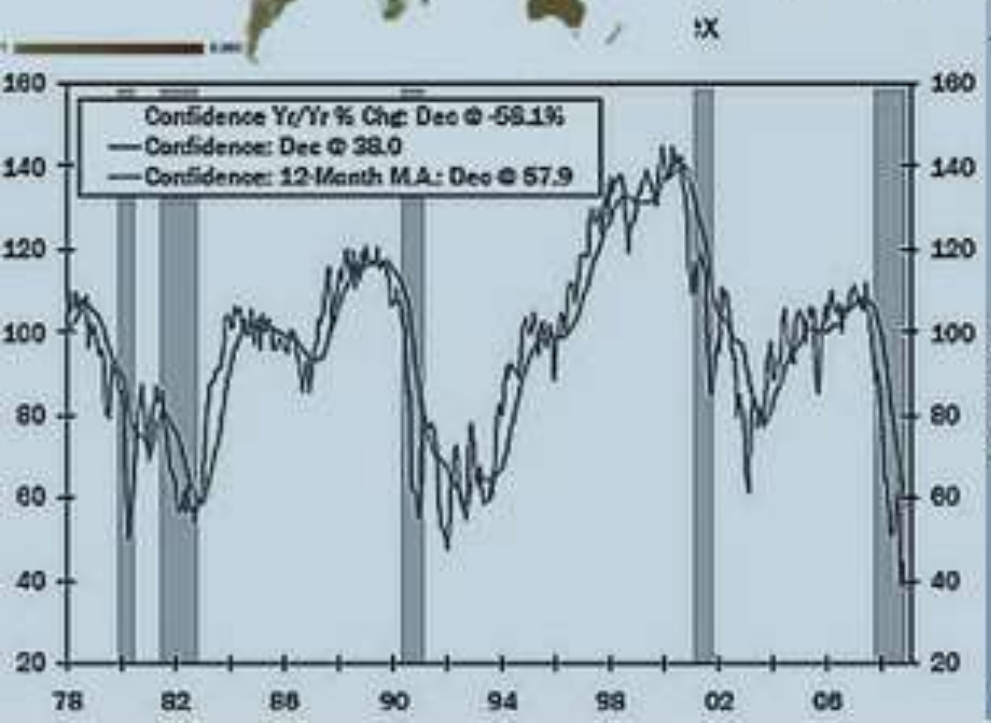
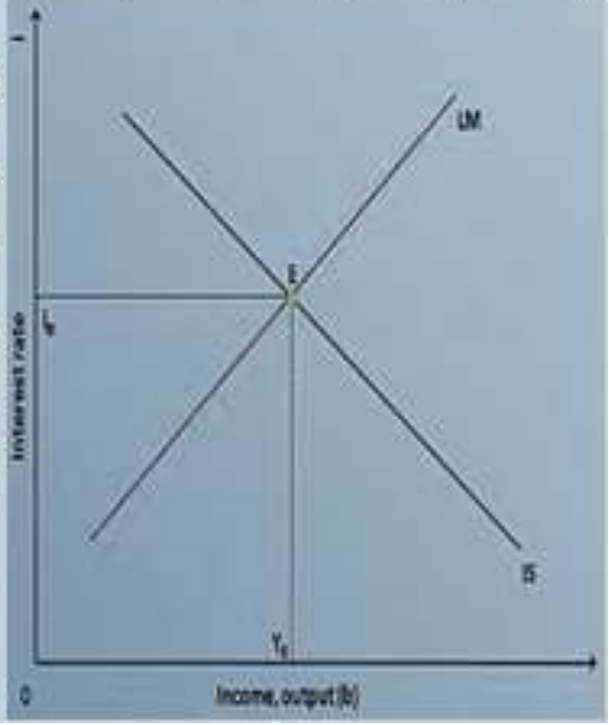
Vol. 10, Issue 2, 2023
ISSN 2343-7995 (online)

Hyperion Economic Journal





HYPERION ECONOMIC JOURNAL

Semiannual journal published by
Faculty of Economic Sciences
Hyperion University of Bucharest
Romania

YEAR X, ISSUE 2, SEPTEMBER 2023
ISSN 2343-7995 (online)

Editorial Office: Hyperion University, Faculty of Economic Sciences,
Calea Calarașilor no. 169, district 3, Bucharest, 030615
http://www.hej.hyperion.ro hej@hyperion.ro

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METHODOLOGICAL STUDY REGARDING THE CALCULATION OF STATISTICAL INDICES BY THE PROCESS OF SEPARATING THE ISOLATED ACTION OF EACH FACTOR AND THE PROPORTIONAL DISTRIBUTION OF THE INTERACTION OF THE INFLUENCING FACTORS

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ABSTRACT: *The methodological study presented in this article offers a solution of practical utility for substantiating decisions aimed at increasing the economic-financial performance of economic operators based on the identification and quantification of the factors that determined the size and modification of an indicator of strong representation of the activity carried out. The methodology presented in this study has a rigorous content, from a mathematical point of view, which respects a principle of calculation and proportional attribution of the influence of each factor that explains the change of a result indicator of the economic activity, synthetic or complex, obtained through sequential contributions but in the same unitary time of two or more factors with different degrees of importance. The general purpose of this methodology is to provide information unaffected by limited, particular principles, with justifications to which more or less pertinent counter-arguments can be brought. It is mentioned that there is the inconvenience of the complexity of the calculations, more difficult to achieve if a manual procedure is used, and a computer solution would be fully recommended.*

Keywords: *statistical index, influence factor, economic indicator*

JEL Classification: *C02*

1. INTRODUCTION

For the substantiation of decisions aimed at the management of economic activity, the **index method** is particularly useful due to the informational content provided by the statistical dimension called the index, obtained as a result of the comparison made in dynamic or static terms.

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The statistical index is a relative quantity that expresses one of the following categories of states of economic phenomena:

- dynamics,

- the degree of fulfillment of the programmed or planned indicators,

- the relative level of the proposed burden for the increase or decrease of an economic indicator in the following time segment,

- the size ratio between two economic indicators identical in terms of content and method of calculation, referring to two similar territorial entities (city, county, country) or two economic agents, but coexisting in time.

Therefore, the index is the result of the ratio of two statistical indicators referring to the same economic phenomenon, which, in turn, can be presented in absolute, relative or average form. The index expresses the relative change in the size of the indicator from the numerator compared to the size from the denominator of the ratio.

From the point of view of scope, two categories of statistical indices are distinguished: *individual, elementary or simple indices and group indices.*

The individual index expresses the size ratio between two statistical indicators that characterize collections of homogeneous units (objects or types of products) or phenomena with the same economic content. For example, one can calculate the individual index of the dynamics of the physical volume, the dynamics of the prices or the dynamics of the value of the goods sold by an economic agent for each type of goods, separately.

The general formulas for calculating the individual dynamics indices are:

- for a quantitative economic indicator (*f*),

$$i(f) = \frac{f_1}{f_0},$$

- for a qualitative economic indicator (x),

$$i(x) = \frac{x_1}{x_0}$$

- for a complex economic indicator (*Y*),

$$i^{(f)(x)} = \frac{f_1 * x_1}{f_0 * x_0}$$

The group index expresses the average relative change in the characteristics of a collection of units that differ from each other in terms of content or use value.

For example, the group index of the dynamics of the value of goods sold by a commercial company (the group index of the turnover dynamics), which is an index of a complex statistical indicator, is calculated as a ratio between the sum of receipts (value of sales) in the current period or calculation and the amount of receipts (value of sales) from the base period of comparison, according to the following relationship,

$$I^{(q)(p)} = \frac{\sum(q_1 * p_1)}{\sum(q_0 * p_0)}$$

in which,

"*q*" is the physical volume of sales by type of goods (economic indicator of quantitative type - *f*),

"*p*" represents the unit sale price for each kind of goods (economic indicator of qualitative type - *x*).

It is stated that both the physical volume of sales and the unit sales prices are not directly summable because they refer to different types of goods and consequently to highlight the separate influence or change of each of the two factors (*q* and *p*) are calculated factorial group indices by applying a certain weighting system.

Therefore, in the case of a factorial-deterministic relationship of the form $Y = f * x$, or $\sum y = \sum(f * x)$ to measure the separate change of each of the factors (quantitative - f and qualitative - x) that determined the change of the complex indicator (Y) or, in another form interpretation method, used only in the case of factorial group indices, to quantify the average change of the quantitative and, respectively, the qualitative indicator, the **method of successive substitutions (in a chain)** is used, as a rule, but, in the analysis practice, other methods are sometimes used weighting methods: Laspeyres Index, Paasche Index, Logarithmic Weights Procedure (Fisher Index), Average Weights Procedure (Edgeworth Index), Finite Increases Procedure (Lagrange Index).

In order to systematize, generalize and rigorously apply the method of successive substitutions, the economic indicators are grouped as follows:

- ***quantitative economic indicators (f),*** such as: physical volume of production or services (q); average number of employees; the time worked by employees, expressed in man-hours; the time worked by employees, expressed in man-days; the average value of fixed assets; the average value of current assets; existing tourist accommodation capacity or the capacity built and intended for tourist accommodation; places-days capacity of existing tourist accommodation; places-days tourist accommodation capacity available, in operation or active; tourists staying in tourist accommodation units; the number of tourist days, etc.;

- ***qualitative economic indicators (x)***: production price or tariff per physical unit of services; retail price; labor costs incurred on average with one employee; full unit cost; the specific consumption of material and energy resources expressed in natural units; expenses per 1000 lei turnover; financial return rate; labor productivity; the average number of rotations of current assets, the average duration in days of a rotation of current assets and in general all indicators expressing economic efficiency;

- ***complex economic indicators (Y)***: turnover; commercial margin; exercise output; added value, total expenses; total revenues; total labor costs; total expenses with raw materials, materials and energy related to the productive activity, trade or service provision; the total consumption of raw materials, materials and fuel expressed in natural units - by types of resources; operating result; the net result of the financial year, the gross result of the year.

The application of the method of successive substitutions implies compliance with the following two basic rules:

1) *the individualization and dimensioning of the influence of a quantitative factor that determined the change of the complex indicator is carried out by weighting (keeping it constant) with the qualitative factor as a basis for comparison*;

2) *the individualization and dimensioning of the influence of a qualitative factor that determined the change in the complex indicator is carried out by weighting with the compared quantitative factor.*

We make it clear that, in the case of the analysis by influence factors of the indicators that characterize the efficiency of the use of direct or primary production factors (labour force, fixed assets and material circulating assets or material and energy resources), consumed to obtain an economic result, the indicators of economic effect are treated as qualitative indicators, and those of economic effort have the meaning and behave as quantitative indicators.

The general calculation formulas used in the case of the method of successive substitutions, when we want to quantify the respective changes in relative and absolute quantities, are the following:

- the total change of the complex phenomenon (indicator):

Index,

$$I^{(f)(x)} = \frac{f_1 * x_1}{f_0 * x_0}, \text{ or } I^{(f)(x)} = \frac{\sum(f_1 * x_1)}{\sum(f_0 * x_0)}$$

The related absolute change,

$$\Delta = f_1 * x_1 - f_0 * x_0, \text{ or } \Delta = \sum(f_1 * x_1) - \sum(f_0 * x_0)$$

from which:

- the influence of the change in the quantitative type factor (*f*):

Index,

$$I(f) = \frac{f_1 * x_0}{f_0 * x_0}, \text{ or } I(f) = \frac{\sum(f_1 * x_0)}{\sum(f_0 * x_0)}$$

The related absolute change,

$$\Delta(f) = f_1 * x_0 - f_0 * x_0, \text{ or } \Delta(f) = \sum(f_1 * x_0) - \sum(f_0 * x_0)$$

- the influence of the change in the qualitative type factor (*x*):

Index,

$$I(x) = \frac{f_1 * x_1}{f_1 * x_0}, \text{ or } I(x) = \frac{\sum(f_1 * x_1)}{\sum(f_1 * x_0)}$$

The related absolute change,

$$\Delta(x) = f_1 * x_1 - f_1 * x_0 \quad \text{or } \Delta(x) = \sum(f_1 * x_1) - \sum(f_1 * x_0)$$

to check the equalities:

$$I^{(f)(x)} = I(f) * I(x)$$
$$\Delta = \Delta(f) + \Delta(x)$$

2. REFERENCE LITERATURE

Methodological study regarding the calculation of statistical indices through the process of separating the isolated action of each factor and the proportional distribution of the interaction of influencing factors joins the numerous methodological substantiation works that have been presented in articles and specialized papers from the country and abroad.

All the studies we refer to are based on the logic of basing the statistical approach on economic theory. The methods and procedures of statistical processing of statistical information data, the particular cases that aim at the size, structure and dynamics of economic variables, as well as the formation of interdependence relationships between them, are described distinctly.

In this sense, the works that describe the statistical methodology for calculating and interpreting statistical indices, the informational significance of the results, published by Andrei Tudorel, Statistics and econometry, Economic Publishing House, Bucharest, 2003[1], are relevant; Baron T., Biji E., Tövissi L., Wagner P., Isaic-Maniu Al., Korka M., Porojan D., Theoretical and economic statistics, Didactic and Pedagogical Publishing House, Bucharest, 1996[2]; Calot G., Cours de statistique descriptive, DUNOD Publishing House, Paris, 1965[3]; Desabie, J., Theorie et pratique des sondages, Statistique et programs economiques, Volume 10, DUNOD Publishers, Paris, 1966[4]; Isaic-Maniu Al., Mitruţ Constantin, Voineagu Virgil, Statistics for business management, Economic Publishing House, Bucharest, 1995[6];

Mihăilescu, N. - "Statistics and Statistical Bases of Econometrics", Transversal Publishing House, Bucharest, 2021[8]: Mills F. C., Statistical Method, Columbia University Press, New York, 1956[9].

A specialized application treatment refers to the factor analysis of the dynamics of complex indicators which is presented by Mihăilescu, N. in the paper - "Analysis of the economic-financial activity - Research methodologies, solved case studies for the substantiation of economic-financial decisions and knowledge tests" , Transversal Publishing House, Bucharest, 2021[7].

The mentioned works present, in the context of scientifically based methodology, from an economic point of view, statistical studies to express the reality of economic processes with dynamic development or in a static profile.

3. THE METHOD OF SEPARATING THE ISOLATED ACTION OF EACH FACTOR WITH DISTRIBUTION PROPORTIONAL TO THE INTERACTION OF INFLUENCING FACTORS (METHOD OF PROPORTIONAL INCREASES)

Another methodological procedure used to calculate the influence of the factors that determined the change of a complex indicator is known as the ***"Method of separating the isolated action of each factor".***

The application of the principle of separating the individual action of the factors that determine the modification of a complex indicator - presented as a function of two or more influencing factors, according to a factorial-deterministic relationship - is based on a weighting system that invariably uses the basic indicators of comparison, regardless of whether they are of a quantitative or qualitative nature. It results, in this case, and an additional influence which is caused by the interaction of factors or the simultaneous action of factors.

The process of separating the isolated action of each factor leads to the amplification of the volume of calculations, especially when the number of factors that determined the change of the complex indicator is greater than two. To demonstrate this fact, we present the Table 1.

It is noted, thus, the important increase in the typology of factors' interaction indices as the number of indicators considered as influencing factors increases. It is also noted that the influences expressed by the indicators of the interaction of the factors (simultaneous action of the factors) present difficulty for interpretation, and consequently their dimensions are to be distributed over the specified factors, using a criterion of proportionality, thus we have the image of complexity the calculations involved with the application of the procedure of separating the isolated action of each factor.

Note on exemplifying the calculation of the number of combinations,

$$C_3^1 = \frac{3!}{1! * (3-1)!} = \frac{1 * 2 * 3}{1 * 1 * 2} = 3$$

$$C_5^3 = \frac{5!}{3! * (5-3)!} = \frac{1 * 2 * 3 * 4 * 5}{1 * 2 * 3 * 1 * 2} = 10$$

Table 1. The number of statistical indices and related absolute changes in the case of the Procedure of separating the isolated action of each factor

The number of factors	Index synthetic	The number of indices of isolated influences	The number of factor interaction indices						
2 factor	C_2^0	C_2^1	C_2^2						
The number of indices	1	2	1	1					
3 factor	C_3^0	C_3^1	C_3^2	C_3^3					
The number of indices	1	3	3	1	4				
4 factor	C_4^0	C_4^1	C_4^2	C_4^3	C_4^4				
The number of indices	1	4	6	4	1	11			
5 factor	C_5^0	C_5^1	C_5^2	C_5^3	C_5^4	C_5^5			
The number of indices	1	5	10	10	5	1	26		
6 factor	C_6^0	C_6^1	C_6^2	C_6^3	C_6^4	C_6^5	C_6^6		
The number of indices	1	6	15	20	15	6	1	57	
7 factor	C_7^0	C_7^1	C_7^2	C_7^3	C_7^4	C_7^5	C_7^6	C_7^7	
The number of indices	1	7	21	35	35	21	7	1	120

Exemplification of the calculation methodologies will be carried out in the variants that present the complex indicator according to two influencing factors and respectively three influencing factors between which there is a multiplying relationship.

Case 1 – Complex indicator with two influencing factors: "*a*" and "*b*"

- the synthetic index (complex indicator index),

$$I = \frac{a_1 * b_1}{a_0 * b_0} \text{ and}$$

- the absolute change of the complex indicator,

$$\Delta = a_1 * b_1 - a_0 * b_0$$

- indices of the isolated influences of factors "*a*" and "*b*"

a) $I^{(a)} = \frac{a_1 * b_0}{a_0 * b_0}$ and

- the related absolute change,

$$\Delta^{(a)} = (a_1 - a_0) * b_0 = \Delta(a) * b_0$$

b) $I^{(b)} = \frac{a_0 * b_1}{a_0 * b_0}$ and

- the related absolute change,

$$\Delta^{(b)} = (b_1 - b_0) * a_0 = \Delta(b) * a_0$$

- the index of the interaction of factors "a" and "b"

$$I^{(a)(b)} = \frac{a_1 * b_1}{a_1 * b_0} \div \frac{a_0 * b_1}{a_0 * b_0} = \frac{(a_1 * b_1) * (a_0 * b_0)}{(a_1 * b_0) * (a_0 * b_1)} \text{ and}$$

- the related absolute change,

$$\Delta^{(a)(b)} = a_1 * b_1 - a_1 * b_0 + a_0 * b_0 - a_0 * b_1 = \Delta(a) * \Delta(b) = (a_1 - a_0) * (b_1 - b_0)$$

The recurrence relation between indices (multiplicative format)

$$I = \frac{a_1 * b_1}{a_0 * b_0} = I^{(a)} * I^{(b)} * I^{(a)(b}$$

The recurrence relation between the absolute changes (additive format)

$$\Delta = a_1 * b_1 - a_0 * b_0 = \Delta^{(a)} + \Delta^{(b)} + \Delta^{(a)(b)}$$

After the proportional distribution of the change caused by the interaction of the factors, the factor influences expressed in absolute numbers are:

- the influence of factor "a",

$$\Delta^{(a)} = (a_1 - a_0) * b_0 + \frac{(a_1 - a_0) * b_0}{(a_1 - a_0) * b_0 + (b_1 - b_0) * a_0} * \Delta(a) * \Delta(b)$$

- the influence of factor "b",

$$\Delta^{(b)} = (b_1 - b_0) * a_0 + \frac{(b_1 - b_0) * a_0}{(a_1 - a_0) * b_0 + (b_1 - b_0) * a_0} * \Delta(a) * \Delta(b)$$

- the proportionality coefficient of the isolated influence, determined by the change in the "a" factor,

$$Ka = \frac{(a_1 - a_0) * b_0}{(a_1 - a_0) * b_0 + (b_1 - b_0) * a_0}$$

- the proportionality coefficient of the isolated influence, determined by the change in the "b" factor,

$$Kb = \frac{(b_1 - b_0) * a_0}{(a_1 - a_0) * b_0 + (b_1 - b_0) * a_0}$$

Case 2 – Complex indicator with three influencing factors: "a", "b" and "c"

- the synthetic index

$$I = \frac{a_1 * b_1 * c_1}{a_0 * b_0 * c_0} \text{ and}$$

- the absolute change of the complex indicator,

$$\Delta = a_1 * b_1 * c_1 - a_0 * b_0 * c_0$$

- indices of the isolated influences of factors "a", "b" and "c"

$$I^{(a)} = \frac{a_1 * b_0 * c_0}{a_0 * b_0 * c_0} \text{ and}$$

- the related absolute change,

$$\Delta^{(a)} = (a_1 - a_0) * b_0 * c_0 = \Delta(a) * b_0 * c_0$$

b) $I^{(b)} = \frac{a_0 * b_1 * c_0}{a_0 * b_0 * c_0}$ and

- the related absolute change,

$$\Delta^{(b)} = (b_1 - b_0) * a_0 * c_0 = \Delta(b) * a_0 * c_0$$

$I^{(c)} = \frac{a_0 * b_0 * c_1}{a_0 * b_0 * c_0}$ and

- the related absolute change,

$$\Delta^{(c)} = (c_1 - c_0) * a_0 * b_0 = \Delta(c) * a_0 * b_0$$

- indicators of the interaction of factors

1. the interaction of factors "*a*" and "*b*"

$$I^{(a)(b)} = \frac{a_1 * b_1 * c_0}{a_1 * b_0 * c_0} \div \frac{a_0 * b_1 * c_0}{a_0 * b_0 * c_0} = \frac{(a_1 * b_1 * c_0) * (a_0 * b_0 * c_0)}{(a_1 * b_0 * c_0) * (a_0 * b_1 * c_0)}$$

and the related absolute change,

$$\Delta^{(a)(b)} = (a_1 * b_1 * c_0) - (a_1 * b_0 * c_0) + (a_0 * b_0 * c_0) - (a_0 * b_1 * c_0)$$
$$= (a_1 - a_0) * (b_1 - b_0) * c_0 = \Delta(a) * \Delta(b) * c_0$$

2. the interaction of factors "*a*" and "*c*"

$$I^{(a)(c)} = \frac{a_1 * b_0 * c_1}{a_0 * b_0 * c_1} \div \frac{a_1 * b_0 * c_0}{a_0 * b_0 * c_0} = \frac{(a_1 * b_0 * c_1) * (a_0 * b_0 * c_0)}{(a_0 * b_0 * c_1) * (a_0 * b_0 * c_0)}$$

and the related absolute change,

$$\Delta^{(a)(c)} = (a_1 * b_0 * c_1) - (a_0 * b_0 * c_1) + (a_0 * b_0 * c_0) - (a_1 * b_0 * c_0) =$$
$$= (a_1 - a_0) * (c_1 - c_0) * b_0 = \Delta(a) * \Delta(c) * b_0$$

3. the interaction of factors "*b*" şi "*c*"

$$I^{(b)(c)} = \frac{a_0 * b_1 * c_1}{a_0 * b_1 * c_0} \div \frac{a_0 * b_0 * c_1}{a_0 * b_0 * c_0} = \frac{(a_0 * b_1 * c_1) * (a_0 * b_0 * c_0)}{(a_0 * b_1 * c_0) * (a_0 * b_0 * c_1)}$$

and the related absolute change,

$$\Delta^{(b)(c)} = (a_0 * b_1 * c_1) - (a_0 * b_1 * c_0) + (a_0 * b_0 * c_0) - (a_0 * b_0 * c_1) =$$
$$= (b_1 - b_0) * (c_1 - c_0) * a_0 = \Delta(b) * \Delta(c) * a_0$$

4. the interaction of factors "*a*" , "*b*" and "*c*"

$$I^{(a)(b)(c)} = \left[\frac{a_1 * b_1 * c_1}{a_0 * b_1 * c_1} \div \frac{a_1 * b_1 * c_0}{a_0 * b_1 * c_0}\right] \div \left[\frac{a_1 * b_0 * c_1}{a_0 * b_0 * c_1} \div \frac{a_1 * b_0 * c_0}{a_0 * b_0 * c_0}\right] =$$

$$= \frac{(a_1 * b_1 * c_1) * (a_0 * b_1 * c_0) * (a_0 * b_0 * c_1) * (a_1 * b_0 * c_0)}{(a_0 * b_1 * c_1) * (a_1 * b_1 * c_0) * (a_1 * b_0 * c_1) * (a_0 * b_0 * c_0)}$$

and the related absolute change,

$$\Delta^{(a)(b)(c)} = (a_1 * b_1 * c_1) + (a_0 * b_1 * c_0) + (a_0 * b_0 * c_1) + (a_1 * b_0 * c_0) - (a_0 * b_1 * c_1)$$

$$-(a_1 * b_1 * c_0) - (a_1 * b_0 * c_1) - (a_0 * b_0 * c_0) = (a_1 - a_0) * (b_1 - b_0) * (c_1 - c_0) = \Delta(a) * \Delta(b) * \Delta(c)$$

The recurrence relation between indices (multiplicative format),

$$I = \frac{a_1 * b_1 * c_1}{a_0 * b_0 * c_0} = I^{(a)} * I^{(b)} * I^{(c)} * I^{(a)(b)} * I^{(a)(c)} * I^{(b)(c)} * I^{(a)(b)(c)}$$

The recurrence relation between the absolute changes (additive format),

$$\Delta = a_1 * b_1 * c_1 - a_0 * b_0 * c_0 = \Delta^{(a)} + \Delta^{(b)} + \Delta^{(c)} + \Delta^{(a)(b)} + \Delta^{(a)(c)} + \Delta^{(b)(c)} + \Delta^{(a)(b)(c)}$$

After the proportional distribution of the changes caused by the interaction of the factors with the changes calculated by the isolated substitution of each factor, the factor influences expressed in absolute numbers (derivative procedure in additive format) are:

- the influence of factor "a",

$$\Delta^{(a)} = \Delta(a) * b_0 * c_0 + \frac{\Delta(a) * b_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(a) * \Delta(b) * \Delta(c) + \frac{\Delta(a) * b_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0} * \Delta(a) * \Delta(b) * c_0 + \frac{\Delta(a) * b_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(a) * \Delta(c) * b_0$$

- the influence of factor "b",

$$\Delta^{(b)} = \Delta(b) * a_0 * c_0 + \frac{\Delta(b) * a_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(a) * \Delta(b) * \Delta(c) + \frac{\Delta(b) * a_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0} * \Delta(a) * \Delta(b) * c_0 + \frac{\Delta(b) * a_0 * c_0}{\Delta(b) * a_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(b) * \Delta(c) * a_0$$

- the influence of factor "c",

$$\Delta^{(c)} = \Delta(c) * a_0 * b_0 + \frac{\Delta(c) * a_0 * b_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(a) * \Delta(b) * \Delta(c) + \frac{\Delta(c) * a_0 * b_0}{\Delta(a) * b_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(a) * \Delta(c) * b_0 + \frac{\Delta(c) * a_0 * b_0}{\Delta(b) * a_0 * c_0 + \Delta(c) * a_0 * b_0} * \Delta(b) * \Delta(c) * a_0$$

The exposed methodology has a rigorous content that respects a principle of calculation and proportional attribution of the influence factors that explain the change of an economic activity result indicator, synthetic or complex, obtained through sequential but at the same time unitary contributions of two or more factors with different degrees of importance. The general purpose of this methodology is to provide information unaffected by limited, particular principles, with justifications to which more or less pertinent counter-arguments can be brought.

It is mentioned that there is the inconvenience of the complexity of the calculations, more difficult to achieve if a manual procedure is used, and a computer solution would be fully recommended.

- **Case study, demonstrative**

It is mentioned that in order to make a convenient demonstration, the derivative procedure will be applied in additive format and the statistical data that will be used are conventional. The complex indicator ("*Y*") under analysis is presented as a product of a number of three influence factor indicators,*"a*", *"b*" and *"c*".

Table 2 The system of statistical data on the dynamics of the "Y" indicator and influencing factors "a", "b" and "c".

The name of the indicators	Base period (Measurement units – m.u.)	Calculation period (Measurement units –m.u.)	Dynamics indices
The complex indicator	$Y_0 = a_0 * b_0 * c_0 = 90$	$Y_1 = a_1 * b_1 * c_1 = 192$	2,13333
a	3	4	1,33333
Factorial indicators *b*	5	6	1,20000
c	6	8	1,33333

The total absolute change of the complex indicator, in the calculation period compared to the base period, is given by the following relationship:

$$\Delta = a_1 * b_1 * c_1 - a_0 * b_0 * c_0 = 192 - 90 = 102,$$ from which :

- the isolated influence of the indicator (factor) "*a*"

$$\Delta^{(a)} = (a_1 - a_0) * b_0 * c_0 = (4 - 3) * 5 * 6 = +30$$

- the isolated influence of the indicator (factor) "*b*"

$$\Delta^{(b)} = (b_1 - b_0) * a_0 * c_0 = (6 - 5) * 3 * 6 = +18$$

- the isolated influence of the indicator (factor) *„c*"

$$\Delta^{(c)} = (c_1 - c_0) * a_0 * b_0 = (8 - 6) * 3 * 5 = +30$$

-simultaneous influence of indicators (interaction of factors) **„*a*"** and **„*b*"**

$$\Delta^{(a)(b)} = (a_1 - a_0) * (b_1 - b_0) * c_0 = (4 - 3) * (6 - 5) * 6 = +6$$

- simultaneous influence of indicators (interaction of factors) *„a*" and *„c*"

$$\Delta^{(a)(c)} = (a_1 - a_0) * (c_1 - c_0) * b_0 = (4 - 3) * (8 - 6) * 5 = +10$$

- simultaneous influence of indicators (interaction of factors) *„b*" and *„c*"

$$\Delta^{(b)(c)} = (b_1 - b_0) * (c_1 - c_0) * a_0 = (6 - 5) * (8 - 6) * 3 = +6$$

- simultaneous influence of indicators (interaction of factors) *„a*", *„b*" and *„c*"

$$\Delta^{(a)(b)(c)} = (a_1 - a_0) * (b_1 - b_0) * (c_1 - c_0) = (4 - 3) * (6 - 5) * (8 - 6) = +2$$

After applying the procedure for distributing the interjection of the factors, the result is:

- the influence of the factor **„*a*",**

$$\Delta^{(a)} = \Delta(a) * b_0 * c_0 + \frac{\Delta(a) * b_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0 + \Delta(c) * a_0 * b_0} * * \Delta(a) * \Delta(b) * \Delta(c) + \frac{\Delta(a) * b_0 * c_0}{\Delta(a) * b_0 * c_0 + \Delta(b) * a_0 * c_0} * \Delta(a) * \Delta(b) * c_0 +$$

$$+\frac{\Delta(a)*b_0*c_0}{\Delta(a)*b_0*c_0+\Delta(c)*a_0*b_0}*\Delta(a)*\Delta(c)*b_0=$$
$$=30+\frac{30}{30+18+30}*2+\frac{30}{30+18}*6+\frac{30}{30+30}*10=$$

$$=30.00000+0.76923+3.75000+5.00000=+39.51923$$

- the influence of the factor *„b*”,

$$\Delta^{(b)}=\Delta(b)*a_0*c_0+\frac{\Delta(b)*a_0*c_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}*$$
$$*\Delta(a)*\Delta(b)*\Delta(c)+\frac{\Delta(b)*a_0*c_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0}*\Delta(a)*\Delta(b)*c_0+$$
$$+\frac{\Delta(b)*a_0*c_0}{\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}*\Delta(b)*\Delta(c)*a_0=$$
$$=18+\frac{18}{30+18+30}*2+\frac{18}{30+18}*6+\frac{18}{18+30}*6=$$

$$=18.00000+0.46154+2.25000+2.25000=+22.96154$$

- the influence of the factor *„c*”,

$$\Delta^{(c)}=\Delta(c)*a_0*b_0+\frac{\Delta(c)*a_0*b_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}*$$
$$*\Delta(a)*\Delta(b)*\Delta(c)+\frac{\Delta(c)*a_0*b_0}{\Delta(a)*b_0*c_0+\Delta(c)*a_0*b_0}*\Delta(a)*\Delta(c)*b_0+$$
$$+\frac{\Delta(c)*a_0*b_0}{\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}*\Delta(b)*\Delta(c)*a_0=$$
$$=30+\frac{30}{30+18+30}*2+\frac{18}{30+30}*10+\frac{30}{18+30}*6=$$

$$=30.00000+0.76923+5.00000+3.75000=+39.51923$$

To calculate the factorial influences that determined the change in the complex indicator, the following proportionality coefficients were used:

1) for the distribution of the interaction of the factors *”a*”, *”b*” şi *”c*”

- the proportionality coefficient of the isolated influence, determined by the change of the factor *”a*”,

$$K(a)bc=\frac{\Delta(a)*b_0*c_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}=\frac{30}{30+18+30}=0{,}384615$$

- the proportionality coefficient of the isolated influence, determined by the change of the factor *”b*”,

$$Ka(b)c=\frac{\Delta(b)*a_0*c_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}=\frac{18}{30+18+30}=0{,}230769$$

- the proportionality coefficient of the isolated influence, determined by the change of the factor *”c*”,

$$Kab(c)=\frac{\Delta(c)*a_0*b_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0}=\frac{30}{30+18+30}=0{,}384615$$

2) for the distribution of the interaction of the factors *”a*” and *”b*”

- the proportionality coefficient of the isolated influence, determined by the change of the factor*"a*",

$$K(a)b = \frac{\Delta(a)*b_0*c_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0} = \frac{30}{30+18} = 0{,}625$$

- the proportionality coefficient of the isolated influence, determined by the change of the factor*"b*",

$$Ka(b) = \frac{\Delta(b)*a_0*c_0}{\Delta(a)*b_0*c_0+\Delta(b)*a_0*c_0} = \frac{18}{30+18} = 0{,}375$$

3) for the distribution of the interaction of the factors "*a"* and "*c"*

- the proportionality coefficient of the isolated influence, determined by the change of the factor "*a"*,

$$K(a)c = \frac{\Delta(a)*b_0*c_0}{\Delta(a)*b_0*c_0+\Delta(c)*a_0*b_0} = \frac{30}{30+30} = 0{,}500$$

- the proportionality coefficient of the isolated influence, determined by the change of the factor "*c"*,

$$Ka(c) = \frac{\Delta(c)*a_0*b_0}{\Delta(a)*b_0*c_0+\Delta(c)*a_0*b_0} = \frac{30}{30+30} = 0{,}500$$

4) for the distribution of the interaction of the factors *"b*" and "*c"*

- the proportionality coefficient of the isolated influence, determined by the change of the factor*"b*",

$$K(b)c = \frac{\Delta(b)*a_0*c_0}{\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0} = \frac{18}{18+30} = 0{,}375$$

- the proportionality coefficient of the isolated influence, determined by the change of the factor "*c"*,

$$Kb(c) = \frac{\Delta(c)*a_0*b_0}{\Delta(b)*a_0*c_0+\Delta(c)*a_0*b_0} = \frac{30}{18+30} = 0{,}625$$

The total absolute change of the complex indicator: +102.00000 monetary units.
from which:

- the influence of the factor *"a"*: +39.51923 monetary units.
- the influence of the factor *"b*": +22.96154 monetary units.
- the influence of the factor "*c"*: +39.51923 monetary units.

Based on these results, the following findings are identified:

- the complex indicator registered an increase in the calculation period compared to the level of the base period by 2.1333 times, respectively by 102,000 m.u;
- factor "*a*" caused the increase of the complex indicator "*Y*" by 39.51923 m.u. respectively by 38.744%;
- factor "*b*" justifies the increase of the complex indicator "*Y*" by 22.96154 m.u. respectively by 22.511%;
- factor "*c*" caused the increase of the complex indicator "*Y*" by 39.51923 m.u. respectively by 38.744%;

Note: A customized situation for a complex indicator like "*Turnover*", the following functional relation, *Y =f(a,b,c*), can be written:

*Turnover (Y) = Stock turnover rate expressed in number of turnovers (a) * Proportion of stocks in the value of current assets (b) * Value of current assets (c)*

It is specified that the value of stocks and respectively the value of current assets are calculated as average values related to a period of time for which the turnover was recorded.

Case 3 – Complex indicator with four influencing factors: "a", "b", "c" and "d",

Example of a demonstrative calculation with conventional statistical data where the complex indicator Y is in a determining relationship with four factorial indicators (Method of proportional increases – additive variant)

Base period: $Y_0 = a_0 \cdot b_0 \cdot c_0 \cdot d_0 = 3 \cdot 5 \cdot 7 \cdot 9 = 945$ m.u.
Calculation period: $Y_1 = a_1 \cdot b_1 \cdot c_1 \cdot d_1 = 4 \cdot 6 \cdot 8 \cdot 10 = 1920$ m.u.

The total absolute change of the *Y* indicator,
$\Delta = Y_1 - Y_0 = 1920 - 945 = 975$ m.u.

The isolated influence of each factor:
The isolated influence of the factor "*a*",
$\Delta(a: bcd) = (a_1 - a_0) \cdot b_0 \cdot c_0 \cdot d_0 = (4 - 3) \cdot 5 \cdot 7 \cdot 9 = 315$
The isolated influence of the factor "*b*",
$\Delta(b: acd) = (b_1 - b_0) \cdot a_0 \cdot c_0 \cdot d_0 = (6 - 5) \cdot 3 \cdot 7 \cdot 9 = 189$
The isolated influence of the factor "*c*",
$\Delta(c: abd) = (c_1 - c_0) \cdot a_0 \cdot b_0 \cdot d_0 = (8 - 7) \cdot 3 \cdot 5 \cdot 9 = 135$
The isolated influence of the factor "*d*",
$\Delta(d: abc) = (d_1 - d_0) \cdot a_0 \cdot b_0 \cdot c_0 = (10 - 9) \cdot 3 \cdot 5 \cdot 7 = 105$
TOTAL: 315 + 189 + 135 + 105 = 744

Calculation of the proportion of the isolated influence of each factor in the total change of the isolated influences:
Proportion of the factor's isolated influence "*a*" : 315/744 = 0,423387
Proportion of the factor's isolated influence "*b*" : 189/744 = 0,254032
Proportion of the factor's isolated influence "*c*" : 135/744 = 0,181452
Proportion of the factor's isolated influence "*d*" : 105/744 = 0,141129
TOTAL: 0,423387 + 0,254032 + 0,181452 + 0,141129 = 1,000000

- **The influence of the interaction of factors:**
  - Group of 2 factors
  The influence of the interaction of factors "*a*" and "*b*"
  $\Delta(a, b) = (a_1 - a_0) \cdot (b_1 - b_0) \cdot c_0 \cdot d_0 = 1 \cdot 1 \cdot 7 \cdot 9 = 63$
  The influence of the interaction of factors "*a*" and "*c*"
  $\Delta(a, c) = (a_1 - a_0) \cdot (c_1 - c_0) \cdot b_0 \cdot d_0 = 1 \cdot 1 \cdot 5 \cdot 9 = 45$
  The influence of the interaction of factors "*a*" and "*d*"
  $\Delta(a, d) = (a_1 - a_0) \cdot (d_1 - d_0) \cdot b_0 \cdot c_0 = 1 \cdot 1 \cdot 5 \cdot 7 = 35$
  The influence of the interaction of factors "*b*" and "*c*"
  $\Delta(b, c) = (b_1 - b_0) \cdot (c_1 - c_0) \cdot a_0 \cdot d_0 = 1 \cdot 1 \cdot 3 \cdot 9 = 27$
  The influence of the interaction of factors "*b*" and "*d*"
  $\Delta(b, d) = (b_1 - b_0) \cdot (d_1 - d_0) \cdot a_0 \cdot c_0 = 1 \cdot 1 \cdot 3 \cdot 7 = 21$
  The influence of the interaction of factors "*c*" and "*d*"
  $\Delta(c, d) = (c_1 - c_0) \cdot (d_1 - d_0) \cdot a_0 \cdot b_0 = 1 \cdot 1 \cdot 3 \cdot 5 = 15$
  TOTAL: 63 + 45 + 35 + 27 + 21 + 15 = 206

SELECTION OF INTERACTIONS RELATED TO 2 FACTORS:
Factor interactions "*a*" = 63 + 45 + 35 = 143
Factor interactions "*b*" = 63 + 21 + 27 = 111
Factor interactions "*c*" = 45 + 27 + 15 = 87
Factor interactions "*d*" = 21 + 15 + 35 =71
Total = 143 + 111 + 67 + 71 = 412

PROPORTIONS of the interaction in the case of the group of 2 factors:
Proportion of factor interactions "*a*" = 143/412 = 0,3470874
Proportion of factor interactions "*b*" = 111/412 = 0,2694174
Proportion of factor interactions "*c*" = 87/412 = 0,2111651
Proportion of factor interactions "*d*" = 71/412 = 0,1723301

PROPORTIONAL DISTRIBUTION OF THE INTERACTIONS OF 2 FACTORS ON THE INFLUENCE OF EACH FACTOR

For the factor "*a*" = 206 x 0,3470874 = 71,5
For the factor "*b*" = 206 x 0,2694174 = 55,5
For the factor "*c*" = 206 x 0,2111651 = 43,5
For the factor "*d*" = 206 x 0,1723301 = 35,5
Total = 71,5 + 55,5 + 43,5 + 35,5 = 206,0

Group of 3 factors

The influence of the interaction of factors "*a*", "*b*" and "*c*"
$\Delta(a,b,c) = (a_1 - a_0) \cdot (b_1 - b_0) \cdot (c_1 - c_0) \cdot d_0 = 1 \cdot 1 \cdot 1 \cdot 9 = 9$
The influence of the interaction of factors "*a*" , "*b*" and"*d*"
$\Delta(a,b,d) = (a_1 - a_0) \cdot (b_1 - b_0) \cdot (d_1 - d_0) \cdot c_0 = 1 \cdot 1 \cdot 1 \cdot 7 = 7$
The influence of the interaction of factors "*a*" , "*c*" and "*d*"
$\Delta(a,c,d) = (a_1 - a_0) \cdot (c_1 - c_0) \cdot (d_1 - d_0) \cdot b_0 = 1 \cdot 1 \cdot 1 \cdot 5 = 5$
The influence of the interaction of factors "*b*" , "*c*" and "*d*"
$\Delta(b,c,d) = (b_1 - b_0) \cdot (c_1 - c_0) \cdot (d_1 - d_0) \cdot a_0 = 1 \cdot 1 \cdot 1 \cdot 3 = 3$
TOTAL: 9 + 7 + 5 + 3 =24

SELECTION OF INTERACTIONS RELATED TO 3 FACTORS:
Factor interactions: "*a*" = 9 + 7 + 5 = 21
Factor interactions: "*b*" = 9 + 7 + 3 = 19
Factor interactions: "*c*" = 9 + 5 + 3 = 17
Factor interactions: "*d*" = 7 + 5 + 3 =15
Total = 21 + 19 + 17 + 15 = 72

PROPORTIONS of the interaction in the case of the group of 3 factors:
Proportion of factor interactions "*a*" = 21/72 = 0,2916667
Proportion of factor interactions "*b*" = 19/72 = 0,2638889
Proportion of factor interactions "*c*" = 17/72 = 0,2361111
Proportion of factor interactions "*d*" = 16/72 = 0,2083333

PROPORTIONAL DISTRIBUTION OF THE INTERACTIONS OF 3 FACTORS ON THE INFLUENCE OF EACH FACTOR

For the factor "*a*" = 24 x 0,2916667 = 7,0
For the factor "*b*" = 24 x 0,2638889 = 6,3
For the factor "*c*" = 24 x 0,2361111 = 5,7

For the factor "*d*" = 24 x 0,2083333 = 5,0
Total = 7,0 + 6,3 + 5,7 + 5,0 = 24,0

Group of 4 factors
The influence of the interaction of factors "*a*" ,"*b*", "*c*" and "*d*"
$\Delta(a,b,c,d) = (a_1 - a_0) \cdot (b_1 - b_0) \cdot (c_1 - c_0) \cdot (d_1 - d_0) = 1 \cdot 1 \cdot 1 \cdot 1 = 1$

PROPORTIONAL DISTRIBUTION OF THE INTERACTION OF THE 4 FACTORS ON THE INFLUENCE OF EACH FACTOR

For the factor "*a*" = 1 x 0,423387 = 0,423387
For the factor "*b*" = 1 x 0,254032 = 0,254032
For the factor "*c*" = 1 x 0,181452 = 0,181452
For the factor "*d*" = 1 x 0,141129 = 0,141129
Total = 0,423387 + 0,254032 + 0,181452 + 0,141129 = **1,0**

The relationship to confirm the correctness of the calculations,
$\Delta = Y_1 - Y_0$ **= 1920 – 945 = 975 = 744 +206 + 24 + 1**

The explicit influences of each factor that determined the change in the complex indicator Y, calculations:

Influence of the factor "*a*",
$\Delta^{(a)}$ = 315,00000 + 71,50000 + 7,00000 + 0,423387 = 393, 923387 m.u.
Influence of the factor "*b*",
$\Delta^{(b)}$ = 189,00000 + 55,50000 + 6,30000 + 0,254032 = 251,054032 m.u.
Influence of the factor "*c*",
$\Delta^{(c)}$ 135,00000 + 43,50000 + 5,70000 + 0,181452 = 184,381452 m.u..
Influence of the factor "*d*",
$\Delta^{(d)}$ = 105,00000 + 35,50000 + 5,00000 + 0,141129 = 145,641129 m.u.
TOTAL:393, 923387 + 251,054032 + 184,381452 + 145,641129 **= 975,00000** m.u.

Note. A particular situation for a complex indicator such as "Turnover" can be considered the following functional relationship:

Turnover (Y) = Average number of staff (a) x Degree of technical endowment of work with fixed assets that have an active role in the economic process (b) x Production of the year that returns to 1 leu fixed assets with an active role in the economic process (c) x Degree of capitalization of the production of exercise (d)

It is specified that the value of fixed assets that have an active role in the economic process is included in the model as an average value related to the time period comparable to that to which the turnover refers.

This methodology, exemplified for four influencing factors, is also applicable to complex indicators that are explained by a relationship with 5 or more factors.

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THE SOCIO-ECONOMIC IMPORTANCE OF STEEL - AN OVERVIEW OF GLOBAL STEEL DEMAND

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ABSTRACT: *Steel is one of the most used metals in modern society. Versatility, durability and resistance make it a popular choice for many different applications: metal constructions/confections, pipes for the transport of hot/cold drinking water, parts and parts for machinery, power line poles, auto production, advertising industry, household appliances. Steel is an alloy of iron and carbon containing less than 2% carbon, 1% manganese and insignificant amounts of silicon, phosphorus, sulfur and oxygen. There are more than 3500 grades of steel with different physical and chemical properties. British inventor Henry Bessemer is credited with developing the first mass production technique for steel in the mid-1850s. Steel is still produced using technology based on the Bessemer Process of blowing air through molten iron to oxidize the material and separate impurities. Considering the many fields in which steel is used and the impact of its use on the world economy, in this paper I considered it important to analyze the demand and consumption of steel at the world level. Thus, I focused both on the comparative analysis of world regions and on an analysis of the main ten steel consuming countries worldwide. In my study I used data provided by the World Steel Association, an international organization founded in 1976, which represents and promotes the steel industry globally.*

Keywords*: steel, demand, consumption, world economy*

JEL Classification*: L61, N60*

1. INTRODUCTION

Steel is the most important material in the world used in many industrial sectors such as: transport, civil construction, renewable energy and household appliances. A globally competitive economy depends on an efficient, modern and integrated transport network. Almost all vehicles on the road today are made of steel. Railway transport requires steel for trains, rails and infrastructure. Shipbuilding traditionally uses structural steel sheets to manufacture ship hulls. Steel is widely used for aircraft landing gear due to its high strength. The innovative use of very high strength steel in the construction of the machines contributes to excellent performance following the impact tests. And the corrosion-resistant metal coating ensures a longer service life. The housing and construction sector is the largest consumer of steel today, where around 50% of the world's steel production is used. It took 57,000 tons of steel to build the skeleton of the Empire State Building, one of the most recognizable buildings in the world. Also, steel is the main material used in the supply of renewable energy - wind,

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solar and water. In the renewable energy sector, steel products with specific mechanical properties are used in hydroelectric plants for turbines, water gates and valves that take water to the turbines. In the case of wind energy, high-strength steel plates and long profiles are used to make the structure of the towers, and electric steel for generators. Finally, a specific range of flat steel products is used for household appliances, so that the technical performance is optimized. The versatility and resistance of steel make it the perfect material for household appliances. Specific grades of flat steel products are used in a wide range of appliances, including ovens and refrigerators. In addition, for decades the steel industry has been reducing the need to use raw material and encouraging steel recycling. This material is the most recycled on the planet. [3]

The World Steel Association (WSA) is one of the most important organizations in the steel industry, bringing together 180 manufacturers, national and regional associations, and research institutes. Members of the organization produce approximately 85% of the steel delivered worldwide each year. The main purpose of the organization is to promote sustainable development and address the common problems of the steel industry. This includes issues such as climate change, technological innovation, occupational safety and health, international trade and energy efficiency. WSA provides relevant statistics and data on global steel production, consumption and trade. This information is used by the members of the organization, but also by other actors in the industry and economy to understand and determine the evolution and trends in the field of steel. WSA also plays an important role in promoting collaboration between companies to facilitate the exchange of best practices and knowledge in the steel industry. It was founded as the International Iron and Steel Institute on 10 July 1967. In the beginning, there were 18 founding members from seven European countries and from Australia, Canada, Japan and the US. It changed its name to the World Steel Association on 6 October 2008. [4]

2. WORLD STEEL DEMAND

According to the World Steel Association, global steel demand will increase to 1,822.3 million tons, or 2.3%, in 2023, and to 1,854 million tons, or 1.7%, in 2024. WSA representatives pointed out that in 2022, the recovery of the steel market after the pandemic shock was affected by high inflation and rising interest rates, the Russian invasion of Ukraine and the quarantine imposed in China. As a result, activity in steel-using sectors fell in the last quarter of 2022. This, combined with the effect of inventory adjustments, led to a larger-than-expected contraction in steel demand.

Table no. 1. Global steel demand by region, 2022-2024 (million tons)

	2022	**2023 (f)**	**2024 (f)**
European Union (27) + Great Britain	151,8	151,3	159,8
Europe - other countries[1]	39,2	42,1	44,6
Russia and other CIS countries[2] + Ukraine	53,3	51,5	49,3
USA + Mexico + Canada	132,9	135,0	138,1
Central and South America	45,4	46,0	47,0
Africa	40,6	40,5	42,1
Middle East	51,3	52,4	54,1
Asia and Oceania	1267,0	1303,6	1319,1
Total – 63 countries	**1781,5**	**1822,3**	**1854,0**

Notes: [1] Macedonia, Norway, Serbia, Turkey; [2] Belarus, Kazakhstan.

Source: The World Steel Association (April 2023), *Steel Demand Forecast*, https://worldsteel.org/steel-topics/statistics/short-range-outlook/

Persistent inflation and high interest rates in most economies will limit the recovery in steel demand in 2023, despite positive factors such as the reopening of China's economy, Europe's resilience in the face of the energy crisis and the easing of supply chain bottlenecks.

In 2024, global steel demand will increase due to regions outside of China, but at the same time will face a global slowdown due to the forecast stagnation of China's economy. At the same time, sustained inflation will further affect global steel demand. [5]

In the European Union (EU), 2022 ended with a sharper-than-expected decline in steel consumption (-7.2%) as steel demand decreased significantly due to the energy crisis and the impact of the war in Ukraine. It is estimated that the ban on steel imports from Russia will affect products worth 3.3 billion euros. Europe's refusal to buy Russian rolled steel forces Russian factories to redirect the supply to China and Asia. But it is unlikely that this move will provide material economic benefits.

Steel consumption is still forecast to be negative (-1%) in 2023, before recovering in 2024 (+5.4%). Specialists from the European Steel Association are of the opinion that the steel industry has been severely affected at the end of 2022, struggling to recover, but the conditions are not yet favorable. Decarbonization projects are underway, but the EU needs access to green and affordable electricity for a sustainable transition of the steel sector. [2]

The most important steel consumer in the EU is Germany, with a consumption of 31.6 million tons in 2022, which represents more than 20% of the total steel consumption of the EU countries and the UK. (Table no. 2)

Table no. 2. Major consumers of steel worldwide, 2022-2024, (million tons)

	2022	**2023 (f)**	**2024 (f)**
1. China	920.9	939.3	939.3
2. India	114.9	123.3	130.9
3. United States	94.5	95.8	98.2
4. Japan	55.0	57.2	57.9
5. South Korea	51.2	52.7	53.8
6. Russia	41.7	39.6	36.9
7. Turkey	32.5	35.4	37.6
8. Germany	31.6	30.9	34.0
9. Italy	25.1	24.9	25.8
10. Mexico	24.8	25.4	26.1

Source: The World Steel Association (April 2023), *Top 10 Steel Using Countries*, https://worldsteel.org/steel-topics/statistics/short-range-outlook/

China's steel demand contracted in 2021 and 2022 as its economy decelerated sharply due to unexpected nationwide shutdowns caused by the Covid19 pandemic. The construction sector suffered the most in 2021 and 2022. WSA experts believe it will recover moderately in 2023, and China's total steel demand is expected to grow by 2% in 2023 and remain flat in 2024.

As for *India*, the WSA experts opined that after managing inflation well, the economy is set to see healthy growth with an increase in investment in GDP due to strong government spending on infrastructure. At the same time, the residential sector is expected to grow, supported by affordable housing projects as well as increasing urban demand. India's capital goods sector will benefit from the boost from infrastructure and renewable energy investments. Motor vehicles and consumer goods are expected to maintain healthy growth driven by sustained growth in private consumption. After growing by 8.2% in 2022, steel demand in India will grow by 7.3% in 2023 and 6.2% in 2024, WSA estimated.

In the *US*, forecast steel growth in 2023-2024 is expected to be subdued under recessionary pressure, WSA analysis shows. Rising car prices, high gas prices and rising interest rates have caused US car sales to decline in 2022. Analysts expect a recovery of 8.0% in 2023 and another 7.0% in 2024, considering a potential decline in interest rates. However, car sales will reach only 94% of the level recorded in 2019. Infrastructure development is supported by recent legislation such as the Infrastructure Act 2021 and the Inflation Reduction Act (IRA). Demand for steel from the power sector will benefit from expanding power production. However, US steel demand is expected to grow by only 1.3% in 2023 and 2.5% in 2024. [7]

Japan's steel demand contracted in 2022 due to low production levels and reduced inventories. The construction sector will expand in 2023 and 2024 mainly due to civil engineering projects supported by the National Resilience Master Plan. [1] However, labor shortages continue to constrain construction activities. In manufacturing, the industrial machinery and automotive sectors will see growth in 2023 and 2024. Therefore, in Japan, steel demand is forecast to grow by 4.0% in 2023 and 1.2% in 2024.

In 2022, *South Korea* steel demand contracted significantly due to lower plant investment and activity in the construction sector, which was further affected by damage caused by repeated floods in the Pohang region. Although auto production rebounded in 2022 due to easing supply chain constraints and strong exports, moderate growth is expected in 2023 and 2024. However, WSA analysts forecast that car production will remain below pre-pandemic levels, but the shipbuilding sector will contribute to a slight recovery in demand in 2023 and 2024. South Korea will have a steel demand grow by 2, 9% this year and 2% next year.

Russia's economy avoided a full-scale crisis in 2022, and steel demand contracted less than expected. In 2022, it was supported by pipeline projects and residential construction. However, the demand for steel is reduced because 8 of the 14 Russian auto factories have suspended their activities, and the decline of the auto industry could be 50%. In 2023-2024, the construction sector is expected to slow, and Russian steel demand will have an accelerated contraction in 2024. In the next years, the Russian economy will face major challenges due to Western sanctions as well as labor losses caused by the war. Thus, steel demand in Russia is forecast to decrease by a further 5.1% in 2023 and by 6.8% in 2024. [7]

3. CONCLUSIONS

Steel is closely related to the way the world has developed and the way our everyday life has changed. In 1950, in the world, there were only 11 buildings taller than 200 m. Today there are 935 buildings taller than 200 m, worldwide. In the same year (1950), 10 million cars were produced worldwide, their number reaching 80 million today.

Steel is important to the world, being necessary for building a solid future. Affected by crises, the steel market will have to adapt and find new solutions to withstand. Global crises lead not only to a decrease in demand for steel, but also to a decrease in its production. Many of the steel producers are forced to adapt to the market and produce only those materials for which there is demand or lower the price of the others. A surplus of products will be reached, which will mean a drop in prices and maximum competitiveness in the market. Thus, it will be necessary to identify new markets and diversify the products offered, as well as cheaper solutions for steel production. The implementation of technologies that lower production costs and increase the quality of the resulting products is one of the solutions to overcome the crisis. The evolution of the steel market for 2023 remains subject to a high level of uncertainty, which will probably continue to undermine demand in the sectors that use steel. Given the current

context, against the background of a worsening energy crisis and the shortage of raw materials, we cannot exclude a new recession or a stagflation scenario.

The outlook for 2023 remains negative, paving the way for the fourth downturn in steel demand in the last five years. A modest recovery is emerging in 2024, albeit subject to high uncertainty caused by energy price developments, Russia's war in Ukraine and their impact on inflation and global supply chains.

Steel manufacturing is expected to lead the recovery, but high interest rates will continue to weigh on steel demand. Recycled-content steel could benefit from another trend identified by the group. Investments in decarbonization and dynamic emerging economies will increasingly drive positive momentum for global steel demand, even as China's contribution to global growth diminishes.

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NEW REQUIREMENTS IN INTERCULTURAL COMMUNICATION IN ECONOMIC AFFAIRS

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ABSTRACT: *A key role in the development of economic affairs is the extension of intercultural communication skills. Intercultural communication favors a better understanding between heterogenous groups of subjects involved, on the one side, and the quality of economic activities, on the other side. The aims of this research are to highlight the place and the role of cultural features within the framework of the new paradigm of the era of globalization - integrated communication, and to define the requirements imposed by the digital revolution in creating and using the IA (Artificial Intelligence) databases in modern languages in relation to business negotiations.*

The results of the research maintain that the formation of the EU integrated economic market does not lead to alteration or disappearance of the cultural features of business partners. On the contrary, the economic actors making efforts to know, respect and use cultural features of the future business partners enhance their competitiveness and may conquer new segments of their organization market and access new markets.

Keywords: *interculturality, plurilingualism, artificial intelligence, linguistic technology platforms.*

JEL Classification: *O33, Z13*

1. INTRODUCTION

Over the past years, development of digital technologies as well as intense extension of both mass-media and informational and cultural systems have led to a new social communication map. All these changes have rendered the gap between regions, groups, individuals and cultures more widely accepted and quicker. At present, the business environment needs experts in intercultural communication able to understand and interpret the potential causes of the misunderstandings between partners, on the one side, and ensure accurate transfer of knowledge, on the other side.

This paper shows the results of a lengthy theoretical research aiming at the interference between intercultural communication and business communication in relation to globally spread dialogue. The new interactionist communicational paradigm, which also functions in the field of business communication, integrates the facilities of the IA technologies so that a new cultural convergence emerges, a convergence enabling all parties involved in negotiation to identify similar interests and efficient ways to meet the requirements of the consumers on the target markets.

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The IA technologies allow complex economic analyses conducted while negotiating. Such analyses support understanding the customers' buying and consumption particularities, fairly and completely presented in all cultures, in all written and spoken languages present on the market which has turned into a market without frontiers. Nevertheless, a market which has segments, areas, regions of cultural specificity. Virtues integrating intercultural communication into the new paradigm of complex communication relying on IA are therefore analyzed, the viewpoint being that one should avoid a mechanistic alienation of the communication mix in the sector of business environment. The issues relating to identification and treatment of objections inherent in communication should not be settled using equally proportional arguments. We support the supreme value of interhuman business contacts integrating everything that the science provides towards accurate and updated data. Nonetheless, we count on preservation of conviviality, expression and valorization of emotional communication between present and future business partners.

The paper is theoretical and comes along other scientific initiatives which support the primordial role of communication abilities. This is different from communicational competence, yet they both form a functional whole conferring efficiency in conducting business negotiations and conclusion of some contracts so as to ensure satisfying market demands and, following this successful process, enhancing the capacity of the Romanian specialists acting in economic affairs to communicate in an interpersonal manner.

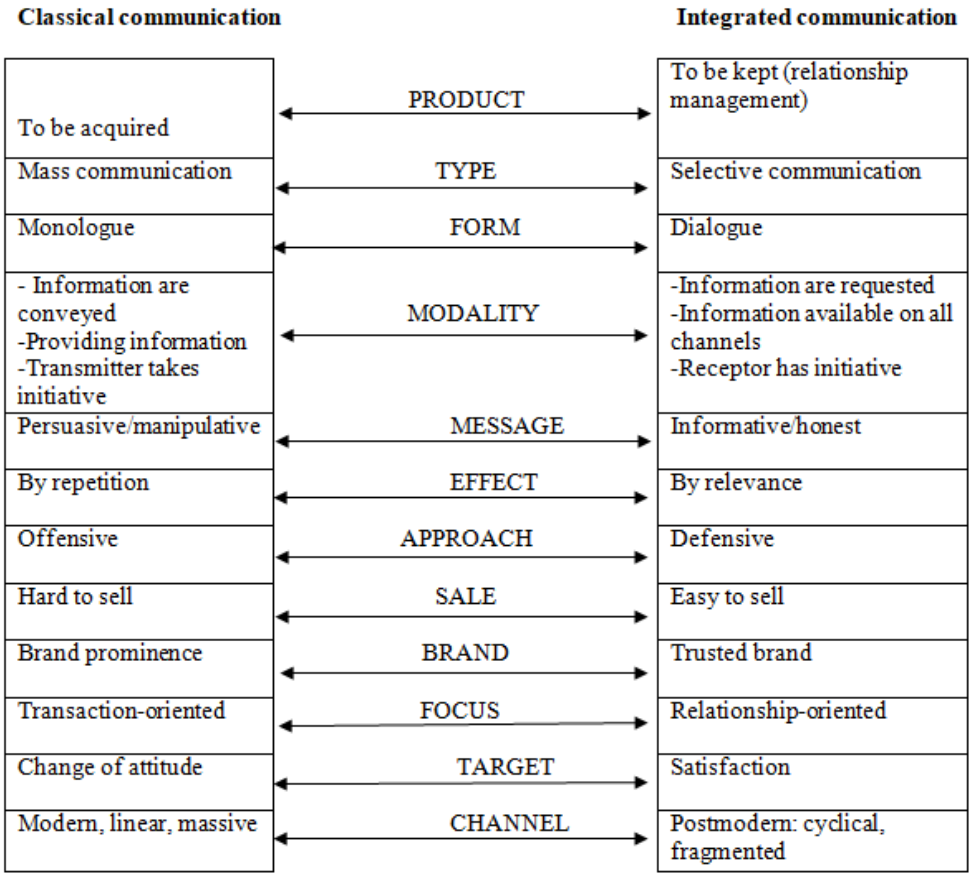
2. LITERATURE REVIEW: CULTURE, A VARIABLE FOR SUCCESS IN INTERNATIONAL BUSINESS

Culture, business and communication are in a relation of synergy (Sasu, 2009). One cannot speak of negotiation or doing business and disregard culture (unlike corporate culture), formation and training negotiators. Intercultural business practices are permanently updated, similarly to integrated intercultural communication models. It is difficult yet necessary to understand the behavior of negotiation partners and to establish a strategy allowing all parties to work in harmony in a business context. Cultural profiles of Americans, Chinese, Saudis, Mexicans, etc. have been outlined and some general tendencies such as distancing oneself from power and group orientation have been mentioned. However, negotiators belonging to a certain group have a different behavior from the ones who are part of other groups even though they share the same culture. Americans, for instance, have different formality levels, mimicry, body language, tonality, and language depending on whom they negotiate: employees of their own company, negotiators from other American companies or negotiators in foreign companies.

Negotiators in a multinational company are each bearers of the culture in their home country. Nevertheless, in the process of a business meeting, they fall under the cultural traits of their corporation despite using the same ethnic language. They actually form a new culture, a new model and not an amount of cultural behaviors (Sasu, 2009). The employees in charge of negotiation and conclusion of economic contracts permanently study cultural communication in business and use interaction with their peers in other cultures, facilitated by Artificial Intelligence which saves time allocated to internet use and removes connection problems. What we witness is a pluralisation of values inside modern societies (Tantau, 2002) as well as a dynamization of such values. Furthermore, we see a differentiation of economic behavior, innovations, new organization and management technologies and a tremendous wave of changes in the field of communication and business promotion. Contemporary requirements impose that negotiators should have intercultural communication expertise and be prepared to practice environmental responsibility and social justice. Corporate culture, their knowledge and communication abilities are components of an intangible asset – reputation, i.e. stakeholders' perception of the organization, perception which is measurable in value (for example, using the

NPS - Net Promoter Score Method). A good reputation is a source of competitive advantage (Doorlay et al., 2017). Integrated communication has significant difference compared to classical communication (Figure 1).

Figure 1. Major differences between classical communication and integrated communication



Source: Adaptation by Yamada, H., 2017, cited in Florea, N.V., Tanasescu A.D. [4:53]

The dynamics and the complexity of the external factors influencing the activity of the organizations have imposed a fundamental review of the communication process. The consumer is assaulted by a huge volume of information which they are unable to process in an efficient manner so most of the information was screened and removed. Increase of the importance of brand, internationalization of business, unprecedented atomization of the demand as well as the evolution and spread of new technologies have been key factors leading to development of integrated communication.

This management concept requires that all aspects of communication – publicity, promotions, public relations, brand image, should cooperate in a single voice towards conveying a unitary coherent message coordinated on various channels aiming at the customer whose behavior should be influenced in the decision-making process and turn them into loyal customers as quickly as possible. The loyal customer is loyal to the brand while the trust they gain facilitates their orientation so that the time allocated to purchase-related decision is significantly reduced.

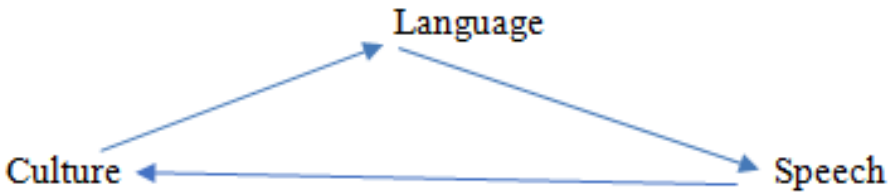
Integrated communication is cyclical in the sense that the bidders create systems intended to collect consumers' feedback in order to permanently improve the quality of the products and services, ensure a quality-price ratio in line with the level and the structure of the

demand, and diversify distribution channels according to the customers' requirements and the context on the market.

2. LANGUAGE – CULTURE BINOM

The French linguist Emile Benveniste makes a distinction between language and speech taking the logical roadmap from linguistics to language (Lesenciuc, 2017). As early as 1966, Benveniste defines language as "a system of structures simultaneosuly belonging to community and collective". The determining connection between them is achieved through language which for the transmitter expresses a reality and for the receptor a recreation of such reality in a proper, particular decoding manner" Speech coagulates culture" (Lesenciuc,1966) (Figure 2) .

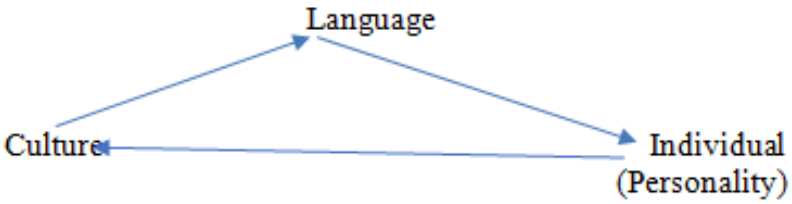
Figure 2. Culture-language-speech interdetermination



Source:Lesenciuc, A. ,2017, p.135.

Language is a a revealing element of society "Speech is individual and represents a geometrical place of interaction between individual and society, between thinking and culture" (Figure 3).

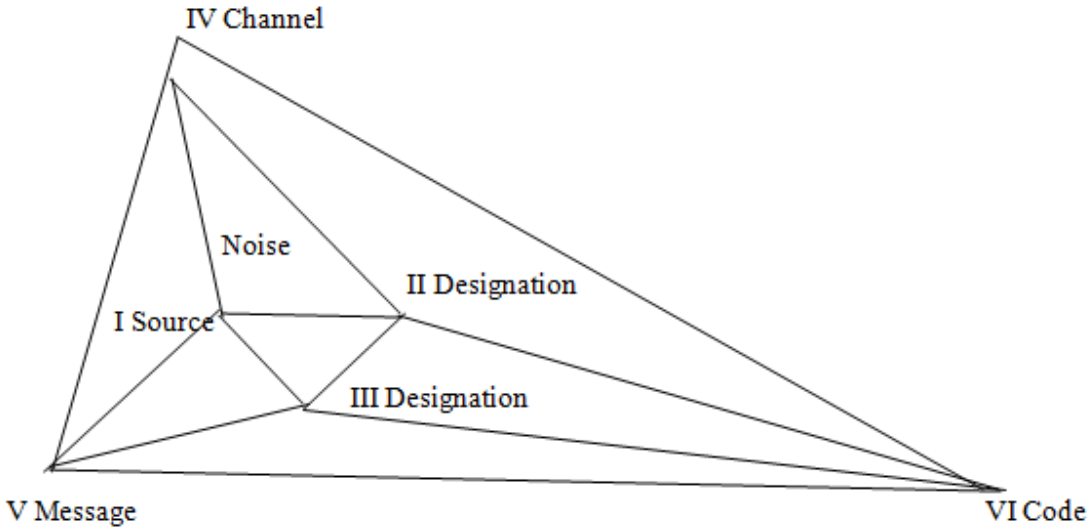
Figure 3. Culture-language-individual interdetermination



Source: Lesenciuc, A., 2017, p.136

The American linguist of Hungarian origin Sebeok studies and validates the functions of language as conceptualized by his predecessors Buhler and Jacobson, and starting from Shannon's model, he proposes a semiotic more detailed triangle (Figure 4) which highligts the complex structure of communication (Trandabat, 2002).

Figure 4. Sebeok's semiotic diagram

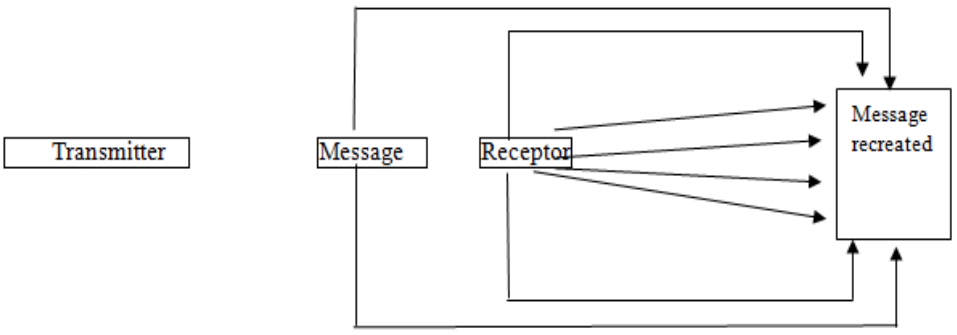


Source: Lesenciuc, A., 2017, p.142.

The models presented, as many others that came in succession, are mechanistic models which grant the primordial role to the transmitter, the one who builds and launches the message.

In 2002, the American researcher Lee O. Thaer lays emphasis on the role of the receptor and, in a transactional manner, he elaborates a model revealing orientation towards destination and incorporation in the message of both primary data (content of the message) and contextual communication elements (Figure 5).

Figure 5. Thaye's Model



Source: Lesenciuc, A., 2017, p.155.

In Thayer's model, the receptor stands in the forefront. He practically creates the message, assigns meaning to it and turns communication into a relation. Thayer's model suggests that decoding messages and formation/influencing receptors' opinions depend on the cultural baggage of each individual, their own scale of values.

3. ARTICIFIAL INTELLIGENCE – COMPONENT OF COMMUNICATION AND COLLABORATION IN ECONOMIC AFFAIRS

For complex and unified communications within business negotiations and to increase the reaction speed as well as the management of operation flows in conducting business, employees can use several AI technologies such as: i) programmed learning; ii) natural language processing (NLP); iii) robots or software applications for repetitive, simple activities; iv) speaking, text dictation, text conveyed into speaking; and v) robotics (Blair, 2019). AI may be defined as an ensemble of technological components collecting, processing and acting on data in ways which simulate artificial intelligence. Similar to humans, AI solutions may apply rules, may learn in time through acquisition of new data and information and may adapt to changes in their environment (Russel and Norvig, 2006). Artificial intelligence is perceived as a sector of the computer science which uses intelligent human-like thinking and acting machines. This includes recognition of speech, natural language processing, image recognition etc. (Bucea-Manea et al., 2022).

IA instruments carry out all and any time-consuming operation and provides highly accurate information in pre- and post- business negotiating periods as well as during business negotiations. Moreover, as the volume of the information becomes heavier, the AI instruments pinpoint other actors of B2B and B2C markets of which activities are correlated to those of the economic agents involved in negotiations, consolidating therefore the quality of the relations.

Marcin Franckiewicz (2023) has recently posted an article regarding the potential of GBT-4 natural language processing (Generative Pre-trained Transformer 4). This NLP generates a response to any request of information concerning workplaces, formation of digital abilities, entrepreneurship. GBT-4 practically reduces the digital gap and enables people to contain modern technology use skills. GBT-4 processes language, including for persons with various disabilities. GBT-4 may connect people from different communities and is able to create language models in various languages even though the participants do not know the language and come from completely different cultures. The linguistic gap between cultures is effectively reduced by GBT-4 which processes natural language and generates linguistically and semantically accurate texts, translations between languages, contextual conversations.

Effective April 2021, the European Commission proposed the first normative EU regulation on AI with a view to analyzing and classifying applications according to risk levels for consumers, with the observation that AI systems will be supervised by people and not through automated processes as there are different rules depending on the risk levels. This regulation is the first regulation of such kind around the world and follows extensive research (Eurobarometru, 2017.UE-28). The research revealed that 61% of the Europeans have a favorable opinion of AI and robots. On the contrary, 88% state that AI technologies have to benefit from a high-performance thoroughly-applied management.

The law sets the following risk AI systems: high risk, with two sub-systems components; generative AI, such as ChatGPT, and limited risk.

All risk categories are widely detailed, debated and negotiated with the final stated objective that the final form of the law should be adopted in the European Parliament by the end of 2023.

4. ARTIFICIAL INTELLIGENCE AND ITS USE IN ROMANIA IN BUSINESS AND EVERYDAY LIFE

Along with the evolution of digital technologies, there is an increasingly spread practice to use artificial intelligence in everyday life. Whether we speak of a Google research, or an e-order, an online payment or simply watching TV news, AI is capable of completing all these

activities. AI is present in our daily life through virtual assistants. AI supports not only us, human beings as physical persons, but it also represents a real benefit for companies. The organizations implementing such digital technologies can increase sales of their products and provide their customers with better services both leading to better indicators. In addition, AI ensures better operation of companies and generates lower costs (Loureire et al, 2021). Artificial intelligence transforms businesses, economy and society and consequently experiences and relations between the parties concerned and citizens. Throughout time, there have been many specialists who have shown a genuine interest in using AI in business and in getting to know their role. Therefore, Huang and Rust (2018) have studied the AI impact on the employees' tasks (Huang and Rust, 2018) while Flavian and Casalo have highlighted the benefits of AI use in the sector of services (Flavián and Casaló, 2021). AI is successfully used in several economic areas. In marketing, it is successful in automation of repetitive functions and marketing activities, in processing data to help the decision-making process, on the one side, and the strategic planning, on the other side (Huang and Rust, 2021). AI has the capacity to adapt to any environment and it is at present a source of innovation, in particular in the sector of services. Rapid development of technology and the AI impact on society represent a challenge for the decision-making factors. The necessity to regulate the artificial intelligence systems is widely recognized (Smuha, 2021).

Digital technologies have been used more and more frequently both worldwide and nationwide. Therefore, the Research Institute for Artificial Intelligence within the Romanian Academy (RACAI) has created language models starting from some large size corpora. The systems and the resources for language technology applications are beyond comparison when it comes to the degree of coverage and the quality of the ones already in place for English language. There are also discontinuities in financing research and development.

On May 16 2020, in Marseile, there was the first international workshop on linguistic technological platforms. The key subject was the European Linguistic Grid, a platform with thousands of sets of data and hundreds of linguistic technology services for all European languages and cultures, adapted to their social and economic needs. The grid is financed through the Research and Innovation Program of the European Union, ORIZONT 2020.

The Artificial Intelligence (AI) is of strategic importance for the economic development. In our country, only 6% of the companies use AI applications. We come last in Europe in relation to use of AI by Romanian-owned companies, despite the fact that, paradoxically, the Romanian economy takes the 19th place in a classification of complex and sophisticated economies worldwide. The Economic Complexity Index (ECI) of Harvard Kennedy School of Government, the number and the complexity of the products exported place our country some places below China (17), France (18) and above Poland (26), Bulgaria (39) (Toma, A., 2023).

5. CONCLUSIONS

Business globalization does not mean extinction of cultural particularities of producers, traders and consumers of goods and services. It only means knowing them best possible so as to create an intercultural offer which should satisfy the needs of a large group of customers. The changes in the structure and the volume of the demand of goods and services occur extremely rapidly against the background of a more and more intense people and business mobility and reduction in cross-border barriers.

Business negotiations rely on creation of some sound databases and direct contacts or contacts mediated by representatives of companies acting as bidders or beneficiaries. Linguistic technology platforms enable storage of databases and conduct of operations of negotiation and contracting in any language agreed upon by partners, in addition to English language (lingua

franca), which means an emotional communication harmonized with a proper atmosphere enhancing the quality of the negotiations. The new technologies slow down the already consistent process of extinction of some languages in the process of business communication with negative effects since there is a loss of cultural advantages incorporated in the vocabulary of each language in the economic area concerned by the business.

All economic actors mainly use English language which has become Lingua Franca. Nevertheless, the spectacular evolution of artificial intelligence (AI) leads to an already visible evolution towards high-performance databases in almost all business languages which have become competitive advantages. The consumers impose respect for their buying and consumption customs and traditions, whereas the bidders highlight the capacity of goods and services to create and satisfy emotions.

The field of intercultural communication in connection with study and creative application of AI technology become captivating not only for the specialists in production and sale of goods and services, but also for the general public from among who companies identify future customers and fight to gain them. Romania has demonstrated that it may be an active player on the European and global economic market, by assimilating new digital technologies and by practicing in economic affairs the respect for the partners' culture and the responsible management of cultural differences in the process of negotiation, conclusion and performance of economic contracts.

Finally, we express our conviction that the technological and scientific advance will generate improvement of all economic and cultural processes which contribute to the physical and mental wellbeing of the greatest being in the Univers – the human being.

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THE ROLE OF DIGITALIZATION IN THE TRANSITION TOWARD CIRCULAR ECONOMY

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ABSTRACT: *The paper presents the ways in which the digitalization can contribute to an effective transition to a circular economy. Digitization can enable the intelligent use of limited resources, both on a human and material level. Therefore, we can say that digital society can influence the transition process and ensure the acceleration of the transition to a, circular economy.*

Keywords: *digitalization, digital economy, circular economy*

JEL Classification*: O33, Q56.*

1. INTRODUCTION

In recent years, the urgent need for digitization has been intensively discussed. In full era of the modern technologies', which penetrated more and more into almost all aspects of private, economic as well as political life, appeared the need to adapt to the new coordinates imposed by them. The modern technologies not only take over from people tasks that once were done manually and repetitively, but it can create completely automatic processes, which do not need the intervention of people.

Digitization can enable the intelligent use of limited resources, both on a human and material level. This could reduce the need for physical equipment, thus reducing the consumption of materials, energy and fuel. Last but not least, digital technology allows the use of generic computing and user interface hardware, which means a reduced need to produce dedicated devices [1]. Modern technologies can be used to improve services, to produce safer equipment and machines and, at the same time, it can improve production processes and bring competitive advantages to businesses, including in sectors that already enjoy significant positions, such as the circular economy, the car manufacturing industry, agriculture and tourism [2].

Digital transformation has the ability to influence the transformation of the economy from a linear to a circular economy. On the one hand, digital society has all the necessary technical means to ensure circular processes, and on the other hand, it creates a perspective of long-term sustainable development, which is significant for the development of a circular economy [3].

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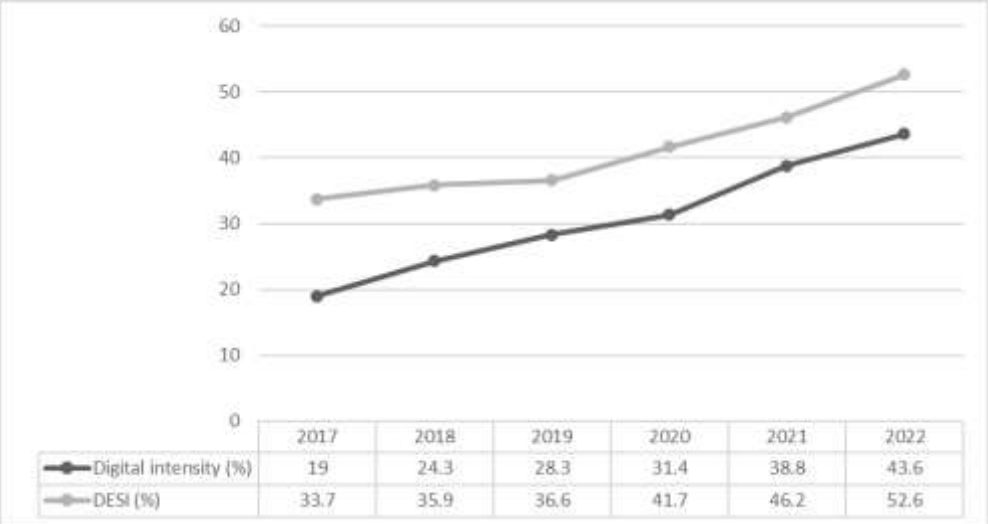
2. DIGITALIZATION AND TRANSITION TOWARD TO CIRCULAR ECONOMY

Digitization involves using the possibilities offered by new technologies to rethink all aspects of operational processes. Some studies estimate that the digitization of products and services will generate for European businesses annual revenues of over 110 billion euros [4]. For many EU businesses, openness to digital transformation is essential if they want to remain competitive. According to a European Investment Bank study, digitization is associated with better business performance in terms of productivity, management practices, innovation, growth and well-paid jobs [5].

Digital transformation is one of the EU's priorities and consequently it seeks to develop policies that will strengthen Europe's capabilities in the new digital technologies, open new opportunities for businesses and consumers, support the green transition and help achieve climate neutrality by 2050.

Figure 1. The evolution of digitalization level in EU, 2017-2022



	2017	2018	2019	2020	2021	2022
Digital intensity (%)	19	24.3	28.3	31.4	38.8	43.6
DESI (%)	33.7	35.9	36.6	41.7	46.2	52.6

Source: author own processing based on Eurostat data

The long-term vision of the European Union on its competitiveness and the perspectives of the economy after 2030, published in March this year, highlights the fact that digitization is one of the main vectors of the economy [6]. As a consequence of the implementation of appropriate policies for stimulating digitalization, as it can be seen in Figure 1, the level of digitization at European Union level has increased from year to year, the digital intensity increasing with 129,47% from 2017 to 2022.

On the background of increasingly limited access to natural resources and the challenges generated by the effects of climate change, the theme of a more environmentally friendly and sustainable economy is increasingly present in the public policy makers and economic agent’s discourse. Associated with sustainable development, the concept of the circular economy is increasingly seen as a lever for sustainable progress.

The circular economy involves a number of concepts such as sharing, renting, reusing, repairing, refurbishing and recycling materials and products. This approach has the effect of extending the life cycle of products and optimizing the consumption of raw materials and energy, minimizing the amount of waste generated, reducing the carbon footprint and more environmentally friendly approach.

In the case of the circular economy, we are talking about an integrative model, based on eco-innovation and eco-design, characterized by the 10 R concept: Refuse, Rethink, Reduce, Reuse, Repair, Restore, Remanufacture, Reorient, Recycle and Recover.

Refusal refers to making a product redundant by giving up at the function it provides (for example the option to refuse to use your own car for urban transportation, opting for public transport or a ride-sharing service.

Rethinking refers to increasing the use of a product, for example by sharing the product (for example in food industry, in order to reduce the amount of waste, it is used the collaborative approach to reduce the use of single-use packaging and the migration to reusable packaging).

Reduction refers to increasing efficiency in the production or use of the product by consuming fewer natural resources (for example, in the automotive industry where the pressure to reduce fuel consumption has intensified innovation and the successful launch of electric models).

Reuse refers to any operation by which products or components that have not become waste are used again for the same purpose for which they were designed.

Repair refers to the reconditioning or maintenance of the defective product so that it can be used with its original function.

Refurbishing refers to restoring an old product and updating it.

Remanufacturing refers to incorporating parts of the discarded product into another product with the same function. Old laptops and computers are reclaimed for parts to create refurbished products that can then be donated to schools.

Reorientation refers to the incorporation of the discarded product or parts of it into a new product with a different function. For example, paper, plastic, metal, wood and other materials left over from manufacturing processes can be reused to make various other items.

Recycling refers to any recovery operation whereby waste is transformed into products, materials or substances to fulfill their original function or for other purposes.

Recovery refers to the incineration of materials and energy recovery. We meet the model in the cement industry, where waste incineration is used in the manufacturing process or in the burning of non-recyclable materials to obtain energy [7].

In line with the Union's objective of achieving climate neutrality by 2050 under the Green Deal [8], the European Commission proposed, in March 2020, the first package of measures for the transition to a circular economy, included in the Circular Economy Action Plan [9]. Proposals include encouraging sustainable products, informing consumers for the green transition, revising building materials regulations and a strategy for sustainable textiles [10].

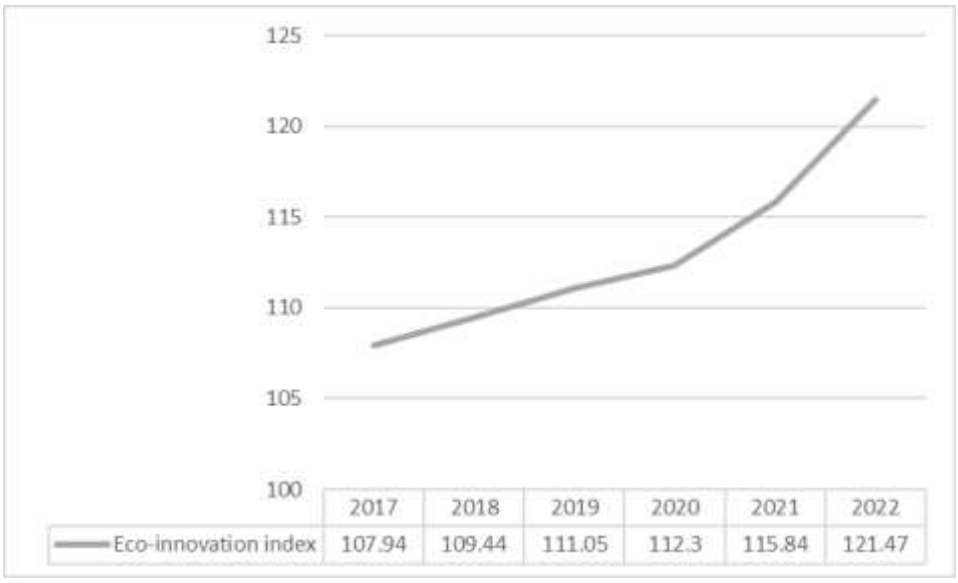
To achieve a circular economy, circularity and sustainability must be introduced at all stages of the value chain, from design to production and finally to the consumer. Circularity encourages innovation and job creation, and some experts believe that, by 2030, this model could generate an additional income of 4.5 trillion dollars globally [11].

The European Commission estimates that applying circular economy principles across the EU economy has the potential to increase EU GDP by an additional 0.5% by 2030, creating approximately 700,000 new jobs. There is a clear business case for individual companies too – since manufacturing firms in the EU spend on average approximately 40% of the total cost of goods on materials, closed-loop circular models can increase profitability and protect against price fluctuations [12].

In supporting the transition to a circular economy and achieving the objectives of the European Green Deal eco-innovation is vital, by reducing impacts on the environment, increasing resilience against external pressures and using resources more efficiently. [13]. The Eco-Innovation Scoreboard gathers data on eco-innovation performance across the EU and

beyond, thus helping to monitor and evaluate progress made since 2010. The Eco-Innovation Index measures the environmental innovation performance of EU Member States, on the basis of the 12 indicators included in the measurement framework. In the period 2017-2022, the Eco-innovation index at the EU level increased constantly, reaching in 2022 the value of 121.47 (+ 12.31% compared to 2017) as a result of the policies applied in the field of environment, research-innovation and digitalization.

Figure 2. The evolution of Eco-innovation index in EU, 2017-2022



	2017	2018	2019	2020	2021	2022
Eco-innovation index	107.94	109.44	111.05	112.3	115.84	121.47

Source: author own processing based on Eurostat data

Digital technologies play a key role, both directly and indirectly. On the one hand, they make it possible to create and manage the information required for complex circular supply chains and business models. On the other hand, they are the basis for products-as-a-service business models, a crucial part of the dematerialization process. Overall, digitally enabled transparency, efficiency and convenience are necessary to increase resource productivity and value retention to the point where a circular economy really begins [14].

With more data generated than ever before, improved exchange and provision of information is a cornerstone of the circular economy: now, companies must know the suppliers of their suppliers and the customers of their customers (ECERA, 2020). Precise and timely data are necessary for the safe processing of concentrated waste streams, safe sharing and recycling of products, increasing product longevity or improving material efficiency/replacing rare inputs with renewables. Shortened supply chains and localized/decentralized production also depend on digitalization. Improving connectivity and information sharing, offers significant benefits, by using blockchain to securely trace products and materials across their entire lifecycle and in all use environments [14].

Without a coherent and inclusive global digitization effort, climate goals will not be achieved in a timely manner. Furthermore, in order to achieve the 2050 climate goals, a coherent digital network must be created. This will have the same impact on the circular economy in the next 30 years as the Internet has had on the digitization of society in the last 30 years. Without a digital platform, the transition to a circular economy will occur more slowly, with fewer attractive circular business models and less impact on global climate goals, economic growth and poverty reduction [12].

3. CONCLUSIONS

Digital technologies will play a key role in Europe's transition to a more circular economy. Without them, a modern economy cannot become truly sustainable.

The digitization of the circular economy cannot be postponed; We don't need more conferences, reports and calculations. Our planet and the many people suffering from climate change compel us to act now. Governments, global organizations, industry associations and leading enterprises must take the initiative to ensure the focused, accelerated and responsible digitization of the circular economy. This is the only way we can achieve our ambitious climate goals and save our planet.

Through the transition of European states to the circular economy, the pressure on natural resources will be reduced and sustainable economic growth and new jobs will be ensured. Moreover, it will contribute decisively to reaching the 2050 targets on climate neutrality and biodiversity loss.

To a large extent, any successful transition to a CE will depend on the contributions and collaboration of consumers and citizens, on the way people live and consume materials and products. The better people are informed, the more they are aware of the impact their choices have, and the more rapid this process will be. Moreover, encouraging people to collect data and providing them with tools to make their wishes and concerns heard can improve monitoring of product lifecycles and other variables [14].

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ACCOUNTING EXPERTISE IN THE NATIONAL AND EUROPEAN CONTEXT

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ABSTRACT: *The trends in the evolution of the accounting profession in the European space has a limited and precisely delimited scope of action and is conditioned by strict specialization and high level of qualification in many countries. The accountancy profession in the narrow sense is approached as a liberal profession which, in its work, addresses harmonised professional standards in accounting, financial reporting, auditing, education and ethics. It is necessary to resolve the problems of recognition of professional qualifications between countries, to achieve a global accountancy profession by removing different levels of professional competence and quality of professional services from one country to another.*

Keywords: *chartered accountant, accounting expertise, accounting standards, professional ethics, accounting profession*

JEL Classification: *M41*

1. INTRODUCTION

In the practice of public accounting, as well as in other activities carried out by accounting professionals, harmonised standards in the field of public accounting, accounting and financial reporting are needed. They need to be adapted to make them compatible with different sets of national accounting standards, in order to bring them into line with the requirements of stock exchanges in other countries. This conversion is the task of the international accounting profession through the harmonisation of accounting standards, i.e. the definitive removal of the differences that separate the accounting profession from one country to another.

The International Accounting Standards Committee (IASC) has prepared and published accounting standards with global applicability. The use of accounting standards in international classifications is also supported by the International Organisation of Securities Commissions (IOSCO).

According to the accounting practice and doctrine, in different countries, under market economy conditions, the accounting profession is in close correlation with legal doctrine and practice and other related fields, accounting expertise manifesting itself in a variety of specialisations as set out in the Ministry of Justice Order No 1190/C/2023.

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2. ACCOUNTING EXPERTISE IN THE NATIONAL AND EUROPEAN CONTEXT

In March 2001, the International Accounting Standards Board (IASB) became a Foundation, organised along the lines of the American Accounting Standards Board (FASB). The Foundation consists of four elements:

- the trustees;
- the standard-setting body itself, the IASB, which takes over harmonisation activities from the former international body (International Accounting Standards Committee: IASC);
- an interpretation committee, the International Financial Reporting Interpretations Committee (IFRIC);
- an International Accounting Standards Advisory Council (IASAC)

Nowadays, the general term International Financial Reporting Standards (IFRS) is accepted, which includes:

- International Financial Reporting Standards (IFRS x), developed as such by the IASB;
- international accounting standards (IAS x) which have undergone and will undergo a revision process by eliminating alternatives, redundancies and conflicts in their content, as well as those which have not required such an improvement or have not been required, at least for the time being, to be eliminated;
- new interpretations: developed by the IFRIC Committee or its predecessor, the Standing Interpretations Committee (SIC), they (especially the latter) are subject to deletions and revisions when reality dictates.

Given the European Union's ambitions in relation to the adoption of the international accounting framework, let us not lose sight of the major implications of such a choice. Such an adoption has brought and is bringing fundamental changes to the thinking of accounting professionals in the old continent.

The challenges bring with them the upheaval of those stuck in their sophisticated traditions. It is all the greater because some European countries (in fact, most of them) have been and still are the bearers of an accounting model far removed from the Anglo-Saxon philosophy, a model which also inspires the work of the international standard-setting body.

The core element of these developments is in line with the objective attached to accounting, even by the international conceptual framework: to provide information on meeting the needs of investors in informing their decisions to buy, hold or sell the financial securities they hold. It is from this objective that the balance sheet takes precedence over other financial statements. It is in this balance of power that the principle of substance over form and the use of a valuation system based on fair value are increasingly being applied.

Forensic expertise is used in various fields to clarify strictly specialised factual issues or to interpret information with a view to resolving controversial or contentious issues, often being decisive in the adoption of a decision. However, the activity of forensic expertise does not have a regulation that provides a uniform legal framework for its development, which ensures its integrity.

The disparate normative acts regulating for example forensic technical expertise, evaluation expertise, forensic expertise, the relationship of forensic technical experts with professional associations are incompetent and in some respects contradictory. For this reason, in practice it is not possible to resolve issues such as: the legal status of the forensic expert, his rights and obligations, his certification, control and limits, the evidential value of the information presented in the forensic expert's report, the expert's liability for errors in the expert's report.

The vagueness of the rules in this respect is directly reflected in the quality and impact of the information that the forensic expert provides, in the context of its use as evidence in court.

The creation of a new image and a new position of the forensic expert in the judicial activity cannot be achieved individually, but through a professional organisation, a thematic professional training and a careful check of the expert's development, his approved results of practice, his professional reputation.

The fact that there is no known evidence of corruption in the profession of forensic expert does not mean that this activity is not exposed to corruption; exaggerated fees for biased forensic expertise, for example, can sometimes be a form of veiled bribery. If in the activity of magistrates one can speak of corruption offences (bribery, influence peddling), the examples of recent years being significant, the liberal profession status of legal experts makes this special category justify the fee on the basis of the fact that it is based on a work, namely the legal expertise report.

Guy Verhofstadt, former Prime Minister of Belgium from 1999 to 2008 and current leader of the Alliance of Liberals and Democrats for Europe in the European Parliament, believes that the Romanian judiciary remains vulnerable and that it is therefore necessary to put an end to "the internal culture of corruption and political favouritism that dominates the country like a cancerous tumour and prevents it from consolidating its progress".

Or the role of judicial expertise in finding the truth in the case must be understood in the sense that the expert is part of the judicial system.

Knowing that vulnerability refers to the subject/subjects exposure to the manifestation of threats, the phenomenon involves the forensic expert by: incomplete and limiting legislative framework on the transparency of forensic expertise. In addition to the normative acts mentioned in the previous chapter, there are professional standards, regulations and guidelines at the level of professional associations, without a general framework of approach. Since the date of accession, Romania has created a broad institutional and legal framework for the implementation of EU legislation in this field. However, many systematic gaps have not been sufficiently addressed. The gaps are caused by factors such as frequent changes in the legal framework and institutional structure which do not provide sufficient capacity, as well as the lack of effective instruments (European Commission report under the MCV). Non-compliance with regulations is due to a complete lack of control of liability invoices within these associations that have such obligations. One example is the failure to carry out quality audits of forensic accounting expertise.

Thus, according to the Regulation on quality auditing in the field of accounting services: art. 18 Accounting experts, in carrying out forensic accounting expert work, are obliged to submit the expert reports...for quality auditing; art. 19 Quality auditors have the following duties: auditing forensic accounting expert work before submitting it to the bodies that requested it.

Although the forensic expert's report is considered as evidence in court, it leaves room for interpretation in the sense that it is only an expression of the forensic expert's opinion, as found in the Code of Civil Procedure.

There is a lack of definition of the profession of forensic expert, its rights and obligations, especially as there is an incomplete classification of the fields and specialties of forensic experts as provided by Order 1190/C/2024 for the approval of the Nomenclature of Specializations of Forensic Technical Expertise, with reference to the economic field.

At the same time, there is a situation where the chartered accountant for the parties agrees with them by concluding a contract for the performance of the expertise, as provided for in the new Code of Civil Procedure. This novelty in the Code of Civil Procedure may have contradictory consequences. Analysing Article 331 of Law no. 134/2010, regarding the

appointment of the technical expert: "(1) if the parties do not agree on the appointment of experts, they shall be appointed by the court, by drawing lots, from the list drawn up and communicated by the local expert's office, including persons registered in its records and authorised by law to carry out judicial expertise (Law no. 134/2010 on the Code of Civil Procedure)", confusion may arise between court-appointed forensic experts and forensic experts proposed by the parties.

The divergences identified in the forensic accounting assignment are:

- how to assign work to forensic experts;
- how to establish the objectives of forensic expertise without the involvement of the court or the forensic expert; in general, the objectives are submitted by one of the parties, either the plaintiff or the defendant, with the other party subsequently submitting objections to the objectives, with implications for the length of the trial.
- lack of transparency in the system for setting the fee and settlement of the costs of the appointed forensic expert, with fees not in line with the workload and costs of expertise not taken into account. In comparison, the expert's fee may be multiplied, but this amount does not appear in the case file;
- complete lack of forensic experts' relationship with the court. The shortcomings of the expert's relationship with the court lead to unjustified delays in trials, poor quality expert results, and numerous criminal proceedings brought against forensic experts by the parties.

The forensic expert is put in the situation of studying the file alone, and having no judicial training, cannot see what is wanted. There are situations when he is sent simplistic, formal objectives that do not contain the problem to be solved. Also, the expert does not receive the action and the documents in the file (often very voluminous), but is obliged to copy them himself, for a fee, without any settlement of expenses.

Regarding the legal knowledge of the judicial experts, although Article 8 of the OG 2/2000 states as clearly as possible that the examination of the judicial technical expert is organized by the Ministry of Justice and has the purpose of verifying the level of knowledge of the future experts in the specialty for which they are applying, the degree of knowledge of the normative acts related to the respective specialty, of the provisions of the civil and criminal procedure codes related to expertise and of other normative acts regulating the activity of judicial technical expertise, the rights and obligations of the experts are not verified. For the forensic accounting expert the test is organised at CECCAR level.

- ✓ Lack of specialisation of magistrates in various technical and economic fields.
- ✓ Constraints/limitations exercised by filing criminal complaints against forensic experts, which do not refer to possible criminal acts, but only if one of the parties is not satisfied with the conclusions of the expert. These complaints have had the effect of intimidating the forensic experts, which has led to the conclusions being altered if objections to the objectives are raised.
- ✓ The professional competence of forensic experts, which implies the harmonious combination and use of knowledge, skills and abilities in order to achieve the results expected in the work, is very different from one field and speciality to another, taking into account that their evaluation is not optimal, as they are assessed at the level of a professional association and not as a whole. Training and further training are insufficient or unrelated to judicial activity, as is the case with CECCAR. With reference to legal knowledge, it is almost non-existent due to the lack of seminars on these topics, with serious implications for the preparation of accurate expert reports. The professional competence of forensic experts which affects the quality of forensic expertise is also due to the deficiencies in the organisation of forensic expertise.

In addition, 10% of the amounts collected by each expert are taken by the Ministry of Justice and deposited in a fund to finance the continuous professional training of legal experts, which creates a strong discontent among them.

- ✓ The lack of an audit of the quality of judicial expertise, an activity which is also included in the regulations of some professional associations.
- ✓ Lack of internal regulations on the classification of non-compliances of the activity of the forensic expert as working hypotheses: negligence in service, abuse of service, forgery. Although these offences are included as offences in the Criminal Code, the forensic expert, in drawing up the forensic report, tries to take advantage of his dependence. Integrity, although required by some regulations of professional associations, is considered one of the fundamental values of representatives of public institutions and authorities, who are obliged to declare any personal interests that may conflict with the objective exercise of their duties and not those of a liberal profession or independent profession. It can happen that the expert's conclusion is wrong because he did not have all the necessary evidence at his disposal, and when he reaches his conclusion, one of the parties or even the court may present other evidence that totally changes the conclusion.
- ✓ Lack of experts specialising in economic areas with current issues. Accountants can only partially cover criminal cases such as public procurement, EU funds etc.

In the same European Commission report under the CVM, it is underlined: "...these shortcomings in the resolution of court cases are very significant in comparison with practice in other Member States. Also, the judiciary has had difficulties in resolving complex financial cases definitively in court. This is particularly the case for cases involving public procurement, as this type of case is an exception to the generally positive trend in high-level corruption cases brought to court. Such cases require from prosecutors and judge’s special skills, developed through training, specialisation and external expertise. Under the conditions of a market economy and after our country's entry into the European Union, the internationalisation of accounting and the alignment with International Accounting Standards (IAS/IFRS) has been achieved in Romania.

3. CONCLUSIONS

Accounting has had to evolve with Romanian society, to be responsive to changes in the economic, political and social environment, shaping itself according to the requirements of the moment.

After 1989, the Romanian accounting system underwent a continuous process of modifications and changes aimed at facilitating understanding and improving the brevity of accounting operations by harmonising national accounting rules and regulations with international ones in general and European ones in particular.

In Romania, the main legal act that created the legal framework for the application of national accounting standards is the Accounting Law no.82/1991, which is constantly amended and supplemented to align national accounting standards with European Union directives and international accounting standards.

Accounting expertise and chartered accountants have been continuously aligned with the requirements of the National Accounting Standards in order to accurately reflect the actual accounting realities.

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SOCIO-DEMOGRAPHIC AND BEHAVIORAL DETERMINANTS OF TAX FRAUD AND TAX EVASION

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ABSTRACT: *The issue of tax fraud and tax evasion is complex. Aspects such as measuring these phenomena, methods of combating them, determinants, effects, etc., are studied. Determinants can be classified based on the nature of the empirical study: macro or micro. At macro level, estimating these phenomena is influenced by economic, macro-cultural, or institutional factors. Our study addresses micro-level aspects. We investigate socio-demographic and behavioral factors that could affect individuals' decisions to engage in illicit tax activities. Analyzing the rationales that support possible causal relationships with fraud and evasion can form the basis for empirical studies at the micro level.*

Keywords: *tax fraud, tax evasion, socio-demographic determinants, behavioral determinants*

JEL Classification: *G28, G41*

1. INTRODUCTION

In the current context, given the increasing complexity of the contemporary global economy, tax fraud are illicit fiscal phenomena with significant implications for tax fairness, efficient revenue collection, and the sustainable development of economies and societies. In the endeavor to understand and control these undesirable practices, the study of socio-demographic determinants and human behavior becomes an essential component. This multifaceted approach explores social, demographic, and psychological variables that may form the foundation for individual or group decisions to resort to tax fraud or evasion. This can shape an analytical framework necessary and effective for the development of prevention and combating strategies tailored to the specificities of each society or economy.

Socio-demographic factors, in a classic sense, refer to variables such as age, education, income, marital status, etc., and can be identified as essential determinants that have effects on taxpayers' attitudes toward complying with tax obligations. If the causal relationships of these factors with fraud and evasion are well-understood and measurable, profiles of social groups

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with different predispositions to comply or not with tax legislation can be delineated. Consequently, consciously tailored, and effective policies can be adopted.

Turning to human behavior, this brings up psychological factors, such as risk perception, trust in government institutions, or social norms. These theoretical aspects, for which there are various attempts at measurement through proxy variables, provide a more detailed insight into the individual motivations that underlie decisions to engage or not in illegal fiscal practices. Through theoretical investigation of causality of this nature, a better understanding of the psychology of fiscal behavior is reached. Consequently, more coherent strategies for education and awareness can be developed to address the root causes of tax fraud and evasion.

Moreover, the study of socio-demographic and behavioral determinants in the context of tax fraud and evasion can become a valuable tool for defining effective and equitable public policies. If reasoned through such an approach, vulnerabilities in the tax system can be identified. Additionally, a clear theoretical basis can be provided for the development of legislative strategies, as well as preventive strategies, that can consider the diversity and dynamics of contemporary societies and economies.

Therefore, considering the concrete reality of continuously changing economic and social challenges, studying socio-demographic determinants and human behavior becomes indispensable to develop innovative and efficient solutions in preventing and combating illicit fiscal phenomena. Only through such a comprehensive approach can a tax system be built primarily on fairness and responsibility, while successfully orienting itself towards the sustainable development of contemporary societies.

In our study, we will address the two categories of determinants separately in distinct sections. They will not merely be listed but analyzed separately, with discussions on the logic of the effects they can have on fraud and evasion. Our approach is accompanied by arguments drawn from economic theory, citing relevant bibliographic sources.

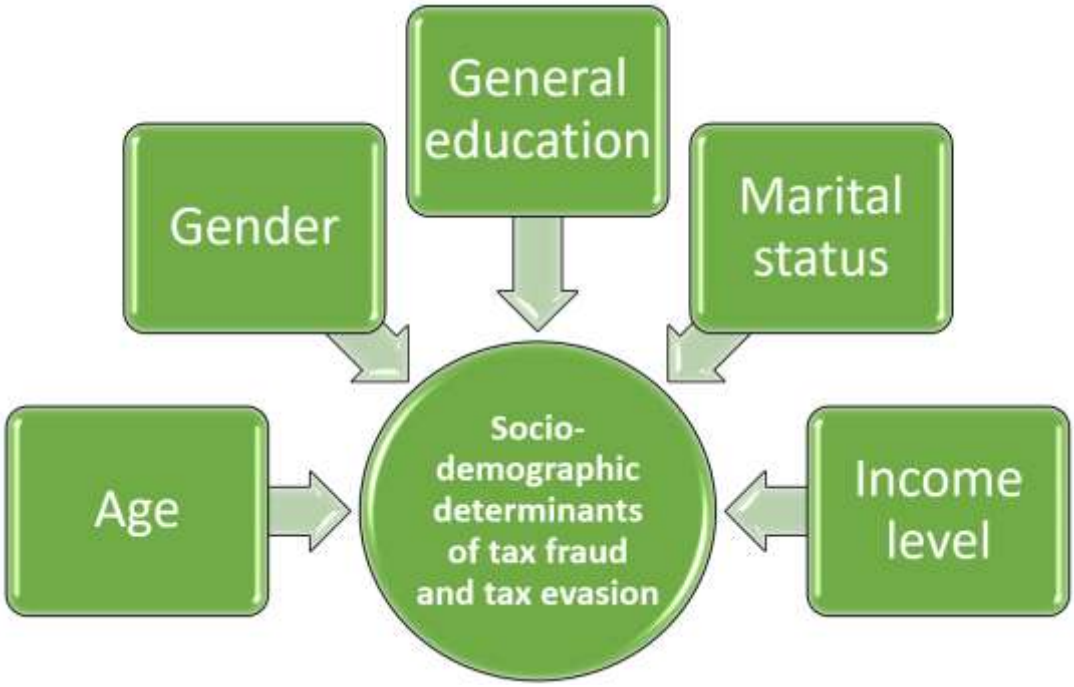
2. SOCIO-DEMOGRAPHIC DETERMINANTS OF TAX FRAUD

Fraud and tax evasion not only represent localized issues but can significantly impact a national territory. These illicit phenomena yield undesirable economic consequences, limit the capabilities of public authorities to provide services of broad community interest, and undermine the trust that the population places in the tax system. However, despite being a national problem, it is not uniformly prevalent among individual taxpayers. Efforts have been documented in the literature that seek to theoretically explain and statistically highlight the influence of factors such as age, gender, education, marital status, residency environment, income level, and socio-professional category on taxpayers' behavior concerning compliance with tax rules (see also Figure 1).

Age has been discussed in various studies as a determinant of tax fraud and evasion (Achim & McGee, 2023). Generally, estimation results have shown that younger individuals have a higher predisposition to engage in fraudulent tax practices than older individuals. There are also several theoretical arguments supporting these results. Younger individuals are generally less willing or able to understand the complex phenomena of taxation, so they may perceive fulfilling tax obligations as a burdensome task (Hofmann et al., 2017). Youthfulness can also manifest through a lack of tax experience, leading to errors or non-compliance in reporting income and expenses. Another type of behavioral argument is that older individuals exhibit an increased predisposition regarding the importance of their contribution to financing public services, such as pensions or healthcare services. Older individuals are more likely to be law-abiding, mainly due to the values and social norms accumulated throughout their longer lives. Therefore, there are logical rationales that can explain the results of empirical studies

identifying age as a statistically significant socio-demographic determinant of tax fraud and evasion at the national level.

Figure 1. Socio-demographic determinants of tax fraud and evasion



Source: own construction based on literature study

Gender has also been empirically identified as an influencing factor in fraudulent tax behavior (Achim & McGee, 2023). Different applications based on national databases have highlighted behavioral differentiations in fraud and evasion between men and women. Results generally show that men have higher probabilities than women to engage in evasive behaviors. Moderating factors have also been identified that can nuance the observed gender differences. One such moderating factor is income disparity, which is prevalent between genders in most economies. The fact that, in most cases, incomes, especially salary-related incomes, are lower for women than for men, compels them to feel increased pressure, constituting an incentive to reduce their tax contributions (Alarcón-García, Quiñones & Sánchez-Meca, 2015). Conversely, an opposing argument suggests that men generally have a higher level of confidence in their abilities, encouraging them to attempt to circumvent the tax system and avoid detection by authorities for their frauds or evasions. Other enhancing factors of the gender differences' effect on the probability of illicit fiscal actions are of a cultural and social nature. Without clearly specifying the direction in which they act, certain social norms favoring gender-specific tax behaviors can be identified. For example, in societies or economies where a strong emphasis is placed on gender equality, differences in illicit fiscal behaviors between women and men are less pronounced.

The level of *general education* is often considered a factor with a concrete impact on fraud and evasion (Achim & McGee, 2023). First and foremost, the most widely circulated argument is that individuals with a higher level of education are predisposed to be more aware of the implications of taxation and have a better overall understanding of the tax system (Holkova, 2023). Consequently, more educated individuals should exhibit a lower predisposition to engage in actions associated with tax fraud and evasion. Education can also act through perceptions of detection risks in the commission of illicit acts. Taxpayers with higher education levels generally have a higher awareness of the possible legal consequences

of evasive actions and also have an increased perception of the probability of being discovered. These characteristics discourage them from engaging in illicit fiscal behaviors. Education can also influence through the creation of ethical values and personal behavioral characteristics. Individuals with higher education can more accurately understand the role of tax elements in financing public services and may be more motivated to contribute to the general interest of society. As a result of all these arguments, education is capable of significantly influencing the fiscal behavior of individuals.

Marital status has also been identified as a factor influencing the individual probability of resorting to tax fraud or evasion. In general, both married individuals and those in longer-term relationships with a partner have a lower predisposition to engage in fraudulent tax actions compared to individuals without a stable partner or who are divorced (Vythelingum, Soondram & Jugurnath, 2017). The reasons behind marital status can be diverse. For example, married or long-term committed individuals are generally more interested in maintaining a socially favorable image, thus attempting to avoid legal issues. Consequently, this way of reasoning may lead them to higher fiscal responsibility. Another argument is of a legislative nature; in many jurisdictions, married individuals enjoy certain tax advantages, including (but not limited to) deductions for children or tax benefits for jointly owned properties. The effect of these provisions can be behavioral, meaning citizens more seriously involved in relationships may have a higher level of motivation to comply with tax rules to maximize tax savings.

Income level is arguably the most widely discussed individual socio-demographic determinant regarding its effects on the decision to commit tax fraud or evasion (Achim & Borlea, 2020). The most common result found in empirical literature shows that individuals with generally higher incomes tend to have lower predispositions for illicit fiscal behavior compared to individuals with less stable income sources or lower wage earnings (Agyeiwaa et al., 2019). The differentiations observed in applied studies can be explained by several logical arguments. A primary argument is that individuals with substantial earnings can afford to engage tax specialists who can advise them to maximize their tax issues legally. Additionally, generous incomes enable them to diversify investment options and tax planning, implicitly facilitating a reduction in the impact of taxes and levies on their gross income. Another argument is that individuals with lower, volatile, or uncertain incomes feel a higher exposure to financial pressures and often seek legal opportunities to reduce the tax burden to cope with current expenses. Relative poverty can thus incite them to engage in fraudulent or evasive behaviors, including underreporting income or overreporting expenses.

Consequently, fraud and evasion are complex issues, even just considering socio-demographic determinants such as age, gender, education, residency environment, marital status, income level, or socio-professional category. Understanding the mechanisms through which such factors act, their place, and timing of action can be of particular importance in developing effective tax policies and promoting tax compliance. If factors are well identified, and their effects are well quantified through quantitative methods, public authorities facilitate the task of developing superior strategies to combat fraud and evasion and to achieve the goal of ensuring a more equitable distribution of the tax burden within the economy.

3. BEHAVIORAL DETERMINANTS OF TAX FRAUD

In some academic sources, cultural and behavioral factors are treated together (Achim et al, 2019; Achim& Borlea, 2020) In our argumentation, we have chosen a separate approach primarily for pragmatic reasons. Both categories of factors characterize the individual. Cultural factors can prove to have homogeneous values from one individual to another within a society. This allows, through aggregation or the application of an average, to obtain indicators at the

national level that still have a high level of representativeness. On the other hand, behavioral factors (such as perception of tax inequality or tax education) can vary immensely from one individual to another, so aggregating them through an average would be statistically unrepresentative. Therefore, cultural factors can be empirically used as explanatory variables in cross-sectional studies at the international level, while behavioral factors can be almost exclusively used in micro-level studies, with the individual as the statistical unit. In our analysis, we investigate several factors likely to influence tax fraud and evasion, and we also discuss the logical connections through which they can be addressed within tax and compliance policies (see also Figure 2 for a schematic presentation of the factors).

Figure 2. Behavioral determinants of tax fraud and evasion

Source: own construction based on literature study

The *perception of fiscal inequity* is a behavioral factor, felt by individuals, and is mentioned in theoretical and empirical tax studies as the main behavioral determinant explaining the level of tax fraud and evasion (Achim et al, 2018). When individuals in a society perceive the tax system as unfair or unjust, there is an increased propensity for them to engage in actions associated with tax fraud and evasion (Alleyne & Harris, 2017). Injustice is not a concept that is so simple and can manifest in several forms. For example, tax obligations may be perceived as too high compared to the social benefits returned by public authorities. Taxes and levies may also be perceived as having too much arbitrariness or selectivity. In circumstances where a taxpayer perceives that their contributions are not used adequately to fund certain societal needs or that discriminatory criteria disadvantage them in the application of tax systems, they become less inclined to fully comply with tax legislation. However, whatever the manifestation of the perception of tax injustice, such an individual is more likely to resort to a certain form of tax system evasion (Alleyne & Harris, 2017). This issue is counteracted by public authorities, especially through actions aimed at improving the transparency of public activities related to the use of tax revenues. Possible measures may also include actions for a fairer application of tax laws. As image issues are also possible dialogues with taxpayers, as well as consulting their opinions when defining and implementing tax policies.

Perception of risk and punishment can also act through different actions on the fiscal behavior of individuals or economic entities. In circumstances where the taxpayer perceives a

low risk of being identified and exposed in the case of non-compliant fiscal behavior, and where sanctions are lenient, they will have a higher probability of resorting to practices associated with tax fraud or evasion (Stankevicius & Leonas, 2015). Conversely, when there are high values of the perception of the risk of detection, harsh sanctions, or both simultaneously, non-compliant fiscal behavior will be discouraged. Identifiable solutions are also available to regulatory public authorities. A straightforward way in theory is the very rigorous application of tax legislation and intensifying efforts to achieve compliance. Effective measures also include those focusing on the development of efficient systems for detecting evasive and fraudulent practices or legislating for firmer penalties and sanctions in cases of violations of tax rules. Thus, the perception that taxpayers have of risk and punishment is directly targeted.

Norms and social values are also considered by researchers to explain individual inclination toward tax fraud and evasion. In any society, there are, of course, norms and values, but their reinforcement and adherence in the community differ. When there are social norms supporting compliance with tax laws and fiscal ethics, taxpayers are less inclined to engage in illegal fiscal behaviors (Pickhardt & Prinz, 2014; Borlea et al, 2019). However, there are also societies, especially in less developed states, where illegal fiscal activities are not entirely disapproved by norms or are not socially undesirable, in which case taxpayers resort more frequently to tax fraud and evasion. If a decrease in illegal fiscal phenomena is desired, attention must be given to norms and social values; they must be promoted, respected, and set as examples of best practices in the community. Civil society can successfully support public authorities in such an endeavor, for example, through non-governmental organizations (NGOs) with concrete actions to educate the population about the importance of paying tax obligations and the importance of ethics in taxation. Such actions or even regularly conducted awareness campaigns can contribute to positive changes in social norms regarding human behavior in taxation.

Knowledge and fiscal education are also determinants of overall fiscal behavior or certain components. Individuals who, through various means of information, have reached a higher level of understanding of the role, organization, and functioning of the tax system and their tax obligations usually have an additional motivation to comply with tax laws. Conversely, minimal tax knowledge can lead to errors in reporting income and expenses, as well as incorrect understandings of the legal consequences of illegal tax activities (Oz Yalama & Gumus, 2013). Fortunately, the issue is solvable; public authorities have numerous opportunities to invest time and material and human resources to increase tax education levels. There is also the option of using specific assistance programs, tax guides, or on-demand tax consultancy to increase tax compliance levels.

Financial motivation is also addressed in the literature, more theoretically than empirically, to explain the level of fraud and evasion reached. If individuals and economic entities contributing to the tax system perceive it as possible or even very likely to obtain financial benefits through illegal tax actions, there will be an increased individual or collective predisposition to engage in these types of fraudulent behaviors (Ritsatos, 2014). It becomes possible for fraud or evasion to contribute to rapid financial benefits for a particular taxpayer, and defrauding the tax system can lead to the achievement of financial advantages through illegal or immoral means. To address this delicate issue, public authorities have the opportunity to direct efforts toward reducing the kind of financial motivation that is highly likely to lead to fraud and evasion. It may require very substantial efforts, including restructuring government tax structures, to increase fairness and reduce opportunities for fraud and tax evasion. There are even other possibilities, simpler to organize, such as providing material and moral incentives from authorities to taxpayers who have complied with tax regulations and encouraging taxpayers to report observed tax fraud to other individuals or economic entities.

Looking at the individual level, we enter a very complex behavioral world, with a multitude of possible influencing factors on financial behaviors. For these factors, theoretical and logical explanations and reasoning are easier to articulate than to use in applications. First of all, macro-level factors are currently excluded due to the difficulty of aggregating such indicators at the population or community level. Instead, micro-level empirical studies are possible through surveys and samples. However, there are difficulties in obtaining relevant data, statistical representativeness, accuracy of responses from interviewees, etc. Nevertheless, even without large-scale empirical studies, which are currently lacking in the literature, we already know that the efficient approach to illegal tax phenomena requires a combination of interventions by authorities, such as improving tax transparency, rigorous enforcement of tax laws, promoting social norms that support compliance with tax laws, tax education of citizens, and reducing financial motivation for illegal fiscal behaviors. Even though it largely relies on theoretical assumptions, by addressing these factors, public authorities can develop more coherent, ethical, and effective tax policies and ensure a fairer distribution of the tax burden among taxpayers.

4. CONCLUSIONS

While fraud and evasion are viewed as national issues, among taxpayers, there are huge differentiations in their usage. These differences can be explained, among other things, by certain socio-demographic factors with a significant impact on individuals' fiscal behavior. Age, for example, plays a role here; younger individuals tend to have a higher predisposition to engage in fraudulent fiscal behaviors due to a lack of tax experience and the perceived difficulty of the tax task. Gender can also be quite decisive; generally, males have a higher probability of engaging in evasive behaviors than females. Conversely, income differences between genders can exacerbate this tendency, as the usually lower incomes of women may encourage them to reduce tax contributions. Individuals with higher general education levels may have, though not exclusively, a better understanding of the tax system and the risks associated with illegal tax activities. The same category is more aware of the legal consequences of evasive behavior, leading to lower probabilities of involvement in such illicit activities. Married or involved individuals in more serious relationships tend to have a lower predisposition to engage in activities associated with tax fraud, as they are more motivated to avoid legal problems and, conversely, to benefit from the tax advantages offered to married couples. Individuals with higher incomes tend to have a lower predisposition for tax fraud, possibly because they can afford to consult tax specialists and invest in legal tax planning. Socio-demographic factors are relatively easy to quantify and observe, but they are only usable in micro-level approaches, with data available from surveys and samples.

The behavioral determinants of tax fraud and evasion identified in the literature cannot be aggregated to create national-level indicators, especially due to the enormous variability from one individual to another. Therefore, they are only usable in empirical micro-level analyses. The perception of tax unfairness is generally considered the most powerful individual behavioral determinant. Tax unfairness can be seen in various ways, either through taxes perceived as too high in relation to the social benefits offered or the perception that taxes are applied discriminatorily. The perception of risk and punishment manifests itself in that when taxpayers perceive a low risk of being discovered or receiving mild sanctions for not complying with tax laws, there is a higher probability that they will resort to fraud and evasion. Social norms and values are also significant; communities that promote compliance with tax laws and fiscal ethics have higher proportions of taxpayers less predisposed to tax non-compliance. The level of knowledge and tax education are also determinants of compliance; well-informed and tax-educated citizens have a higher motivation to comply with tax laws. Through financial

motivation, if taxpayers believe they can obtain significant financial benefits through tax fraud or evasion, they are more likely to engage in such illegal behaviors.

In conclusion, the investigation of so many different factors reveals that the issue is complex. This fact opens continuous research opportunities, as the topic is far from being exhausted. For example, some determinants have only been theoretically investigated, with no empirical studies confirming or refuting their effects on tax fraud and evasion. Moreover, there is always room for the use of innovative statistical and econometric methods, which can either yield different results than those obtained so far or nuance the results from previous studies.

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INVESTMENT TRENDS IN THE GLOBAL, EUROPEAN AND ROMANIAN ECONOMIES IN 2022

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ABSTRACT: *Following the series of atypical and impactful years, including the 2020 COVID-19 pandemic, 2022 emerged as another year that shook global politics, sending economic shockwaves worldwide. It is natural for Foreign Direct Investments (FDI), a key globalization vector, to react to these shocks. This article aims to provide a comprehensive overview of the investment sensitivity levels in the global, European, and Romanian economies. It analyzes the macroeconomic impact of the Ukraine war and other external and internal factors on the dynamics of FDI globally, within the EU, and specifically in Romania. Was the context of 2022 inhibiting or encouraging for private investors? The answer is complex and not universally applicable, requiring a thorough analysis of the global economy, continents, and our country.*

Keywords: *Foreign Direct Investment, new FDI projects, sustainable investment, Ukraine war*

JEL Classification: *D25, E22, F21*

1. INTRODUCTION

Undoubtedly, 2022 will be remembered as the year of the beginning of the Russian invasion in Ukraine, a year with profound economic, financial, social, and strategic-military implications globally and especially in Europe. This phenomenon will continue to have economic repercussions in the near future. The international economic environment, already significantly impacted by the COVID-19 pandemic in 2020-2021, continues to operate under risk, uncertainty, prudence, and opportunities due to at least two ongoing wars, in Ukraine and the Middle East. A politically and economically intriguing, if not explosive, situation!

2. GLOBAL FDI TRENDS IN 2022

Global Foreign Direct Investments (FDI) declined by 12% in 2022, reaching $1.3 trillion. This decline was primarily due to lower financial flows and transactions in developed countries. However, real investment trends were more positive, with announcements of new investment projects in most regions and sectors.

FDI in developing countries saw a marginal increase, with growth concentrated in a few large emerging economies. In many smaller developing countries, entries remained stagnant, and FDI in the Least Developed Countries (LDC) decreased.

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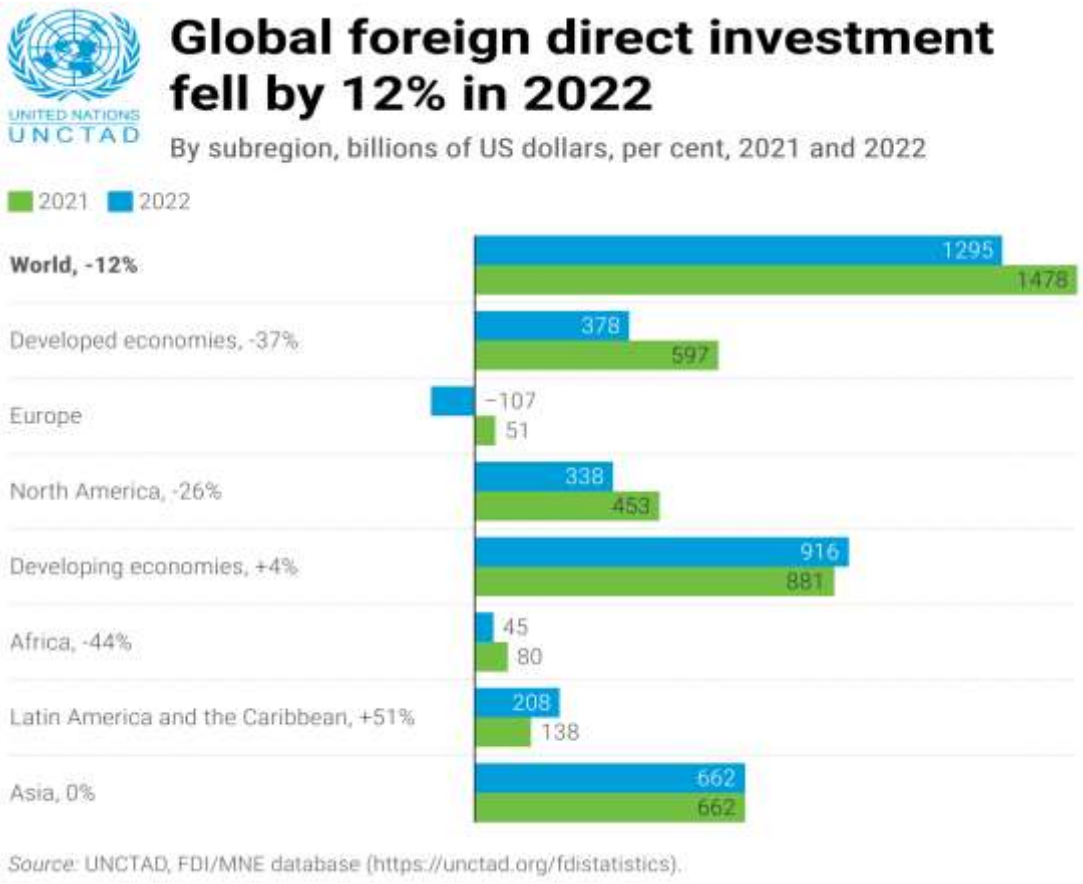
Industrial trends showed an increase in projects in infrastructure and industries facing supply chain restructuring pressures, including the electronics, automotive, and machinery sectors. Three of the five largest investment projects were announced in the semiconductor industry in response to the global chip shortage. Investments in the digital economy sectors slowed down after the growth observed in 2020 and 2021. The number of investment projects in the energy sector remained stable, temporarily alleviating concerns about the declining trend in fossil fuel investments due to the energy crisis.

Factors Impacting FDI in 2022

The slowdown in FDI growth was driven by the global polycrisis: the war in Ukraine, high food and energy prices, and debt pressures. International project financing and cross-border mergers and acquisitions were particularly affected by tighter financing conditions, rising interest rates, and market uncertainties. The global environment for international business and cross-border investments remains challenging in 2023. Although the economic currents shaping investment trends in 2022 have somewhat calmed, they have not disappeared entirely. Geopolitical tensions remain high, and recent disruptions in the financial sector have added uncertainty for investors. UNCTAD predicts that downward pressure on global FDI will continue in 2023. Early indicators for Q1 2023 show weak trends in international project financing and cross-border mergers and acquisitions. However, trends in direct investments in infrastructure appear to counterbalance positively. The number of project announcements increased by 15% in 2022, and data for Q1 2023 also show resilience. Trends in international investments in productive real assets are, therefore, more positive than the basic FDI data suggests.

Regional Highlights

1. **Africa:** FDI returned to 2019 levels at $45 billion after abnormally high levels in 2021, driven by a single financial transaction. Greenfield project announcements increased by 39%, and international project financing transactions rose by 15%. The energy sector, both extractive and energy production, recorded the highest growth.
2. **Asia:** FDI in developing Asia remained stable at $662 billion, still representing over half of global FDI. India and the Association of Southeast Asian Nations (ASEAN) were the most receptive, with 10% and 5% growth, respectively, and a significant increase in project announcements. China, the world's second-largest FDI host country, experienced 5% growth. FDI in the Gulf States declined, but the number of greenfield project announcements increased by two-thirds.
3. **Latin America and the Caribbean:** Flows increased by 51% to reach $208 billion, the highest level ever recorded. High commodity prices led to increased reinvested earnings of foreign subsidiaries in extractive industries. Project growth across the region was more modest, with 14% more greenfield project announcements and a decrease in international project financing transactions.



FDI flows to structurally weak and vulnerable economies declined. While there was overall growth in developing countries, FDI in the 46 least developed countries (LDC) decreased by 16% to $22 billion, less than 2% of global FDI. Greenfield project announcements for LDCs recovered ground after the decline in 2020-2021 but remained significantly below their 10-year average. Developing countries without access to the sea and small island developing states experienced slight increases in FDI.

This analysis provides a glimpse into the complex global economic landscape of 2022, marked by various challenges and opportunities, shaping investment patterns in the coming years.

3. FOREIGN DIRECT INVESTMENT (FDI) IN EUROPE IN 2022: A COMPREHENSIVE OVERVIEW

According to Ernst & Young's predictions, Europe's investment attractiveness is increasing despite strong competition from the USA and China, and this trend is expected to continue over the next three years.

"Europe remains competitive in attracting direct foreign investments from within the continent, the USA, and other regions. The effects of the war have been significant for companies with a presence in Europe, from the accelerated rise in energy and commodity costs to economic sanctions, social tensions, and increased risks of cyber-attacks. However, it's heartening to see that investors can look beyond these challenges and consider Europe an attractive destination for long-term investments." (Bogdan Ion, EY Romania&Moldova Country Managing Partner/ EY CESA Chief Operating Officer)

Amid the economic and financial challenges caused by the COVID-19 pandemic and later the energy price crisis due to the war in Ukraine, analyses have shown that Foreign Direct Investments (in terms of project numbers) in Europe stagnated in 2022, growing only by 1% compared to 2021. They remained 7% lower than in 2019, before the COVID-19 pandemic, and 10% below the peak in 2017, as stated in the EY European Attractiveness Survey 2023, published in May 2023. Although 67% of investors - compared to 53% in 2022 - declare plans to establish or expand operations in Europe in 2023, they have expressed serious concerns regarding threats to political instability, rising costs, regulatory burdens, and the unavailability of people with suitable skills.

The creation of jobs through FDI in Europe decreased by 16% in 2022 compared to 2021. The geopolitical impact, energy crises, and economic challenges are even more apparent concerning employment: the number of jobs created in Europe in 2022 by foreign investors decreased by 16%. This decline indicates investors' caution in the face of uncertain markets and, for some, significant efforts to streamline their activities.

Key Sector: IT Services - Top Preference of Foreign Direct Investors

The most important sector for FDI projects in 2022 was software and IT services, growing by 8% - twice the growth rate of 2021 - and representing 20% of the total projects. This was followed by business services and professional services, growing by 27%.

The top three major economies in Europe, France, the United Kingdom, and Germany, continued to attract the majority of FDI flows, representing 50% of total projects. However, in 2022, their performance was reduced: FDI projects increased by 3% in France but decreased by 1% in Germany and 6% in the United Kingdom.

Country-wise Performance

1. **France:** The performance of France (1,259 projects in 2022, +3%) was boosted by economic agreements and reforms initiated by President Macron years ago, from which they are now reaping the benefits. The turbulent social situation in France and the efforts of the French government to manage high public debt and an unemployment rate of 7% should also be considered.
2. **United Kingdom:** The UK's performance likely reflects an eclectic combination of factors: inflation and energy prices, political uncertainty in 2022, and the ongoing impact of Brexit. As a leader in investments and financial services, the UK had the highest number of jobs associated with its projects and secured the second position in the European FDI ranking.
3. **Germany:** Tight supply chains, high wages, and production costs limit the ability to attract FDI projects (only 832, despite being Europe's number one economy).

In Western Europe, companies reduced their investment pace in Belgium (-4%) and Spain (-10%) in 2021, while Ireland recorded a substantial growth (+21%).

In Southern, Central, and Eastern Europe, the strong performance of countries like Italy (17% compared to 2021), Poland (+23%), Portugal (24%), Romania (+86%), and Turkey (+22%) illustrates their comparative advantage as low-cost countries, making them compelling destinations in the race for large investments in production and back-office operations.

Table 1. Summary of Major Euopean Countries' Performance

Country	Number of Projects in 2022	Number of Projects in 2021	Change 2021/22	Number of Jobs in 2022
France	1,259	1,222	+3%	38,102
UK	929	993	-6%	46,779

Country	Number of Projects in 2022	Number of Projects in 2021	Change 2021/22	Number of Jobs in 2022
Germany	832	841	-1%	33,548
Spain	324	361	-10%	39,104
Turkey	321	264	+22%	13,677
Portugal	248	200	+24%	21,944
Italy	243	207	+17%	20,313
Poland	237	193	+23%	18,483
Belgium	234	245	-4%	8,071
Ireland	184	152	+21%	23,371
Netherlands	147	151	-3%	1,334
Finland	104	124	-16%	3,755
Austria	101	103	-2%	2,913
Serbia	74	73	+1%	16,018
Romania	69	37	+86%	6,460
Total	**5,962**	**5,877**	**+1%**	**343,634**

Source: https://www.ey.com/ro_ro/news/2023/5/

These trends reveal both the resilience and challenges faced by Europe in attracting foreign investments, emphasizing the dynamic nature of the region's economic landscape.

4. FDI TRENDS IN ROMANIA IN 2022

Investor Preference and Performance

Despite challenges posed by the ongoing pandemic and the situation in Ukraine, Romania remained a preferred destination for investors in Eastern Europe. In 2022, the country ranked 16th out of 32 countries as one of the most attractive investment destinations, surpassing countries like Hungary and the Czech Republic and closely following Poland. 56% of foreign companies established or expanded their operations in Romania, placing the country fourth alongside France and behind Portugal, Lithuania, and the United Kingdom.

FDI Inflows and Sector Preferences

Romania experienced a record net inflow of foreign direct investments (FDI) amounting to 10,039 million euros in 2022, a 12.3% increase from the previous year. Detailed statistics indicated a preference among foreign investors for industries, trade, financial intermediation, and insurance sectors. The net FDI balance reached an all-time high of 107,944 million euros by the end of 2022, with 65.8% representing investments in Greenfield enterprises, indicating new projects and job creation.

Top Investor Countries

Germany maintained its position as the leading foreign investor in the Romanian economy, accounting for 14.9% of the total FDI balance. Austria, France, Italy, the United States, and the Netherlands followed, each with FDI balances exceeding 5,000 million euros.

Economic Growth and Employment

In 2022, Romanian enterprises experienced a significant increase in turnover, reaching 273,335 million euros, a 30.2% rise compared to 2021. This growth was influenced by substantial increases in energy prices due to the conflict in Ukraine. Despite challenges, Romanian enterprises increased their workforce by 2.6% compared to the previous year, reflecting the expansion and consolidation of operations at the national level.

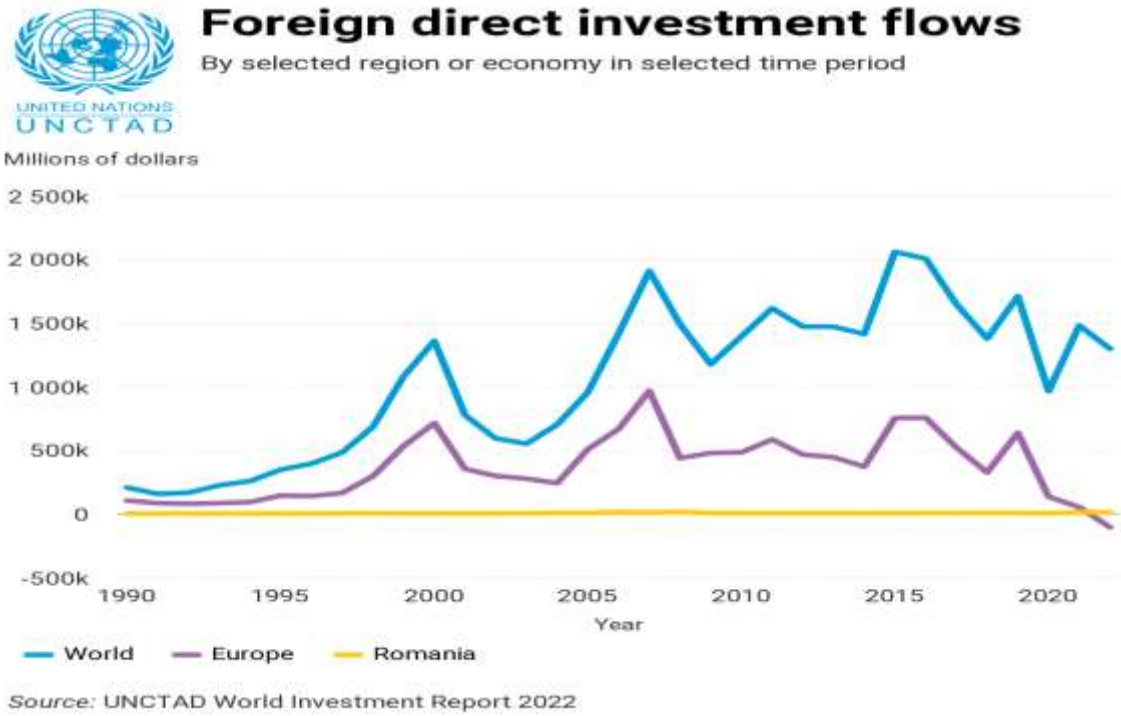
Competitiveness Challenges

Romania's historical attractiveness to investors, driven by favorable fiscal policies, cheap labor, and low energy prices, faced challenges due to rising energy costs and a deepening labor shortage caused by the conflict in Ukraine. The country's relative stability, however, continued to attract investors. Nevertheless, there were concerns about a potential reduction in investments in the coming years due to these challenges.

Future Prospects and Relocation Opportunities

Despite challenges, Romania remained optimistic about future investments, particularly due to the prospect of increased funding from the European Union. Romania's strategic position in Europe made it an attractive destination for companies relocating from conflict-affected regions like Ukraine. The country's ability to attract these businesses could be crucial in mitigating the impact of future disruptions.

The data from 2022 highlighted Romania's resilience in the face of challenges and its attractiveness to foreign investors. While concerns about energy prices and labor shortages persisted, Romania's strategic advantages and active efforts to attract investments positioned it as a competitive player in the European market.



Source: UNCTAD World Investment Report 2022

5. CONCLUSION

Despite the uncertainties and challenges of 2022, Europe managed to preserve its attractiveness for investments, with investor sentiment mostly stable across the continent. Europe's high living standards, skilled workforce, and robust infrastructure continued to be major attractions. However, investor concerns about geopolitical tensions and economic stability affected the FDI landscape, leading to caution among investors. The European market faced competition from other regions, notably Asia and North America. Asia's rapid recovery from the pandemic and its resilient economic growth drew attention away from Europe, while North America remained an attractive destination for technology and innovation investments. Europe's investments were influenced by geopolitical tensions, global supply chain disruptions, and changing consumer behavior due to the ongoing pandemic. Despite these challenges, Europe managed to maintain a favorable investment environment, emphasizing sustainable development, innovation, and digitalization. Investment projects in Europe were diverse, covering sectors such as automotive, technology, healthcare, and renewable energy. Greenfield investments and expansions of existing businesses were prominent trends, indicating confidence in Europe's economic recovery and future prospects. The EU's commitment to climate goals and sustainable practices further enhanced its attractiveness for green investments. Romania, as an EU member state, experienced a mix of challenges and opportunities in its FDI landscape in 2022. Despite uncertainties related to the energy crisis and geopolitical tensions, Romania attracted investments in sectors such as manufacturing, technology, and renewable energy. The country's skilled workforce, strategic location, and EU membership continued to be strong assets, attracting investors looking for stable opportunities in Eastern Europe. The government's efforts to improve the business environment and infrastructure also contributed to Romania's appeal. Challenges such as inflation, energy price fluctuations, and supply chain disruptions affected investor confidence, leading to careful investment decisions. However, the overall sentiment remained positive, with investors expressing interest in long-term partnerships and collaborations. The resilience of the Romanian economy and its ability to navigate global challenges made it an attractive destination for FDI in 2022. The government's role in supporting businesses and facilitating investments played a crucial part in maintaining investor confidence. Romania's FDI landscape reflected the broader trends in Europe, with a focus on sustainable development, technology, and innovation. The country's ability to adapt to changing market dynamics and prioritize key sectors for investment positioned it as a competitive player in the European FDI landscape. As the global and regional economies continued to evolve, Europe, including Romania, remained a vital hub for international investments, driven by innovation, talent, and a commitment to sustainable growth.

Despite the challenges posed by the global polycrisis, Europe and Romania managed to maintain their attractiveness for Foreign Direct Investments in 2022. The region's stability, skilled workforce, and commitment to sustainable development played key roles in preserving investor confidence. While uncertainties related to the Ukraine conflict, energy crisis, and supply chain disruptions influenced investment decisions, Europe's resilient economy and diverse market opportunities remained appealing to investors. The trends observed in 2022 indicated a cautious yet optimistic approach from investors, emphasizing the importance of long-term partnerships and sustainable practices. As the global landscape continued to change, Europe and Romania adapted to emerging challenges, showcasing their ability to navigate complex situations and provide stable investment environments. Looking ahead, the resilience demonstrated by Europe and Romania in 2022 positions them as promising destinations for Foreign Direct Investments, with opportunities for growth, innovation, and collaboration.

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METHODOLOGIES FOR ESTIMATING THE FINANCIAL WORKING CAPITAL OF ECONOMIC OPERATORS

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ABSTRACT: *The current relevance of managerial concerns for the consolidation and development of businesses necessitates a scientific logic to underpin the best decisions that ensure the financial balance required for a healthy economic and financial state. This major goal can only be achieved by adopting viable methodological solutions based on an appropriate statistical-mathematical logic. In this context, practical methods are presented for determining the necessary working capital*

Keywords: *Financial balance, financial working capital, elasticity coefficient, regression equation, forecast*

JEL Classification:

1. INTRODUCTION

The analysis of financial balance is a current field for decision-makers whose essential objective is to ensure the functioning of the economic agent they administer under conditions of financial performance

Financial balance is studied based on information synthesized in the funding table (financial statement), both in the long term, by taking into consideration permanent needs and resources, and in the short term, considering current needs and resources. The two types of financial balances are mutually conditioned, meaning that short-term financial balance is at the same time a prerequisite for long-term financial balance, and vice versa. The financial working capital, through its content and financial function of covering a portion of the value of current assets, as well as the presence of a financial working capital of an appropriate size for the conduct of the economic process, ensures a functional financial balance and, consequently, the fulfillment of the main objectives of the economic agent:

a - avoiding financial deadlock and ensuring the continuity of financial resource flows regarding receipts and payments.

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b - achieving the economic program, production, and turnover, under the conditions of an effective structure of current assets consisting of inventory, receivables, cash on hand (cash and bank accounts), and short-term financial investments, as well as prepaid expenses. Inventories should ensure the continuity of economic processes, cash availability should fulfill the current role of paying due debts, and receivables should not immobilize financial resources for irrational periods of time, and also, they should be relatively equivalent to current liabilities to suppliers.

c - achieving a net result for the financial year (profit) and a financial profitability rate that meets the expectations of decision-makers for the implementation of the economic policy of consolidating and developing the business.

In the context of this typology of analysis, both the financial working capital or permanent working capital, in both absolute size and relative size in relation to temporary needs constituted by current assets (circulating assets and prepaid expenses), hold a crucial position. They are closely interdependent with the magnitude of management indicators such as turnover, production of the period, added value, as well as with indicators expressing financial performance, such as the turnover rate of current assets, the degree of indebtedness expressed through debts to be paid over a period longer than one year relative to equity, and the level of financial autonomy measured by relating equity to permanent capital.

If it is observed that over several previous financial periods, *the ratio between working capital* and *turnover* shows stability within a range of 5 percentage points, alongside a balanced financial state (working capital and working capital requirements remain at a relatively equal level), or in conditions of financial performance confirmed by a financial profitability rate exceeding the average interest rate calculated for one-year term deposits, it is opportune to proceed with projecting the absolute level of working capital for the upcoming period based on changes in turnover. This can be done using the *coefficient of elasticity method* or by applying the *regression method.*

2. METHODOLOGIES FOR ESTIMATING THE FINANCIAL WORKING CAPITAL OF ECONOMIC OPERATORS

This methodology for analyzing and estimating working capital based on turnover is also known as the global method, and we illustrate it based on the situation presented in Table 1.

Table 1. The dynamics of working capital and turnover

Year	Working capital (FR) (mil. lei) *y*	Turnover (CA) (mil. lei) *x*	$r_i = \frac{FR_i}{CA_i} \cdot 100$	Calculated Deviations based on a chain basis (percentage points) $\Delta = r_i - r_{i-1}$
1	27,667	114,800	24,1	-
2	30,119	126,550	23,8	-0,3
3	36,920	162,644	22,7	-1,1
4	44,172	196,320	22,5	-0,2
5	48,686	225,400	21,6	-0,9
6	51,706	251,000	20,6	-1,0
7	52,912	267,230	19,8	-0,8
8	55,229	287,650	19,2	-0,6
9	57,912	308,040	18,8	-0,4
10	61,882	332,700	18,6	-0,2

The deviations calculated in the last column of table 1 show a general trend of successive decrease in the ratio r = FR/CA, confirming a process of leading the increase in working capital over the increase in turnover, thus illustrating a subunitary elasticityWhile the turnover increased by 189.8% in year 10 compared to year 1, $\left[\frac{332.700}{114.800}\cdot 100-100=+189{,}8\%\right]$, the working capital recorded a relative increase of 123.7%, $\left[\frac{61.882}{27.667}\cdot 100-100=+123{,}7\%\right]$, Therefore, with a relatively smaller working capital, a higher turnover was achieved.

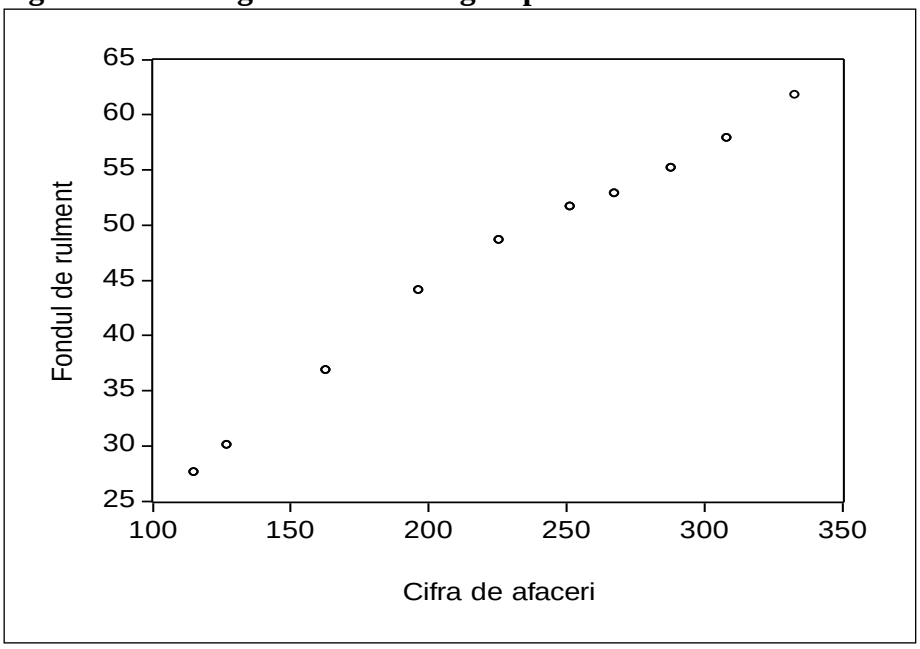
This numerical finding succinctly expresses a stable economic and financial activity that can favor profitability growth, as well as enhance the financial possibilities for consolidation, solvency, and economic development. Thus, it justifies expanding the analysis to fulfill the objective of estimating the working capital needed for the next year's operating economic cycle.

The proposed analysis takes into account the completion of successive work stages which are presented below:

1) The mathematical confirmation of the statistical relationship between the dynamics of working capital and the dynamics of turnover is based on estimating the regression equation, as well as assessing the correlation strength using the correlation ratio.

The determination of the regression equation is meant to formalize analytically the interdependence between turnover as an independent variable and working capital as a dependent variable, eliminating the influence of non-essential factors.

Figure 1. Correlogram of Working Capital in Relation to Turnover



The correlogram of working capital in relation to turnover (Figure 1) allows us to appreciate that there is a linear correlation between the two phenomena, which is expressed analytically by the equation: y = a + bx.

By using the method of least squares, the estimation of the parameters in the regression equation is carried out, which is considered as the analytical expression of the interdependence between working capital and turnover.

It results in the system of equations:

$$\begin{cases} \Sigma y = na + b\Sigma x \\ \Sigma xy = a\Sigma x + b\Sigma x^2 \end{cases} \rightarrow \begin{cases} 467{,}205 = 10a + 2.272{,}334b \\ 114.070{,}064 = 2.272{,}334a + 567.727{,}04b \end{cases}$$

Solving the system of equations provides the following results:

$$a = \frac{\begin{vmatrix} 467{,}205 & 2.272{,}334 \\ 114.070{,}064 & 567.727{,}04 \end{vmatrix}}{\begin{vmatrix} 10 & 2.272{,}334 \\ 2.272{,}334 & 567.727{,}04 \end{vmatrix}} = 11{,}75549 \quad b = \frac{\begin{vmatrix} 10 & 467{,}205 \\ 2.272{,}334 & 114.070{,}064 \end{vmatrix}}{\begin{vmatrix} 10 & 2.272{,}334 \\ 2.272{,}334 & 567.727{,}04 \end{vmatrix}} = 0{,}153873$$

The calculated regression equation is: y_c **= 11,75549 + 0,153873** x

Table 2., with intermediate calculations

Year	Working capital (WC) (mil. lei) y	Turnover (CA) (mil. lei) x	yx	x^2
1	27,667	114,800	3.176,172	13.179,04
2	30,119	126,550	3.811,559	16.014,90
3	36,920	162,644	6.004,816	26.453,07
4	44,172	196,320	8.671,847	38.541,54
5	48,686	225,400	10.973,820	50.805,16
6	51,706	251,000	12.978,210	63.001,00
7	52,912	267,230	14.139,670	71.411,87
8	55,229	287,650	15.886,620	82.742,52
9	57,912	308,040	17.839,210	94.888,64
10	61,882	332,700	20.588,140	110.689,30
Total	467,205	2.272,334	114.070,064	567.727,04

The actual levels of working capital (y), the estimated levels of working capital obtained through the application of the linear regression equation (yc), the residual series, and their arrangement are presented in Table 3.

Table 3. The situation of actual and estimated working capital

Year	Working capital (WC) (mil. lei) Y	Turnover (CA) (mil. lei) x	Residual series $u = y - y_c$	The range of the residual term
1	27,667	29,4201	-1,75307	| *, | , |
2	30,119	31,2281	-1,10908	| , * | , |
3	36,920	36,7820	0,13804	| , |* , |

4	44,172	41,9638	2,20823	| , | , *|
5	48,686	46,4384	2,24761	| , | , *|
6	51,706	50,3775	1,32847	| , | *, |
7	52,912	52,8749	0,03712	| , * , |
8	55,229	56,0170	-0,78796	| , * | , |
9	57,912	59,1544	-1,24243	| ,* | , |
10	61,882	62,9489	-1,06693	| , * | , |
Total	467,205	467,2050	0,00000	

The analyzed correlation system is characterized by a very high magnitude of the correlation ratio: $R_{y.x} = \sqrt{R^2_{y.x}} = \sqrt{0{,}984366} = 0{,}99215$

The value close to one of the correlation ratio attests to the existence of a very strong correlation between working capital and turnover, also providing a reliable basis for calculating the estimate of working capital for the next year, using both the elasticity coefficient method and the extrapolation variant of the regression from the previous 10 years.

It is mentioned that the statistical significance of the correlation ratio is confirmed based on the **"F Criterion",** being significantly different from zero, with a probability of at least 95%, as shown in the summary table of results presented in Table 4.

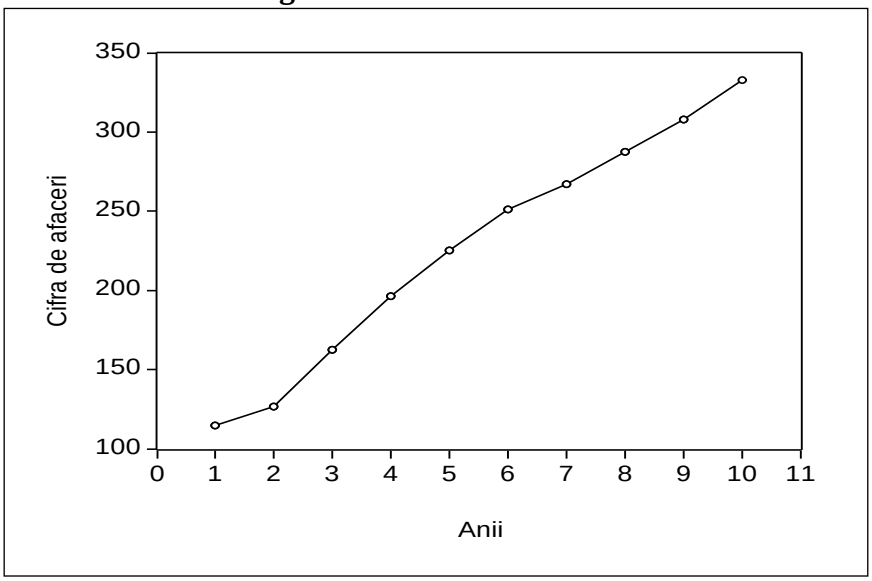
Table 4. The summary table of results attesting to the viability of the linear correlation model between working capital and turnover

Dependent variable: Working capital				
Method of Least Squares				
Analysis period: 2001 – 2010; Number of observations: 10.				
Variables	Coefficient	Standard error of the coefficient.	*t*-Statistic	Probability (significance level)
b (regression coefficient)	0,153873	0,006856	22,44362	0,0000
a	11,75549	1,633572	7,196189	0,0001
Coefficient of determination: $R^2_{y.x}$	0,984366	Mean of the dependent variable		46,72050
Adjusted coefficient of determination	0,982412	The standard deviation of the dependent variable		11,71779
Estimated standard error of the regression equation.: $\hat{\sigma}_{y,y_c}$	1,554005	Criterion of statistical information Akaike		3,896404
Sum of squares of the error term.	19,31945	Schwarz's Bayesian Information Criterion		3,956921
Log likelihood	-17,48202	*F*-statistic		503,7160
Durbin-Watson statistical coefficient.	0,501451	Probability (significance level for F-statistic)		0,000000

Note: *The results presented in the summary table of results are obtained using the EViews software program.*

2) *The statistical adjustment and extrapolation of turnover evolution, based on the linear trend equation – xc = a + b t - as the turnover schedule suggests a linear trend (Figure 2) - using the method of least squares.*

Figure 2 Turnover timeline



` The estimation of parameters in the linear trend equation is carried out using the method of least squares, which leads to the system of equations:

$$\begin{cases} \Sigma x = na + b\Sigma t \\ \Sigma xt = a\Sigma t + b\Sigma t^2 \end{cases} \rightarrow \begin{cases} 2.272{,}334 = 10a + 55b \\ 14.545{,}282 = 55a + 385b \end{cases}$$

From this, the following values for the parameters of the trend equation result:

$$a = \frac{\begin{vmatrix} 2..272{,}334 & 55 \\ 14.545{,}282 & 385 \end{vmatrix}}{\begin{vmatrix} 10 & 55 \\ 55 & 385 \end{vmatrix}} = \frac{874.848{,}59 - 799.990{,}51}{3.850 - 3.025} = \frac{74.858{,}08}{825} = 90{,}73707$$

$$b = \frac{\begin{vmatrix} 10 & 2.272{,}334 \\ 55 & 14.545{,}282 \end{vmatrix}}{\begin{vmatrix} 10 & 55 \\ 55 & 385 \end{vmatrix}} = \frac{145.452{,}82 - 124.978{,}37}{825} = \frac{20.474{,}45}{825} = 24{,}81752$$

The equation of the linear turnover trend is: x_c = 90,7307 + 24,81752 *(t)*

Based on the linear trend, the estimated average level of turnover forecasted for year 11 is calculated.:

$x_{c\ (11)}$ = 90,73707 + 24,81752 (11) = 363,7298 mld. RON

Tabelul 4. The dynamics of turnover (actual levels and estimated levels based on the trend equation)

Year	Time variable t	t^2	xt	Turnover (CA) (real levels) - mil. lei- x	Turnover (Estimated levels based on the linear trend equation) x_c = 90,73707 + 24,81752 (t) - mil. lei-
1	1	1	114,800	114,800	$x_{c\,(1)}$ = 90,73707 + 24,81752 (1) = 115,554
2	2	4	253,100	126,550	$x_{c\,(2)}$ = 90,73707 + 24,81752 (2) = 140,372
3	3	9	487,932	162,644	$x_{c\,(3)}$ = 90,73707 + 24,81752 (3) = 165,190
4	4	16	785,280	196,320	$x_{c\,(4)}$ = 90,73707 + 24,81752 (4) = 190,007
5	5	25	1.127,000	225,400	$x_{c\,(5)}$ = 90,73707 + 24,81752 (5) = 214,825
6	6	36	1.506,000	251,000	$x_{c\,(6)}$ = 90,73707 + 24,81752 (6) = 239,642
7	7	49	1.870,610	267,230	$x_{c\,(7)}$ = 90,73707 + 24,81752 (7) = 264,460
8	8	64	2.301,200	287,650	$x_{c\,(8)}$ = 90,73707 + 24,81752 (8) = 289,277
9	9	81	2.772,360	308,040	$x_{c\,(9)}$ = 90,73707 + 24,81752 (9) = 314,095
10	10	100	3.327,000	332,700	$x_{c\,(10)}$ = 90,73707 + 24,81752 (10) = 338,912
Total	55	385	14.545,282	2.272,334	2.272,334

3) *The elasticity coefficients are calculated in two variants considered to be strictly necessary to ensure an option base.*

3$_1$) The elasticity of working capital with respect to turnover, from year 1 to year 10, is calculated as follows:

$$E_{10/1} = \frac{y_{c(10)} - y_{c(1)}}{y_{c(1)}} : \frac{x_{c(10)} - x_{c(1)}}{x_{c(1)}} = \frac{62{,}9489 - 29{,}4201}{29{,}4201} : \frac{338{,}912 - 115{,}554}{115{,}554} =$$

$$= 1{,}1396562 : 1{,}9329318 = 0{,}58960$$

3$_2$) The elasticity of working capital with respect to turnover, from year 10 to year 9, is calculated as follows:

$$E_{10/9} = \frac{y_{c(10)} - y_{c(9)}}{y_{c(9)}} : \frac{x_{c(10)} - x_{c(9)}}{x_{c(9)}} = \frac{62{,}9489 - 59{,}1544}{59{,}1544} : \frac{338{,}912 - 314{,}095}{314{,}095} =$$

$$= 0{,}0641457 : 0{,}0790111 = 0{,}81186$$

The elasticity coefficients calculated for two time periods allow us to appreciate that the elasticity of working capital with respect to turnover from year 10 to year 9 is preferable to be used in estimating the working capital for year 11. This is because it is higher than [the alternative], it approaches unit elasticity, and thus provides a better representation of the estimation.

4) *We proceed to calculate the estimate of the working capital for year 11:*

41) assuming the use of the elasticity coefficient. $E_{10/9}$,

$$y_{c(11)} = y_{c(10)} + y_{c(10)} \cdot E_{10/9} \frac{x_{c(11)} - x_{c(10)}}{x_{c(10)}} =$$

$$= 62,9489 + 62,9489 \cdot 0,81186 \cdot \frac{363,7298 - 338,912}{338,912} = 66,6912605 \text{ mil.lei}$$

42) assuming the use of the simple linear regression equation.

$$y_{c(11)} = 11,75549 + 0,153873 \cdot x_{c(11)} = 11,75549 + 0,153873 \cdot 363,7298 = 67,7236855 \text{ mil.lei}$$

Comparing the two obtained results, it is noted that there is a normal difference between them, due to the use of two different methodologies for estimating the required working capital for the next period. However, it is believed to be not significant. The choice of one of the estimates is purely managerial in nature.

The estimation of the necessary working capital for conducting economic activities under financial equilibrium conditions can also be carried out based on simple or multiple regression equations using the following exogenous variables:

- turnover (x_1)
- current assets turnover velocity (x_2)
- the debt ratio expressed by the debts that must be paid in a period longer than one year relative to the equity (x_3)
- the degree of indebtedness expressed by the liabilities due in over a year relative to equity. (x_4)
- the level of financial autonomy measured by relating equity to permanent capital. (x_5)

In this case, the following types of regression equations are proposed, where the dependent variable "y" is the size of the financial working capital;

1) $y_C = f(x_2) \rightarrow y_c = a + bx_2$
2) $y_C = f(x_1, x_3) \rightarrow y_c = a + bx_1 + cx_3$
3) $y_C = f(x_1, x_4) \rightarrow y_c = a + bx_1 + cx_4$
4) $y_C = f(x_1, x_5) \rightarrow y_c = a + bx_1 + cx_5$
5) $y_C = f(x_2, x_3) \rightarrow y_c = a + bx_2 + cx_3$
6) $y_C = f(x_2, x_4) \rightarrow y_c = a + bx_2 + cx_4$
7) $y_C = f(x_2, x_5) \rightarrow y_c = a + bx_2 + cx_5$

Note: When outlining the system of variables to be studied as interdependent, it is recommended not to include the variables in the same regression equation, as there may be a certain reciprocal correlation between them.

3. CONCLUSIONS

In the context of performing multiple calculation scenarios to project the necessary size of financial working capital, successive simulations can be carried out regarding the magnitude

of various financial components highlighted in the funding table. This way, the final option can be assimilated by decision-makers as a managerial objective.

The presented methodological solutions can provide managers with a substantial operational support for substantiating decisions aimed at correcting or strengthening the financial status of the economic agent. These decisions may involve determining the borrowing policy through obtaining bank loans for the implementation of economic development programs or for ensuring the continuity of economic activities.

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OPTIMIZING INTERNAL AUDIT PROCESS FOR EFFICIENT OF MAIN ACTIVITIES IN LOCAL ADMINISTRATION

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ABSTRACT: *Internal audit contributes to the oversight of the public sector, providing senior managers and audit committees with assurance that their management systems and practices are well-designed and operating efficiently. Being an independent and impartial diagnostic tool, internal audit also serves as a valuable resource for taxpayers, ensuring that the public sector's systems of oversight, accountability, and control are operating as intended. The objective of the article is to examine and find ways and strategies to enhance internal audit processes in the public sector. It aims to identify specific issues faced by public institutions regarding internal audit and provide solutions and recommendations to streamline and improve audit processes, thus ensuring the efficient use of resources and better governance in the public sector.*

Keywords: *internal audit, diagnostic, public sector, risks, administration*

JEL Classification: *M42, H83, H89*

1. INTRODUCTION

The role and value of internal auditing are in line with the requirements of today's public sector, requirements arising from the increasing need for oversight, increasingly complex issues of public trust in administration, and the erosion of public trust. Internal auditing plays an essential role in today's public sector, as it is a crucial tool to ensure transparency, accountability, and good governance in administration. This role and the value of internal auditing indeed align with the growing demands of the public sector regarding oversight, the complexity of issues related to public trust, and the management of eroded trust. In an environment where transparency and accountability are becoming increasingly important, internal auditing provides an objective framework for evaluating the activities and decisions of public administration. Through auditing, inefficiencies, risks, and possible abuses can be identified, thus contributing to the improvement of transparency and accountability in public administration.

This helps maintain its reputation and builds public trust. As a source of learning, internal audit provides public sector managers with information and equips them with specific knowledge and expertise in the areas of public sector governance, management, and risk control. In this way, internal audit assists senior managers in fulfilling their management responsibilities in an ever-changing and increasingly complex environment. As a source of

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operational advice, internal audit provides public officials with foresight, offering honest, reliable, and relevant advice on difficult aspects of public institutions (HAINOUS et al., 2021).

The need for oversight in the public sector is continuously growing. Internal auditing plays a vital role in monitoring and assessing compliance with laws and regulations, ensuring that public administration adheres to current standards and norms. This helps prevent and detect abuses and corruption.

The challenges facing public administration have become increasingly complex, from managing financial resources to public policies and strategies. Internal auditing offers a systematic and structured approach to assessing and managing these complex issues, contributing to better-informed decision-making and resource optimization. Internal auditing can play a significant role in restoring and maintaining public trust in administration.

By identifying and addressing deficiencies and inefficiencies, public administration can demonstrate that it is taking steps to improve its services and processes, which can contribute to rebuilding public trust in government institutions. Through internal auditing, public administration can evolve and adapt to the new challenges and requirements of contemporary society (Tabirca & Radu, 2020).

Internal auditing in the public sector is essential to ensure transparency, accountability, and the efficient utilization of public resources. However, there are numerous specific challenges that public institutions face regarding internal auditing. These challenges may include limited resources, the complexity of government operations, and an increase in reporting and compliance requirements (EPSAS WG 17/14, 2017).

This paper examines and proposes methods and strategies for improving internal audit processes in the public sector. It aims to identify specific issues faced by public institutions regarding internal auditing and to provide solutions and recommendations for streamlining and enhancing audit processes, thereby ensuring the efficient use of resources and better governance in the public sector.

2. LITERATURE REVIEW

The term audit comes from the Latin word audit-auditare, which means "to listen", but audit has been spoken about since the time of the Assyrians, the Egyptians, during the reign of Charlemagne or Edward I of England. Activities of audit were realized over time in Romania as well, but they had other names.

The use of the term audit in the sense used today is relatively recent and dates back to the economic crisis of 1929 in the United States of America, when organizations affected by the economic recession had to pay large sums for external auditors who performed the certification of the accounts of all companies listed on the stock exchange (Ghiță et al., 2010).

If at the beginning the internal audit function had as its main purpose the verification of the sincerity of the people who had financial responsibilities, as recorded in other research (Dobrețeanu &Dobrețeanu, 2002), in time it evolved its scope expanding to the entire public or private organization.

In Romania, the function of internal audit has undergone many transformations in a short period, so that today there is an adequate intellectual framework for both public institutions and private sector companies. However, managerial education is deficient in terms of the role, place and importance of internal audit within public institutions as well as the impact of internal audit on the managerial act itself.

In the specialized literature, the term audit has the following meanings:

Internal audit is a function and the internal auditor a person who has obligations and these are not minor and concern the entity as a whole (Ghiță,2009:268).

Auditing is an independent evaluation function of the organization. It provides an examination and evaluation service of its activities, according to the Institute of Internal Auditors (Munteanu, 2002:62).

The audit represents, within a company, an independent activity of assessing the control of operations, in the opinion of the French Institute of Internal Consultant Auditors (Afloarei et al., 2002).

Internal auditing is (considered) an independent and objective activity that gives an organization assurance about the degree of control it has over operations, and contributes to adding value. Internal audit helps this organization achieve its goals by evaluating, through a systemic and methodical approach, its processes, risk management, control and business management, and making proposals to strengthen their effectiveness, as reported in other research (Voinea, 2016: 11).

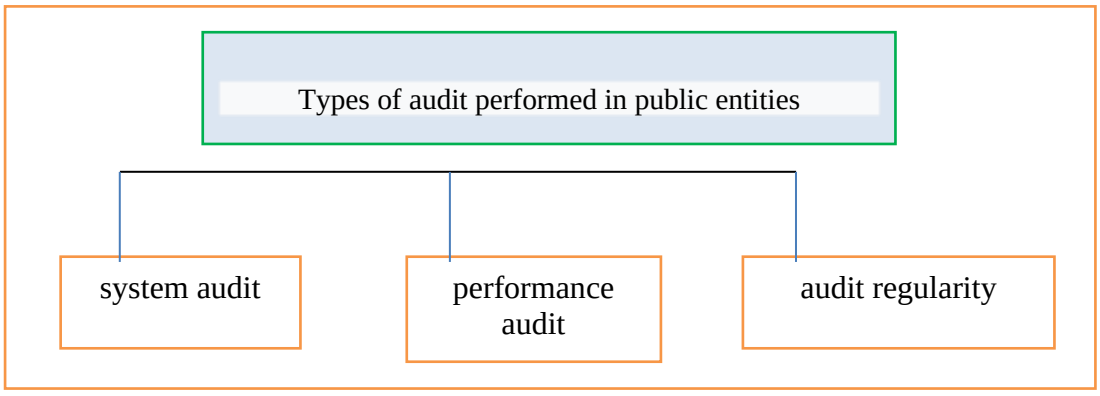
In Romanian legislation, internal audit is seen as "an independent and functionally objective activity, which provides assurance and management advice for the good administration of public revenues and expenses, improving the activities of public entities in order to achieve the objectives in a systematic and methodical way. approach, which evaluates and improves the efficiency and effectiveness of the management system based on risk management, control and governance processes." (Law 672/2002, article 2, letter a).

Analysing the definitions above, we can conclude that the audit is a control function, carried out by qualified persons according to certain norms, practices and well-established rules, but also an independent and objective activity that adds value to the public institution or private company in which it is applied, helping it meet its goals, managing risks and increasing business effectiveness.

We must not confuse "internal audit" with "internal control"· Internal audit It is the function that evaluates the internal control of each individual, detects in its dysfunctions and helps managers improve it by formulating recommendations (Renard, 2012:23).

The internal audit is an internal activity of the entity, organized separately, subordinated to the management, it is the independent, assurance and advisory activity carried out with the aim of adding value; it uses specific techniques and procedures, and its main objective is the risk approach, control and management processes exercising over all activities and processes (Figure 1).

Figure 1. Types of audit performed in public entities



Source: Authors projection

Internal audit and external audit, from a structural point of view, complement each other as activities, something regulated by professional standards (Ghiță, 2009: 617-636, Standard 2050-Coordination and Standard 2440-Dissemination of Results)

Although there are substantive differences, the finality of both processes shows us that they support and demonstrate each other.

3. SPECIFIC ISSUES ENCOUNTERED IN INTERNAL AUDITING IN THE PUBLIC SECTOR

While internal audit in the public sector focuses on evaluating the quality of budgeting, financial, and accounting information and assessing the extent to which organizations have met their established objectives, the external function of auditing is performed by Supreme Audit Institutions (SAIs). SAIs are independent governmental bodies responsible for conducting external audits of public sector entities (Kamara, 2023).

a. *Limited human and financial resources*: Public institutions are often faced with insufficient financial and human resources to carry out internal quality audits. This can easily be deduced from audit teams often understaffed and without the ability to cover all risk areas in the entity.

Table 1. Personal and Budget SAI

Country	Staff number expresed in FTEs (no)	SAI Budget (milion euros)	SAI budget per SAI staff member (euros)
Italy	2.843	502,18	176.637,35
Romania	1.966	88,00	44.760,94
Poland	1.576	68,00	43.147,21
Germany	1.080	187,00	173.148,15
European Court of Auditors	969	175,00	180.598,56
France	819	118,00	144.078,14
Grece	778	36,70	47.172,24
Spain	733	78,00	106.412,01
Portugal	530	29,00	54.716,98
Hungary	497	33,70	67.806,84
Czech Republic	459	42,90	93.464,05
Belgium	452	60,40	133.628,32
Bulgaria	398	12,04	30.251,26
Sweden	322	38,70	120.186,34
Austria	295	37,40	126.779,66
Croatia	293	12,40	42.320,82
Slovakia	291	13,90	47766,32
Netherlands	276	39,50	143.115,94
Denmark	269	30,00	111.524,16
Lithuania	244	10,02	41.065,57
Ireland	191	15,90	83.246,07
Latvia	161	7,45	46.273,29
Finland	140	17,00	121.428,57
Cyprus	137	8,00	58.394,16

Country	Staff number expresed in FTEs (no)	SAI Budget (milion euros)	SAI budget per SAI staff member (euros)
Slovenia	125	8,30	66.400,00
Estonia	80	5,86	73.250,00
Malta	58	3,90	67.241,38
Luxemburg	32	5,20	162.500,00

Source: https://op.europa.eu -Statistics

In the Table 1 from the official website of the Publications Office of the European Union, you can see the structure of the budgets and staff of the Supreme Audit Institutions, from the EU countries as well as the European Court of Auditors, so you can easily see that Italy has the largest budget allocated 502.18 million euros, and at the opposite pole Malta with a budget of 3.9 million euros. Bulgaria has the lowest budget expressed in euros per member of the SAI, 30,251.26 euros, compared to the largest budget of the European Court of Auditors, 180,598.56 euros, Romania being near the bottom of the ranking.

Insufficient financial resources can reduce the funds allocated to the internal audit function in public institutions, which has a negative impact on the recruitment and retention of qualified auditors. With tight budgets, public entities can compete to attract top-of-the-line auditors, leaving the losers with a team smaller than necessary to effectively oversee organizational operations.

The shortage of human resources aggravates the problem of internal audit. Even if more financial resources were available from public entities or with support from the state, finding and maintaining qualified auditors in institutions will always be a challenge, as these professionals are in high demand, both in the public sector, as well as in the private one. The total or partial lack of qualified auditors can lead to overburdening existing staff who will try to cover a wide range of audit areas, and implicitly the review often becomes superficial in assessing risks and potential problems.

The consequence of these resource limitations is that many times, public institutions prioritize certain risk areas to the detriment of others or reduce the frequency of audits, leaving potential critical aspects of uncontrolled operations. Selective audit approach can inadvertently expose organizations to susceptible risks and vulnerabilities that might otherwise have been identified through an extensive audit program.

b. Complexity of Government Operations: Often government operations are very complex and involve multiple departments and audit programs. Auditing them involves a deep understanding of complex processes and rules.

Complexity of organizations transformed power relations: the owner – or "Main" – gradually loses contact with the management of his organization. It is the shareholder who no longer has the means or capacity to manage live; It is public authorities that lose touch with management Organizations. (Renard, 2010:76).

The complexity of government operations is a significant challenge that auditors face when tasked with examining the activities of public institutions. Governments, whether central or local, are usually, administratively, large and multifaceted entities that oversee a diverse range of functions, services and programs. This complexity results from several factors:

Governments are responsible for different departments and programs, each with its own mission, objectives and specific functions according to the area of activity, so they can include areas such as education, health, transport and infrastructure, defense or social services. Auditors must have an integrative understanding of the complexity of these diverse areas to effectively assess their performance or achievement of objectives.

Due to the integration into the EU and the desire to obtain facilities for accessing European funds, recently, many entities from the private sector and non-profit organizations show their interest in the implementation of the internal audit function (Ghiță el al., 2010:82-83)

In Romania, on the recommendation of the European Commission, internal audit was implemented in the Public Sector from 2002 and in the private sector from 2007, so we are talking about a pre-aderation and a post-aderation period.

Government operations at the national, county, or local level often involve interconnected processes that span multiple state departments and agencies, so auditors must understand how these processes interact, relate, and affect each other in order to assess efficiency and effectiveness.

Governments are subject to a myriad of laws, regulations, EU directives and compliance requirements that vary by sector, jurisdiction and the objectives of a government program, so internal auditors must have a detailed knowledge of these laws, regulations and rules to ensure that government operations are conducted within the letter and spirit of the law (European Commission, 2023)

Governments and central or local public authorities manage large amounts of data and information, which are often stored in IT systems and in different formats, so auditors need tools and expertise to access, analyze and interpret this data accurately to issue conclusive audit reports based on data integrity and reliability.

Examining how governments or central or local authorities in the territory allocate human and financial resources to different programs is a complex task, and internal auditors must assess whether resource allocation is effective and whether budgets align with government strategic priorities and population needs.

The operations of government authorities, whether central or local, are assessed not only on processes and compliance, but also on outcomes and performance. Auditors must assess whether government programs are achieving their desired results and whether public funds are being used effectively to achieve the desired goals.

Given this complexity, auditors dealing with the public sector need a diverse set of capabilities and skills, which include a deep and integrative understanding of government structures, processes and regulations as well as an analytical capacity for synthesis. Auditors often work in collaboration with subject matter experts within government structures to obtain accurate information about the programs and operations being audited.

It is very important, effective communication of audit findings, this is crucial because the complexity of government operations shown by audit reports must convey detailed information in a clear and easy to understand way to inform decision makers at the political level but also the population about accountability, efficiency and effectiveness of government policies.

In conclusion, the complexity of government operations presents a great challenge for auditors, requiring them to possess a multilaterally developed skill set and a comprehensive knowledge of government norms, structures and regulations in order to assess and report effectively on the performance and accountability of public institutions.

c. Reporting and Compliance Requirements: Public institutions are required to adhere to numerous reporting and compliance requirements, which can range from laws and regulations to accounting and ethical standards. Auditing must ensure compliance with these requirements.

4. DISCUTION

Internal auditing is an independent, objective assurance and consulting activity designed to add value and improve an organisation's operations. It helps an organisation accomplish its objectives by bringing a systematic, disciplined approach to evaluate and improve the effectiveness of risk management, control, and governance processes (Chartered Institute of Internal Auditors,2023)

In order to improve the audit process in the public sector, several aspects must be considered:

a. *Human resource development*: It is absolutely essential that we invest in the development of internal audit staff through professional training and certification of internal auditors. They must have good training to be able to address the complexity of central or jurisdictional government operations, however, analyzing the above table we see that even if the staff is more numerous (the case of Romania) the budget is not in agreement with the staff structure so that it is very it's hard to keep staff loyal as long as the budget is not commensurate with the effort.

b. *Use of technology*: The use of technology in internal audit can help to streamline internal audit processes within public institutions. Audit software, data collection and analysis, and reporting tools can help auditors identify potential risks and assess entity performance (BinSaeed et al., 2023).

The rapid change of information technologies at the same time as the development of the complexity of information systems lead to the reduction or elimination of traditional audit functions, which makes it necessary to have new procedures for verifying the accuracy of financial information contained in complex databases .(Radu,2009)

Emerging technologies have the potential to increase audit quality while adding value. Audit is transitioning from a reactive, backward-looking activity to a proactive, predictive, forward-looking one that operates in real time. It offers a way to assist businesses by delivering timely information (Butaka, 2022).

c. *Evaluation and prioritization of institutional risks:* Internal audit must concentrate its efforts on the evaluation and prioritization of risks based on their impact on the goals and objectives of the public institution in accordance with the central objectives, which will implicitly lead to an efficient allocation of resources.

Public entities must ensure the existence of the internal audit function in accordance with the regulations in force, considering that it will provide independent and objective assurance on the appropriate way of risk management, control and governance. (LAW no. 672/2002: art. 2).

The main recommendations for Better Governance in the Public Sector are:

1.*Transparency and Accountability*:

The free and unrestricted access of the person to any information of public interest, defined as such by Law 544/2001, constitutes one of the fundamental principles of relations between individuals and public authorities, in accordance with the Romanian Constitution and international documents ratified by the Romanian Parliament. (LAW no. 544/2001: art. 1)

Governments should promote transparency and accountability in the management of public resources so that the public has access to information about internal audit and its results and even the dissemination of these reports.

National financial accounting and reporting standards generally understand transparency as a necessary aspect of reporting, without providing illustrative definition or even actionable guidance (EPSAS WG 17/14, 2017:5)

2. *Performance Monitoring and Reporting*: Public institutions should develop their own performance monitoring systems collection of data on specified indicators to provide

management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds(OECD,2009:1) in accordance with the rules and regulations in force and periodically report through dissemination the results of internal audits, thus they will help to identify and solve deficiencies at a centralized but also individualized level (Kohtamäki & Olsson, 2018).

3. *Public participation*: Governments should encourage public participation external to the audited functions in the internal audit process, even if only at the observer level, public involvement can provide valuable information on government processes in public institutions.

Public participation is a critical input to government activity, and developing effective strategies, programs and projects. Failing to adequately engage the public risks alienating the community and creating negative impacts through poorly informed and implemented decisions (Better practice guide, 2015:3)

Figure 2.

Source : www.audit.vic.gov.au

4. *An effective internal audit reform* can only be completed if it is carried out together with the management reform at the level of each entity but also centrally, thus there should not be different implementation deadlines for both areas. Internal audit reform must consider the institutionalized management framework and operational environment, as well as the country's unique mode of development compared to other countries. Therefore, the idea of a rapid change or "revolution" at the audit level independent of that of management should be abandoned.

5. Self-training of internal auditors is not enough, and the 15 working days of participation in the training courses are insufficient. Internal auditors must improve their knowledge, skills and other competencies through a continuous professional training. In this sense, internal auditors have the obligation to participate in activities of professional training at least 15 working days per year. (METHODOLOGICAL RULES regarding the organization and exercise of the public audit activity of the Ministry of National Education according to H.G. no. 1086/2013:97).

The original purpose of internal audit in countries with poor public sector management should also be taken into account by verifying, moreover, what is the purpose of financial regulations, and the question that arises in this context is: "What kind of management reform is needed and what should be the internal audit programs to help improve financial performance and regularity of control both in weak management circumstances but also in situations where the quality of management is improving?".

6. If *in the management of a company, the main actor is the general manager* (Ghiță et al., 2010: 50) The internal auditor is the one who will be the first to alert the manager about the adjustments to be made in any public institution related to procedures, norms or operating rules, but the last word will be the manager or management of that public entity (Renard & Nussbaumer, 2011).

5. CONCLUSIONS

Internal audit in the public sector is absolutely necessary for ensuring good governance in public entities as well as for the transparent and efficient use of public resources. Despite the challenges of all kinds, specific to the public sector and faced by public entities, it is absolutely necessary to constantly develop strategies and implement solutions at the central and private level to improve internal audit processes. By prioritizing investments in human resources but also technology and assuming the prioritization of risks in public institutions, an efficient and productive internal audit can be ensured as well as better governance.

The activity of internal audit is complex, requires thorough professional preparation, involves ongoing relationships with line management and top management, and last but not least, entails a systematic readiness for each internal auditing mission (Demetean & Predescu, 2010: 177).

Internal auditors and managers should be viewed as partners rather than adversaries, sharing the same objectives, including the effectiveness of the management process and achieving internal targets reporting to the highest hierarchical level, thus involving management in addressing identified issues.

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AFTER-EFFECTS OF THE COVID-19 PANDEMIC ON THE ECONOMY

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ABSTRACT: *The worldwide spread of the COVID-19 pandemic and its economic consequences are poised to wreak havoc on economies globally, pushing numerous countries into economic collapse and depression. With the rapid increase in infection and death rates, and the uncertain recovery from the pandemic, even in developed countries with high vaccination rates, signs of economic turmoil are already appearing, including in European economies. The goal of this study is to determine the effects of the ongoing global crisis, specifically the COVID-19 pandemic, on various economic sectors such as demand, supply chains, trade, investment, pricing, energy price volatility, and exchange rates. By examining these factors at a macroeconomic level, it has been observed that the pandemic has led to a rise in unemployment globally. This paper further explores the probable impacts through research methods including analysis, synthesis, and comparison.*

Keywords: *Pandemic, Covid19, economy, labor, production, crisis.*

JEL Classification: *D80, E32, E66.*

1. INTRODUCTION

For almost two years since the Covid19 pandemic outbreak in Wuhan, China, it has spread all over the world, with tragic effects in all the states and domains. The effects of the Covid19 pandemic around the world haven't been as tragical as predicted from a healthcare point of view, but the economic outcome is severe. Experts say that the limitation of the health effects can pe justified by the radical economic measures enforced by the governments of the countries in order to eradicate this pandemic. The repercussions are obvious in labor market, in production and in expenses. An increasing number of economists are raising concerns about a potential recession in the United States, Europe, and other parts of the world, as measures to contain the coronavirus abruptly halt major segments of the global economy. Many are drawing parallels between the rapid and severe economic downturn caused by the coronavirus and the Great Depression, which started in 1929.

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Of course, in delicate economic situations, the role of the productive system is no longer to ensure economic growth, but to support the needs of citizens, being a sector with a fairly high power of reorientation of activity, compared to the services sector. The most recent global challenge, which affects not only the economic system, but also the social, political, etc., is the pandemic caused by the SARS-COV-2 virus, also known as coronavirus. The pandemic caused by the COVID-19 virus has spread at an alarming rate, infecting millions of people, causing fears of an impending economic crisis. [Rădulescu, 2020] To stop the spread of the virus, countries have imposed strict traffic restrictions and social distancing measures. Social distance, the isolation of infected people, the imposition of travel restrictions and the decrease in demand for goods (except medical supplies, for which demand has increased), have led to a reduction in employment in all economic sectors, leading to the loss of many jobs. [Barua, 2020] The economic impact is becoming increasingly evident, leading to the conclusion that the economic turmoil caused by the COVID virus is the most significant shock the world has faced in recent decades. The pandemic undoubtedly triggers a financial and economic crisis, posing a substantial challenge to national governments, European institutions, and the global system. To address this, governments must grasp the extent of the crisis and the nature of the health, social, and economic issues at hand, as well as revise economic policies to navigate through this critical period. Considering that the Romanian economy is part of the worldwide economic exchange network, this analysis will first outline the global-level effects, particularly in key economic sectors, before examining the specific impacts of the COVID-19 virus on the Romanian economy.

2. COVID19 CONSEQUENCES ON THE GLOBAL PRODUCTION NETWORKS

The impact of the COVID-19 pandemic on the world economy has transposed into a shock to both supply and demand, profoundly affecting trade flows, with disruptive implications on all levels of value-added networks. These events revived discussions about the advantages and disadvantages of globalization and represented a moment to revitalize trends promoting economic nationalism, opening debates on the opportunity of interventionist industrial policies.

A global value chain (GVC) is represented by the series of steps taken to manufacture a final product (or service), each stage of production adding value, and at least two stages being executed in different countries. Thus, a country, a sector or a company participates in a GVC if it is engaged (at least) in one of the stages. Proportional to value added, the participation of an economy in production networks has different degrees of intensity; at the same time, the position within the chain varies, from design activity and product development for the export of raw materials, intermediate or final goods.

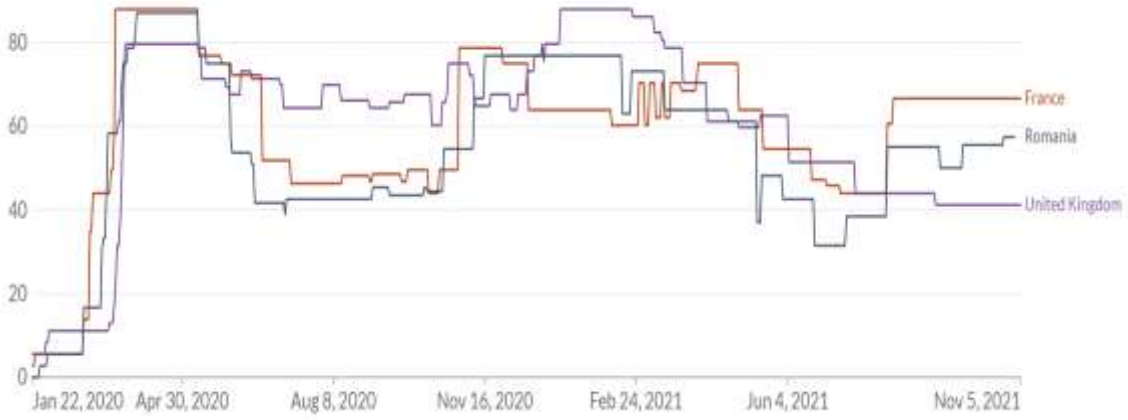
Globalization has imposed a high level of specialization, which in conjunction with the effect economies of scale and technology transfer, facilitated the geographical coagulation of production capacities [Radu, 2009]. But this disposition, modeled even by the strategy to minimize inventory costs, has revealed its vulnerability to risk interruptions of activity. The spread of pandemic shocks was initially felt on the supply side. The immediate effect on production by ceasing activities has been doubled by an indirect impact with contagion on the value chain, also in association with restrictions which concerned the transport, whether of goods or persons. At the same time, at the level of demand, material changes of the consumption behavior could have been noticed, which increased its volatility.

The direct impact of the activity interruption for health security reasons could have been noticed during the first half of 2020 in most of the countries and companies. In Romania, for example, the illustrative case was represented by the activity cutoff for a few weeks at the

largest operators in the automotive sector, in line with the behavior of large companies operating on the continent. Enormous companies such as Ford and Renault had suspended their activity for more than one month, inline with the Global trend. What is really interesting to analyze, is that in Renault's case, before the March-April 2020 break, they had encountered a situation on 1st of February 2020, when they had stopped the production, due to the lack of crucial pieces. This allegedly minor event can expose an important point: the healthcare system has a sinuous evolution, with apex moments, such as March-April 2020, or nowadays, November 2021, but also with linear moments, such as last two summers. The economic field is not that malleable, and the outbreaks are being felt on long term, before and after a new apex on the medical axis. In order to have chances to survive a new tension point in healthcare, we have not to concomitantly also fight on the economic field. Ford factories in Europe and North America, alongside with their local partner suppliers, have ceased operations in the second half of March 2020, mainly for health security reasons of their own employees. Cessations of production operations have, however, caused further contagion effects in the chain, through deliveries delay of intermediate products including to producers whose activity would not would otherwise have been directly affected by pandemic measures. We can see the equivalency in these two big companies situations, because the pattern is easy to spot and predict starting from a certain point.

y states around the world. The global economy has been stroke from many directions, causing flagrant imbalances in the GVC.

Figure 1. COVID-19 Stringency Index



Source: Oxford COVID-19 Government Response Tracker, Blavatnik School of Government, University of Oxford – Last updated 10 November 2021 16:50 (London time)

Transport and movement restrictions imposed by the authorities have exacerbated the vulnerabilities of cross-border networks, starting, hilariously, even with the shortage of sanitary equipment or with the limitation exports of food raw materials. These sectors, considered as being strategic, have been subjects to special restrictions and surveillance, with great potential to affect some operations, even in the conditions where the production facilities within the networks maintained their activity.

In the broader context of international trade renegotiation, in many countries around the world, governments have had access to immediate intervention in the case of such goods, in order to divert the normal course of trade flows in favor of domestic demand (measures undertaken in particular for pharmaceuticals and food). These governmental decisions have obviously affected the GVC chain, due to their central role in the international economic

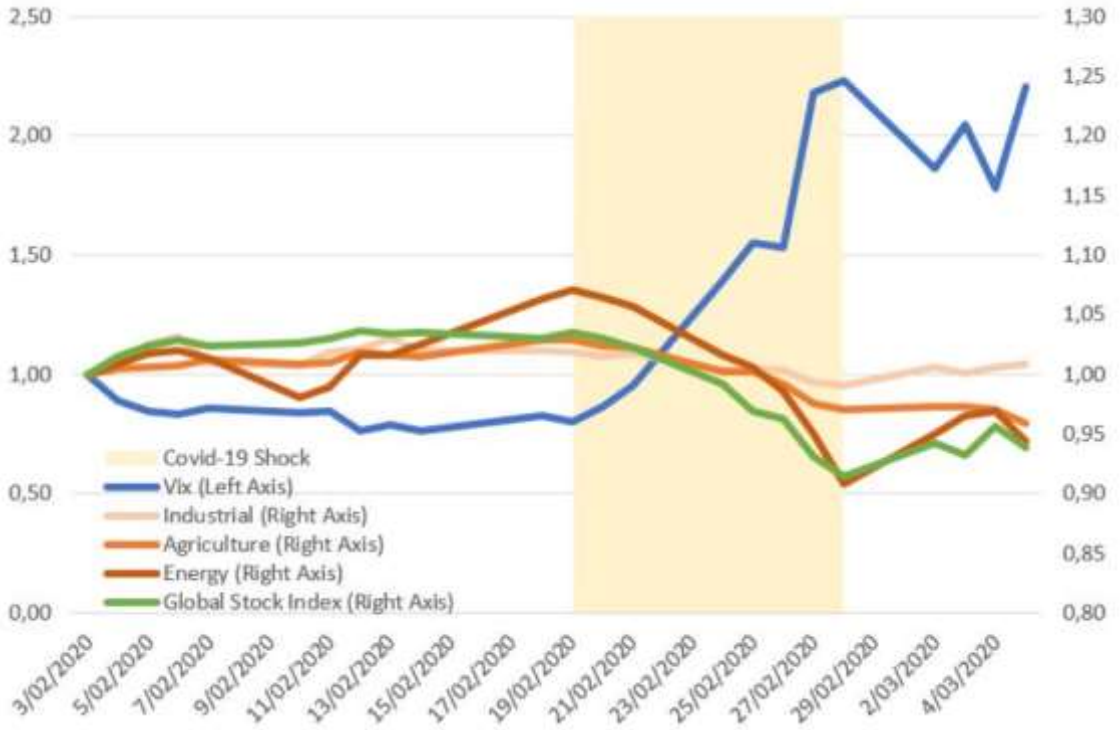
dynamic. However, these actions brought to light the problems of returning to economic nationalism.

Another factor associated with the pandemic crisis that revealed GVC vulnerabilities had targeted the changing structure of demand and its increasing level of volatility, in the context of changing consumer preferences. This influence could have been possible remarked from the first months of the year [Prizzon, 2020], taking the form of a demand peak for certain products for medical use at the same time as a strong reorientation of consumers regarding food (with the closure of restaurants and supplying the population with non-perishable food stocks).

3. COVID19 IMPACT ON RAW MATERIALS AND ENERGY

The pandemic shock was strongly felt in the raw materials sector. The prices of goods have been more affected in the context of the large-scale interruption of transport activity (Tooze, 2020).

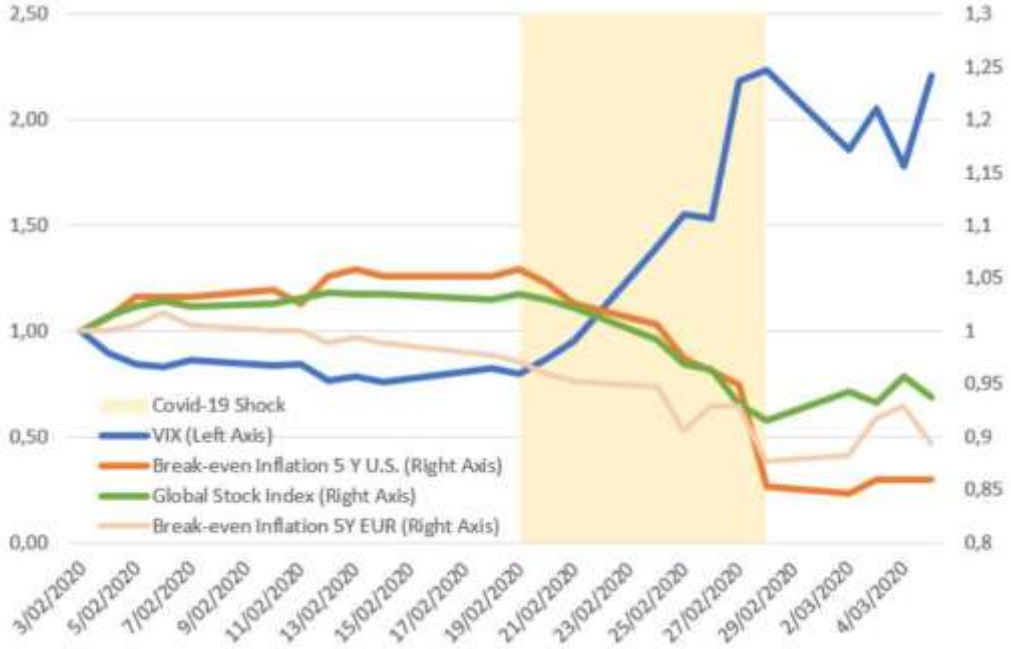
Figure 2. The COVID-19 shock: indices of stocks, VIX and raw materials prices



Source: Bruegel. Note: Agriculture includes unweighted average of corn, wheat, soybean, cocoa, sugar, rubber, ethanol; Energy: unweighted average of crude oil and natural gas; Industrial: unweighted average of copper, aluminum, zinc and tin; Global stock index is MSCI All-Country World Equity Index.

The idea exposed in Figures 2 and 3 is that between 20 February and 28 February (the yellow shaded area in the figures) markets were hit by a COVID-19 collapse. Afterwards, the global economy was hit by other strokes. We can acknowledge what happened in the six days highlighted in Figures 1 and 2 as the pure impact of the COVID-19 shock and as a kind of natural experiment from which to draw conclusions on its macroeconomic emanation.

Figure 3. The COVID-19 shock: indices of stock exchange, VIX and break-even inflation



Source: Bruegel.

Thus, the energy index price of the raw materials calculated by the World Bank fell on average by 31.7 percent in 2020. Quotation Brent crude oil has amply fallen in the first half of the year. The trend has later reversed, once with the resumption of economic activity, the increasing price being also supported by limitation-strategy coordination of OPEC + production.

According to FAO data, agri-food prices have increased by 3.8 percent in 2020 with the aggravated increasing price trend in the second half of the year. This direction was imprinted by developments in the segment of cereals, oilseeds and, to a lesser extent, of sugar, in the context of more modest agricultural results, caused by adverse climatic phenomena in several regions of the world.

Precious metals prices continued to rise in 2020, the annual variation of the index calculated by the World Bank standing at 26.6 percent. The trend was initiated by the gold quotation, given the increasing preference for this asset in times of uncertainty. In fact, this context is associated with the support of available incomes at a relatively robust level and performance and with heterogeneity of various sectors and companies from an economic point of view, including on the background of structural transformations that have taken shape [Leijen, 2020]. All the transformations have fueled demand for placements in as diverse assets as possible, which was reflected in a favorable evolution of mentioned market, but also in the capital market, as well as during cryptocurrencies quotations.

4. COVID19 IMPACT ON LABOR MARKET

The economic shock induced by COVID-19 pandemic led to deteriorating conditions on the labor market in 2020, generating redundancies, restrictive employment opportunities and a significant moderation of the growth rate of salaries. The number of employees contracted 1 percent, marking the end of an eight consecutive years period of growth (DeBord, 2020).

However, the crisis has not uniformly impacted economy, wider restrictions on staffing schemes taking place in sectors directly affected by the introduction of mobility restrictions and measures suspension / restriction of activity (HoReCa, air transport, entertainment activities, cultural and recreational), but also in industry, where the shock has already amplified the downward trend in the number of employees, outlined in 2019. Instead, higher demand for labor had been noticed in areas compatible with physical distancing, such as construction, courier services, IT, but also in essential activities such as the healthcare and pharmaceutical sectors (Hutt, 2020).

Under these circumstances, an increase in the excess supply of labor force was observed, BIM unemployment rate rising to 5 percent on the whole 2020 (from 3.9 percent in the previous year, the lowest level after year 2000) - the maximum annual value, respectively 5.4 percent, was reached in the second quarter (peak period of the crisis), the indicator stabilizing in the second half of the year around value of 5.3 percent; unemployment rate followed a more attenuated trajectory, increasing from 2.8 percent in February (the minimum of the last two decades) [Jones, 2020], to about 3.2 percent in the second half. At the same time, the capacity of the economy to create jobs has diminished, the vacancy rate decreasing compared to the previous year. [Cochran, 2020] The increasing number of potential candidates for employment led to a reversal of the "balance of power" in the sense of a greater bargaining power of employers in setting contractual terms, unlike previous years, when workers were in a dominant position - the phenomenon is specific to the recession phase of the economic cycle, being surprised by the wide movement along the Beveridge curve, visible during year 2020.

Schemes for supporting working capital and investments, along with support measures for the labor market, have helped to limit the negative effects of COVID-19 pandemic on the economy and the preservation of short - term employment.

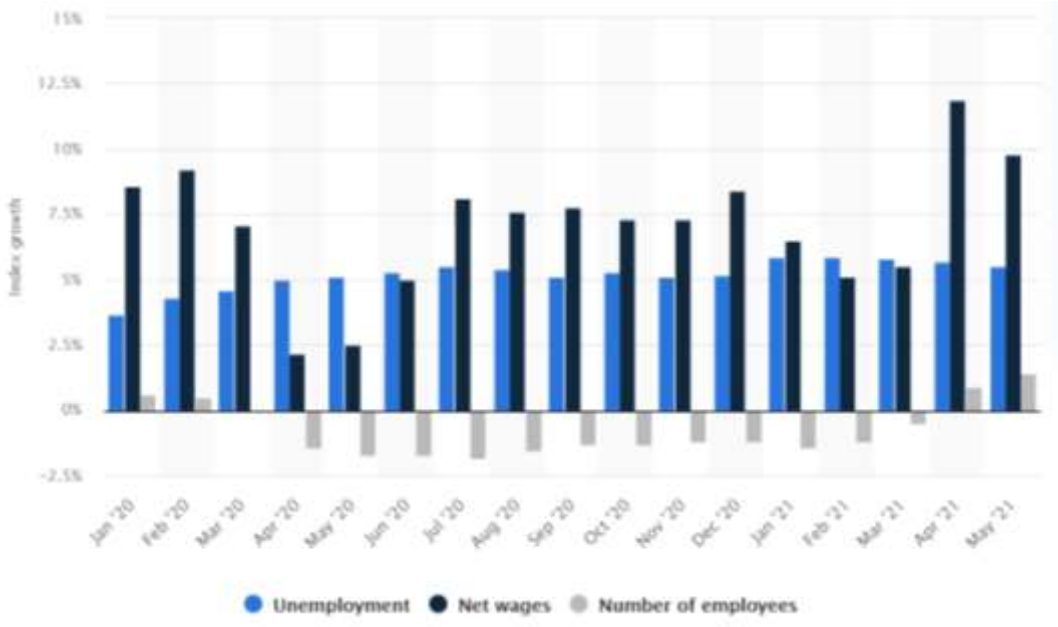
Only considering the programs on the labor market, a counterfactual exercise which involved increasing the number of unemployed by the number of employees who have benefited from government support measures under different scenarios, reveal a higher level of unemployment rate by about 2 percentage points at end of 2020.

However, once these programs are completed, some jobs may not be viable anymore, and the process of resources reallocating might intensify. In fact, there are changes in domestic labor demand, companies manifest a growing interest for professions which involve working remotely and having a high level of digital skills, in line with global trends (Zhan et al., 2020).

In this sense, stronger and stronger indices are emerging according to which the pandemic shock amplified structural changes, essentially connected to accelerating the process of automatization and digitization of economic activities, and the Romanian labor market is expected to have a fragile position in front new requirements, increasingly inclined towards the new generation of technologies (such as robotics, artificial intelligence, 3D printing, cloud computing, e-commerce, analysis and processing of large databases). According to some estimates, our country owns the higher percentage of jobs endangered by process automation in European economies (over 60 percent), along with a very reduced percentage of people with digital skills. Economy index and digital society index calculated by the European Commission shows that less than a third of Romanians with ages between 16 and 74 had elementary digital skills, compared to 58 percent in the EU, Romania ranking 27th out of 28 of European countries in this regard.

In this context, implementation of active labor market policies become essential in order to assure a smoother transition to the new economic reality, which can shape into programs for reconversion vocational training and / or training in order to acquire / develop compatible skills with current or some requirements designed to facilitate the candidates search process and matching them with vacancies.

Figure 4. Impact of the coronavirus (COVID-19) outbreak on the labor market indicators in Romania from February 2020 to May 2021



Source: https://www.statista.com/statistics/1119871/romania-labor-market-indicators/

5. CONCLUSIONS

COVID-19 is jeopardizing economies - no matter large or small, developed or developing. As of today, end to this pandemic remains uncertain. The uncertainty is causing loss of public confidence and trust worldwide [Fernandez, 2020]. The macroeconomic outbreaks in any economy are likely to worsen across economies, if consumer and producer confidence is lost and a powerful demand shock coupled with massive supply-side supports cannot be implemented in a timely manner. In the current context, recovery from the disease is primary and economics is secondary. However, as evidence of economic adversities emerge, it would be wise to begin from now designing and implementing aggressive and innovative policy actions with a long-term perspective to prevent the looming. We believe that the current crisis triggered by the coronavirus pandemic is revisiting issues similar to those seen during the 2008 crisis, and even some fundamental ones from as far back as 1929. This situation calls for new economic strategies, encompassing a reassessment of the roles played by international institutions, global supply chains, and the labor market. Additionally, it necessitates the pursuit of new developmental objectives that consider the challenges confronting the global economy and beyond.

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