exclusively for investments that contribute to environmental protection.

-Sustainable investment funds: The creation of investment funds focused on green projects can mobilize private capital to support sustainable development.

Promoting green investments can be enhanced through collaboration between the public and private sectors:

-Public-private partnerships: These can accelerate the implementation of sustainable projects by combining the resources and expertise of both sectors.

-Innovation in public policy: Collaboration can lead to the development of innovative policies that support green investments, such as emission trading systems.

Another important aspect is **educating investors and the general public** about the importance of green investments, such as: **awareness campaigns;** Governments and non-governmental organizations can run campaigns to raise awareness about the benefits of green investments. Or **financial education programs;** these can be aimed at investors to help them better understand the opportunities and risks associated with green investments.

Although promoting green investments is essential, there are significant challenges:

-High initial costs: Green projects can involve large initial costs, which may discourage investments without adequate government support.

-Volatility risk: Markets for green technologies can be volatile, which may make these investments appear risky to investors.

- International coordination: In a globalized economy, a lack of coordination between countries regarding green policies can lead to negative effects, such as the relocation of investments to countries with less strict regulations.

In conclusion, promoting green investments is a crucial component in achieving sustainable development goals. Success in this area depends on the implementation of appropriate fiscal and regulatory policies, the development of suitable financial instruments, effective collaboration between the public and private sectors, and educating and raising public awareness.

The data in **Table 1: Promoting Green Investments** illustrate the promotion of green investments in Romania, for the period 2007-2024. This data includes information on green investments (in millions of euros), government subsidies, the number of funded projects, and the percentage of renewable energy in the total energy produced.

Table 1: Promoting Green Investments, 2007-2024

	Green investments (Mil Euro)	Government subsidies (Mil Euro)	Projects (no)	Renewable energy (%)
2007	100	10	5	5
2008	150	15	10	6
2009	180	18	12	7
2010	220	20	15	8
2011	250	25	18	9
2012	270	30	20	10
2013	300	35	25	11
2014	350	40	30	12
2015	370	45	35	13
2016	400	50	40	14
2017	450	55	45	15
2018	480	60	50	16
2019	500	65	55	17
2020	550	70	60	18
2021	600	75	65	19
2022	650	80	70	20
2023	700	85	75	21
2024	750	90	80	22

Source: Author owns processing based on Eurostat data (2024)

Between 2007 and 2024, Romania made significant progress in promoting green investments, largely due to its accession to the European Union and alignment with European initiatives on renewable energy and the green economy.

In 2020, Romania achieved its renewable energy targets, with 24.5% of total energy consumption coming from renewable sources, surpassing the national target of 24% set by the EU [2]. A large part of this growth was driven by the development of the photovoltaic and wind sectors, supported by government subsidies and support schemes such as the green certificate scheme. This was one of the main measures to promote green investments in renewable energy.

Romania benefited from significant international funding for green energy and environmental infrastructure projects. For example, the World Bank supported Romania's green development projects, including a loan of EUR 599.1 million in 2024 to support green growth and inclusion [3]. This contributed to strengthening the transition to a greener economy by stimulating investments in green infrastructure.

Through the Large Infrastructure Operational Program (POIM) and other European structural funds, Romania invested in the energy efficiency of public and residential buildings, as well as in the modernization of infrastructure to reduce energy consumption and carbon emissions. These investments were supported by European funds, and the Romanian government provided fiscal incentives to companies that adopted energy-efficient solutions.

Although Romania has made progress in green investments, challenges remain related to integrating renewable sources into electricity grids and attracting more private investment in this sector. Additionally, better coordination between national and local authorities is needed to facilitate the implementation of new green projects.

Important statistical data highlight that in 2022, renewable sources represented approximately 25% of Romania's energy mix, with a significant share coming from wind and photovoltaic energy.

In recent years, Romania has issued green bonds to support investments in environmental infrastructure and renewable energy, following the European trend of increasing this type of financial instrument [4]. These statistics and developments highlight Romania's commitment to investing in green projects and achieving the sustainable development goals set at both national and European levels.

Interpreting the statistical data on the promotion of green investments in Romania for the period 2007-2024 involves a careful analysis of the evolution of each indicator and the relationships between them.

Here are some key aspects, in Figure 1, to consider:

Green investments (Million Euro):

-*Continuous growth:* We observe a steady increase in green investments from 100 million euros in 2007 to 750 million euros in 2024. This indicates growing interest and commitment to green projects, likely driven by government policies and increased awareness of environmental issues.

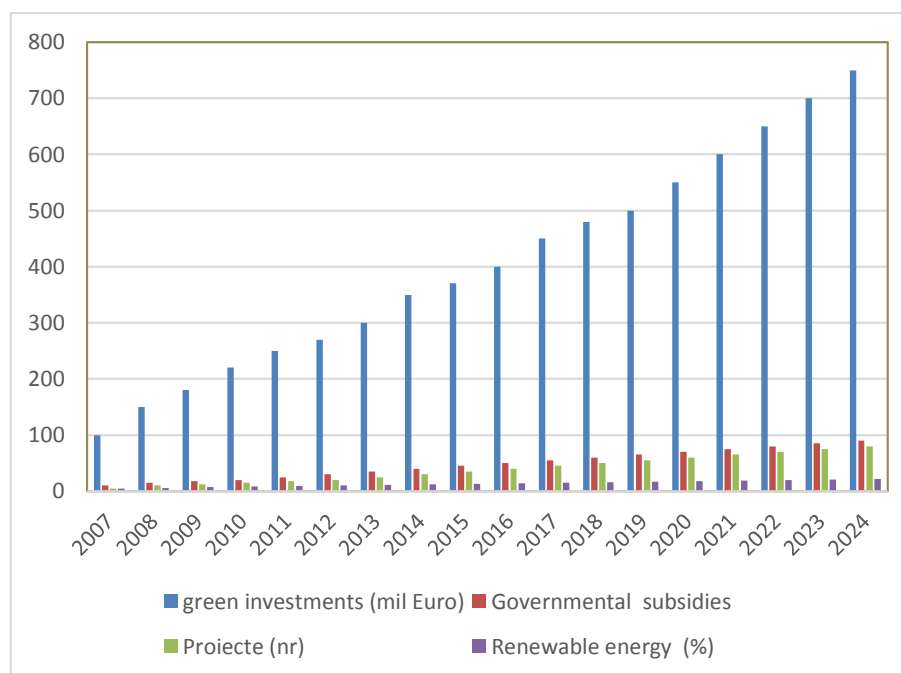
-*Analysis of inflection points:* Identify moments when investment growth accelerates or slows down. For example, if a significant increase is seen in a particular year, it may be useful to correlate this with the introduction of new fiscal policies or major economic events.

Government subsidies (Million Euro):

-*Correlation with investments:* The rise in government subsidies seems to follow a similar trend to that of green investments, growing from 10 million euros in 2007 to 90 million euros in 2024. This suggests that subsidies have played an important role in stimulating investments.

-Subsidy efficiency: Analyze whether the increase in subsidies is proportional to the increase in investments. If subsidies grow faster than investments, a reassessment of the efficiency of these funds may be necessary.

Figure 1. Green investments in Romania, 2007-2024 period



Source: Author owns processing based on Eurostat data (2024)

Number of funded projects:

-Increase in number: The number of funded projects has risen from 5 in 2007 to 80 in 2024, suggesting a diversification and expansion of green investments. This may indicate both improved access to financing for green projects and increased interest from the private sector.

-Comparison with investments: Check if the increase in the number of projects is proportional to the increase in total investments. A large discrepancy might suggest that individual projects are becoming larger and more complex, or that there is variable efficiency in resource allocation.

Share of renewable energy (%):

-Gradual increase: The share of renewable energy in total energy production has risen from 5% in 2007 to 22% in 2024. This indicates success in integrating green energy sources, in line with carbon reduction goals.

-Impact of investments: Correlate the growth in the share of renewable energy with green investments and government subsidies to evaluate how effectively these have contributed to increasing renewable energy production capacity.

Overall analysis:

-Synergies between indicators: Analyze how these indicators interact with each other. For example, an increase in subsidies and investments should lead to a rise in the number of projects and the share of renewable energy. If there is no direct correlation, a deeper analysis may be needed to identify barriers.

-Economic and political context: Try to place these developments in the broader context of economic and environmental policies in Romania. For instance, major legislative

changes, adherence to international standards, or external influences may explain fluctuations.

3. CONCLUSION

The taxation is essential for promoting sustainable development, providing the resources needed for social equity, environmental protection, and economic growth. However, its effectiveness is constrained by factors such as economic distortions, tax evasion, and limited fiscal capacity, particularly in developing countries. To maximize its impact, tax policy must be carefully designed and integrated into a broader framework of sustainable development strategies.

The data suggests that Romania has made significant progress in promoting green investments, both through the direct increase in allocated funds and the rise in the number of projects and the share of renewable energy. However, for a comprehensive evaluation, it is essential to also consider external factors, the long-term sustainability of these policies, and potential improvements needed in resource allocation.

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TEACHER-DIRECTOR COMMUNICATION FOR CREATING A FAVORABLE CLIMATE AT WORK AND INCREASING THE PERFORMANCE OF THE SCHOOL UNIT

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ABSTRACT: *Organizations recognize the importance of employee communication and consider it essential to establishing and maintaining quality working relationships, especially now that service workers outnumber manufacturing workers and research as well as manufacturing processes emphasize greater collaboration and working in team between workers from different functional groups. In addition, a radical change in communication technologies has helped to transform both the work structure and the organization. The purpose of the work is to identify the role of teacher-principal communication in creating a favorable workplace climate and in increasing the performance of the school unit. The data were obtained from 40 teachers and managers of secondary schools in Dâmbovița county. The formulation of the hypotheses was based on previous research that examined the factors that influence employee communication, and the objectives were to identify the role of managerial communication in achieving performance in the school organization; knowing the degree of influence of internal communication on the efficiency of relations between teachers and the director, as well as identifying the degree of influence of the manager's negotiation skills on the favorable climate in the school organization. Thus, the study provides useful knowledge to researchers interested in employee communication and strategic communication practitioners responsible for internal communication.*

Keywords: *business communication, business negotiation, school organization*

JEL Classification: *M12, D83*

1. INTRODUCTION

The study of organizational communication claims that in organizations communication goes far beyond training managers to be effective speakers and to have good interpersonal communication skills. In addition, it recognizes that all organizations, not just business organizations, have communication needs and challenges (Banwart, 2020; Sng, 2012).

Although interpersonal and group communication are at a lower level than organizational communication, they are important forms of communication (Barnett, 2003).

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Indeed, the initial focus of organizational communication literature was managers' interpersonal communication skills (especially speaking and writing) (Bennis & Nanus., 2007; Stoll & Fink, 1996). As organizations have become more communication-based, greater attention has been directed toward improving the interpersonal communication skills of all organizational members (Catano, N., Stronge, 2007).

The school participates in the process of change, renewal and reform of the educational system, based on internal, upward, downward and lateral communication (Hong, 2010). Addressing the role of managerial communication in creating a favorable climate in the school and increasing the performance of school units, is seen as an essential factor in achieving the objectives (Kochamba & Murray, 2003).

Managers of school units are people who hold leadership positions in schools that involve coordination, organization, disposition, command and control (König & Pflanzl., 2016; Story, 2010). They are the decision-makers in the school and directly influence the behavior of other people within the respective organization. Teaching staff are managers' subordinates and are managers' interlocutors.

2. RESEARCH METHODOLOGY

The purpose of the research is to identify the role of teacher-director communication in creating a favorable workplace climate and increasing the performance of school units. The sample is not representative, being made up of 40 people, teachers and principals from secondary schools in Dâmbovița county. The period of the opinion poll was April 2024, and the instrument used to collect the data was the questionnaire. It includes 22 questions: factual (age, gender), opinion (information about feelings, attitudes), motivation (respondents' options) and personal questions.

Table 1. Research objectives and hypotheses

Research objectives	Research hypotheses
1. Identifying the role of managerial communication in achieving performance in the school organization	H1: Teachers perceive differently the role of managerial communication in achieving performance in the school organization.
2. Knowing the degree of influence of internal communication on the efficiency of relations between teachers and the director	H2: Internal communication is a priority for the efficiency of relations between teachers and the school principal.
3. Identifying the degree of influence of the manager's negotiation skills on the favorable climate in the school organization.	H3: There is a positive association between the level of negotiation knowledge of the manager and the creation of a favorable climate in the school organization.

Source: developed by the authors

3. RESULT

O1: Identifying the role of managerial communication in achieving performance in the school organization

To fulfill the first objective, we allocated five items. They present representative information in establishing the role of managerial communication in achieving performance. In proportion to 43% of the respondents believe that in the process of communication they want to be heard, understood and establish a connection with the interlocutor, about half of the

respondents believe that it is important that the message conveys information, decisions, opinions and ideas, while 12% believe that communicating means speaking correctly and beautifully.

The importance assigned to communication in relation to the other activities carried out is very high for three quarters of the respondents, while one third considers it low. Teaching activities constitute the main work carried out by teaching staff, without taking into account other projects and objectives of the school. And the high importance assigned to open and constructive communication between teachers and managers is approved by 67% of the respondents.

Three quarters of teachers and managers answered positively that upward, downward, lateral communication is necessary to achieve school performance.

O2: Knowing the degree of influence of internal communication on the efficiency of relations between teachers and the director

Relations between teachers and the director are maintained through communication, and the type considered important and suggestive is verbal communication, accessible to all, fast and with immediate feedback. 65% of the respondents opted for this type, 20% communicate by phone, on WhatsApp groups, by email and 15% use written communication on paper, which they consider the most important, indisputable.

The relationships established between the employees in the school where the respondents work are based on collaborations, which can be one of the strategies used by the manager who is an adept of change, of refreshing the manner of solving conflict situations, thus maximizing personal involvement and accepting the ideas of other members of the organization. It is emphasized the presence in this school organization of some teachers who hide certain fears under the auspices of competition (30%), which indeed leads to performance, but in this type of activities collaboration is imperative (30% of respondents). A percentage of 20% of the participants in the study believe that relations between employees are sympathetic, and 10% are in conflict with their colleagues.

Regarding the attitude of a teacher in the relationship with the school manager, 63% are respectful towards him, 27% have a friendly attitude, and for 10% of the teachers surveyed, the managers must find ways to approach their employees with a sober attitude. Teachers' perceptions of their relationship with the manager are also motivated by the manager's attitude towards them. They believe that the manager discriminates between them, treats them with superiority and is often indisposed.

The manager's qualities perceived by the respondents are: intelligence (55%), authority (30%) and indulgence (15%). The teaching staff recognize the manager's quality of getting close to people, that through the manner of leading and managing all the activities and the situations that these activities generate, he creates a bridge between the members of the organization, a sure way to increase the performance of the school unit, but his authority and indulgence are also appreciated.

The relationship with the manager is relatively satisfactory, the score obtained for this item was 2.6 out of a total of 3 points. Thus, 62% of the teaching staff consider that it is a satisfactory relationship, aware that all the barriers that prevent the growth of performance can be removed through communication, respect and collaboration, there are other ways generated by their own way of dealing with situations, everyone's mentality, personal motivation, etc. It is observed that the dissatisfied people are in the minority, representing 1%, which makes the undecided, i.e. 14%, adopt a different attitude to improve and improve the relationship with the manager, because more than half of the activities are carried out with the help of the relations of collaboration and teamwork.

Regarding the degree of involvement of teaching staff in the activities proposed by the manager, 25% of them state that they are actively involved, while the same percentage remains indifferent. The percentage of 25% reflects the teaching staff involved in the activity of the school organization, with a spirit of initiative, eager to identify solutions that contribute to raising the efficiency of the organization, to creating an optimal work climate for achieving performance. The manager must identify managerial strategies that motivate the teaching staff who want or consider themselves to be far from the life of the organization because they want to feel that they belong to this organization, but encounter internal or external communication obstacles, which must be overcome and with management help. A percentage of 30% of teachers come up with innovative ideas to increase performance, and 20% do not want to get involved due to the fragmentation of departments in several schools.

The control carried out by the manager of the school institution regarding the performance of work tasks is carried out properly, and 43% of the teaching staff believe that they are treated correctly. Teaching staff are honest people who care about etiquette, respect for moral values and are aware that without compliance with norms and rules there would be no performance. That's why the manager is the model meant to reach an increasingly high level of performance of the school unit by maintaining a favorable workplace climate.

Regarding the attitude towards compliance with the rules and procedures in carrying out job-specific activities, half of the respondents declare themselves satisfied, they do not find them too difficult or difficult to comply with, while 30% think they hinder them in their activities, and 20% are dissatisfied with these impositions.

O3: Identifying the degree of influence of the manager's negotiation skills on the favorable climate in the school organization.

The negotiation capacity of the manager in the school is perceived by the respondents as good, the obtained score of 3.95 reflects the manager's ability to hold discussions, negotiate and find the best solutions in achieving the objectives together with the partners with whom they enter into contact, namely: the town hall, the county council, the family, cultural institutions, the police, health units, the church, NGOs, etc.

Regarding the respondents' perception of the correlation between the principal's negotiation skills with teachers and the favorable climate in the organization in which they work, 45% of the respondents believe that, in creating and maintaining a favorable climate in the school, the qualities of a good negotiator are reflected of the manager, while 37% believe that knowledge does not matter in negotiation in the teacher-director relationship.

Many see the communication with the manager as one-sided, 40% of the respondents, that is, the manager draws the tasks and the teaching staff executes them. Therefore, some express their dissatisfaction, but they are unjustified dissatisfaction, because they are not open to express their opinions in front of the management, although the manager is willing to dialogue. Also, 3% state that sometimes there is effective communication between the manager and teachers, but the fact is omitted that the understanding of the manager is manifested in any situation encountered in the environment of the school organization, contributing to the smooth running of the activity.

40% of teachers consider themselves wronged by the manager, and 25% of those questioned are aware that there are often things that do not require much attention and must be overlooked, especially as they can be unclear/minor situations from the cause of problems generated by petty quarrels between students, and the directors intervene more or less objectively. There are few teachers who wait for the manager to come up with new ways of solving the situations encountered in the organization, with the aim of increasing the efficiency of the activity carried out.

To this question, 25% claim that they have a two-way communication, which gives them a sense of security and confidence in their own initiatives at work, 8% state that they have no idea, that is, they are not concerned with this side of the organization in which they are also. 7% admit that the manager initiates the communication, and 15% represent those teaching staff who consider themselves quite involved in the process of increasing the efficiency of the activity, favoring a suitable climate for the expression of personal opinions.

With regard to the manager's negotiation skills and his ability to keep the teacher-manager relationship active, more than half of the respondents' state that the manager has these capabilities, but teaching staff are also involved.

O4: Establishing the profile of the respondents

It is noted, following the processing of the data, that the staff in the reference schools is relatively young, only 18% belong to the over 50 age segment, dominating the two age segments, 30-40 years (30%) and 40-50 years (32%). This aspect influences the degree of involvement in achieving the objectives proposed by the school, the professional development of teaching staff, collaboration with colleagues and the school manager, facilitates upward and downward communication. The gender of the staff in the analyzed schools is predominantly female, in proportion to 67%, being characterized by communication skills, negotiation, patience, empathy, etc.

4. VALIDATION OF ASSUMPTIONS

1. Teachers perceive differently the role of managerial communication in achieving performance in the school organization - valid

Teachers' different experiences and teaching styles can influence how they perceive the importance of managerial communication. Depending on the personality and approach of each teacher, communication can be seen as an essential tool for collaboration and performance improvement, or, on the contrary, as a factor that can inhibit individual creativity and initiative. This diversity of perspectives underlines the need for clear, open communication adapted to the specific needs of each frame in the school organization.

2. Internal communication is a priority for the efficiency of relations between teachers and the school director – valid

Effective internal communication contributes to building a collaborative and respectful work environment, essential for the success of the school organization. By establishing open channels of communication, both teachers and the principal can better collaborate, resolve conflicts, and share ideas, which leads to better team cohesion and, implicitly, improved educational performance. In addition, transparent communication fosters a climate of trust, which is crucial for teacher motivation.

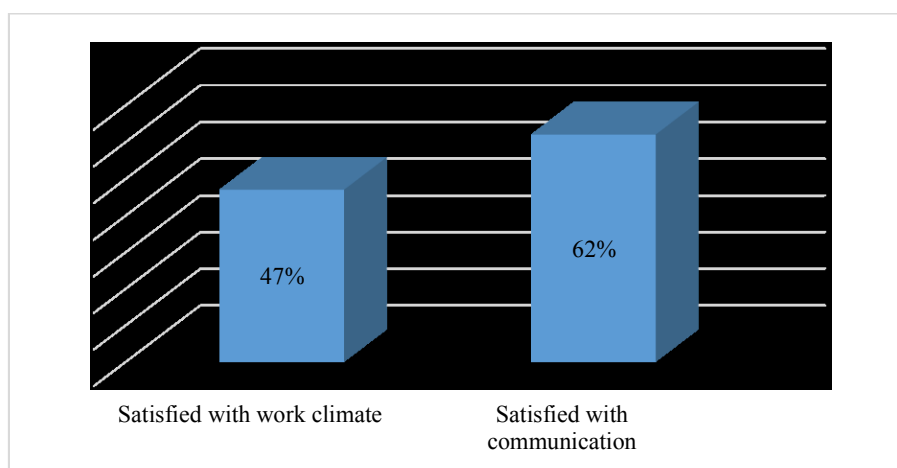
3. There is a positive association between the level of negotiation knowledge of the manager and the creation of a favorable climate in the school organization – valid

A manager well trained in negotiation techniques can significantly contribute to mediating conflicts, facilitating dialogue and finding solutions acceptable to all parties involved. Negotiation skills help the manager to ensure a positive organizational climate where teachers feel valued and listened to. They lead to the improvement of interpersonal relations in the school, to the increase of professional satisfaction and, finally, to the optimization of the educational process.

Moreover, some correlations can be made that highlight important particularities that define the school organization:

1. The correlation between the climate in the organization and the communication with the school manager highlights the fact that 47% of the staff are satisfied with the work climate, which is reflected in the percentage of 62% who are satisfied with the communication with the school manager. We have to take into account that some of the cadres come to the school once a week and some of them only have one hour of teaching in the school. It is worth appreciating the fact that the manager takes care of creating an optimal work environment, thus aiming to increase the performance of the school unit, but also to stimulate the motivation of teaching staff for involvement in the organization that they must feel close to them, that they belong to it (Figure 1).

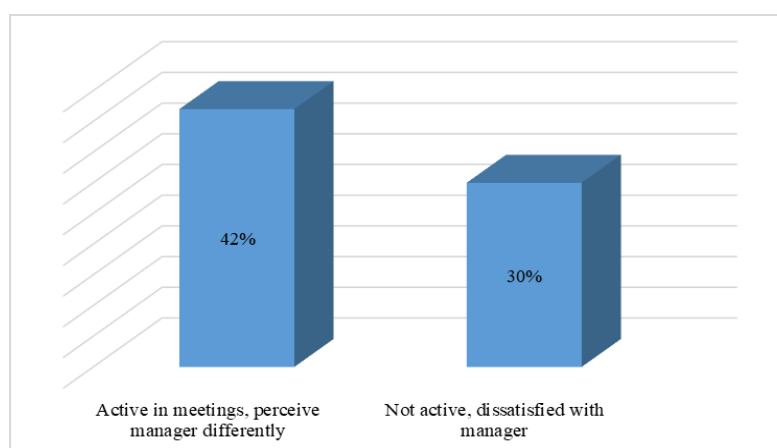
Figure 1. Correlation between work climate and communication with manager



Source: developed by the authors

2. Another correlation is the one that is created between the way of involvement in school meetings and their degree of dissatisfaction regarding the attitude of the manager of the school where they work. 42% of the staff say that they feel the differences made by the manager between their colleagues, but they are actively involved in the meetings. Another percentage of 30% does not get involved in the meetings, but these are the ones who are dissatisfied for other reasons with the manager's attitude, stating that they perceive him as tired, sad, absent or bored (Figure 2).

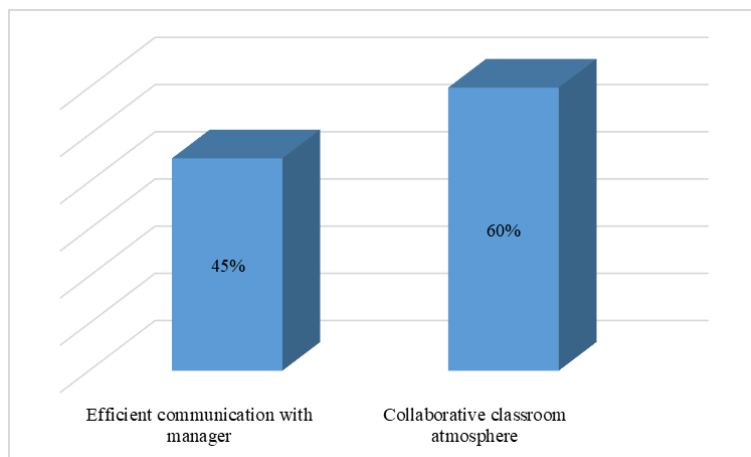
Figure 2. Participation in meetings vs. perception of manager



Source: developed by the authors

Another suggestive correlation is the one between the results obtained for the question "Do you think there is effective communication between the manager and the teachers?" and the results regarding the atmosphere during class hours. 45% of the teaching staff believe that there is effective communication between them and the manager, which is reflected in the percentage of 60% of teachers who feel that the atmosphere during class hours is one of collaboration, which emanates appreciation and respect from both sides, teachers and students (Figure 3).

Figure 3. Communication efficiency vs. classroom atmosphere



Source: developed by the authors

5. CONCLUSIONS

Communication is an important aspect in increasing the performance of the school unit, and every manager wants the organization he leads to assert itself in the life of society. The results of the organization reflect the degree in which the communication process is carried out, its quality and the degree of appreciation of the employees, their motivation and involvement in achieving the objectives proposed by the organization.

The communication method chosen by each teaching staff may or may not be consistent with the manager's type of communication, a fact that is reflected in the efficiency of the school unit's activity. The particularities of the way of communication reflect the imprint of beliefs, skills, habits, goals, personal education. Cases are identified in which the need to improve both the means of communication and the preferred manner is felt. The manager must be receptive to any change in order to channel the efforts of all employees to increase the efficiency of the activity carried out in the organization.

Therefore, communication and continuous training courses must be approved and followed in order to deepen knowledge and identify the most effective communication tools that have the purpose of obtaining the performance of the activity carried out by the members of the organization. It is also recommended to participate as much as possible in short work sessions for the best possible planning of both the results and the ways of fulfilling work tasks, the creation of an environment favorable to collaboration and communication that gives a positive and constructive meaning to the spirit of competition that should not be missed by the teaching staff focused on increasing the efficiency of their activity.

It is very important for the manager to send the messages to the organization's employees in a timely manner, giving them a reasonable period of time to complete their work tasks. It is recommended to periodically inform the teaching staff about the achievements and

non-achievements recorded by the organization, the mutual provision of feedback that influences the quality of the communication process but also the execution of the activities that must be carried out.

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STRATEGIC MANAGEMENT IN THE DIGITAL AGE: CHALLENGES AND OPPORTUNITIES

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ABSTRACT: *Digital transformation redefines business strategies and organizational models, offering significant opportunities for increased competitiveness. This study analyzes the impact of digitalization on organizational structures, the challenges of change management, and the importance of digital leadership. The adoption of new technologies is often hindered by resistance to change, lack of digital skills, and cybersecurity risks. To effectively manage these challenges, companies must implement flexible reorganization strategies, adopt an innovation-oriented culture, and develop proactive risk management plans. Also, the analysis of digital risks and case studies of company failures demonstrate the importance of robust business continuity and regulatory compliance strategies. Looking ahead, digitalization will continue to evolve through the integration of artificial intelligence, blockchain, and advanced data analytics, requiring organizations to adapt their business models and improve their strategic agility. The conclusion of this study highlights that success in the digital age depends on a balanced approach between innovation, security, and adaptability.*

Keywords: *digital transformation, change management, digital leadership, organizational reorganization, cybersecurity, risk management, digital compliance, strategic flexibility, technological innovation, and digital competitiveness.*

JEL classification: L21, M15, O32, O33

1. INTRODUCTION

Digitalization is profoundly redefining organizational strategies, driving an innovative approach to strategic management. This technological transformation requires companies to reconfigure their business models, adopt emerging technologies, and develop new competencies to remain competitive in the market (Porter & Heppelmann, 2015, p. 8).

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Digital transformation is not just a trend, but a strategic imperative that influences the organizational structure, operational processes, and customer interaction (Bharadwaj et al., 2013, p. 472). In this context, emerging technologies such as artificial intelligence, big data, and the Internet of Things (IoT) generate significant opportunities for innovation and efficiency (Vial, 2019, p. 119).

This study aims to analyze the impact of digital transformation on business strategies and highlight the main emerging trends. Through an approach based on recent research, it will investigate how digitalization influences competitive advantage, organizational structures, and decision-making processes (Sebastian et al., 2017, p. 201). It will also analyze how companies adapt their strategies to capitalize on new technological opportunities (Fitzgerald et al., 2014, p. 4).

In conclusion, digitalization is a disruptive factor that redefines the rules of competition and requires a rethinking of business strategies. The present study aims to contribute to the understanding of this phenomenon, providing relevant perspectives on the impact of digitalization in the organizational environment (Westerman et al., 2014, p. 15).

2. TRANSFORMATIONS OF STRATEGIC MANAGEMENT IN THE DIGITAL ERA

➤ Digitalization and strategic changes

Digitalization is forcing companies to rethink their strategies to respond to new economic, social, and technological realities. Organizations need to adopt a more flexible and adaptable approach, based on:

- Strategic agility: The ability to react quickly to changes through continuous adjustments to strategy (Porter, 2019, p. 45).
- Data-driven decisions: Using Big Data and predictive analytics to inform strategic choices (Brynjolfsson & McAfee, 2017, p. 88).
- Personalizing the customer experience: Integrating digital technologies to provide personalized solutions (Kotler & Keller, 2020, p. 112).
- Transforming operational models: Automating processes and digitizing workflows (Davenport & Prusak, 2018, p. 76).

➤ Disruptive technologies and their impact

The transformation of strategic management is influenced by several disruptive technologies that are reshaping industries:

- Artificial Intelligence (AI): Automating decision-making processes, analyzing data, and creating personalized solutions for customers (Russell & Norvig, 2021, p. 135).
- Blockchain: Ensuring transparency and security of transactions through distributed ledger technology (Nakamoto, 2008, p. 3).
- Big Data and Analytics: The ability to collect, analyze, and use massive data for optimized strategies (Mayer-Schönberger & Cukier, 2019, p. 59).
- cCloud Computing: Scalability, flexibility, and operational efficiency through accessible digital infrastructures (Armbrust et al., 2010, p. 50).

Implementing these technologies brings significant benefits, but also poses challenges related to security, infrastructure, and digital skills.

➤ **Adapting business models**

Traditional business models are undergoing fundamental changes in response to digitalization:

- Platform economy: Companies adopt models based on digital platforms (e.g. Uber, Airbnb), facilitating direct interactions between suppliers and consumers (Parker, Van Alstyne & Choudary, 2016, p. 97).
- Digital ecosystems: Strategic partnerships and integration of digital solutions to create complex networks of services (Iansiti & Levien, 2004, p. 73).
- Automation and artificial intelligence: Optimizing the value chain through automation technologies (Besson & Rowe, 2019, p. 41).
- Subscription models and digital services: Increasing popularity of subscription-based services (e.g. SaaS, streaming) that offer financial continuity and increased customer retention (Lovelock & Wirtz, 2020, p. 128).

3. CHANGE MANAGEMENT AND ORGANIZATIONAL REORGANIZATION

❖ **Challenges and barriers**

The adoption of digital technologies within organizations is a complex process that involves numerous challenges. Among the most common barriers are employee resistance to change, lack of adequate digital skills, and difficulties in aligning organizational culture with new work models. Studies show that the success of digital transformation depends on the organization's ability to manage internal resistance and implement effective professional training programs (Kotter, 2018, p. 34).

Resistance to change often stems from fear of the unknown, the perception of job loss, or uncertainty about new professional requirements (Besson & Rowe, 2019, p. 112). To overcome these obstacles, organizations must adopt effective communication strategies and involve employees in the change process. The success of digital transition is also conditional on the existence of leadership that supports innovation and encourages continuous learning (Vial, 2021, p. 87).

❖ **Internal reorganization and strategic flexibility**

In the context of digital transformation, organizational structures are becoming more agile and flexible, which allows for rapid adaptation to market changes. Organizations are adopting operational models based on cross-functional teams, which combine skills from different areas to stimulate innovation and process efficiency (Teece, 2018, p. 42).

Strategic flexibility involves the ability of an organization to pivot quickly when the economic or technological context requires it. In this sense, digitalization allows for better data collection and analysis, facilitating real-time decision-making (Wessel et al., 2020, p. 214).

To maintain a competitive advantage, organizations must redefine their hierarchical structures and facilitate collaboration between different departments. By implementing agile methods, such as scrum and kanban, companies can improve their reactivity and respond more effectively to market challenges (McKinsey & Co., 2022, p. 56).

❖ Digital leadership

In the digital age, traditional leadership is being replaced by models based on collaboration, adaptability, and strategic vision. Leaders must be able to understand new technologies and create an organizational environment that encourages experimentation and risk-taking (Westerman et al., 2019, p. 67).

The essential competencies of a digital leader include innovative thinking, the ability to manage distributed teams, and the ability to foster a culture of change. They must also be able to use data to inform decisions and create a climate of continuous learning (Bharadwaj et al., 2020, p. 198).

Furthermore, digital leadership involves a balance between employee autonomy and clearly defined strategic direction by management. This approach allows for greater employee engagement and stimulates innovation within the organization (Kane et al., 2021, p. 142).

Change management and organizational reorganization are critical factors in the digital transformation process. To overcome the associated barriers and challenges, organizations must adopt flexible operating models, invest in employee training, and develop leadership that is adaptable to new technological realities. Through a well-defined strategy and an innovation-oriented culture, companies can ensure a successful transition to the digital age.

Companies that adopt these principles become more competitive and able to navigate the complexity of the modern market.

4. RESEARCH METHODOLOGY

This research uses a qualitative and exploratory approach, aiming to analyze the impact of digital transformation on organizational structures, change management strategies, and risks associated with digitalization. To achieve this objective, the research methodology was structured in the following stages:

Type of research

The study adopts a documentary and comparative methodology, based on the analysis of specialized literature, case studies, and ISI-indexed academic sources. This approach allows for an in-depth understanding of the main challenges and opportunities of digitalization in organizations.

Data sources and literature selection

For the development of this study, scientific articles published in specialized journals, relevant case studies, and research reports were analyzed. The sources used were identified through recognized academic platforms, such as Web of Science, Scopus, and Consensus.app. The literature selection was made based on the following criteria:

- Relevance for the field of digital transformation and organizational management;
- Recent publications (last 10 years), to ensure the information is up-to-date;
- Articles indexed in prestigious scientific databases;
- Studies that provide theoretical and empirical perspectives on the impact of digitalization.

Data collection and analysis methods

The method used for data analysis was a systematic literature review, which allowed the identification of the main trends and challenges in digital change management. Case studies were selected to highlight concrete examples of success and failure in the adoption of digital technologies.

Comparative analysis was used to examine the differences and similarities between organizations that successfully implemented digital transformation and those that faced failures, thus identifying critical success factors.

Study limitations

The main limitations of this study include:

- lack of primary empirical data, given that the research was based on secondary sources;
- the dynamic context of digitalization, which can lead to rapid changes in the analyzed organizational strategies;
- focusing on existing literature, without including interviews or field studies that could provide more detailed insights.

Justification of the methodology

The chosen methodology is appropriate for this study due to the exploratory nature of the topic. Documentary analysis provides a solid basis for identifying trends and best practices in the field of digital management. The results of this research can serve as a starting point for future studies that include more detailed empirical analyses, expert interviews, and in-depth case studies.

5. RISK MANAGEMENT IN THE DIGITAL AGE

Risks associated with digital transformation

Digital transformation brings significant benefits but also involves numerous risks, the most important of which are cybersecurity, data protection, and compliance with applicable regulations.

Cybersecurity is one of the biggest challenges for organizations as cyberattacks are becoming increasingly sophisticated. Security breaches can damage a company's reputation, cause financial losses, and compromise customer data (Schneider et al., 2019, p. 78). According to a recent report, ransomware attacks on companies have increased by over 150% in recent years, affecting both SMEs and large corporations (Anderson & Taylor, 2021, p. 95).

Data protection is another key risk, given the large volume of information collected, stored, and analyzed by organizations. GDPR and other regulations impose strict standards for data management, and failure to comply can result in substantial fines (Fernandez et al., 2020, p. 112).

Regulatory compliance is critical as digital transformation requires the adoption of international standards for data security and protection. Organizations must adapt quickly to legislative changes to avoid legal and reputational penalties [(Jones et al., 2022, p. 87).

Risk Management Strategies

To minimize the impact of digital risks, companies must implement effective risk management strategies.

Business continuity plans (BCPs) are essential for reducing digital vulnerabilities. These plans should include preventive and reactive measures so that organizations can respond quickly to incidents such as cyberattacks, data loss, or IT infrastructure failures [(Walker & Smith, 2020, p. 142).

Proactive cybersecurity strategies include continuous threat monitoring, the use of artificial intelligence to detect attacks, and implementing an organizational culture based on risk awareness. Studies show that companies that invest in employee training programs reduce the risk of phishing attacks by over 70% [(Miller & Wong, 2021, p. 198).

Managing legal and compliance risks involves collaborating with regulatory experts and adopting clear data protection policies. Organizations should implement data anonymization technologies and use advanced encryption methods to prevent unauthorized access to sensitive information (Peterson et al., 2019, p. 76).

Case studies on risks and failures

Numerous companies have been affected by digital risks due to the lack of adequate risk management strategies.

Example 1: Cyberattack on Equifax (2017)

In 2017, Equifax, one of the largest credit reporting agencies in the US, was the victim of a cyberattack that exposed the data of over 147 million customers. This incident was caused by an unaddressed vulnerability in the company's systems, and the lack of effective security measures led to billions of dollars in financial losses and a loss of consumer trust (Johnson et al., 2020, p. 213).

Example 2: The failure of digitization at Target

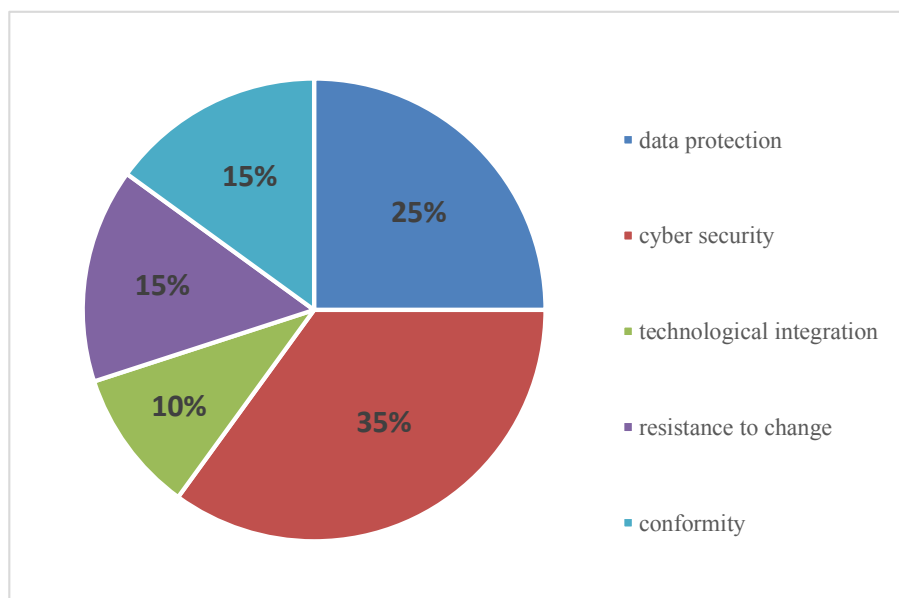
Retailer Target invested in a big data-driven inventory management system, but its implementation was flawed. The lack of integration between different IT platforms led to errors in supply chain management, which led to significant losses and the closure of several stores in Canada (Stewart & Lee, 2021, p. 156).

Example 3: Google's non-compliance with GDPR

In 2019, Google was fined €50 million for violating GDPR rules. The company failed to provide users with clear information about how personal data is collected and used, leading to a significant penalty and a reassessment of its privacy practices (Davidson & Brown, 2022, p. 98).

Risk management in the digital age is essential for protecting organizations against cyber threats, financial losses, and compliance issues. By adopting proactive strategies, investing in security, and learning from the mistakes of other companies, organizations can reduce digital vulnerabilities and ensure a successful digital transformation.

Figure 1. Distribution of the main risks in digital transformation



6. CONCLUSIONS AND FUTURE PERSPECTIVES

Conclusions

Digital transformation is an inevitable process for companies that want to remain competitive in a dynamic and technologically advanced economic environment. It offers numerous opportunities, including optimizing operational processes, improving customer experience, and creating innovative business models. However, digitalization also comes with significant challenges, such as resistance to change, cybersecurity risks, and the complexity of data protection regulations (Vial, 2021, p. 132).

The success of implementing digital technologies depends on the ability of organizations to adopt agile structures, invest in the development of employees' digital skills, and implement effective risk management strategies. Studies show that companies that integrate digitalization strategically and coherently manage to achieve a sustainable competitive advantage (Westerman et al., 2019, p. 95).

Furthermore, leadership plays a critical role in guiding organizations through change processes. Leaders must develop digital skills and foster a culture of innovation to facilitate the transition to new operating models (Bharadwaj et al., 2020, p. 211).

Future prospects

In the future, digitalization will continue to redefine the business environment, leading companies to adopt emerging technologies such as artificial intelligence (AI), blockchain, and the Internet of Things (IoT). These technologies will help automate processes, increase efficiency, and develop data-driven business models (Brynjolfsson & McAfee, 2022, p. 176).

Another major trend is the personalization of services through the use of advanced data analytics. Organizations will be able to anticipate customer needs and offer solutions better tailored to their preferences, which will contribute to increasing customer loyalty and satisfaction [(Davenport & Ronanki, 2021, p. 189)](<https://consensus.app/papers/data-driven-business-strategy-davenport-ronanki/852963>).

Furthermore, with the increase in cyberattacks and strict regulations, digital security will become a strategic priority for companies. The future of digital transformation will depend on the development of advanced security solutions and the implementation of more robust compliance frameworks (Schneider et al., 2020, p. 145).

Organizations will also need to improve their strategic agility to respond quickly to market changes. Business models based on flexibility and collaboration will become essential for long-term success (Wessel et al., 2021, p. 202).

Final conclusion

Digitalization is not just an option, but a necessity for companies that want to remain relevant in the economy of the future. The integration of digital technologies must be approached strategically, with a balance between innovation, security, and adaptability. By investing in digital skills, effective leadership, and careful risk management, organizations can fully capitalize on the opportunities offered by the digital age.

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CORRUPTION AND DEVELOPMENT IN THE NEW EU MEMBER STATES: A COMPARATIVE ANALYSIS

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ABSTRACT: *Within the European Union, corruption is a complex phenomenon, with profound implications for governance, the economy and citizens' trust in institutions. Although all Member States have formal mechanisms to combat corruption, the perceived level of corruption varies considerably from one country to another. The new Member States of the European Union, especially those in Central and Eastern Europe, have undergone major political, economic and institutional transformations in recent decades. While EU accession entailed clear commitments to the rule of law, transparency and the fight against corruption, the post-accession reality shows a mixed picture. In many of these countries, corruption remains a structural challenge, affecting good governance, economic development and public trust in democratic institutions. The Corruption Perceptions Index (CPI) shows notable differences between new and old Member States, and these differences are strongly correlated with a number of other indicators – GDP per capita, quality of the rule of law, level of human development, political stability, degree of digitalization, independence of the judiciary, freedom of the press, degree of government transparency and other indicators. Analyzing these correlations in the context of new EU members provides important insights into how corruption is influenced by structural factors and the quality of post-accession reforms.*

Keywords: *corruption, economic growth, human development, digitization*

JEL Classification: *F43, O40*

1. INTRODUCTION

Corruption, defined as the abuse of power for personal gain, is considered a major obstacle to economic and social development. Corruption has devastating effects on national economies. It reduces the efficiency of resource allocation, generates economic inequalities and undermines public trust in government institutions. Furthermore, it contributes to increasing transaction costs and discourages foreign investment, negatively affecting economic growth and competitiveness. Corruption also has a direct impact on the quality of governance, leading to political decisions influenced by personal interests rather than the common good.

To better understand the dynamics of this phenomenon, it is essential to analyze the relationship between corruption and other socio-economic and institutional indicators. The Corruption Perceptions Index (CPI) provides a useful reference framework for such comparative analyses. It is published annually by Transparency International, which

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standardizes 8-13 sources (e.g. World Economic Forum, Bertelsmann Foundation, Economist Intelligence Unit). Particularly in the European context, this index correlates significantly with indicators such as GDP per capita, the quality of the rule of law, the level of human development, political stability, the degree of digitalization, freedom of the press, the degree of government transparency and other indicators. Exploring these correlations allows for the highlighting of common patterns between Member States and reveals persistent challenges related to integrity in public administration in the EU.

Another indicator with a role in assessing the quality of governance is the Corruption Perceptions Index, which represents the perception of the extent to which public power is exercised for private purposes. This is also a composite index, built from multiple sources (opinion polls, expert reports, international organizations and private institutions, e.g. Freedom House, Global Insight, Economist Intelligence Unit, etc.).

2. LITERATURE REVIEW

Both the theoretical and empirical literature on corruption has fueled an intense debate over the past three decades. A number of authors, including Krueger (1974), Myrdal (1989), Shleifer and Vishny (1993), Tanzi and Davoodi (1998), and Mauro (1995, 1998), have argued that this practice has a negative impact on economic development. They draw attention to the way in which corruption distorts public policy goals and redirects resources from collective to personal interests, which generates significant losses for society (Krueger, 1974). Ehrlich (1999) argues that, depending on the stage of economic development, a negative relationship between the level of corruption and per capita income can be expected.

Most empirical studies have consistently found a negative relationship between corruption and economic growth, and examples supporting possible positive effects are rare (Mauro, 1995; Tanzi and Davoodi, 1998). Research by Li et al. (2000) confirmed that there is a negative association between corruption, investment and economic progress, while indicating that the causal influence runs from corruption to development, and not vice versa.

However, there is also a body of literature that highlights arguments in favor of a positive role of corruption in increasing economic efficiency. Most commonly, these perspectives are based on the hypothesis that corruption can “grease” economic mechanisms, facilitating bureaucratic processes and accelerating decisions (Leff, 1964; Huntington, 1968; Bardhan, 1997; Treisman, 2000; Ramirez, 2014). In this direction, Beck and Maher (1986) argue that, in certain contexts, corruption can contribute to increased efficiency, especially if institutions are weak and poorly functioning (Acemoglu and Verdier, 2000; Meon and Weill, 2010).

The same issue was also analyzed by Méon and Sekkat (2005). They investigated the effects of corruption on economic growth, asking whether it functions as a facilitating factor (“greases the wheels”) or, on the contrary, as an obstacle (“grinds the wheels”) of economic progress. Their conclusions indicate that, in conditions of a fragile rule of law and inefficient governance, corruption tends to amplify the negative effects on investment. Song et al. (2021) reach the same conclusion, namely that in developing countries corruption can lead to more efficient decision-making and minimize transaction costs, since corruption can shorten administrative procedures.

3. CORRELATIONS BETWEEN CORRUPTION AND OTHER ECONOMIC INDICATORS

Corruption remains one of the greatest challenges to global development. Measuring corruption is essential to understanding its impact on national economies and to developing

effective policies to combat this phenomenon. Indicators such as the Corruption Perceptions Index, the Global Governance Indicators, the Control of Corruption Index and others provide valuable information to analyze corruption globally and its links to other indicators. Determining the direction of the relationship between corruption and other factors – whether it represents a cause or an effect – is often difficult. In many cases, corruption and these indicators may be interdependent manifestations of the same systemic dysfunctions. Although the identified correlations provide valuable information, they should be interpreted with caution, avoiding drawing definitive conclusions about causal relationships.

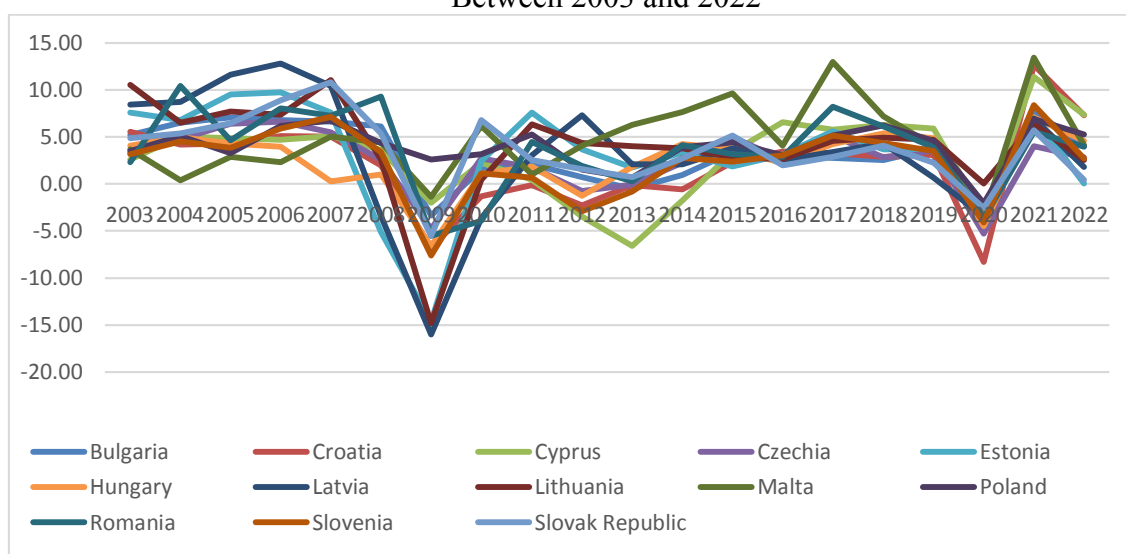
In the following, the observed correlations between corruption and other economic indicators relevant to the economies of the new EU Member States will be analyzed.

3.1. Corruption and Economic Growth

Corruption has a significant negative impact on economic growth by distorting market mechanisms and reducing the efficiency of resource allocation. In corrupt economies, investment – both domestic and foreign – is discouraged because the business environment becomes unpredictable and unofficial costs increase. Corruption also affects tax revenue collection and diverts public funds from productive projects to personal or political purposes. These mechanisms contribute to reducing productivity, stifling innovation and reducing economic competitiveness in the long term. Countries with higher levels of corruption tend to have lower GDP per capita and slower economic growth compared to countries that have effective control over corruption.

Figure 1 shows the economic growth recorded by the new EU Member States between 2003 and 2022. The year 2003 was chosen to capture the evolution of economic growth starting one year before accession. Taking into account the economic and political context, several conclusions can be drawn: countries with stable economic policies, coherent reforms and early European integration such as Poland and Estonia had a more solid evolution; exogenous factors (global crises, pandemics, regional conflicts) had a major impact, demonstrating the vulnerability of small and open economies (Latvia and Lithuania).

Figure 1. Economic Growth of the New EU Member States
Between 2003 and 2022

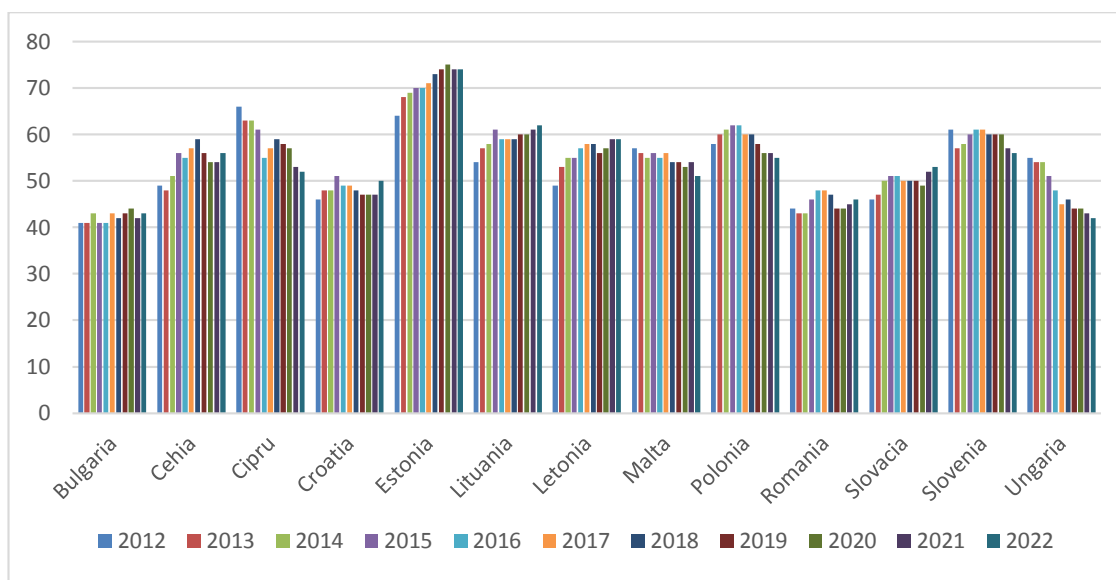


Source: World Bank, statistics <https://data.worldbank.org/>

The new EU Member States have adopted diverse growth strategies, with the developments of these economies reflecting both their historical and institutional heritage and their capacity to adapt to the standards and opportunities offered by membership of the European Union.

The Corruption Perceptions Index is an important indicator, developed by Transparency International, and its main purpose is to assess the perceived level of corruption in a country's public sector, as seen by experts and business people. It does not measure actual cases of corruption, but rather the perception of them, making it an indirect but useful indicator. A higher score (less perceived corruption) suggests a more functional state, with more efficient institutions and more rigorous law enforcement. The way corruption is perceived in the new Member States between 2012 and 2022 is represented in Figure 2.

Figura 2. The Corruption Perception Index (CPI) of New EU Member States



Source: World Bank, statistics <https://data.worldbank.org/>

3.2. Corruption and Human Development

The Human Development Index is a multidimensional indicator that provides a synthetic measure of human development. Corruption and human development are generally negatively related: as corruption increases, the HDI score tends to decrease. Countries with high levels of corruption (low scores on the Control of Corruption or Corruption Perceptions Index) tend to have lower HDI scores.

The Human Development Index (HDI) is a fundamental benchmark in the analysis of a country's capacity to respond to economic and social challenges. In this context, Ul Haq (1995) proposes a conceptual extension of the HDI by integrating additional variables, designed to strengthen the link between the theoretical construct and socio-economic realities. Among these variables, corruption is highlighted as a relevant determinant, with the potential to explain structural dysfunctions and significant transformations within democratic regimes, including in situations where the HDI records high values.

The HDI scale considers 0 (zero) for countries with very low human development and 1 (one) for countries with very high human development, being they separated in 4 groups, according to the degree of human development, whose values are (UNDP, 2015; Alves; et al., 2017):

- Very high human development: 0.800 and above;

- High human development: 0.700 - 0.799;
- Medium human development: 0.550 - 0.699;
- Low human development: below 0.550

From table no. 1 it can be concluded that a high Human Development Index implies a low level of corruption (Estonia and Slovenia), and a low level of human development also implies high corruption (Bulgaria and Hungary being the most corrupt countries of those analyzed). Sarabia et al. (2020) analyzes the relationship between HDI and CPI in EU countries during the period 2013-2019 and shows that there is a high correlation between the Human Development Index and the level of corruption. The crisis had a significant impact on the citizens of the European Union, eroding their optimism and considerably diminishing their trust in democratic prospects. This degradation of trust was accompanied by increasingly visible social tensions, generated by factors such as high unemployment, increased migratory flows and the generalized perception of corruption in the political sphere.

3.3. Corruption and digitalization

The relationship between corruption and digitalization is also bilateral: digitalization can reduce corruption, but the level of corruption can, in turn, affect the implementation and efficiency of digitalization processes. Androniceanu et al. (2019) analyze the level of digitalization of European Union Member States, identifying groups (clusters) of countries with similar characteristics in this area. Romania and Bulgaria were included in a cluster characterized by a low level of digitalization, having the fewest changes in the digital field, according to the European Commission report. The study highlights the significant differences between European Union Member States in terms of digitalization, emphasizing the importance of implementing national digitalization strategies to reduce existing gaps.

Digitalization, especially in public administration (e-government), can significantly contribute to limiting corruption by: reducing direct contact between citizen and official, which limits opportunities for bribery; increasing transparency by publishing government data (open data); automation of decision-making processes, which reduces arbitrariness; Traceability of transactions (e.g. blockchain in public procurement) and through corruption reporting applications (e.g. whistleblower platforms).

The digital progress of EU Member States in four areas can be measured by the DESI index (Digital Economy and Society Index), an index of the European Commission that has in its structure human capital (digital skills of the population), connectivity (internet access and quality), integration of digital technology by companies, digital public services.

The values of this indicator for 2022 are presented in table no. 1. It can be seen that the most digitalized countries are Malta, Estonia and Slovenia, whose economic growth in recent decades has also been based on digitalization. Romania is in last place, with Bulgaria ahead of it, at a fairly large distance. Not only does digitalization limit corruption, but also the other way around (Němec et al., 2022; Santiso, 2022). Corruption can slow down or distort digitalization, through: the capture of digitalization decisions by corrupt elites for their own interests, the falsification or manipulation of digital data, overvalued public IT projects, with rigged tenders and useless technologies, the lack of real political will for authentic digitalization in a corrupt system.

These studies suggest that the relationship between corruption and digitalization is complex and bidirectional. Corruption can hinder the effective implementation of digital technologies, while digitalization can help reduce corruption, provided it is accompanied by institutional reforms and political commitment.

3.4. Corruption and Innovation

The complex relationship between corruption and innovation is a topic of interest in contemporary economic literature. Empirical studies suggest that the impact of corruption on innovation varies significantly depending on the institutional context and the level of development of economies.

Traditional economic theory suggests the negative impact of corruption on innovation, through:

- Inefficient allocation of resources (corruption can lead to investments in unproductive or low-quality projects).
- Reduced incentives for innovation (corrupt environments can discourage investment in research and development).
- Erosion of trust in institutions (a climate of corruption can undermine the protection of intellectual property rights).

On the other hand, the “greasing the wheels” theory suggests that in economies with weak institutions, corruption can facilitate innovation by:

- Reducing bureaucracy (informal payments can speed up administrative processes).
- Overcoming regulatory obstacles (corruption can allow firms to avoid restrictive regulations).

3.5. Corruption and Political Stability

The relationship between political stability and corruption is analyzed through the lens of political instability. Alesina and Perotti (1993) conducted an empirical study on 70 countries during the period 1960–1985, highlighting a negative relationship between income inequality and the level of investment. According to their conclusions, economic inequality increases social tensions and generates political instability, which, in turn, discourages investment and negatively affects economic growth. In a similar vein, Acemoglu and Robinson (2012) argue that political and economic institutions play a fundamental role in determining the trajectory of economic development and political stability in the long term.

In this context, corruption appears as a key factor influencing both the quality of institutions and political stability. Weak, corrupt or captured institutions not only limit equitable access to resources, but also worsen inequalities and amplify social instability. Thus, efficient and transparent governance becomes essential for strengthening political and economic institutions, reducing corruption and stimulating sustainable investment. According to the model proposed by Acemoglu and Robinson (2012), sustainable economic development cannot be achieved in the absence of a solid institutional framework, capable of counteracting corrupt practices and ensuring a fair distribution of opportunities.

There is generally a bidirectional relationship between political stability and corruption:

- corruption affects political stability by eroding citizens' trust in institutions and political leaders; increasing the risk of protests, riots, or even government instability, especially in democratic or hybrid regimes; fueling political polarization and the perception of inequality. Corruption can lead to revolutions or violent regime changes, if combined with economic crises (e.g. Arab Spring).

- the effects of lack of political stability on corruption are translated into difficulties for governments to enforce laws and maintain effective control mechanisms; the lack of transparency of stable authoritarian regimes that can hide endemic corruption; a power vacuum in fragile or conflict-affected states that could lead to generalized corruption.

Of the countries analyzed, Malta and the Czech Republic are the most politically stable, but not necessarily in terms of corruption.

Table no. 1 presents the values corresponding to 2022 – the last year for which complete and updated values are found for all the indicators presented above.

The conclusions are divided into two directions:

1) Regarding the relationships between the indicators, the following emerge:

- From innovation point of view, the most innovative countries are Estonia, Malta and Cyprus. The worst performers are Romania and Slovakia. Darker colors mean a higher degree of innovation.

- From digitalization point of view, the first places are Malta, Estonia and Slovenia. In last place is Romania, far behind Bulgaria. Dark colors mean high digitalization.

- Malta has the highest GDP per capita, and Bulgaria the lowest.

- In first places in terms of human development, Slovenia, Malta and Cyprus are ranked. In last place is Bulgaria, preceded by Romania.

- Estonia is perceived as the least corrupt country among the new EU Member States, with Bulgaria and Hungary being the most corrupt. Dark colors indicate low corruption.

- Estonia also has a higher level of corruption control, compared to Hungary and Bulgaria.

- Malta, the Czech Republic and Estonia are the most politically stable countries. Bulgaria, Cyprus and Romania are in last place. Dark colors indicate high political stability.

2) Regarding the correlations of corruption with other indicators, the situation is as follows:

- GDP per capita, PPP: countries with higher GDP, as a rule, have a lower perception of corruption, but this relationship is not universal (e.g. Malta).

- Digital economy and society: there is a positive correlation between the digital economy and the CPI, with more digitally advanced countries having a lower perception of corruption (e.g. Estonia, Cyprus).

- Human development: the positive correlation is evident between the HDI and the CPI, being a signal that more humanly developed countries tend to have less perceived corruption.

- Innovation: more innovative countries, as a rule, have a higher CPI, indicating better governance.

- Political stability: Political stability is directly related to the perception of corruption; countries with political instability tend to have a lower CPI.

Table no. 1 The Values of Some Macroeconomic Indicators for the New EU Member States in 2022

	Corruption Control Index	GDP per capita, PPP (constant 2021 international \$)	Digital Economy and Society Index	Human Development Index	Global Innovation Index	Political Stability (WGI)	Corruption Perceptions Index
Bulgaria	-0,158	31564,78	37,7	0,799	39,5	0,313	43
Czechia	0,663	48390,66	49,14	0,895	42,8	0,814	56
Cyprus	0,421	51669,30	48,35	0,907	46,2	0,423	52
Croatia	0,147	39864,16	47,55	0,878	35,6	0,672	50
Estonia	1,544	43690,41	56,51	0,899	50,2	0,727	74
Lithuania	0,746	46651,21	52,71	0,879	37,3	0,653	62
Latvia	0,693	37685,01	49,71	0,879	36,5	0,486	59
Malta	0,238	57659,82	60,88	0,915	49,2	0,911	51
Poland	0,506	43405,02	40,55	0,881	37,5	0,505	55
Romania	0,016	39380,25	30,58	0,827	34,1	0,431	46

	Corruption Control Index	GDP per capita, PPP (constant 2021 international \$)	Digital Economy and Society Index	Human Development Index	Global Innovation Index	Political Stability (WGI)	Corruption Perceptions Index
Slovakia	0,213	38638,44	43,45	0,855	34,3	0,445	53
Slovenia	0,767	47064,15	53,37	0,926	40,6	0,709	56
Hungary	-0,103	40353,00	43,76	0,851	39,8	0,678	42

Source: <https://www.wipo.int/documents/d/global-innovation-index/docs-en-wipo-pub-2000-2022-en-main-report-global-innovation-index-2022-15th-edition.pdf>, https://commission.europa.eu/index_en, <https://www.worldbank.org/ext/en/home>, World Bank, <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD>, <https://www.worldbank.org/en/publication/worldwide-governance-indicators>, European Commission, <https://digital-strategy.ec.europa.eu/en/policies/desi>

4. CONCLUSION

In conclusion, Estonia stands out as a complete performer: innovation, digitalization, integrity and stability, remaining the classic example of a highly performing Nordic country. Malta has a very strong digital economy relative to its small size and is also performing well in innovation, human development and political stability. Hungary is problematic in terms of perceived corruption, despite a relatively good HDI. Romania and Bulgaria are consistently at the bottom of all rankings.

Countries that score well in stability, corruption and digitalization also have higher human development and stronger innovation (e.g. Estonia, Malta, Slovenia). Corruption and political instability problems drag down development and innovation scores (e.g. Romania, Bulgaria, Hungary). Overall, the analysis suggests that economic development, digitalization, political stability and the level of innovation are factors that contribute to a lower perception of corruption and better control of it. However, each country has its specificities, and some of the correlations are not always perfect (e.g. Malta and Romania), which suggests that other factors (cultural, historical, etc.) also play an important role in the perception of corruption.

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