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REALITIES AND PERSPECTIVES

Performance and Risks in the European Economy

An Analysis of the Production Leader in the Stackelberg Model

Cătălin Angelo Ioan[1], Gina Ioan[2]

Abstract: The paper analyzes the situation of a duopoly in which each competitor does not have complete information about the role assumed by the other.

Keywords: leader; satellite; Stackelberg

JEL Classification: E17; E27

1. Introduction

Oligopole represents the situation of a market where there is a small number of bidders (at least two) of a non-substitutable good and a sufficiently large number of consumers. Oligopole composed of two producers is called duopoly.

Considering two competing companies A and B that produce the same normal good, we propose to analyze each of them in response to the activity of the other firm.

Each of them when determining their production level and selling price will consider the production and price of the other. If one of the two companies first establishes the price or the quantity produced, the other one adjusting for it, then it will be called the price leader, respectively the production leader, the second firm called the price satellite or the production satellite.

2. The Analysis

Companies A and B have incomplete information about each other. They will consider the other firm as a production leader or satellite.

Consider for the beginning that the company A is considered to be leader of quantity. If it produces Q_A good units, then B, considered by A as a satellite, will adjust its output after A producing $Q_B=f(Q_A)$ units of good. The sales price is dependent on the total quantity of products placed on the market. So let's say: $p=p(Q_A+Q_B)$ the price per unit of product.

[1] Associate Professor, PhD, Danubius University of Galati, Department of Economics, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: catalin_angelo_ioan@univ-danubius.ro.
[2] Senior Lecturer, PhD, Danubius University of Galati, Department of Economics, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: ginaioan@univ-danubius.ro.

Company A must set a production level based on B's reaction, as this will result in the product's sales price through its output. Similarly, from the point of view of A, company B will adjust its production level according to its own, because at a higher or lower level the price will change and therefore the profit of the respective company.

We assume that the two marginal costs of A and B are constant (in the short term, marginal cost variations being very small, the assumption is not absurd): $Cm_A = \alpha$ and $Cm_B = \beta$. Also, the price function (the inverse function of the demand) will be of the form: $p(Q) = a - bQ$, $a, b > 0$. So let the profit of the production leader A:

$$\Pi_A(Q_A) = p(Q_A + Q_B)Q_A - CT_A(Q_A) = -bQ_A^2 - bQ_A Q_B + aQ_A - CT_A(Q_A)$$

Because $Q_B = f(Q_A)$ we have:

$$\Pi_A(Q_A) = p(Q_A + f(Q_A))Q_A - CT_A(Q_A) = -bQ_A^2 - bQ_A f(Q_A) + aQ_A - CT_A(Q_A)$$

Consider the satellite's profit as well:

$$\Pi_B(Q_B) = p(Q_A + Q_B)Q_B - CT_B(Q_B) = -bQ_B^2 - bQ_A Q_B + aQ_B - CT_B(Q_B)$$

The extreme condition for A's profits is:

$$\frac{\partial \Pi_A(Q_A)}{\partial Q_A} = -2bQ_A - bf(Q_A) - bQ_A f'(Q_A) + a - \alpha = 0$$

and for B:

$$\frac{\partial \Pi_B(Q_B)}{\partial Q_B} = -2bQ_B - bQ_A + a - \beta = 0$$

Considering therefore the production of the Q_A leader as being given, it results that the satellite satisfies the condition:

$$Q_B = \frac{a - \beta - bQ_A}{2b}$$

By replacing Q_B's above expression in the condition of maximizing A's profit, it results for $f(Q_A) = \frac{a - \beta - bQ_A}{2b}$: $-2bQ_A - b\frac{a - \beta - bQ_A}{2b} + \frac{bQ_A}{2} + a - \alpha = 0$ from where:

$$Q_A^* = \frac{a - 2\alpha + \beta}{2b}$$

and now: $Q_B^* = \frac{a - \beta - bQ_A^*}{2b} = \frac{a + 2\alpha - 3\beta}{4b}$.

We have therefore: $Q_A^* - Q_B^* = \frac{a - 6\alpha + 5\beta}{4b}$.

The assumption that A is the leader of quantity will be real if $Q_A^* - Q_B^* \geq 0$ that is: $a \geq 6\alpha - 5\beta$.

In the case $\alpha > \beta$, if A will be leader of quantity, we have $a \geq \beta$.

If B, however, assumes the role of production leader, considering A as satellite, from the above calculations, in which we will permute all the A and B-related indicators, we will get:

$$Q_B^{**} = \frac{a - 2\beta + \alpha}{2b}, \ Q_A^{**} = \frac{a + 2\beta - 3\alpha}{4b}, \text{ from where: } Q_B^{**} - Q_A^{**} = \frac{a - 6\beta + 5\alpha}{4b}.$$

Therefore assuming that B is the leader of quantity will be real if: $Q_B^{**} - Q_A^{**} \geq 0$ that is: $a \geq 6\beta - 5\alpha$.

In the case $\alpha < \beta$ then if B is the leading quantity we have $a \geq \alpha$.

In order to determine the profits of the two firms, from the fact that marginal costs CmA=α and CmB=β results after a simple integration: $CT_A(Q) = \alpha Q + \gamma$, $CT_B(Q) = \beta Q + \delta$, $\alpha, \beta, \gamma, \delta \geq 0$.

As companies do not have complete information about each other, we will investigate the four situations that may arise:

Case 1: A - leader, B - leader

In this case, A takes the leading role and B is also a leader.

We have in this case: $Q_{A/A-leader,B-leader}^* = \frac{a - 2\alpha + \beta}{2b}$, $Q_{B/A-leader,B-leader}^* = \frac{a + \alpha - 2\beta}{2b}$ from where:

$$p_{A-leader,B-leader} = p\left(Q_{A/A-leader,B-leader}^* + Q_{B/A-leader,B-leader}^*\right) = \frac{\alpha + \beta}{2}, \text{ and:}$$

$$\Pi_{A/A-leader,B-leader}\left(Q_{A/A-leader,B-leader}^*\right) = \frac{(\alpha - \beta)(-a + 2\alpha - \beta)}{4b} - \gamma$$

$$\Pi_{B/A-leader,B-leader}\left(Q_{B/A-leader,B-leader}^*\right) = \frac{(\alpha - \beta)(a + \alpha - 2\beta)}{4b} - \delta$$

Case 2: A - leader, B - satellite

In this case, A takes the leading role and B is considered a satellite of A

We have in this case: $Q_{A/A-leader,B-satellite}^* = \frac{a - 2\alpha + \beta}{2b}$, $Q_{B/A-leader,B-satellite}^* = \frac{a + 2\alpha - 3\beta}{4b}$ from where:

$$p_{A-leader,B-satellite} = p\left(Q_{A/A-leader,B-satellite}^* + Q_{B/A-leader,B-satellite}^*\right) = \frac{a + 2\alpha + \beta}{4}, \text{ and:}$$

$$\Pi_{A/A-leader,B-satellite}\left(Q_{A/A-leader,B-satellite}^*\right) = \frac{(a - 2\alpha + \beta)^2}{8b} - \gamma$$

$$\Pi_{B/A-leader,B-satellite}\left(Q_{B/A-leader,B-satellite}^*\right) = \frac{(a + 2\alpha - 3\beta)^2}{16b} - \delta$$

Case 3: A - satellite, B - leader

In this case, B assumes the leading role and A is considered a satellite of B.

We have in this case: $Q_{A/A-satellite,B-leader}^* = \frac{a - 3\alpha + 2\beta}{4b}$, $Q_{B/A-satellite,B-leader}^* = \frac{a + \alpha - 2\beta}{2b}$ from where:

$$p_{A-satellite,B-leader} = p\left(Q^*_{A/A-satellite,B-leader} + Q^*_{B/A-satellite,B-leader}\right) = \frac{a + \alpha + 2\beta}{4} \text{ , and:}$$

$$\Pi_{A/A-satellite,B-leader}\left(Q^*_{A/A-satellite,B-leader}\right) = \frac{(a - 3\alpha + 2\beta)^2}{16b} - \gamma$$

$$\Pi_{B/A-satellite,B-leader}\left(Q^*_{B/A-satellite,B-leader}\right) = \frac{(a + \alpha - 2\beta)^2}{8b} - \delta$$

Case 4: A - satellite, B - satellite

In this case, both A and B assume the satellite role of the other.

We will have in this case: $Q^*_{A/A-satellite,B-satellite} = \dfrac{a - 3\alpha + 2\beta}{4b}$, $Q^*_{B/A-satellite,B-satellite} = \dfrac{a + 2\alpha - 3\beta}{4b}$ from where:

$$p_{A-satellite,B-satellite} = p\left(Q^*_{A/A-satellite,B-satellite} + Q^*_{B/A-satellite,B-satellite}\right) = \frac{2a + \alpha + \beta}{4} \text{ , and:}$$

$$\Pi_{A/A-satellite,B-satellite}\left(Q^*_{A/A-satellite,B-satellite}\right) = \frac{(2a - 3\alpha + \beta)(a - 3\alpha + 2\beta)}{16b} - \gamma$$

$$\Pi_{B/A-satellite,B-satellite}\left(Q^*_{B/A-satellite,B-satellite}\right) = \frac{(2a + \alpha - 3\beta)(a + 2\alpha - 3\beta)}{16b} - \delta$$

We will then determine the short-term profit situation in the above cases.

Consider the situation of A. What kind of role does it take to assume A?

If B would be the leader then, if A also assumed the leading role:

$$\Pi_{A/A-leader,B-leader} = \frac{(\alpha - \beta)(-a + 2\alpha - \beta)}{4b} - \gamma$$

If A would be considered a satellite of B then:

$$\Pi_{A/A-satellite,B-leader} = \frac{(a - 3\alpha + 2\beta)^2}{16b} - \gamma$$

The difference between the two profits is:

$$\Delta = \Pi_{A/A-leader,B-leader} - \Pi_{A/A-satellite,B-leader} = -\frac{(a - \alpha)^2}{16b} < 0.$$

Therefore, if B takes the leading role, A will have to take on the role of satellite to maximize its profit.

If now B would consider satellite then, if A assumes the leading role:

$$\Pi_{A/A-leader,B-satellite} = \frac{(a - 2\alpha + \beta)^2}{8b} - \gamma$$

But if A assumes a satellite role, not knowing that B has also assumed this role:

$$\Pi_{A/A-satellite,B-satellite} = \frac{(2a - 3\alpha + \beta)(a - 3\alpha + 2\beta)}{16b} - \gamma$$

The difference between the two profits is:

$$\Delta = \Pi_{A/A-leader,B-satellite} - \Pi_{A/A-satellite,B-satellite} = \frac{(a-\alpha)(\alpha-\beta)}{16b}.$$

How (a-α)(α-β)>0 $\Leftrightarrow$ α∈(min(a,β),max(a,β)) the following results:

- If B is considered satellite, if the marginal cost of A: α∈(min(a,β),max(a,β)) then A must take the leading role;

- If B is considered satellite, if the marginal cost of A: α∉(min(a,β),max(a,β)) then A must assume a satellite role.

Consider the situation of B. Now what role do we have to assume B?

If A would consider himself a leader then, if B would also assume the leading role:

$$\Pi_{B/A-leader,B-leader} = \frac{(\alpha-\beta)(a+\alpha-2\beta)}{4b} - \delta$$

If B would be considered a satellite of A then:

$$\Pi_{B/A-leader,B-satellite} = \frac{(a+2\alpha-3\beta)^2}{16b} - \delta$$

The difference between the two profits is:

$$\Delta = \Pi_{B/A-leader,B-leader} - \Pi_{B/A-leader,B-satellite} = -\frac{(a-\beta)^2}{16b} < 0.$$

Therefore, if A takes the leading role, B will have to take on the role of satellite to maximize its profit.

If now it would consider satellite then, if B assumed the leading role:

$$\Pi_{B/A-satellite,B-leader} = \frac{(a+\alpha-2\beta)^2}{8b} - \delta$$

If B, however, assumes a satellite role, not knowing that A has also assumed this role:

$$\Pi_{B/A-satellite,B-satellite} = \frac{(2a+\alpha-3\beta)(a+2\alpha-3\beta)}{16b} - \delta$$

The difference between the two profits is:

$$\Delta = \Pi_{B/A-satellite,B-leader} - \Pi_{B/A-satellite,B-satellite} = \frac{(a-\beta)(-\alpha+\beta)}{16b}$$

How (a-β)(-α+β)>0 $\Leftrightarrow$ β∈(min(a,α),max(a,α)) the following results:

- If A is considered satellite, if the marginal cost of B: β∈(min(a,α),max(a,α)) then B must take the leading role;

- If A is considered satellite, if the marginal cost of B: β∉(min(a,α),max(a,α)) then B must assume a satellite role.

3. Conclusions

- If the marginal cost of A is lower than the marginal cost of B ($\alpha<\beta$) then:

o if $\alpha<a$ then if B is considered to be a satellite, A will also have to be considered satellite; if $\beta<a$ then if A is considered a satellite, B will have to be considered a leader; if $\beta>a$ then if A is considered to be satellite, B will also have to be considered satellite;

o if $\alpha>a$ then if B is considered as a satellite, A will have to be considered a leader; if $\beta<a$ then if A is considered to be a satellite, B will have to be considered leader, but what can not be because of the fact that in this case: $a\geq\alpha$; if $\beta>a$ then if A is considered to be satellite, B will also have to be considered satellite;

o if B takes the lead role, A will have to take on the role of satellite. By analogy, if A takes the lead role, B will have to assume the role of satellite.

- If the marginal cost of A is greater than the marginal cost of B ($\alpha>\beta$) then:

o if $\alpha>a$ then if B is considered as a satellite, A should also be considered satellite; if $\beta>a$, then if A is considered a satellite, B will have to be considered a leader; if $\beta<a$ then if A is considered to be satellite, B should also be considered satellite;

o if $\alpha<a$ then if B is considered a satellite, A will have to be considered a leader; if $\beta<a$, then if A is considered a satellite, B will have to be considered a leader; if $\beta<a$ then if A is considered to be satellite, B should also be considered satellite;

o if B takes the lead role, A will have to take on the role of satellite. By analogy, if A takes the lead role, B will have to assume the role of satellite.

- If the marginal cost of A is equal to the marginal cost of B ($\alpha=\beta$) then if one of them is considered satellite, the other is indifferent to whether it is a leader or a satellite.

4. References

Ioan, Cătălin Angelo & Ioan, Gina (2010). *Applied Mathematics in Micro and Macroeconomics*. Galati, Romania: Sinteze Publishers.

Ioan, Cătălin Angelo & Ioan, Gina (2012). *Matœconomics*. Galati, Romania: Zigotto Publishers.

Mankiw, Gregory N. (2007). *Macroeconomics*. London: John Wiley publishers.

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An Alternative to the Electre Method

Cătălin Angelo Ioan[1], Gina Ioan[2]

Abstract: The paper proposes an alternative of the Electre method consisting in replacing the concordance and discordance coefficients with continuous utility functions.

Keywords: Electre; concordance; discordance

JEL Classification: E17; E27

1. Introduction

The ELECTRE method consists in the existence of a number of n alternatives for a decident: V_1, $V_2,...,V_n$. Let us also consider a number of m criteria C_1, $C_2,...,C_m$ that have each a coefficient of importance (usually subjectively determined) k_1, $k_2,...,k_m$. For each pair (V_i,C_j) we set a numerical value v_{ij} (if it is a qualitative appreciation of the kind: weak, good, very good etc. we convert it to hierarchy numbers). The problem lies in determining the optimal action variant.

The algorithm consists in first establishing the nature of the method (maximizing or minimizing).

It is important to take into account, at this step, that all the criteria lead to the same nature of the problem. Thus, if the problem is, for example, maximization (minimization), and one or more criteria aim at minimizing (maximizing), the v_{ij} values corresponding to the criterion C_j - in question with the $(-v_{ij})$ values will be replaced.

We then normalize the importance coefficients by the relation: $v_i = \dfrac{k_i}{\sum\limits_{p=1}^{m} k_p}$, $i=\overline{1,m}$ and we therefore

have: $\sum\limits_{i=1}^{m} v_i = 1$.

Then we shall determine the utilities U_{ij} corresponding to the pairs (V_i,C_j) as follows:

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[1]. Associate Professor, PhD, Danubius University of Galati, Department of Economics, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, Corresponding author: catalin_angelo_ioan@univ-danubius.ro.
[2] Senior Lecturer, PhD, Danubius University of Galati, Department of Economics, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, Corresponding author: ginaioan@univ-danubius.ro.

♦ for the maximization problem: $\text{Uij} = \dfrac{v_{ij} - \min\limits_{k=1,\dots,n} v_{kj}}{\max\limits_{k=1,\dots,n} v_{kj} - \min\limits_{k=1,\dots,n} v_{kj}}$;

♦ for the minimization problem: $\text{Uij} = \dfrac{\max\limits_{k=1,\dots,n} v_{kj} - v_{ij}}{\max\limits_{k=1,\dots,n} v_{kj} - \min\limits_{k=1,\dots,n} v_{kj}}$.

and build their table.

Utilities are particularly important from two points of view. On the one hand, it is noted that these are dimensionless (being obtained as ratios between sizes of the same nature) which will allow comparison of different sizes of different natures.

On the other hand, utilities provide an overview of the quantities of each criterion, namely, the closer they are to the problem requirement (maximization or minimization), the utility is closer to 1.

The larger the quantity of the problem, the utility is closer to zero.

It should also be noted that utilities are quantities always in the range: [0,1].

Concordance indicators are calculated as follows:

$$c(V_i,V_j) = \frac{\sum\limits_{\substack{p=1,\dots,m \\ U_{ip} \geq U_{jp}}} k_p}{\sum\limits_{r=1}^{m} k_r} = \sum\limits_{\substack{p=1,\dots,m \\ U_{ip} \geq U_{jp}}} v_p$$

Practically, the concordance indicator of variant V_i with V_j is determined by comparing the lines corresponding to V_i and V_j, and where the utility of a variation corresponding to a criterion is greater than or equal to the utility of the other variant for the same criterion, the normalized importance coefficient is added.

We always have: $c(V_i,V_i)=1$, $i=\overline{1,m}$ and $c(V_i,V_j) \in [0,1]$, $i,j=\overline{1,m}$.

We also notice that the concordance indicator $c(V_i,V_j)$ is closer to 1 if the greatest number of utilities of V_i are greater than or equal to the corresponding utilities of V_j (ie, the variant V_i are closer than V_j to the requirements of the problem) and vice versa for the values of concordance close to 0.

The discordance indicators are calculated as follows:

$$d(V_i,V_j) = \max\limits_{p=1,\dots,m} (U_{jp} - U_{ip}, 0)$$

Practically, the discordance indicator of variant V_i with V_j is determined by comparing the lines corresponding to V_i and V_j, and where the utility of the variant V_j corresponding to a criterion is greater than or equal to the utility of the other V_i variant, for the same criterion, the difference is calculated. The highest value provided by them is determined. Always, we will have:

$d(V_i,V_i)=0$, $i=\overline{1,m}$ and $d(V_i,V_j) \in [0,1]$, $i,j=\overline{1,m}$.

We also notice that the discordance indicator $d(V_i,V_j)$ is closer to 0 if the largest number of utilities of V_i are greater than or equal to the corresponding utilities of V_j (ie, the variant V_i are closer than V_j to the requirements of the problem) and vice versa for the discordance values close to 1.

From the definitions of concordance and discordance indicators we can deduce their general formulas:

$$c(V_i,V_j)= \sum_{p=1}^{m} \mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})+1)\nu_p \, , \, i,j=\overline{1,m}$$

$$d(V_i,V_j)= \max_{p=1,m} \Big(\mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})-1)(U_{ip} - U_{jp})\Big), \, i,j=\overline{1,m}$$

where the function sgn (signum - lat., sign) is well known:

$$\mathrm{sgn}(x) = \begin{cases} 1 \text{ if } x > 0; \\ 0 \text{ if } x = 0; \\ -1 \text{ if } x < 0 \end{cases}$$

Indeed, for the concordance indicator we have:

$$c(V_i,V_j)= \sum_{p=1}^{m} \mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})+1)\nu_p = \sum_{\substack{p=1,\dots,m \\ U_{ip}>U_{jp}}} \mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})+1)\nu_p +$$

$$\sum_{\substack{p=1,\dots,m \\ U_{ip}=U_{jp}}} \mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})+1)\nu_p + \sum_{\substack{p=1,\dots,m \\ U_{ip}<U_{jp}}} \mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})+1)\nu_p = \sum_{\substack{p=1,\dots,m \\ U_{ip}>U_{jp}}} \mathrm{sgn}(2)\nu_p +$$

$$\sum_{\substack{p=1,\dots,m \\ U_{ip}=U_{jp}}} \mathrm{sgn}(1)\nu_p + \sum_{\substack{p=1,\dots,m \\ U_{ip}<U_{jp}}} \mathrm{sgn}(0)\nu_p = \sum_{\substack{p=1,\dots,m \\ U_{ip}>U_{jp}}} \nu_p + \sum_{\substack{p=1,\dots,m \\ U_{ip}=U_{jp}}} \nu_p = \sum_{\substack{p=1,\dots,m \\ U_{ip}\geq U_{jp}}} \nu_p \, , \, i,j=\overline{1,m}$$

and for the discordance:

$$d(V_i,V_j)= \max_{p=1,m} \Big(\mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})-1)(U_{ip} - U_{jp})\Big)=$$

$$\max\left(\max_{\substack{p=1,m \\ U_{ip}>U_{jp}}} \Big(\mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})-1)(U_{ip} - U_{jp})\Big), \max_{\substack{p=1,m \\ U_{ip}=U_{jp}}} \Big(\mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})-1)(U_{ip} - U_{jp})\Big), \right.$$

$$\left. \max_{\substack{p=1,m \\ U_{ip}<U_{jp}}} \Big(\mathrm{sgn}(\mathrm{sgn}(U_{ip} - U_{jp})-1)(U_{ip} - U_{jp})\Big) \right) =$$

$$\max\left(\max_{\substack{p=1,m \\ U_{ip}>U_{jp}}} \Big(\mathrm{sgn}(0)(U_{ip} - U_{jp})\Big), \max_{\substack{p=1,m \\ U_{ip}=U_{jp}}} \Big(\mathrm{sgn}(-1)(U_{ip} - U_{jp})\Big), \max_{\substack{p=1,m \\ U_{ip}<U_{jp}}} \Big(\mathrm{sgn}(-2)(U_{ip} - U_{jp})\Big) \right) =$$

$$\max(\max_{\substack{p=1,m \\ U_{ip}<U_{jp}}} \Big(U_{jp} - U_{ip}\Big),0)= \max_{p=1,\dots,m} (U_{jp} - U_{ip},0) \, , \, i,j=\overline{1,m} \, .$$

We shall build a table and we shall pass the concordance indicators to the left, and the discordance to the right of each cell of a table that will have lines and columns of alternatives V_i.

Two p and q values (with complementary probability significance) are set so that $p,q \in (0,1)$ and $p+q=1$ to measure the admitted concordance and discordance limits. So we will say that a variant V_i surpasses a variant V_j if:

$$\begin{cases} c(V_i, V_j) \geq p \\ d(V_i, V_j) \leq q \end{cases}$$

Thus we have: $\begin{cases} c(V_i, V_j) \geq p \\ d(V_i, V_j) \leq q = 1-p \end{cases} \Rightarrow p \leq \min(c(V_i,V_j), 1-d(V_i,V_j))$.

Computing $\min\limits_{j=1,n} c(V_i, V_j)$ and $\min\limits_{j=1,n} (1-d(V_i, V_j))$ we obtain:

$p \leq \min(\min\limits_{j=1,n} c(V_i, V_j), 1- \max\limits_{j=1,n} d(V_i, V_j))$.

The chosen variant is the one for which the maximum of p is obtained.

2. An Alternative to the Indicators

The determintion of the concordance and discordance indicators has the great drawback that it requires comparisons on the components of the utilities of the two alternatives, leading eventually to discontinuous functions.

In the following, we will build a new concordance function that will be not only continuous but also differentiable and also, a function of discordance that will have a continuous character.

Let consider ow, the Heaviside unit's stepping-up function:

$$H(x)=\begin{cases} 0 \ if \ x < 0; \\ \frac{1}{2} \ if \ x = 0; \\ 1 \ if \ x > 0 \end{cases}$$

We have sgn(x)=2H(x)-1.

The function $u(x)=\frac{1}{1+e^{-2kx}}$ approximates differentiable (better and better as k is higher) function H.

The function signum becomes:

$$sgn(x)=2u(x)-1=\begin{cases} -1 \ if \ x < 0; \\ 0 \ if \ x = 0; \\ 1 \ if \ x > 0 \end{cases}$$

Thus: $sgn(x)=\frac{2}{1+e^{-2kx}} - 1 = \frac{1-e^{-2kx}}{1+e^{-2kx}} = \frac{e^{2kx}-1}{e^{2kx}+1}$

Also $sgn(a-b)=\frac{e^{2k(a-b)}-1}{e^{2k(a-b)}+1} = \frac{e^{2ka}-e^{2kb}}{e^{2ka}+e^{2kb}}$ and $sgn(sgn(a-b)+1)=\dfrac{e^{2k\frac{e^{2ka}-e^{2kb}}{e^{2ka}+e^{2kb}}}-e^{2k}}{e^{2k\frac{e^{2ka}-e^{2kb}}{e^{2ka}+e^{2kb}}}+e^{2k}}$,

$sgn(sgn(a-b)-1)=\dfrac{e^{2k\frac{e^{2ka}-e^{2kb}}{e^{2ka}+e^{2kb}}}-e^{-2k}}{e^{2k\frac{e^{2ka}-e^{2kb}}{e^{2ka}+e^{2kb}}}+e^{-2k}}$.

From the formula: $c(V_i, V_j)=\sum\limits_{p=1}^{m} sgn(sgn(U_{ip} - U_{jp})+1)v_p$, $i,j=\overline{1,m}$ we have therefore:

$$c(V_i,V_j)=\sum_{p=1}^{m} sgn(sgn(U_{ip}-U_{jp})+1)\nu_p \sum_{p=1}^{m} \frac{e^{2k\frac{e^{2kU_{ip}}-e^{2kU_{jp}}}{e^{2kU_{ip}}+e^{2kU_{jp}}}}-e^{2k}}{e^{2k\frac{e^{2kU_{ip}}-e^{2kU_{jp}}}{e^{2kU_{ip}}+e^{2kU_{jp}}}}+e^{2k}}\vartheta_p$$

and

$$d(V_i,V_j)=\max_{p=\overline{1,m}}\left(\frac{e^{2k\frac{e^{2kU_{ip}}-e^{2kU_{jp}}}{e^{2kU_{ip}}+e^{2kU_{jp}}}}-e^{-2k}}{e^{2k\frac{e^{2kU_{ip}}-e^{2kU_{jp}}}{e^{2kU_{ip}}+e^{2kU_{jp}}}}+e^{-2k}}(U_{ip}-U_{jp})\right), i,j=\overline{1,m}$$

3. Example

Consider the Electre problem:

Table 1

Criterion nature	min	min	min	max
Coefficients of importance	4	2	4	5
Alternative/Criterion	**C₁**	**C₂**	**C₃**	**C₄**
V₁	1805	4	436	38
V₂	1458	0	353	15
V₃	1177	0	312	36
V₄	1109	4	378	21
V₅	1669	3	170	13

Classic solving with Electre method

Table 2

Table recalculation to maximize				
Alternative/Criterion	**C1**	**C2**	**C3**	**C4**
V1	-1805	-4	-436	38
V2	-1458	0	-353	15
V3	-1177	0	-312	36
V4	-1109	-4	-378	21
V5	-1669	-3	-170	13
min	-1805	-4	-436	13
max	-1109	0	-170	38
max-min	696	4	266	25

Table 3

Utilities				
Normalized coefficients	**0,27**	**0,13**	**0,27**	**0,33**
Alternative/Criterion	**C1**	**C2**	**C3**	**C4**
V1	0	0	0	1
V2	0,5	1	0,31	0,08
V3	0,9	1	0,47	0,92
V4	1	0	0,22	0,32
V5	0,2	0,25	1	0

Table 4

Table of concordance and discordance indicators										
	V_1 (C)	V_1 (D)	V_2 (C)	V_2 (D)	V_3 (C)	V_3 (D)	V_4 (C)		V_4 (D)	V_5 (C)	V_5 (D)
V_1	1	0	0,33	1	0,33	1	0,46		1	0,33	1
V_2	0,67	0,92	1	0	0,13	0,84	0,4		0,5	0,73	0,69
V_3	0,67	0,08	1	0	1	0	0,73		0,1	0,73	0,53
V_4	0,67	0,68	0,6	1	0,27	1	1		0	0,6	0,78
V_5	0,67	1	0,27	0,75	0,27	0,92	0,4		0,8	1	0

Finally:

	min C	1-max D	min
V_1	0,33	0	0
V_2	0,13	0,08	0,08
V_3	0,67	0,47	0,47
V_4	0,27	0	0
V_5	0,27	0	0

The optimal alternative is V_3 (for min=0,47).

The modified Electre method (for k=6)

Table 5

Utilities				
Normalized coefficients	0,27	0,13	0,27	0,33
Alternative/Criterion	C_1	C_2	C_3	C_4
V_1	1	1	1	162754,79
V_2	403,43	162755	41,26	2,61
V_3	49020,8	162755	281,46	62317,65
V_4	162754,79	1	14,01	46,53
V_5	11,02	20,09	162755	1

Table 6

Table with utilities - $sgn(U_{ip}-U_{jp})$				
Alternative/Criterion	V_1			
	C_1	C_2	C_3	C_4
V_1	0	0	0	0
V_2	1	1	0,95	-1
V_3	1	1	0,99	-0,45
V_4	1	0	0,87	-1
V_5	0,83	0,91	1	-1

Alternative/Criterion	V_2			
	C_1	C_2	C_3	C_4
V_1	-1	-1	-0,95	1
V_2	0	0	0	0
V_3	0,98	0	0,74	1
V_4	1	-1	-0,49	0,89
V_5	-0,95	-1	1	-0,45

Alternative/Criterion	V₃			
	C₁	C₂	C₃	C₄
V₁	-1	-1	-0,99	0,45
V₂	-0,98	0	-0,74	-1
V₃	0	0	0	0
V₄	0,54	-1	-0,91	-1
V₅	-1	-1	1	-1

Alternative/Criterion	V₄			
	C₁	C₂	C₃	C₄
V₁	-1	0	-0,87	1
V₂	-1	1	0,49	-0,89
V₃	-0,54	1	0,91	1
V₄	0	0	0	0
V₅	-1	0,91	1	-0,96

Alternative/Criterion	V₅			
	C₁	C₂	C₃	C₄
V₁	-0,83	-0,91	-1	1
V₂	0,95	1	-1	0,45
V₃	1	1	-1	1
V₄	1	-0,91	-1	0,96
V₅	0	0	0	0

Table 7

Table of concordance and discordance indicators									
	V₁ (C)	V₁ (D)	V₂ (C)	V₂ (D)	V₃ (C)	V₃ (D)	V₄ (C)	V₄ (D)	V₅ (C)	V₅ (D)
V₁	1	0	0,41	1	0,35	1	0,64	1	0,6	1
V₂	0,67	0,92	1	0	0,41	0,84	0,59	0,5	0,73	0,69
V₃	1	0,08	1	0	1	0	1	0,1	0,73	0,53
V₄	0,67	0,68	0,87	1	0,4	1	1	0	0,66	0,78
V₅	0,67	1	0,68	0,75	0,27	0,92	0,48	0,8	1	0

	min C	1-max D	min
V₁	0,35	0	0
V₂	0,41	0,08	0,08
V₃	0,73	0,47	0,47
V₄	0,4	0	0
V₅	0,27	0	0

The optimal alternative is V₃ (for min=0,47).

By testing the accuracy of the algorithm for 100,000 random problems for 5 alternatives and 4 criterions, we obtained the following percentages of overlap between the two methods:

Table 8

k	%
2	96,142
3	96,228
4	96,355
5	96,583
6	96,811
7	96,973
8	97,326
9	97,540
10	97,671
20	98,569

We appreciate (also because exponential increases greatly) from the above table that the recommended value of k is 6.

4. References

Ioan, Cătălin Angelo & Ioan, Gina (2010). *Applied Mathematics in Micro and Macroeconomics*. Galati, Romania: Sinteze Publishers.

Ioan, Cătălin Angelo & Ioan, Gina (2011). A method of choice of the importance coefficients in the Electre method. *Journal of Accounting and Management*, no. 2, vol. 1, pp. 5-11.

Ioan, Cătălin Angelo & Ioan, Gina (2011). An adjustment of the Electre method for the case of intervals. *Journal of Accounting and Management*, no. 2, vol. 1, pp. 53-61.

Ioan, Cătălin Angelo & Ioan, Gina (2012). *Matæconomics*. Galati, Romania: Zigotto Publishers.

Ioan, Cătălin Angelo & Ioan Gina (2012). *Methods of mathematical modeling in economics*. Galati, Romania: Zigotto Publishers.

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REALITIES AND PERSPECTIVES

Innovation and Development of HEIs.

Competency Framework and Core Values of DUG's Management Team

Gabriela Marchis[1]

Abstract: The European integration and globalisation are two important challenges faced by the universities, together with the ageing process that affects the size and the distribution of the target group of any higher education institution – the students. In this context, the universities' management system of human resources becomes very important. The performance and risks of any university are influenced by the quality of their employees and moreover, by the quality of the top-management team. This paper is trying to build on the model of recruitment developed by the Council of Europe, because HEIs need talented professionals, capable to work in multi-cultural environment. Thus, our paper tries to adapt the "Competency Framework and Core Values" of the Council of Europe to the specific of Danubius University of Galati, in order to improve the policy of recruitment, development and assessment of the management team. We hope that this paper will represent a starting point of redesigning the human-resources management system at our university, and also, it may represent an example of other universities in their process of renewing their strategies and policies of development. The value of this paper consists mainly in the innovative approach and to the fact that the results are original and unique and may be used for an education reform regarding HEIs' management system.

Keywords: quality; leadership; decision making; managerial-operational-interpersonal competencies

JEL Classification: M51; M52; J31; I250; I280.

1. Introduction

Nowadays, "students hunting" is a reality, as a secondary effect of globalisation and also of EU integration. Competitiveness among HEIs in attracting students is very high. Only in some EU regions, the universities are supported by the regional or even national government policies through different aid schemes that have the role of attracting and maintain the young people in their communities.

The ageing phenomenon together with declining demographics are increasing rapidly and the effects becomes visible, shrinking the student pool. Some societies are ready to face this challenges and others are "taken by surprise". Unfortunately, Romania belongs to the last category, where there are no integrated strategies and policies of development in this regard. Under these circumstances, for Romanian universities the competitiveness for students becomes harder and harder. Moreover, the depressed socio-economic environment limits expansion opportunities, and the negative consequences

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[1] Associate Professor, PhD, Danubius University of Galati, Romania, Address: 3 Blvd. Galati, Galati 800654, Romania, E-mail: gabrielamarchis@univ-danubius.ro.

are reflected by the major drop in student enrolment and also, by the "brain-drain" towards western EU countries.

To meet these challenges, Romanian HEIs have to renew their development strategies and policies in order to maintain and attract talented and committed academic and administrative staff, able to find innovative solution in order to diversify approaches and offers to potential students.

Having as reference point "The Competency Framework and Core Values" of Council of Europe, this paper intends to be a starting point for all aspects of HEIs' human resource management, from recruitment to staff development, career management and performance management.

Improving quality assurance and management proficiency is a constant concern of Danubius University of Galati (DUG) leadership, and therefore, this document may become a tool and a milestone for everyone working at Danubius University, especially for those from Human Resources Department.

2. The Need for a Competency Framework and Core Values

Human capital (academic and support staff) represent the key asset of any university. *Investing in human capital* and *developing a policy to attract and retain good staff* should be the answer for facing the numerous challenges, mentioned above. Moreover, the academic staff (professors, researchers, administrators of the university) may represent the key of attracting students from diverse backgrounds, who share the vision and values of the university. Therefore, the core values of a university are very important because it reflects the *unique culture* of the university, defining behaviours, attitudes and principles of the entire academic community (staff, students, alumni).

Danubius University of Galati has a set of values, which is meaningful, easy to communicate, and with which we all can identify. It is about what DUG's community believe is best and important.
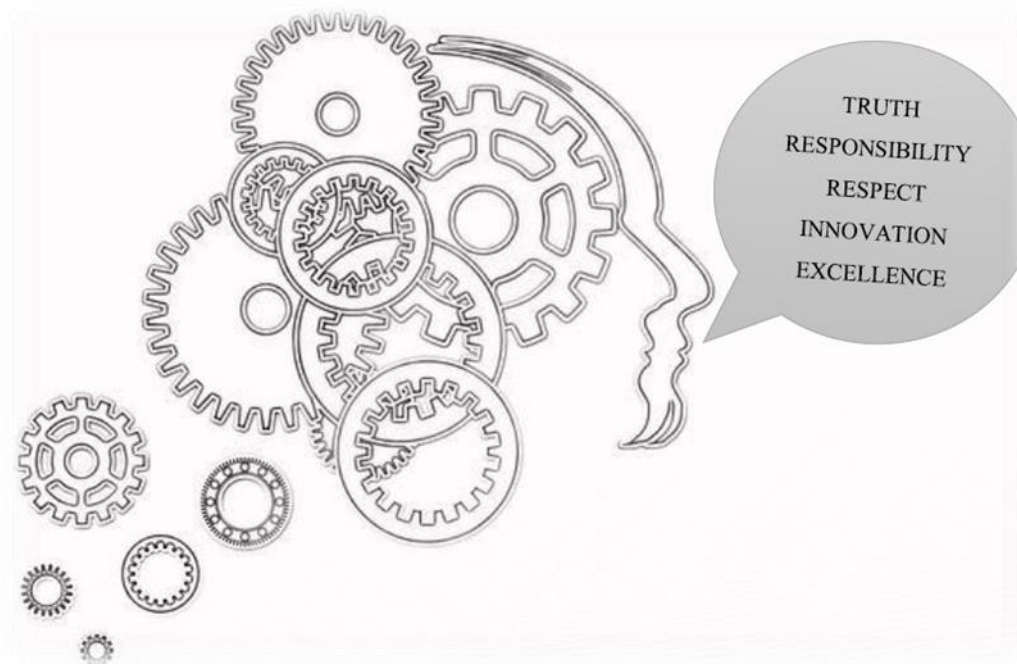

Figure 1. Core values of Danubius University of Galati

But, the existence of a core of values does not guarantee that everyone share the common vision of the organisation. Thus, increasing understanding and acceptance of the core values becomes essential for the positive evolution of any institution, and only when the core values will be embraced by every member of the academic community, the strength of the University will be guarantee. A shared view of the standards is the starting point and a premise that any institution is meeting the challenges of the third millennium.

As it was mention before, the "Competency Framework and Core Values" developed by the Council of Europe may be a benchmark case for the human resources management policy of any higher education institution, because of the ***internationalisation process*** that affects the daily-life of the academic community, even if the internationalisation by itself represents or not a goal of the organisation. Therefore, an international organisation like the Council of Europe may represent a model of conduct in the field of human resources management.

Another reliable source of inspiration in designing a competency framework for HEIs is the United Nations, which also provide examples of how the competencies look in action and indicates how they will be applied.

The greatest strength of a university and at the same time the key to success in this competitive world, consists in the quality of staff and managers. In order to measure the quality of academic staff and managers, a set of criteria is needed.

2.1. Defining Organizational Core Competencies

In accordance with the "Competency Framework and Core Values" developed by the Council of Europe, ***competencies*** are "*a combination of knowledge, skills, attitudes, values and behaviour that lead to successful performance in a job and which can be acquired by doing, learning, training and coaching*".

United Nations identifies 2 types of competencies: ***core competencies***, which are "*the skills, attributes and behaviours, considered important for all staff of the organization, regardless of their function or level*" and ***managerial competencies***, which are "*the skills, attributes and behaviours which are considered essential for staff with managerial or supervisory responsibilities*".

Additional, there are ***functional competencies*** related to different areas of work, but core and managerial competencies are common to any occupation.

Defining organizational core competencies is a long-run process that involves the active participation of the entire top-management group in collaboration with professional's advisors from HR field. This process is very important because it provides a "shared language" between managers and employees, facilitating the understanding of job requirements and expected performance standards.

After that, the competencies becomes a "road map" that describes the entire policy of recruitment, development needs and assessment of staff and management team.

Recruitment

- Competencies will be incorporated into generic job descriptions and vacancy announcements and will be used throughout the recruitment process, in assessments and interviews.

Staff development

- Training and development programmes will be aligned with the competencies and development needs of personnel.

Career Planning

- Competencies will be used to identify individual and organisational needs and planning for career management.

Performance management

- Competencies will be useful to staff and managers in assessing development needs and setting performance standards.

Figure 2. Role of Competencies in Building a New Organizational Culture

2.2. Integrating Competencies into HEIs

Core and managerial competencies for HEIs should be developed through a **participatory process** taking into account the university's environment, stakeholders, work outputs and future challenges.

As part of the process, *interviews* with stakeholders are higher recommended. The next step consists in organizing a series of *focus groups* with staff from different departments at all levels of decision, in order to examine and better understand the socio-economic environment in which the university performs, the services it provides and what are the directions for future developments, and the last, but not the least, the needs of the students, staff, and alumni. Based on these analysis, *HR advisors in consensus with top-management group* will set the **core competences** required for any employee of HEI, as well as the **additional competencies** required by staff who manage others.

It is important to emphasise that acquiring a competency is an **ongoing process** and not a one-time event. Therefore, it takes some time in order to develop and strengthen the competencies of the academic staff, especially the *managerial competencies*. To assist staff in developing their competencies, the university should invest in **formal training** and **coaching**, and in the meantime, **individual learning** activities are needed as well.

Furthermore, in practice, competencies relate more to *what a person **does***, rather than *what a person **knows***. So, in order to integrate competencies into the university is necessary to define a series of **behavioural indicators**, which are exemplifying the competency in practice. Therein, a **code of conduct** describing the action or behaviours agreed and expected throughout the university, may be helpful in promoting shared values and common standards of performance among academic community as well as for potential employees, in order to familiarise them with the HEI's values and competencies.

3. Is DUG Ready for the Challenge?

Promoting *shared values* and *common standards of performance and behaviour* throughout the university are the first steps in acquiring **high performance** and **managerial excellence**.

The "Competency Framework" of the Council of Europe includes 22 competencies, classified in 3 categories: managerial – operational – interpersonal.
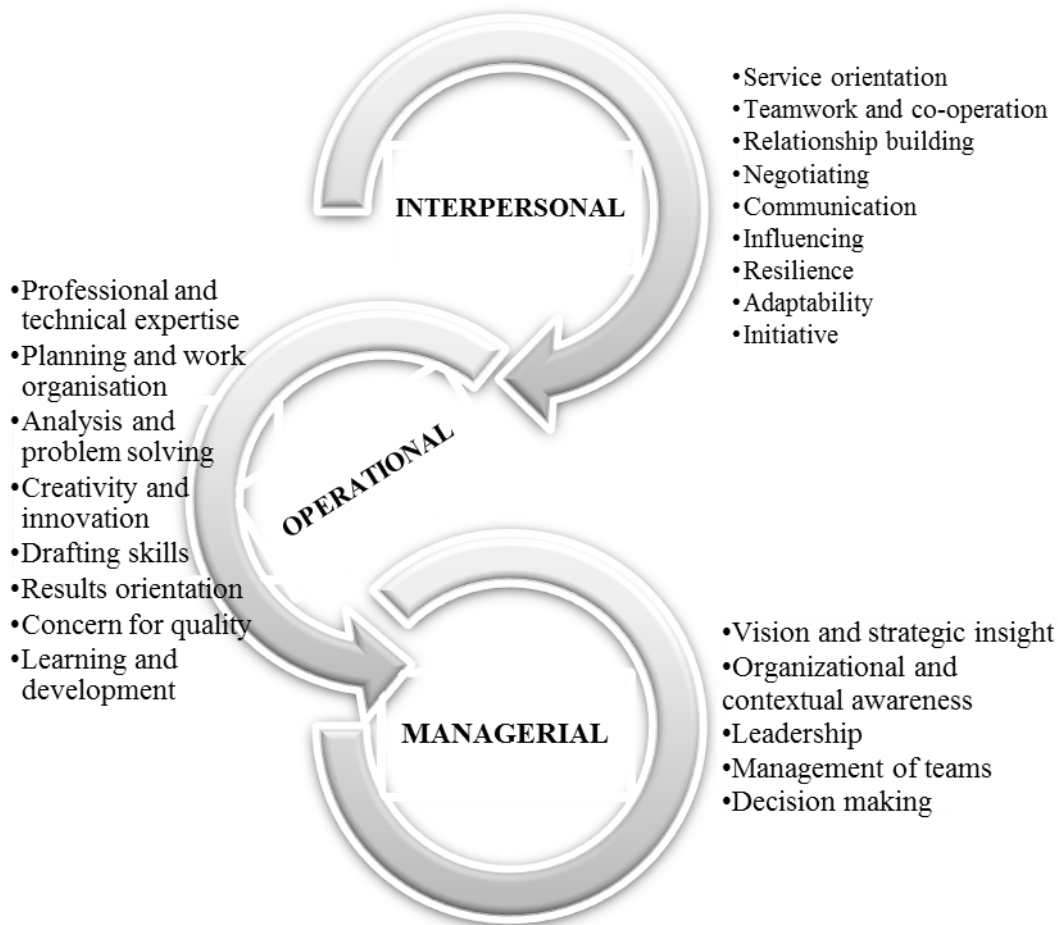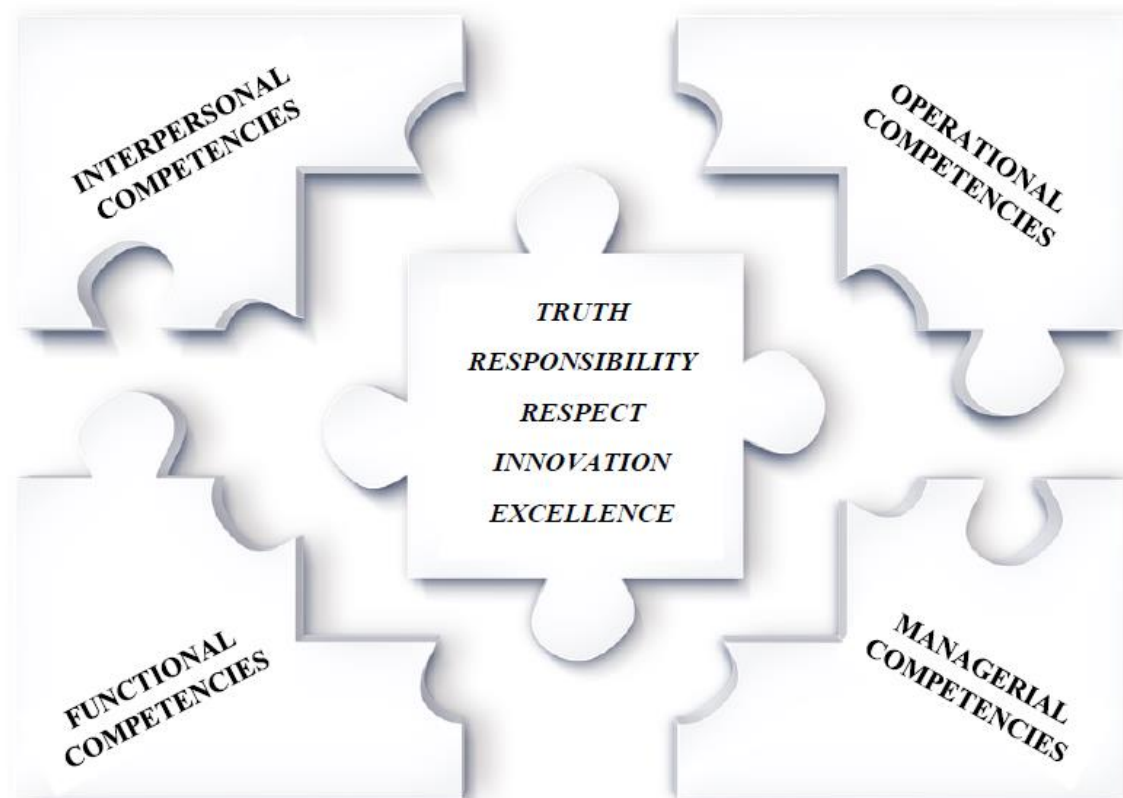

Figure 3. "Competency Framework" of the Council of Europe

Transposing these competences used by Council of Europe into DUG setting, and taking into account the system used United Nations, which classifies competencies into *core competencies* and *leadership competencies*, DUG's model for top-management team would look like this:

Figure 4. "Competency Framework" of DUG's management-team

The competencies defined as "managerial" would be used not only for measuring the performance of the leadership team but also the training needs of the managers:

    ✍   **vision and strategic insight**: the ability to identify strategic issues, opportunities and risks;

    ✍   **organizational and contextual awareness**: the ability to have a good grasp of the structure and activities of Danubius University, and a strong awareness of the national and international environment (political, economic, social and cultural) it operates in;

    ✍   **leadership**: the ability to lead, guide and render autonomous individuals or teams by developing and promoting a shared vision of DUG's goals and objectives;

    ✍   **management of teams**: the ability to guide, involve and motivate teams to achieve the set objectives both at team and individual levels in a multi-cultural environment;

    ✍   **decision making**: the ability to make well-reasoned, sound and timely decisions.

4. Heis' HR Management System Reform - Which Way Forward?

HEIs' management system requires to determine the key directions of the development of universities taking into account the assessment of their global competitiveness.

In the context of studying the current and prospective development of the system of higher education, one of the key drivers of university competitiveness that are performing in the modern conditions, characterized by the globalization, is related to the HEIs policy of recruitment, development and

assessment of the human resources. Given the fact that institutional performance indicators should represent an important criteria for allocating the tuition figures and also, the public funding for public universities, it is necessary to revise the attitude towards the HEIs' HR management system, especially for the leadership team.

Nowadays, competition "has become a major driving force in higher education", being strongly related to quality and performance. (Hopbach, 2012) Effective strategic leadership practices can help HEIs enhance performance while competing in turbulent and unpredictable environments. The attractiveness of a higher education system, is strongly influenced by the quality and even diversify of its resources, especially human. "Those who work in HEIs, in order to respond to new demands, need to rethink the organisational structure and institutional management model within which they are operating […] leadership must recognise the need to employ the best and brightest minds possible […] *because* […] the complexities of today's HEI demand that the designated leader call upon these individuals to contribute to the collective process of distributed leadership". (Taylor & De Lourdes Machado, 2006) To be more precise, a core factor for institutional success is the quality and performance of top-management team. Thus, it is recommended that management competencies would increasingly be used as a basis for identifying individual and organizational needs and planning for development. Support should be provided to leadership-team through publications and career support workshops.

This research represents a proposal of how to redefine the way we work, on a daily basis, through the values and principles, because we consider that values are very important to managers in order to build an *organizational culture* that enables staff to contribute to rich their maximum potential on the path to continuous improvement of educational system.

5. Acknowledgement

6. References

Hopbach, A. (2012). External *Quality Assurance Between European Consensus and National Agendas*. In Curaj, A.; Scott, P.; Vlasceanu, L. & Wilson, L. (Eds), *European Higher Education at the Crossroads. Between the Bologna Process and National Reforms*, pp. 267-285, Springer.

Nokkala, T. (2012). Institutional Autonomy and the Attractiveness of the European Higher Education Area – Facts or Tokenistic Discourse? In Curaj, A.; Scott, P.; Vlasceanu, L. & Wilson, L. (Eds), *European Higher Education at the Crossroads. Between the Bologna Process and National Reforms*, pp. 59-82, Springer.

Taylor J. & De Lourdes Machado M. (2006). Higher Education Leadership and Management: from Conflict to Interdependence through Strategic Planning, *Tertiary Education and Management*, 12, pp. 137–160. https://www.researchgate.net/profile/Maria_De_Lourdes_Machado-Taylor/publication/44836818_Higher_Education_Leadership_and_Management_From_Conflict_to_Interdependence_through_Strategic_Planning/links/0f3175319bc7b82efb000000/Higher-Education-Leadership-and-Management-From-Conflict-to-Interdependence-through-Strategic-Planning.pdf.

http://www.menon.org/wp-content/uploads/2012/11/9.-TRACE-Overview-of-EU-competency-frameworks1.pdf.

https://careers.un.org/lbw/.../competencies_booklet_en.pdf.

https://www.coe.int/en/web/jobs/our-values.

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REALITIES AND PERSPECTIVES

Exploring the Link between Intention
and Behavior in Consumer Research

Mădălina Bălău[1]

Abstract: In the attempts to predict or influence a change in consumer behavior, intention represents one important element and it is considered a close proxy to the behavior itself. However, there are several perspectives on the role of intention on subsequent behavior; the objective of this article is to review several perspectives on this role, starting from models frequently used in consumer research and enriching the perspectives by discussing the influence of implementation intention and the effect of intent measurement on product and brand actual buying behavior. The main findings are that intention is most frequently used in research as a stable concept in the mind of the consumers quite easy to measure, yet other perspectives suggest that intention could easily change according to the context or even under the influence of the measurement process. These competing perspectives need further exploration since the gap between behavior predicted on intentions and actual behavior is still important. The current article contributes to the literature on the conceptualization and measurement of intention and its main implications consist of insights for using the concept of intention in marketing and consumer research aimed at predicting or changing behavior.

Keywords: intention-behavior link; consumer behavior; theory of planned behavior; implementation intentions

JEL Classification: M30; M31; M39

1. Introduction

Explaining consumer behavior is a first step to being able to predict it or change it For most types of interventions, whether we speak of marketing activity aimed at influencing consumers to buy new products or services, or of changing certain kinds of social behaviors, like reducing aggressive behavior of children in schools, the actors involved would like to know what determinants have most impact as to leverage them. Today most behaviors also involve consumption behaviors, understood as buying, using and also disposing off products. Some researchers link behavior to general attitudes of personality traits of individuals, yet these factors only influence behavior indirectly. (Ajzen & Fishbeing, 1980) Factors closer to the context and the behavior itself were considered to be better proxies for explaining and predicting it, such is the case for the construct of intention.

The information about consumers' intentions is often used by companies in predicting their future marketing actions. In launching new products, firms frequently base their decisions on measured purchase intentions. However, it was observed by various researchers (Auger & Devinney, 2007; Carrington, Neville & Whitwell, 2010) that certain kinds of intentions seldom lead to the actual enacting of the behavior: it is the situation of purchasing ethical products or of practicing health

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[1] Senior Lecturer, PhD, DiSEDD Research Center, Danubius University of Galati, Romania. Address: 3 Galati Blvd., 800654 Galati, Romania. Tel.: +40.733.180.384, Corresponding author: madalina.balau@univ-danubius.ro.

promoting behaviors, such as reducing the sugar intake, exercising, eating fresh and seasonal food. Under these conditions, it is obvious that a good understanding of the way intentions function in relation to subsequent behavior may have a positive impact on company's actions. The aim of this article is to explore the multiple facets of intention found in the literature. One the one hand, we present the theories that view the concept of intention as a stable and reliable aspect in the mind ready to be measured and try to understand how well these models succeed to predict behavior, what are the variables that were found to moderate the link between intention and behavior and the main direct influences on intention. On the other hand, we could find studies that conceive intention as a mental strategy which is highly dependent of context. Under this perspective, intention isn't a stable variable ready to be measured, but a very flexible one. This second perspective was less explored in research and would deserve more attention as a possible tool that could be better used by consumers in performing the desired behaviors, since it is quite frequently observed that individuals have sometimes difficulties with 'walking their talk' for non-routine behaviors.

2. The Link between Intention and Behavior under the Theory of Planned Behavior

The intention construct is a central factor for the Theory of Reasoned Action as well as for the Theory of Planned Behavior (TPB), which is a development of the first theory that refers to behaviors outside the volitional control. These two models are well appreciated in the literature and have a great influence in studying and explaining consumer decisions as they were the first to offer a coherent structure that linked attitudes to behavior (i.e., thoughts and action). Fishbein and Ajzen (1975) assert that intentions will indicate the effort the individual will exert in performing the behavior and the willingness of trying to enact it. Thus, the stronger is the intention of an individual, the higher the probability of implementing that behavior. However, Ajzen (1990) noted that this direct relationship works only for behaviors under volitional control, meaning that the individual in question is the one deciding to perform or not that behavior. For behaviors outside volitional control there is another variable that influences directly the behavior, namely the behavioral control. Under the Theory of Planned Behavior, it is expected that an individual will implement a behavior if he/she is motivated, so if he/she has the intention, and also has the necessary ability to enact that behavior. This ability of an individual to perform a certain behavior has an important subjective dimension, which is the individual's own perception of control over performing the behavior. Ajzen (1988) uses this construct in the Theory of Planned Behavior and names it Perceived Behavioral Control, which influences the intention as well as the implementation of behavior.
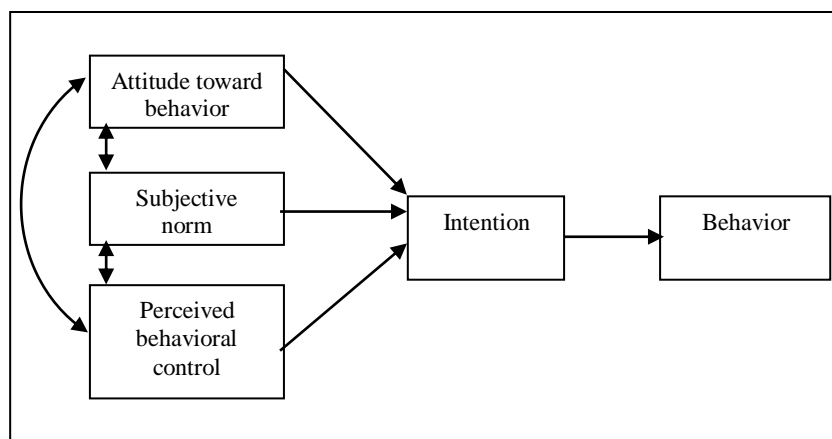

Figure 1. The Theory of Planned Behavior illustrated by Ajzen (1991)

The theory of planned behavior (TPB) presents the determinants of individual decision to do a certain behavior and intention is represented as the individual's motivation to exert effort in that direction. Under the TPB, behavior is determined by intention and perceived control, which is the capability of the individual to enact that behavior. Intention is predicted by attitudes, subjective norm, which captures the individual interpretation of the social pressures related to that behavior, and also the perceived behavioral control which also interacts with intention in further predicting behavior.

In the practice of measurement of intention in order to predict subsequent behavior things aren't always that straightforward. Usually, performing a certain behavior involves choosing one course of action among multiple alternative courses of action. Moreover, sometime the intention measurement cannot take place close to the moment of performance of the behavior, so various factors may intervene between this measurement and the enactment of the behavior. These issues reduce the predictive ability of the theories mentioned above. As well, for understanding and predicting behavior change, it is worth noting that most relevant behaviors are those that involve quite a high degree of uncertainty around the possibility of implementing that behavior.

Sheppard and his colleagues (Shepperd, Hartwick & Warshaw, 1988) proposed a solution for the development of these theories which could incorporate also the diverse invisible factors that may intervene between intention measurement and behavior performance under more or less uncertainty, namely the of "subjective behavioral estimation". Using a meta-analysis to understand the influence of behavioral estimation on the predicted behavior through the model of reasoned action, Sheppard et al. (1988) found that the correlation between intention and behavior presented a higher variance depending on the study context. This suggests the presence of moderators and in this situation the behavioral estimation presented a higher correlation to the behavior and a smaller variance. Moreover, the use of behavioral estimation within the model of reasoned action to predict goals rather than behaviors increased the model's predictive capacity. An important finding of their meta-analysis was that when choice was made salient by the presence of alternatives, the model of reasoned action performed better. A possible explanation offered by Sheppard at el. (1988) was that the choice context elicited a greater involvement on the behalf of the subjects.

Although the TPB model is frequently used to explain and predict behavioral decisions, it has several shortcomings: it only includes "proximal determinants of behavior", as Conner and Armitage (1998) suggest, rather than a complete theory of behavior as Ajzen (1991) suggest; and it has been tested mainly under correlational designs, although the model is supposed to present a causal sequence.

In addition to the constructs in the TPB model, Conner and Armitage (1998) found that past behavior has an important contribution in predicting intention and behavior, with TPB variables already present in the model. Aarts, Verplanken and van Knippenberg (1998) argue that past behavior is a moderator for the relationship between intention and behavior, especially for habitual type of behaviors where the cognitions proposed by TPB play a smaller predicting role. The habitual behavior is an interesting type of behavior since it is triggered automatically by context and the specific situation.

Another important aspect influencing intention is the self-identity concept, which is defined as "the salient part of an actor's self which relates to a particular behavior". (Conner & Armitage, 1998, p. 1444) Charng et al. (1988) suggest that intentions are determined by salient role identities, which will increasingly predict repeated behaviors that make that role identity (or self-identity) more salient. There is also another interpretation proposed by DeBono and Snyder (1995), who argue that people feel the need to maintain their self-identity and that they seek situations according to their attitudes and not necessarily deliberating on attitudes with no choice over the situation.

Fazio (1990) proposed that attitudes influence behavior in two ways, depending on the presence or lack of motivation and opportunities for that behavior. In case the person is motivated and has opportunities, intentions will be formed and a plan for putting them into practice will be conceived. However, if motivation or opportunities lack, attitudes will impact behavior spontaneously, when they will be activated by the presence of the attitude object. The MODE model of Fazio (1990) proposes that attitudes are latent, but when automatically activated by cues, they will shape the perception of the individual on the context, through a selective perception.

When testing the TPB model and the link between intention and behavior, results indicated a less strong relation, and also a more distant one. (Godin & Kok, 1996; Bagozzi, 1992; Conner & Armitage, 1998) The critics of TPB distinguished two processes involved in forming an intention and consequently in implementing it. Kuhl and Beckman (1985) argue that there is a motivational process which leads to making a decision, thus resulting in intention formation, and then, a volitional process that leads to intention implementation.

Gollwitzer (1990) argued that in case of goal intentions, individuals follow a two-stage process, the first part identical to the TPB model proposed by Ajzen, while the second consists of forming plans which are implemented as soon as the environmental conditions support that action. These plans developed in the second stage are named by Gollwitzer (1993) 'implementation intentions' which have greater chances of being performed than the goal intentions which may result from the TPB deliberative process.

3. The "Implementation Intention" Concept

The concept of implementation intention is reported to be closely linked to the performance of the behavior and it deserves a more detailed presentation. First, there needs to be made a distinction between goal intentions and implementation intentions. Goal intentions refer to achieving a certain outcome or performing a certain behavior desired by the individual. However, pursuing a goal to implementation is not an easy task outside the routine behaviors, so for this individuals need to be capable of noticing the opportunities that would enable the goal implementation. The implementation intentions are a tactic to achieving the goal intention, by mentally programming "the when, where and how of goal-directed responses". (Brandstatter, Lengfelder & Gollwitzer, 2001, p. 947) Thus, the implementation intention is a powerful self-regulatory strategy that creates a mental link between a specific future situation and the intended goal directed response.

The implementation intention functions as a concession of control to environmental cues, which activates an automatic initiation of the intended behavior without deliberating or forming again a conscious intent. Thus, the implementation intention may be a tactic used effectively when the goal-directed behavior would be otherwise forgotten. In their studies, Gollwitzer and Brandstatter (1997) tested the implementation of goal intentions with and without forming implementation intentions and the first condition yielded a higher goal achievement rate.

Brandstatter, Lengfelder and Gollwitzer (2001) report the results of four experimental studies that explored the functioning of implementation intentions for participants in different conditions: university students, opiate addicts under withdrawal and schizophrenic patients. Their main findings are that the implementation intentions delegate control to situational cues, which further automatically activate the behavior, and they enables accelerated behavioral responses even for individuals that were under a high cognitive load (the opiate addicts), involving an efficient facilitation of behavior. The

experiments with university students revealed that using implementation intentions does not increase the response speed on the expense of other tasks, but they yield a faster reaction only on the task for which the implementation intention was formed. Thus, it reduces the mental stress related to that task performance.

Implementation intentions and habit may seem alike through the automatization feature, yet the most important difference is that implementation intentions are a mental link between a goal and an anticipated situation, while habits become automatic through the frequency and consistency of the behavior.

Brandstatter, Lengfelder and Gollwitzer (2001) note that the implementation intention is a mental tool that facilitates action and its effect lasts only as long as the person holds that implementation intention. Moreover, this tool seems to function markedly better when difficulties in the goal-directed behavior are present. An explanation might also come from the fact that it activates an action orientation which prevents questioning the goals, so it reduces hesitation. The implementation intentions don't lead to a greater rigidity towards the context either, as it enables action initiation with few cognitive resources that allow the individual to notice actively alternative opportunities of action.

4. Challenges in Measuring Intentions and Their Effects

In the literature there is a well-documented gap between the consumers' self-reported intentions and their actual behavior. (Carrington, Neville & Whitwell, 2010) Some scholars consider that this gap is due to social desirability bias in responses and in the design of the research methodology (Bagozzi, On the Neglect of Volition in Consumer Research: A Critique and Proposal, 1993), others also believe that consumers may also anticipate wrongly the shopping context which distracts them from their intentions. (Auger & Devinney, 2007) This is obviously a limitation inherent of the models that concentrate on attitudes and intentions as directly leading to behavior and isolating decision-making, and thus they fail to account for the situations (contextual) influences. (Foxall, 1993; Fukukawa, 2003)

Carrington, Neville, and Whitwell (2010) propose a holistic conceptual model that could account for the intention-behavior gap in the case of ethically concerned consumers. They suggest that there exist certain types of situations which inhibit the translation of intentions into behavior, namely the distraction in the shopping context, which makes the individual forget his/her intentions. But there also may be the fact that their anticipation are very different from the actual control of the individual, which makes the intentions impossible to implement. In their model, they aim to explore the mediating effect of implementation intention on behavior and the moderating effect of actual behavioral control and of the situational context as defined by Bagozzi (2000).

Carrington, Neville, and Whitwell (2010) adopted a qualitative research methodology in order to test ther functioning of their conceptual model. In identifiying whether the individual forms an implementation intention they follow the recommendations of verifying if there is a identification of a future situation ("if I find coffee from Fair Trade on the shelfs of the supermarket") and the behavioral respose associated with it ("then I will buy that product"). When trying to measure the implementation intention, researchers should thus identify whether there is an implementation plan (the "if, then" anticipation), the strenght of the intentions and of the implementation plan and also the completeness of this plan. The implementation intentions are considered to play an important role in minimizing the influence of the moderating factors which may inhibit the performance of the intended behavior.

Going to the quantitive methodology used to test the theory of planned behavior and to the issue of measuring intention towards performing a certain behavior, Ajzen (2006) offers several guidelines for empirically using the TPB model. One important aspect to keep in mind concering the variables within the model, is that they all are latent variables, that cannot be measured directely, so they need to be inferred from observable responses to items that are proxies for those variables. Under this condition, the terming of all the items for measuring the variables is highly important for a proper functioning of model testing. Thus, his recommendation is that the behavior under study be defined according to its "Target, Action, Context and Time – TACT". (Ajzen, 2002, p. 2) For example, the behavior could be defined: "Buying eco-labeled fruit from the supermarket in the following week". Then, intention could be measured by asking respondents to rate several items such as: "I intend to buy eco-labeled fruit from the supermarket in the following week.", "I will try to buy eco-labeled fruit from the supermarket in the following week.", "I plan to buy eco-labeled fruit from the supermarket in the following week". Although this narrow definition of the intention yields good results in statistically testing the model, it is possible that this intention formation, almost imposed by the researcher through the measurement process might influence the subsequent behavior for those participating in the study.

Indeed, several researchers have observed that the survey measurement process may actually change the attitudes, intention and behavior it tries to measure. (Feldman & Lynch, 1988; Morwitz, Johnson, & Schmittlein, 1993; Fitzsimmons & Morwitz, 1996) Morwitz, Johnson and Schmittlein (1993) descovered that measuring purchase intentions increased the probability of buying a product in the category studied. This leads to the possibly hypothesis that intention is not a fixed aspect ready to be measured, but rather might be a vehicle through which behavior is sometimes enacted. One possible explanation for this finding is that the intention measurement process may activate existing product information in the mind of the consumer, making it more salient. The second explanation is that the measurement process may lead to an increased involvement of the consumer with that product, which will increase his cognitive efforts related to it.

Following these findings, it is possible that the intent measurement process may increase the salience of attitudes surrounding the product central to that study or it may lead to a change in the attitudes, intention and behavior. Fitzsimmons and Morwitz (1996) analyse the effect of measuring intent on brand purchase and they found a systematic influence dependent on brand usage. For consumers that already use a certain brand, measuring purchase intentions will lead to an increase of the market share for that brand. However, if consumers asked about their intentions don't use any brand for that product, this will lead to an increase of the market share of the most well-known brands in that product category. These findings have important consequences on intent measurement: the mere process of measuring intent may lead to an overestimation of sales for brands less known.

5. Conclusions

Intention represents an important aspect in studying behavior as it is considered a close proxy to the performance of the behavior by some of the most frequently tested models is in consumer behavior: the Theory of Reasoned Action and the Theory of Planned Behavior. These models offered a simple and easy to test framework in studying behavioral decisions, however, they do not represent a complete explanation of behavior and in many cases the link between intention and subsequent behavior is weak.

Some new concepts were proposed to be included into these models by several scholars, as the behavioral estimation proposed by Shepperd and his colleagues (Shepperd, Hartwick & Warshaw,

1988) or self-identity and habit or past behavior by Conner and Armitage (1998). The concept of implementation intention was also proposed to be included in the model by the latter researchers. Nonetheless, Brandstatter, Lengfelder and Gollwitzer (2001) argued that the implementation intention is rather a mental strategy with a high flexibility in the face of changing opportunities for behavior implementation. One of the most important aspect of this concept is that it makes a strong link to the situational determinants of behavior, an aspect neglected in the traditionally used models.

The fact that the implementation intention links the goal intention to the external situational determinants while acting as an automatic trigger of behavior performance makes it interesting concept to study in situations where performance of behavior is more demanding for the individual. This strategy may be spontaneously used by individuals, but certainly few of them use it consciously. It would be interesting to test its functioning as a mental tool facilitating behavioral performance, acquired through learning. This could be of help for individuals who have difficulties in putting into practice their goal intentions.

From a managerial perspective, the fact the implementation intentions may function as a tool for performing behaviors where distractions get in the way, might be a helpful insight for certain types businesses. For businesses dedicated to promoting a healthy lifestyle, where consumers seem to get easily distracted and forget their health promoting intentions, using the implementation intentions could be an interesting way for consumers to achieve what they desire and for businesses to keep their consumers engaged. Further exploration of how these implementation intentions could be used for promoting the interests of the consumer and those of the business simultaneously is necessary.

Taking into account the novel perspective brought to the issue of the influence of the measurement process of intention of actual behavior by Fitzsimmons & Morwitz (1996), we can derive very important managerial implications for measuring intentions, when companies want to introduce a new product or brand into the market and would like the estimate the purchase intention. The well known brands benefit from the measurement process in itself and will see their market share increase in the group where the intention measurement has taken place, while less known brands might get overstated intentions that will not turn into actually buying the product. Thus, using the measurement of intention as a tool to influence subsequent behavior could be used as a valuable instrument by well known brands and should be carefully used for less well known brands.

Future research on the use of intention as an enabler for performing the behavior would be necessary and would have important consequences for companies as well as for the consumers themselves. More consumer self-awareness on the formation of intentions and on the use of implementation intentions as a tool for facilitating performance might help them in achieving the desired actions.

6. References

Aarts, H.; Verplanken, B. & van Knippenberg, A. (1998). Predicting behavior from actions in the past: Repeated decision making or a matter of habit? *Journal of Applied Social Psychology,* Vol. 28, pp. 1355-1374.

Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behavior and Human Decision Processes,* 50, pp. 179-211.

Ajzen, I. (2002). Constructing a TPB questionnaire: Conceptual and methodological considerations. *Available online la: http://www.socgeo.ruhosting.nl/html/files/spatbeh/tpb.measurement.pdf*.

Ajzen, I. & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behaviour.* New Jersey: Englewood Cliffs, Prentice-Hall.

Armitage, C. & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: a meta-analytic review. *British Journal of Social Psychology,* 40, pp. 471-499.

Auger, P. & Devinney, T.M. (2007). Do What Consumers Say Matter? The Misalignment of Preferences with Unconstrained Ethical Intentions. *Journal of Business Ethics,* vol. 76, pp. 361–383.

Bagozzi, R. (1993). On the Neglect of Volition in Consumer Research: A Critique and Proposal. *Psychology and Marketing,* Vol 10, pp. 215-237.

Bagozzi, R. (2000). The Poverty of Economic Explanation of Consumption and an Action Theory Alternative. *Managerial and decision economics,* Vol. 21, pp. 95–109.

Bagozzi, R.P. (1992). The self-regulation of attitudes, intentions and behavior. *Social Psychology Quarterly,* 55, pp. 178-204.

Brandstatter, V.; Lengfelder, A. & Gollwitzer, P. (2001). Implementation Intentions and Efficient Action Initiation. *Journal of Personality and Social Psychology*, Vol. 81, pp. 946-960.

Carrington, M.; Neville, B. & Whitwell, G. (2010). Why ethical consumers don't walk their talk: Towards a framework for understanding the gap between ethical purchase intentions and actual buying behavior of ethically minded consumers. *Journal of Business Ethics*, pp. 139-156.

Charng, H.-W.; Piliavin, J. & Callero, P. (1988). Role identity and reasoned action in the prediction of repeated behavior. *Social Psychology Quarterly,* 51, pp. 303-317.

Conner, M. & Armitage, C. (1998). Extanding the Theory of Planned Behavior: A review and avenues for further research. *Journal of Applied Social Psychology, 28, 15*, pp. 1429-1464.

DeBono, K.G. & Snyder, M. (1995). Acting on one's attitudes: The role of a history of choosing situations. *Personality and Social Psychology Bulletin, 21*, pp. 629-636.

Fazio, R.H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M.

Zanna, P. *Advances in experimental social psychology, Vol. 23,* pp. 75-109. San Diego: CA: Academic.

Feldman, J. & Lynch, J.J. (1988). Self-Generated Validity and Other Effects of Measurement on Belief, Attitude, Intention and Behavior. *Journal of Applied Psychology,* 73, pp. 421-435.

Fishbein, M. & Ajzen, I. (1975). *Belief, attitude, intention and behavior.* Reading, MA: Addison-Wesley.

Fitzsimmons, G. & Morwitz, V. (1996). The Effect of Measuring Intent on Brand-Level Purchase Behavior. *Journal of Consumer Research,* Vol. 23, No. 1, pp. 1-11.

Foxall, G. (1993). A Behaviourist Perspective on Purchase and Consumption. *European Journal of Marketing,* Vol. 27, Nr. 8, pp. 7–16.

Fukukawa, K. (2003). A Theoretical Review of Business and Consumer Ethics Research: Normative and Descriptive Approaches. *The Marketing Review,* Vol. 3, pp. 381–401.

Godin, G. & Kok, G. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion,* 11, pp. 87-98.

Gollwitzer, P.M. (1990). Action phases and mind-sets. In Sorrentino, E.T., *Handbook of motivation and cognition: Foundationsof social behavior,* pp. 53-92. New York: Guilford.

Gollwitzer, P.M. (1993). Goal achievement: The role of intentions. In W. Stroebe, & M. Hewstone, *European review of social psychology,* Vol. 4, pp. 141-185. Chichester, UK: John Wiley & Sons.

Gollwitzer, P.M. & Brandstatter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology, 73*, pp. 186-199.

Kuhl, J. & Beckman, J. (1985). *Action control: From cognition to behavior.* New York: Spinger.

Morwitz, V.; Johnson, E. & Schmittlein, D. (1993). Does Measuring Intent Change Behavior. *Journal of Consumer Reseach, 20*, pp. 46-61.

Shepperd, B.; Hartwick, J. & Warshaw, P. (1988). The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research. *Journal of Consumer Research,* Vol. 15, No. 3, pp. 325-343.

Comparative Analysis of Personal Income Taxation

Rodica Pripoaie[1]

Abstract: This paper presents a comparative analysis of personal income taxation in different countries. This is an important component of fiscal policy and directly influences the budget revenues. Over time there have been several taxation systems, and today they differ from state to state. The statistics contain detailed information on income tax on individuals and their income, including gender, age, income and source of income. This work shows how the income distribution of individual taxpayers has changed over time, as well as the differences and similarities of personal income taxation in the different countries.

Keywords: fiscal policy; comparative analysis of fiscal policy; personal income; taxation

JEL Classification: C15; E62; E63; H20; H24

1. Introduction

All people pay taxes, regardless of nationality, sex or religion, so taxation is part of our lives, of all. Employees pay from wage in addition to personal income tax and a series of social contributions that, although not of a fiscal nature, are payment obligations that affect net income and which have the highest percentage of taxes and fees paid.

Worldwide, there is a trend towards fiscal harmonization, but taxes differ greatly from one country to another, and even within the EU Member States. Thus, the rate of taxation differs greatly depending on the degree of development of the country concerned, in the sense that it is lower in developing countries and higher in developed ones.

The income tax on individuals has a very wide scope and differs greatly in terms of tax rates that can be proportional or progressive. This is a direct tax, paid and directly supported by the individual, which makes it the basic element of any fiscal system, especially if it is also considered that it contributes, on average, by about 25-30% to the formation of tax revenues of a country.

The European Union has no role to establish taxes. The rate of tax is decided by the governments of the Member States. The EU's role is to ensure that national taxes are in accord with EU policies and do not discriminate individuals.

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[1] Associate Professor, PhD, Dunărea de Jos University of Galati, Romania, Address: 47 Domnească Street, 800008, Galati, Romania, E-mail: 1rodica.pripoaie@ugal.ro.

2.1. The Organization for Economic Co-operation and Development (OECD) Taxing Wages

The tax wedge is defined by http://www.oecd.org/tax/tax-policy/tax-database.htm as "the combined central and sub-central government income tax plus employee and employer social security contribution taxes, as a percentage of labor costs defined as gross wage earnings plus employer social security contributions. The tax wedge includes cash transfers."

The all-in tax rate is calculated by http://www.oecd.org/tax/tax-policy/tax-database.htm as: "the combined central and sub-central government income tax plus employee social security contribution, as a percentage of gross wage earnings."

Personal average tax rate (or "tax burden") is the term defined by http://www.oecd.org/tax/tax-policy/tax-database.htm used when personal income tax and employees' social security contribution are expressed as a percentage of gross wage earnings.

2.2. Evolution of Personal Income Tax Rates and Thresholds in OECD Countries during the Period 2000-2017

Taxing Wages 2018 shows that the "net personal average tax rate" – income tax and social security contributions paid by employees, minus any family benefits received, as a share of gross wages – was 25.5% across the OECD. This OECD-wide average rate, calculated for a single person with no children earning an average wage, has remained stable in recent years, but it covers country averages that range from below 15% in Chile, Korea and Mexico to over 35% in Belgium, Denmark and Germany.   (http://www.oecd.org/newsroom/workers-in-oecd-countries-pay-one-quarter-of-wages-in-taxes.htm)

2.3. Central Government Personal Income Tax Rates and Thresholds

The table below shows the rates of personal income tax and the taxable income to which these legal rates apply. Also, table presents basic/standard tax allowances, tax credits and tax rates.

The informations are valid for a person without dependent persons.

Tapered means that the tax exemption is reduced as income increases.

Table 1

Central government personal income tax rates and thresholds	Personal allowance	Tax credit	Surtax rate	01 Marginal rate	01 Threshold	02 Marginal rate	02 Threshold	03 Marginal rate	03 Threshold
Country									
Australia	..	..	2.00	0.00	18,200.00	19.00	37,000.00	32.50	87,000.00
Austria	..	..	..	0.00	11,000.00	25.00	18,000.00	35.00	31,000.00
Belgium	7,270.00	..	..	25.00	11,070.00	30.00	12,720.00	40.00	21,190.00
Canada	..	1,745.25	..	15.00	45,916.00	20.50	91,831.00	26.00	142,353.00
Chile	..	..	..	0.00	7,609,464.00	4.00	16,909,920.00	8.00	28,183,200.00
Czech Republic	..	24,840.00	..	15.00	..	..	..	..	..
Denmark	..	4,536.00	8.00	10.08	479,600.00	25.08		..	..
Estonia	2,160.00	..	..	20.00	..	..	..	..	..
Finland	..	..	..	0.00	16,900.00	6.25	25,300.00	17.50	41,200.00
France	..	..	8.00	0.00	9,807.00	14.00	27,086.00	30.00	72,617.00
Germany	..	..	5.50	0.00	8,820.00	..	13,769.00	..	54,057.00
Greece	..	..	10.00	22.00	20,000.00	29.00	30,000.00	37.00	40,000.00
Hungary	..	..	..	15.00	..	..		..	..
Iceland	..	634,880.00	..	22.50	10,016,488.00	31.80	..	..	..
Ireland	..	1,650.00	8.00	20.00	33,800.00	40.00	..	..	..
Israel	..	5,805.00	..	10.00	74,640.00	14.00	107,040.00	20.00	171,840.00
Italy	..	1,880.00	..	23.00	15,000.00	27.00	28,000.00	38.00	55,000.00
Japan	380,000.00	..	2.10	5.00	1,950,000.00	10.00	3,300,000.00	20.00	6,950,000.00
Korea	1,500,000.00	..	..	6.00	12,000,000.00	15.00	46,000,000.00	24.00	88,000,000.00
Latvia	720.00	..	..	23.00	..	..	..	..	..
Luxembourg	1,020.00	300.00	7.00	0.00	11,265.00	8.00	13,137.00	9.00	15,009.00
Mexico	3,397.05	4,884.24	..	1.92	5,952.85	6.40	50,524.93	10.88	88,793.05
Netherlands	..	2,254.00	..	8.90	19,982.00	13.15	33,791.00	40.80	67,072.00
New Zealand	..	..	..	10.50	14,000.00	17.50	48,000.00	30.00	70,000.00
Norway	147,900.00	..	..	9.55	164,100.00	10.48	230,950.00	11.96	580,650.00
Poland	1,335.00	1,188.00	..	18.00	85,528.00	32.00	..	..	..
Portugal	..	..	2.50	14.50	7,091.00	28.50	20,261.00	37.00	40,522.00
Slovak Republic	3,803.33	..	..	19.00	35,022.31	25.00	..	..	..
Slovenia	6,519.82	..	..	16.00	8,021.34	27.00	20,400.00	34.00	48,000.00
Spain	5,550.00	..	..	9.50	12,450.00	12.00	20,200.00	15.00	35,200.00
Sweden	13,200.00	..	..	0.00	438,900.00	20.00	638,500.00	25.00	..
Switzerland	..	..	..	0.00	14,500.00	0.77	31,600.00	0.88	41,400.00
Turkey	..	..	0.76	15.00	13,000.00	20.00	30,000.00	27.00	110,000.00
United Kingdom	11,500.00	..	..	20.00	33,500.00	40.00	150,000.00	45.00	..
United States	6,350.00	510.26	..	10.00	9,325.00	15.00	37,950.00	25.00	91,900.00

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I1
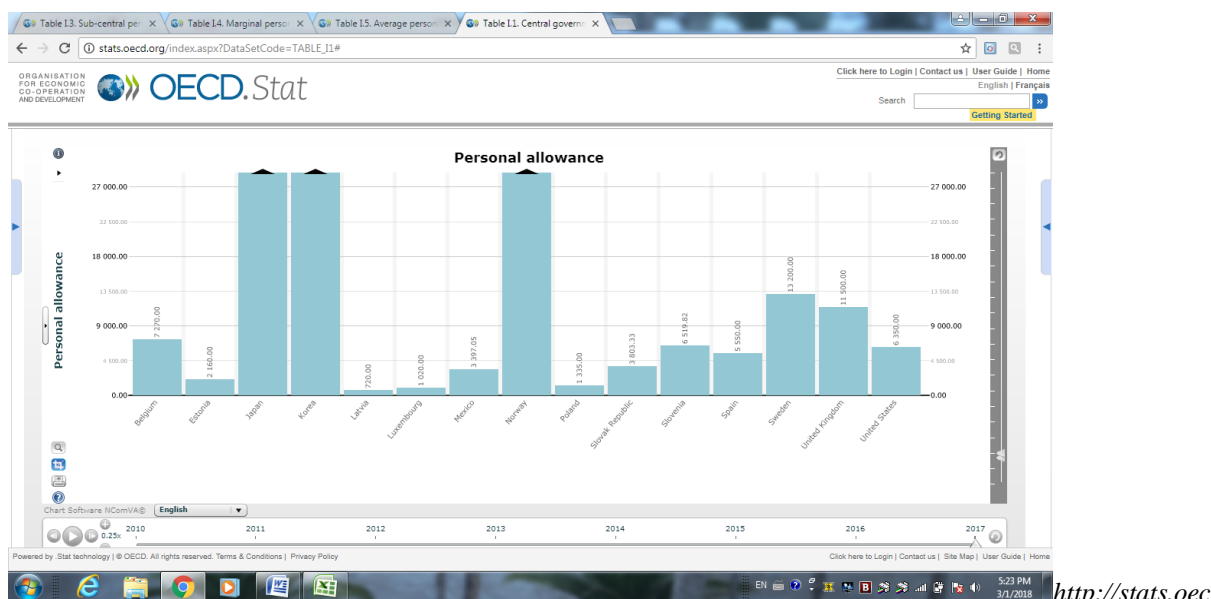
http://stats.oec d.org/index.aspx?DataSetCode=TABLE_I1#

Year			2017
Country	01 Marginal rate	02 Marginal rate	03 Marginal rate
Austria	0.00	25.00	35.00
Canada	15.00	20.50	26.00
France	0.00	14.00	30.00
Germany	0.00	..	..
Greece	22.00	29.00	37.00
Italy	23.00	27.00	38.00
Japan	5.00	10.00	20.00
Mexico	1.92	6.40	10.88
Switzerland	0.00	0.77	0.88
Turkey	15.00	20.00	27.00
United Kingdom	20.00	40.00	45.00
United States	10.00	15.00	25.00

Source: Selection from the previous table

Evolution graphically of marginal rates of central government personal incomes tax can be presents as in the below figures:
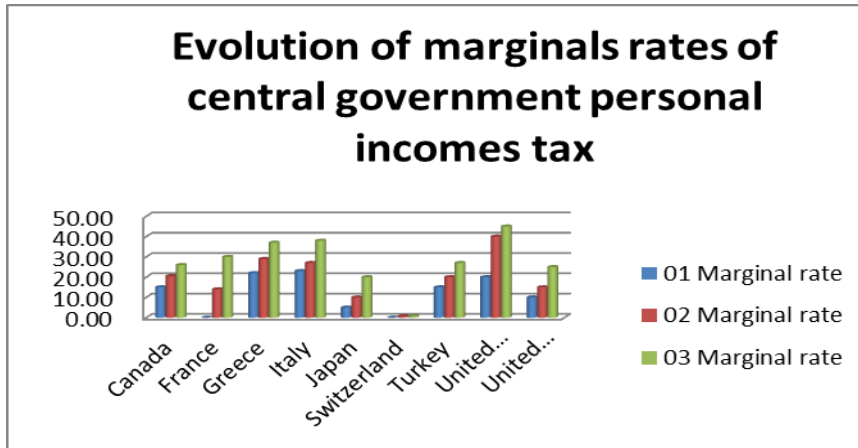
2.4. Sub-Central Personal Income Tax Rates-Non-Progressive Systems

The following table shows which are the representative sub-central personal income tax rates, tax allowances and credits and these are applies to the wage income of a single person no dependants for a representative city or an average of sub-central rates. Also, the minimum and maximum sub-central rates across states and municipalities, and the amounts of tax allowances are expressed in national currencies.

Table 2

Year	2017				
Sub-central tax rates	Sub-central personal allowance	Sub-central tax credit	Representative sub-central rate	Minimum sub-central rate	Maximum sub-central rate
Country					
Denmark	..	..	24.93	22.50	27.80
Finland	6,630.00	..	19.91	17.00	22.50
Iceland	..	..	14.44	12.44	14.52
Italy	..	..	3.33	1.23	3.83
Japan	330,000.00	..	10.00	..	..
Korea	..	..	10.00	5.00	15.00
Norway	..	..	14.45	0.00	14.45
Sweden	..	..	32.12	29.19	35.15
United States	4,000.00	30.62	4.25	..	..
	600.00	..	2.40	..	..

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I2

Evolution graphically of representative sub-central rate can be presents as in the following figures:
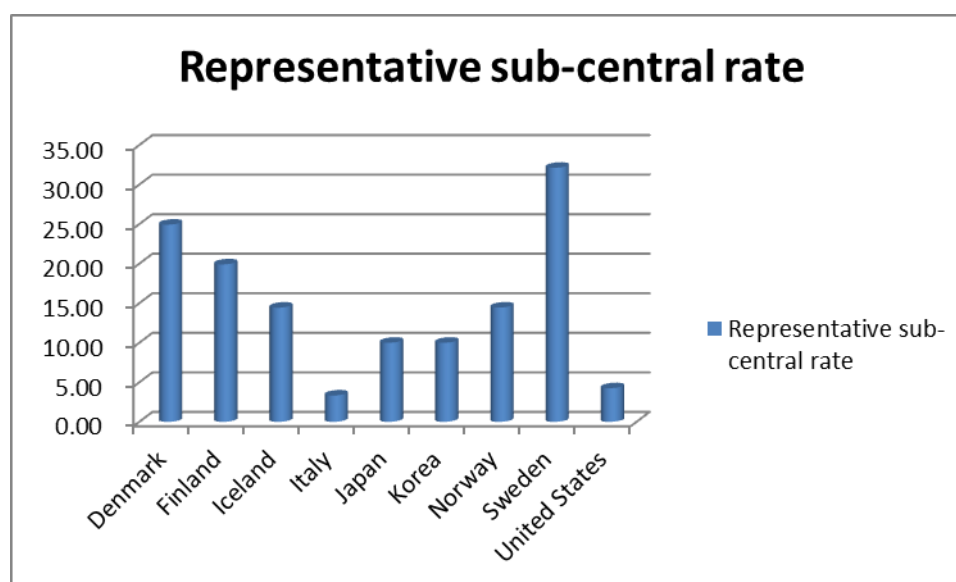
2.5. Sub-central Personal Income Tax Rates-Progressive Systems

The following table is based on the representative case and presents information about sub-central income tax systems with progressive rate structures. These rate taxes are available to wage income of a single person without dependants and the rates are expressed as a percentage of taxable income.

Table 3

Central government tax rates and thresholds	01 Marginal rate	01 Threshold	02 Marginal rate	02 Threshold	03 Marginal rate	03 Threshold
Country						
Belgium	25.0	11,070.0	30.0	12,720.0	40.0	21,190.0
Canada	5.1	42,201.0	9.2	84,404.0	11.2	150,000.0
Spain	9.5	12,450.0	11.2	17,707.0	13.3	33,007.0
Switzerland	0.0	6,700.0	2.0	11,400.0	3.0	16,100.0

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I3

Evolution graphically of representative sub-central rate can be presents as in the following figures:
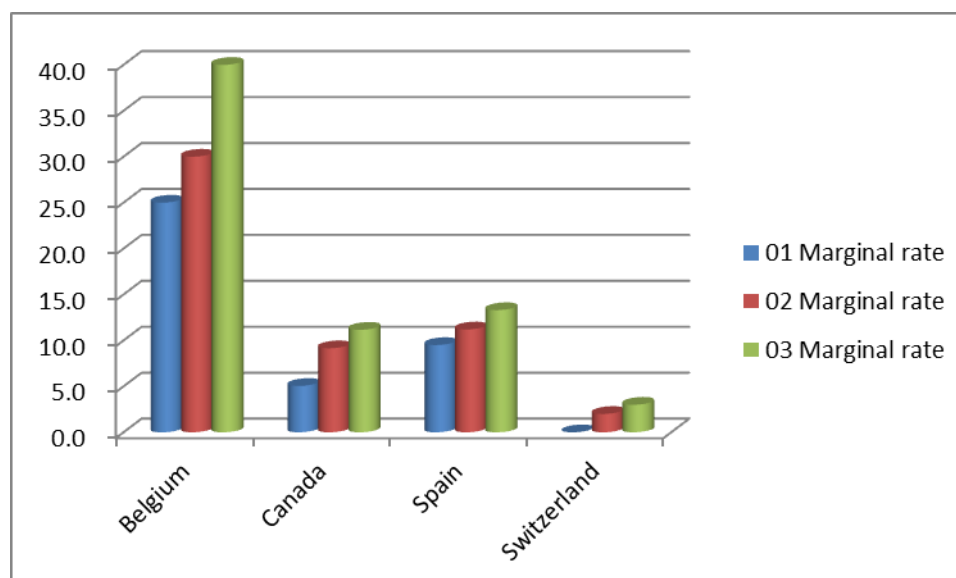
2.6. Marginal Personal Income Tax and Social Security Contribution Rates on Gross Labor Income

The following table presents which is the marginal personal income tax and social security contribution rates for a single person without dependent, at various multiples (67%, 100%, 133% and 167%). The marginal rates are expressed as a percentage of gross wage earnings, with the exception of the Total tax wedge which is expressed as a percentage of gross labor costs.

Table 4

Year	2017			
Unit	Percentage			
Income as a percentage of the average wage	67	100	133	167
Country	**Marginal tax rates and wedges**			
Australia	Total tax wedge	39.6	38.2	42.4	42.4
	Employer SSC	6.0	6.0	6.0	6.0
	All-in	36.0	34.5	39.0	39.0
	Employee SSC	0.0	0.0	0.0	0.0
	Combined central and sub-central government	36.0	34.5	39.0	39.0
	Central government	36.0	34.5	39.0	39.0
	Sub-central government	0.0	0.0	0.0	0.0
Austria	Total tax wedge	55.8	59.7	59.7	41.0
	Employer SSC	28.5	28.5	28.5	7.1
	All-in	43.3	48.2	48.2	36.9
	Employee SSC	18.0	18.0	18.0	0.0
	Combined central and sub-central government	25.3	30.2	30.2	36.9
	Central government	25.3	30.2	30.2	36.9
	Sub-central government	0.0	0.0	0.0	0.0
Belgium	Total tax wedge	65.5	66.4	68.5	67.6
	Employer SSC	32.2	32.2	26.2	26.2
	All-in	54.3	55.6	60.2	59.1
	Employee SSC	14.2	14.2	14.2	13.1
	Combined central and sub-central government	40.2	41.4	46.0	46.0
	Central government	28.5	29.4	32.6	32.6
	Sub-central government	11.7	12.1	13.4	13.4
Canada	Total tax wedge	33.3	39.5	32.8	36.9
	Employer SSC	12.0	9.7	4.7	4.7
	All-in	25.3	33.6	29.7	33.9
	Employee SSC	6.6	5.0	0.0	0.0
	Combined central and sub-central government	18.7	28.7	29.7	33.9
	Central government	14.0	19.8	20.5	20.5
	Sub-central government	4.7	8.9	9.2	13.4

Chile	Total tax wedge	7.0	7.0	10.3	10.3
	Employer SSC	0.0	0.0	0.0	0.0
	All-in	7.0	7.0	10.3	10.3
	Employee SSC	7.0	7.0	7.0	7.0
	Combined central and sub-central government	0.0	0.0	3.3	3.3
	Central government	0.0	0.0	3.3	3.3
	Sub-central government	0.0	0.0	0.0	0.0
Czech Republic	Total tax wedge	48.6	48.6	48.6	48.6
	Employer SSC	34.0	34.0	34.0	34.0
	All-in	31.1	31.1	31.1	31.1
	Employee SSC	11.0	11.0	11.0	11.0
	Combined central and sub-central government	20.1	20.1	20.1	20.1
	Central government	20.1	20.1	20.1	20.1
	Sub-central government	0.0	0.0	0.0	0.0
Denmark	Total tax wedge	39.7	42.0	55.8	55.8
	Employer SSC	0.0	0.0	0.0	0.0
	All-in	39.7	42.0	55.8	55.8
	Employee SSC	0.0	0.0	0.0	0.0
	Combined central and sub-central government	39.7	42.0	55.8	55.8
	Central government	18.9	19.1	32.9	32.9
	Sub-central government	20.7	22.9	22.9	22.9
Estonia	Total tax wedge	41.2	41.2	41.2	41.2
	Employer SSC	33.8	33.8	33.8	33.8
	All-in	21.3	21.3	21.3	21.3
	Employee SSC	1.6	1.6	1.6	1.6
	Combined central and sub-central government	19.7	19.7	19.7	19.7
	Central government	19.7	19.7	19.7	19.7
	Sub-central government	0.0	0.0	0.0	0.0
Finland	Total tax wedge	54.3	55.6	58.5	58.5
	Employer SSC	22.3	22.3	22.3	22.3
	All-in	44.1	45.7	49.3	49.3
	Employee SSC	9.3	9.3	9.3	9.3
	Combined central and sub-central government	34.8	36.3	40.0	40.0

	Central government	0.0	17.4	21.0	21.0
	Sub-central government	34.8	18.9	18.9	18.9
France	Total tax wedge	69.3	58.5	59.4	59.9
	Employer SSC	82.6	35.1	41.2	43.0
	All-in	43.9	44.0	42.7	42.7
	Employee SSC	14.4	14.4	12.6	12.6
	Combined central and sub-central government	29.5	29.6	30.1	30.1
	Central government	29.5	29.6	30.1	30.1
	Sub-central government	0.0	0.0	0.0	0.0
Germany	Total tax wedge	55.8	60.4	57.0	44.3
	Employer SSC	19.4	19.4	10.9	0.0
	All-in	47.2	52.6	52.3	44.3
	Employee SSC	20.8	20.8	10.9	0.0
	Combined central and sub-central government	26.4	31.9	41.5	44.3
	Central government	26.4	31.9	41.5	44.3
	Sub-central government	0.0	0.0	0.0	0.0
Greece	Total tax wedge	47.6	49.1	56.3	56.3
	Employer SSC	25.1	25.1	25.1	25.1
	All-in	34.5	36.3	45.4	45.4
	Employee SSC	16.0	16.0	16.0	16.0
	Combined central and sub-central government	18.5	20.3	29.4	29.4
	Central government	18.5	20.3	29.4	29.4
	Sub-central government	0.0	0.0	0.0	0.0
Hungary	Total tax wedge	46.2	46.2	46.2	46.2
	Employer SSC	23.5	23.5	23.5	23.5
	All-in	33.5	33.5	33.5	33.5
	Employee SSC	18.5	18.5	18.5	18.5
	Combined central and sub-central government	15.0	15.0	15.0	15.0
	Central government	15.0	15.0	15.0	15.0
	Sub-central government	0.0	0.0	0.0	0.0
Iceland	Total tax wedge	39.6	39.6	48.0	48.0
	Employer SSC	6.9	6.9	6.9	6.9
	All-in	35.5	35.5	44.4	44.4
	Employee SSC	0.0	0.0	0.0	0.0

	Combined central and sub-central government	35.5	35.5	44.4	44.4
	Central government	21.6	21.6	30.5	30.5
	Sub-central government	13.9	13.9	13.9	13.9
Ireland	Total tax wedge	35.9	54.0	54.0	54.0
	Employer SSC	10.8	10.8	10.8	10.8
	All-in	29.0	49.0	49.0	49.0
	Employee SSC	4.0	4.0	4.0	4.0
	Combined central and sub-central government	25.0	45.0	45.0	45.0
	Central government	25.0	45.0	45.0	45.0
	Sub-central government	0.0	0.0	0.0	0.0
Israel	Total tax wedge	31.2	36.7	47.0	50.7
	Employer SSC	7.5	7.5	7.5	7.5
	All-in	26.0	32.0	43.0	47.0
	Employee SSC	12.0	12.0	12.0	12.0
	Combined central and sub-central government	14.0	20.0	31.0	35.0
	Central government	14.0	20.0	31.0	35.0
	Sub-central government	0.0	0.0	0.0	0.0
Italy	Total tax wedge	54.7	54.7	62.5	62.9
	Employer SSC	31.6	31.6	31.6	31.6
	All-in	40.4	40.4	50.6	51.2
	Employee SSC	9.5	9.5	9.5	10.5
	Combined central and sub-central government	30.9	30.9	41.1	40.7
	Central government	28.5	28.5	37.7	37.3
	Sub-central government	2.4	2.4	3.5	3.4
Japan	Total tax wedge	33.0	37.2	45.7	35.0
	Employer SSC	15.2	15.2	15.2	6.1
	All-in	22.8	27.7	37.4	31.1
	Employee SSC	14.4	14.4	14.4	5.3
	Combined central and sub-central government	8.4	13.3	23.0	25.8
	Central government	2.8	6.7	15.4	17.3
	Sub-central government	5.6	6.6	7.6	8.5
Korea	Total tax wedge	28.5	30.0	23.4	31.9
	Employer SSC	10.4	10.4	5.9	5.9

	All-in	21.0	22.7	18.9	28.0
	Employee SSC	8.4	8.4	3.9	3.9
	Combined central and sub-central government	12.6	14.3	15.0	24.0
	Central government	11.5	13.0	13.7	21.9
	Sub-central government	1.1	1.3	1.4	2.2
Luxembourg	Total tax wedge	44.0	55.5	55.5	54.2
	Employer SSC	12.2	12.2	12.2	12.2
	All-in	37.2	50.1	50.1	48.6
	Employee SSC	12.5	12.5	12.5	12.5
	Combined central and sub-central government	24.7	37.7	37.7	36.2
	Central government	24.7	37.7	37.7	36.2
	Sub-central government	0.0	0.0	0.0	0.0
Mexico	Total tax wedge	17.5	25.2	28.4	28.4
	Employer SSC	6.5	7.6	7.6	7.6
	All-in	12.1	19.5	22.9	22.9
	Employee SSC	1.3	1.7	1.7	1.7
	Combined central and sub-central government	10.8	17.8	21.3	21.3
	Central government	10.8	17.8	21.3	21.3
	Sub-central government	0.0	0.0	0.0	0.0
Netherlands	Total tax wedge	51.6	51.6	46.2	52.3
	Employer SSC	11.1	11.1	0.0	0.0
	All-in	46.2	46.2	46.2	52.3
	Employee SSC	26.0	0.0	0.0	0.0
	Combined central and sub-central government	20.2	46.2	46.2	52.3
	Central government	20.2	46.2	46.2	52.3
	Sub-central government	0.0	0.0	0.0	0.0
New Zealand	Total tax wedge	17.5	30.0	33.0	33.0
	Employer SSC	0.0	0.0	0.0	0.0
	All-in	17.5	30.0	33.0	33.0
	Employee SSC	0.0	0.0	0.0	0.0
	Combined central and sub-central government	17.5	30.0	33.0	33.0
	Central government	17.5	30.0	33.0	33.0
	Sub-central government	0.0	0.0	0.0	0.0

Norway	Total tax wedge	42.1	42.1	50.2	52.8
	Employer SSC	13.0	13.0	13.0	13.0
	All-in	34.6	34.6	43.7	46.7
	Employee SSC	8.2	8.2	8.2	8.2
	Combined central and sub-central government	26.4	26.4	35.5	38.5
	Central government	12.0	12.0	21.1	24.1
	Sub-central government	14.5	14.5	14.5	14.5
Poland	Total tax wedge	37.0	37.0	37.0	37.0
	Employer SSC	16.4	16.4	16.4	16.4
	All-in	26.7	26.7	26.7	26.7
	Employee SSC	17.8	17.8	17.8	17.8
	Combined central and sub-central government	8.8	8.8	8.8	8.8
	Central government	8.8	8.8	8.8	8.8
	Sub-central government	0.0	0.0	0.0	0.0
Portugal	Total tax wedge	51.1	51.1	51.1	58.7
	Employer SSC	23.8	23.8	23.8	23.8
	All-in	39.5	39.5	39.5	48.9
	Employee SSC	11.0	11.0	11.0	11.0
	Combined central and sub-central government	28.5	28.5	28.5	37.9
	Central government	28.5	28.5	28.5	37.9
	Sub-central government	0.0	0.0	0.0	0.0
Slovak Republic	Total tax wedge	46.4	46.4	46.4	46.4
	Employer SSC	31.0	31.0	31.0	31.0
	All-in	29.9	29.9	29.9	29.9
	Employee SSC	13.4	13.4	13.4	13.4
	Combined central and sub-central government	16.5	16.5	16.5	16.5
	Central government	16.5	16.5	16.5	16.5
	Sub-central government	0.0	0.0	0.0	0.0
Slovenia	Total tax wedge	43.6	51.0	51.0	55.7
	Employer SSC	16.1	16.1	16.1	16.1
	All-in	34.6	43.1	43.1	48.6
	Employee SSC	22.1	22.1	22.1	22.1
	Combined central and sub-central government	12.5	21.0	21.0	26.5

	Central government	12.5	21.0	21.0	26.5
	Sub-central government	0.0	0.0	0.0	0.0
Spain	Total tax wedge	44.6	48.3	48.3	54.1
	Employer SSC	29.9	29.9	29.9	29.9
	All-in	28.1	32.9	32.9	40.4
	Employee SSC	6.4	6.4	6.4	6.4
	Combined central and sub-central government	21.7	26.5	26.5	34.1
	Central government	11.2	14.0	14.0	17.3
	Sub-central government	10.5	12.5	12.5	16.8
Sweden	Total tax wedge	45.6	48.3	63.6	69.7
	Employer SSC	31.4	31.4	31.4	31.4
	All-in	28.6	32.1	52.1	60.1
	Employee SSC	7.0	7.0	0.0	0.0
	Combined central and sub-central government	21.6	25.1	52.1	60.1
	Central government	-13.8	-7.0	20.0	28.0
	Sub-central government	35.3	32.1	32.1	32.1
Switzerland	Total tax wedge	26.3	27.8	32.3	36.6
	Employer SSC	6.2	6.2	6.2	6.2
	All-in	21.7	23.3	28.1	32.6
	Employee SSC	6.2	6.2	6.2	6.2
	Combined central and sub-central government	15.4	17.0	21.9	26.4
	Central government	2.3	2.5	5.5	7.6
	Sub-central government	13.2	14.6	16.4	18.8
Turkey	Total tax wedge	42.8	47.8	47.8	47.8
	Employer SSC	17.5	17.5	17.5	17.5
	All-in	32.8	38.7	38.7	38.7
	Employee SSC	15.0	15.0	15.0	15.0
	Combined central and sub-central government	17.8	23.7	23.7	23.7
	Central government	17.8	23.7	23.7	23.7
	Sub-central government	0.0	0.0	0.0	0.0
United Kingdom	Total tax wedge	40.2	40.2	49.0	49.0
	Employer SSC	13.8	13.8	13.8	13.8
	All-in	32.0	32.0	42.0	42.0
	Employee SSC	12.0	12.0	2.0	2.0

	Combined central and sub-central government	20.0	20.0	40.0	40.0
	Central government	20.0	20.0	40.0	40.0
	Sub-central government	0.0	0.0	0.0	0.0
United States	Total tax wedge	34.3	43.6	43.6	43.6
	Employer SSC	7.7	7.7	7.7	7.7
	All-in	29.3	39.3	39.3	39.3
	Employee SSC	7.7	7.7	7.7	7.7
	Combined central and sub-central government	21.7	31.7	31.7	31.7
	Central government	15.0	25.0	25.0	25.0
	Sub-central government	6.7	6.7	6.7	6.7

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I4

2.7. Average Personal Income Tax and Social Security Contribution Rates on Gross Labor Income

The below table shows which is the average personal income tax and social security contribution rates for a single person without dependent, at various multiples (67%, 100%, 133% and 167%) of the AW/APW.

The average wage (AW) is based on a single person at 100% of average earnings without children.

Table 5

Year	2017						
Unit	Percentage						
All in average income tax rates at average wage	All in rate				All in less cash transfers		
	Single person		One-earner married couple		Single person	One-earner married couple	
	No child	Two children	No child	Two children	Two children	No child	Two children
Country							
Australia	24.4	24.4	24.4	24.4	16.1	24.4	16.1
Austria	32.4	30.2	32.4	30.2	19.1	32.4	19.1
Belgium	40.5	37.0	31.4	28.9	28.8	31.4	20.7
Canada	22.8	18.0	18.6	18.0	1.8	18.6	1.2
Chile	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Czech Republic	24.1	11.8	17.1	4.8	7.6	17.1	0.7
Denmark	36.1	34.8	32.0	32.0	16.5	31.5	25.3
Estonia	18.4	15.9	15.4	13.0	4.7	15.4	4.8
Finland	30.2	29.9	30.2	30.1	21.8	30.2	24.7
France	29.2	22.2	22.5	22.2	11.4	22.5	18.2

Germany	39.9	28.1	31.8	21.7	28.1	31.8	21.7
Greece	26.0	25.5	26.9	26.5	22.4	26.9	23.7
Hungary	33.5	23.4	33.5	23.4	13.5	33.5	14.5
Iceland	28.7	28.7	21.5	21.5	24.8	21.5	18.6
Ireland	19.4	13.4	13.4	10.4	1.3	13.4	1.2
Israel	17.7	11.6	17.7	17.7	7.5	17.7	15.0
Italy	31.2	26.6	28.9	24.3	21.5	28.9	19.3
Japan	22.3	22.3	20.9	20.9	17.7	20.9	16.3
Korea	14.5	12.4	14.0	12.2	12.4	14.0	12.2
Luxembourg	29.1	28.3	18.0	18.0	15.3	18.0	5.0
Mexico	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Netherlands	30.4	24.9	28.6	28.6	14.9	28.6	24.6
New Zealand	18.1	18.1	18.1	18.1	6.4	18.1	6.4
Norway	27.6	25.5	26.6	26.6	19.4	26.6	22.5
Poland	25.1	19.5	23.9	19.5	7.4	23.9	-4.8
Portugal	27.5	20.8	22.2	15.5	15.9	22.2	11.9
Slovak Republic	23.5	19.0	17.2	12.7	14.1	17.2	7.8
Slovenia	33.7	27.5	30.3	25.4	17.1	30.3	12.3
Spain	21.1	10.6	17.5	13.9	10.6	17.5	13.9
Sweden	25.0	25.0	25.0	25.0	18.8	25.0	18.8
Switzerland	16.9	10.8	13.6	10.4	3.9	13.6	3.5
Turkey	27.9	26.7	27.1	25.9	26.7	27.1	25.9
United Kingdom	23.4	23.4	22.8	22.8	18.7	22.8	18.1
United States	26.0	17.1	21.0	14.2	17.1	21.0	14.2

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I5

2.8. All-in Average Personal Income Tax Rates at Average Wage by Family Type

The below table presents which is the average personal income tax rates for single persons and one-earner married couples with and without children. The rates are calculated as a percentage of gross wage earnings.

Average wage represents the average annual gross wage earnings of adult, full-time workers in the industry.

Table 6

Year	2017						
Unit	Percentage						
All in average income tax rates at average wage	All in rate				All in less cash transfers		
	Single person		One-earner married couple		Single person	One-earner married couple	
	No child	Two children	No child	Two children	Two children	No child	Two children
Country							
Australia	24.4	24.4	24.4	24.4	16.1	24.4	16.1
Austria	32.4	30.2	32.4	30.2	19.1	32.4	19.1
Belgium	40.5	37.0	31.4	28.9	28.8	31.4	20.7
Canada	22.8	18.0	18.6	18.0	1.8	18.6	1.2
Chile	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Czech Republic	24.1	11.8	17.1	4.8	7.6	17.1	0.7
Denmark	36.1	34.8	32.0	32.0	16.5	31.5	25.3
Estonia	18.4	15.9	15.4	13.0	4.7	15.4	4.8
Finland	30.2	29.9	30.2	30.1	21.8	30.2	24.7
France	29.2	22.2	22.5	22.2	11.4	22.5	18.2
Germany	39.9	28.1	31.8	21.7	28.1	31.8	21.7
Greece	26.0	25.5	26.9	26.5	22.4	26.9	23.7
Hungary	33.5	23.4	33.5	23.4	13.5	33.5	14.5
Iceland	28.7	28.7	21.5	21.5	24.8	21.5	18.6
Ireland	19.4	13.4	13.4	10.4	1.3	13.4	1.2
Israel	17.7	11.6	17.7	17.7	7.5	17.7	15.0
Italy	31.2	26.6	28.9	24.3	21.5	28.9	19.3
Japan	22.3	22.3	20.9	20.9	17.7	20.9	16.3
Korea	14.5	12.4	14.0	12.2	12.4	14.0	12.2
Luxembourg	29.1	28.3	18.0	18.0	15.3	18.0	5.0
Mexico	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Netherlands	30.4	24.9	28.6	28.6	14.9	28.6	24.6
New Zealand	18.1	18.1	18.1	18.1	6.4	18.1	6.4
Norway	27.6	25.5	26.6	26.6	19.4	26.6	22.5
Poland	25.1	19.5	23.9	19.5	7.4	23.9	-4.8
Portugal	27.5	20.8	22.2	15.5	15.9	22.2	11.9
Slovak Republic	23.5	19.0	17.2	12.7	14.1	17.2	7.8
Slovenia	33.7	27.5	30.3	25.4	17.1	30.3	12.3
Spain	21.1	10.6	17.5	13.9	10.6	17.5	13.9
Sweden	25.0	25.0	25.0	25.0	18.8	25.0	18.8
Switzerland	16.9	10.8	13.6	10.4	3.9	13.6	3.5
Turkey	27.9	26.7	27.1	25.9	26.7	27.1	25.9
United Kingdom	23.4	23.4	22.8	22.8	18.7	22.8	18.1
United States	26.0	17.1	21.0	14.2	17.1	21.0	14.2

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I6

All-in average personal income tax rates at AW by family type

- All in less cash transfers Single person Two children
- All in less cash transfers One-earner married couple No child
- All in less cash transfers One-earner married couple Two children

2.9. Top Statutory Personal Income Tax Rate and Top Marginal Tax Rates for Employees

The following table shows which is the top of statutory personal income tax rate and the top of marginal tax rates for personals employees.

Table 7

Year	2017					
	Top marginal tax rates		Top statutory personal income tax rates		Average wage in national currency units	Average wage in US dollars based on Purchasing Power Parities
Income Tax	Personal income tax	Personal income tax & employee social security contributions (All-in rate)	Top tax rates	Threshold (expressed as a multiple of the average wage)		
Country						
Australia	49.0	49.0	49.0	2.2	83,542.0	55,098.7
Austria	48.0	48.0	48.0	7.9	45,976.8	57,580.8
Belgium	46.0	60.2	52.9	1.0	47,324.3	58,545.1
Canada	53.5	53.5	53.5	4.3	51,642.5	40,983.3
Chile	35.0	35.0	35.0	7.7	9,349,964.0	22,615.9
Czech Republic	20.1	31.1	15.0	0.3	355,149.7	27,535.8
Denmark	55.8	55.8	55.8	1.3	413,503.1	56,210.9
Estonia	19.7	21.3	20.0	0.1	14,809.9	26,795.9
Finland	49.0	58.3	51.4	1.9	43,986.1	49,012.6
France	53.9	55.1	54.5	14.6	38,582.1	48,339.2
Germany	47.5	47.5	47.5	5.4	49,450.0	63,551.0
Greece	55.0	55.0	54.0	3.9	20,886.4	35,165.1
Hungary	15.0	33.5	15.0	0.0	3,578,650.8	26,012.2
Iceland	44.4	44.4	46.2	1.2	8,903,714.4	63,660.6
Ireland	48.0	52.0	48.0	1.9	36,358.1	45,093.0
Israel	50.0	50.0	50.0	4.3	147,983.5	39,215.2
Italy	42.3	52.8	47.2	2.7	30,838.2	43,304.2
Japan	55.8	56.1	55.9	8.5	5,201,390.7	52,946.0
Korea	39.3	43.2	41.8	3.8	46,140,295.7	52,505.3

Latvia	10.9	21.4	23.0	0.1	10,904.8	21,755.0
Luxembourg	41.4	42.8	41.4	2.8	58,564.7	65,716.3
Mexico	35.0	35.0	35.0	25.4	118,203.6	12,730.0
Netherlands	49.7	52.3	52.0	1.4	50,908.5	62,981.1
New Zealand	33.0	33.0	33.0	1.2	58,824.0	39,826.3
Norway	38.5	46.7	38.5	1.6	577,664.4	56,400.7
Poland	22.1	39.9	32.0	2.0	49,569.7	27,816.3
Portugal	50.0	61.0	56.2	15.6	17,993.0	30,888.5
Slovak Republic	21.7	35.1	25.0	3.5	11,425.6	23,484.0
Slovenia	39.0	61.1	50.0	5.0	18,903.8	31,417.2
Spain	43.5	43.5	43.5	2.4	26,534.7	40,451.4
Sweden	60.1	60.1	57.1	1.5	434,858.8	47,657.6
Switzerland	36.1	41.7	41.7	3.5	86,041.9	70,835.1
Turkey	30.5	45.5	35.8	3.2	40,308.0	29,263.0
United Kingdom	45.0	47.0	45.0	3.9	38,208.1	54,318.9
United States	46.3	48.6	46.3	8.0	52,988.0	52,988.0

Source: http://stats.oecd.org/index.aspx?DataSetCode=TABLE_I7

Evolution graphically of top marginal tax rates for employees can be presents as in the following figures:
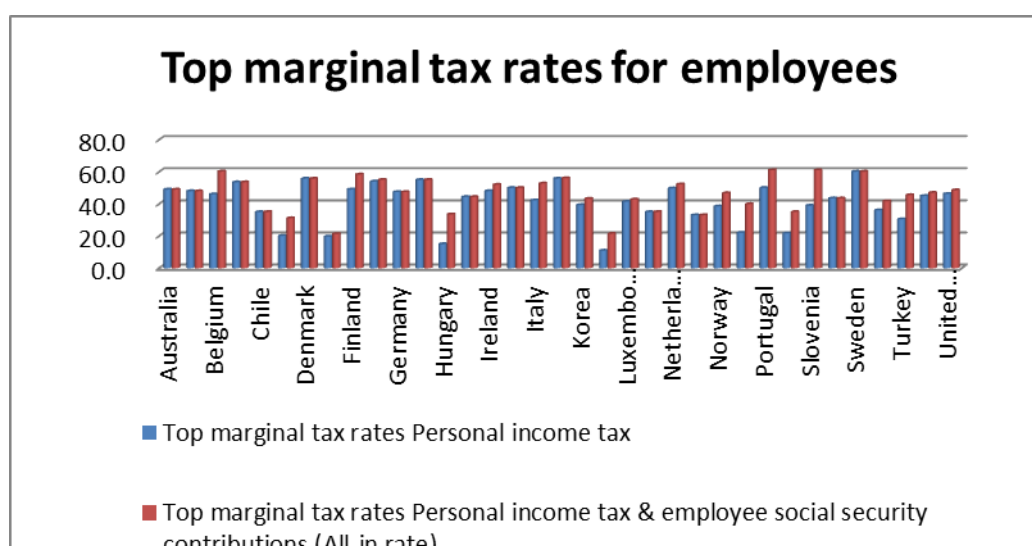
2.9. Conclusions

Taxation is part of our lives, of all because employees pay taxes from wage and social contributions, that affect net income. Worldwide, there is a trend towards fiscal harmonization, but yet taxes differ greatly from one country to another and these can be proportional or progressive.

On the basis of the statistical data provided by the OECD, it is found that increases in the average personal tax rate in 20 of the OECD's 35 member countries in 2017 were mainly due to wage increases that reduced the impact of tax-free allowances and credits. Average tax rates fell in 13 countries and were unchanged in two (Chile and Hungary). The biggest increases in the tax rate were in the Czech Republic (0.5 percentage points).

References

Bronfenbrenner, Martin (2017). *Income Distribution Theory*. New York: Imprint Routledge, eBook Published 5 September.

Dragomir, G.; Trandafir, M. &Dragomir, C.M. (2011). Comparative Analysis on Romanian Taxation in the European Context, as a Prerequisite for Tax Harmonization. *Acta Universitatis Danubius Oeconomica*.

https://europa.eu/european-union/topics/taxation_ro.

https://europa.eu/european-union/topics/taxation_en.

http://www.oecd.org/tax/tax-policy/tax-database.htm.

https://www.oecd-ilibrary.org/taxation/taxing-wages-2011_tax_wages-2011-en.

THE 13TH EDITION OF THE INTERNATIONAL CONFERENCE
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REALITIES AND PERSPECTIVES

The Correlation between State Aids and Competitiveness

Rodica Pripoaie[1]

Abstract: This paper aims to establish the correlation between state aids received by companies and competitiveness, because an enterprise which receives a subsidy provided by a government has an advantage over other firms and competition may be distorted. State aid is an advantage conferred by national public authorities under certain conditions and for certain areas of activity. The E.U. rules for state aids are ensuring applied equally by European Commission, so state aids can be applied after approval by the Commission. But in some circumstances government interventions are necessary for an equitable economy. Measures of state aids can be implemented only if were approved by the European Commission.

Keywords: state aid; correlation; competitors; European Commission

JEL Classification: D29; E22; E29; F23; F35

1. Introduction

State aids in the European Union represent a subsidy provided by a government, as Article 107 of Treaty on the Functioning of the E.U. These state aids distort competition and they are classed by the E.U. as illegal state aids. State aids in the E.U. were taken from Article 87(2) of the G.A.T.T. (General Agreement on Tariffs and Trade) where they were defined as aid "granted by a Member State or through state resources in any form whatsoever". The European Court of Justice consider these state aids give an advantage over its competitors and competition has been or may be distorted.

State aid was defined into E.U. law by the Treaty of Rome as being any state intervention that distorts competition law and after many years, in 2007 was improved in Treaty on the Functioning of the E. U. But in some circumstances government interventions are necessary for an equitable economy. Measures of state aids can be implemented only if approved by the European Commission.

2.1. The Control State Aids

The control state aids are necessary because the companies which receive a subsidy government have an advantage over other companies. The Treaty of E.U. accepts state aids who's justified by reasons of economic development, so these state aids can be considered compatible. The E.U. rules for state aids are ensuring applied equally by European Commission, so state aids can be applied after approval by the Commission.

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[1] Associate Professor, PhD, Dunărea de Jos University of Galati, Romania, Address: 47 Domnească Strada, 800008, Galati, Romania, E-mail: rodica.pripoaie@ugal.ro.

Also, the firms and persons may notify the Commission or may submit notifications to the Official Journal of the European Union for open a formal investigation procedure.

The principle of public transparency offers citizens and companies access to information on state aid, such as name, amount, location, sector and target beneficiary.

After the global financial crisis, the European Commission has adopted flexible procedures to evaluate urgently measures needed to safeguard the stability of the financial system. State aid is an advantage conferred by national public authorities under certain conditions and for certain areas of activity.

In the Treaty on the Functioning of the European Union, Article 107 it is said "these aids given by a member state or as state resources doesn't distort competition and trade within the EU by favouring certain companies or products."

Member states must wait the Commission's decision before they utilised the state aid. Illegal state aid is an aid given without authorization of the European Commission. The Commission may use court orders to obtain information or suspend the further state aids and recovery obligation's member state. The Commission starts a "recovery case" to implementation of her decision. If the member state does not apply the Commission's decision, then it may address to European Court of Justice (ECJ) to enforce the decision, for remove the illegal advantage and to restore the concurrence. The period for recovery is ten years. All decisions of the European Commission can be review by the General Court and ultimately by the European Court of Justice.

2.2. De Minimis Aid and Transparency Requirements

Small amounts of state aid less than 200.000 € for 3 consecutive fiscal years, to a single undertaking for a wide range of purposes aren't distort competition, so this aids are defined as the industrial de minimis regulation. For the *de minimis* regulation don't need to formally notify the aid to the European Commission or get prior approval, but must comply with all of the conditions of the regulation.

Exist separate rules apply to the Agriculture, Fisheries and Road Transport sectors, as well as:

- *De minimis* aid to the agricultural sector is 15.000 € over three consecutive fiscal years;

- *De minimis* aid to the fisheries and aquaculture sectors is 30.000 € over three consecutive fiscal years;

- *De minimis* aid to perform road freight transport for hire or reward is 100.000 € over three consecutive fiscal years. The aid shall not be used for the acquisition of road freight transport vehicles.

The Commission's state aid transparency database contains details for state aids which exceed €500.000. The special rule applies in agriculture and for aquaculture.

2.3. Evolution of State Aids in European Union by State Aid Scoreboard

The State Aid Scoreboard on 2017 presents the evolution of aid expenditure's member states in 2016, for industries, services, agriculture and aquaculture.

Total state aids utilized in 2016 increased with 2.6% face to 2015 expenditures, and with + 2.6 billion EUR in nominal terms, because the following factors:

- increased the state aids to environmental protection including energy savings with 9.3 billion EUR;

- decreased the state aids for regional development with 4 billion EUR;

- decreased the state aids for social support to individual consumers with 1.6 billion EUR;

- increased the state aids for other objectives including broadband, interest or local infrastructures with 1.2 billion EUR;

- decreased the state aids for the agricultural and forestry sectors with 1.1 billion EUR;

- increased the state aids for SMEs with 1.1 billion EUR;

- increased the state aids for research and development including innovation with 0.5 billion EUR.
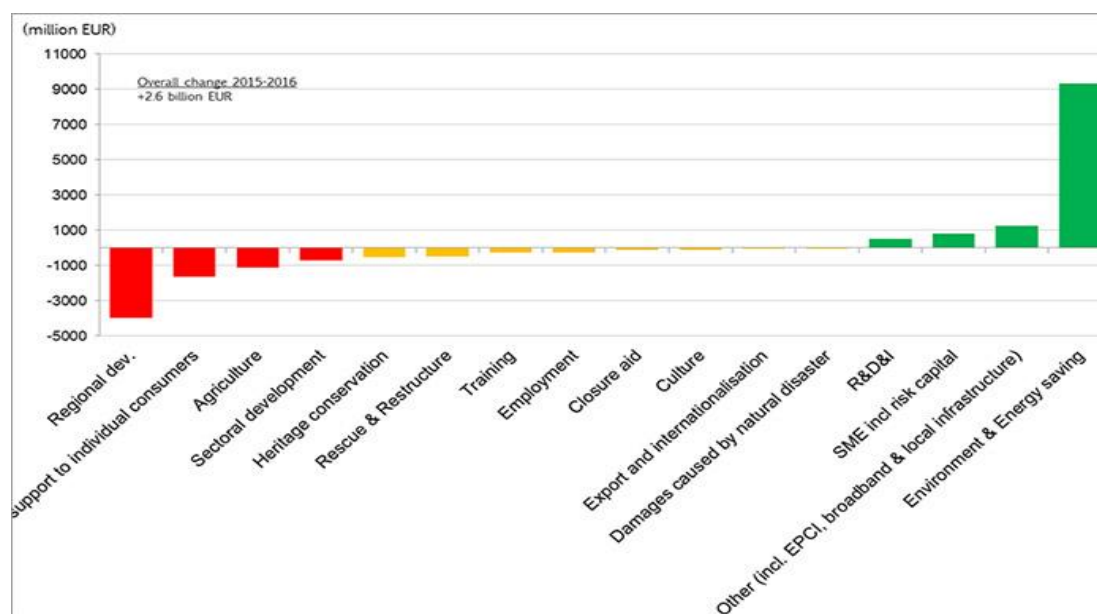
Figure 1. State Aid expenditure by objective in 2016 as compared to 2015, excluding aid to railways (in million EUR)

Source: Commission Services and
http://ec.europa.eu/competition/state_aid/scoreboard/state_aid_scoreboard_%202017_final.pdf

In 2016, 54% of total spending was for green measures as environmental protection and energy savings, because the EU approved state aids rules of renewable energy and many member states adopted these measures for secure and competitive economy.
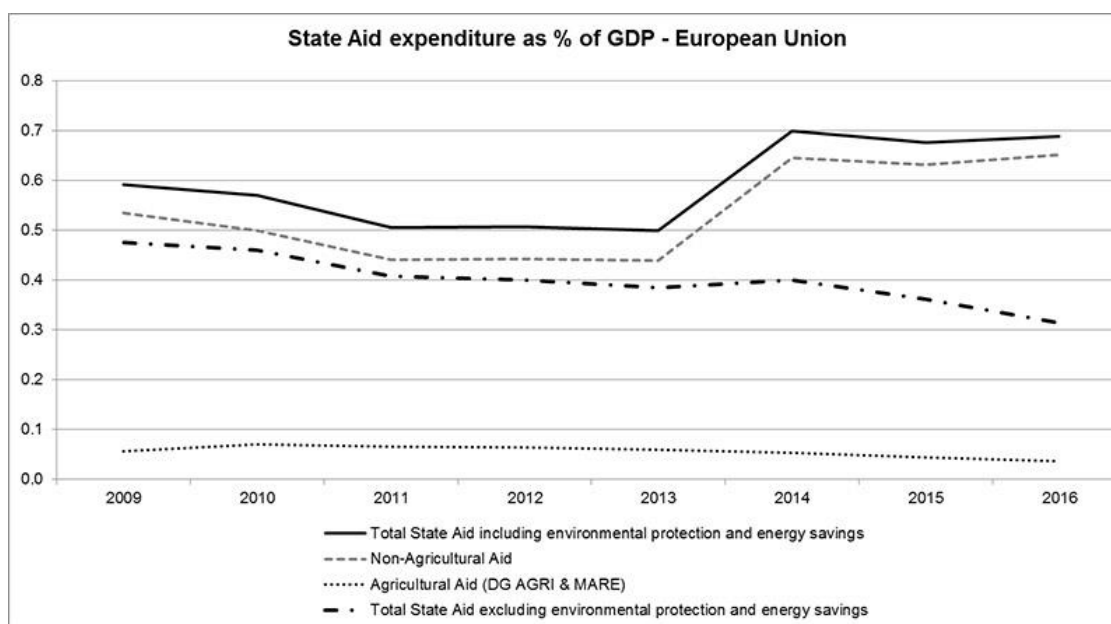
Figure 2. Total State Aid expenditure, excluding aid to railways as % of GDP

Source: Commission Services and
http://ec.europa.eu/competition/state_aid/scoreboard/state_aid_scoreboard_%202017_final.pdf

2.4. Evolution of state aids as % GDP by member state

Table 1

Member State	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total, 2008-2016
Belgium	12.9	5.0	2.5	0.0	2.9	0.0	0.0	0.0	0.0	**23.3**
Bulgaria	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Czech Republic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Denmark	0.5	13.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	**14.6**
Germany	99.3	11.0	0.7	2.7	0.9	0.0	0.0	0.0	0.0	**114.6**
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Ireland	0.0	12.5	52.1	26.1	0.0	0.0	0.3	0.8	0.8	**92.4**
Greece	5.0	0.0	10.0	0.5	20.3	0.9	12.4	10.6	0.0	**59.6**
Spain	0.0	0.0	101.1	0.0	72.6	0.6	0.1	0.0	0.0	**174.3**
France	23.5	0.5	2.7	0.0	2.6	0.0	0.0	0.0	0.0	**29.2**
Croatia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Italy	20.0	0.0	0.0	0.0	2.0	0.0	0.0	3.8	0.0	**25.8**
Cyprus	0.0	0.0	0.0	0.0	1.8	0.0	1.5	0.2	0.0	**3.5**
Latvia	0.3	0.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	**0.8**
Lithuania	0.0	0.0	0.6	0.0	0.0	0.2	0.0	0.0	0.0	**0.8**
Luxembourg	2.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2.5**
Hungary	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.1**
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Netherlands	26.6	0.0	11.1	0.0	0.0	2.2	0.0	0.0	0.0	**39.8**
Austria	15.0	0.7	0.0	0.0	3.2	21.3	0.0	0.0	0.0	**40.1**
Poland	0.0	4.6	0.0	0.0	29.3	0.0	0.8	0.8	7.7	**43.2**
Portugal	0.0	4.0	0.0	8.0	14.3	1.1	4.9	2.6	0.0	**34.8**

Romania	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**
Slovenia	0.0	0.0	0.0	0.3	0.5	3.3	0.4	0.0	0.0	**4.5**
Slovakia	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.7**
Finland	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**4.0**
Sweden	0.3	4.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**5.0**
United Kingdom	64.1	47.6	2.9	0.0	0.0	0.0	0.0	0.0	0.0	**114.6**
Total	269.9	110.0	184.0	37.5	150.8	29.6	20.3	18.8	8.5	829.4
									% 2016 EU GDP	**5.6%**

Source: http://ec.europa.eu/competition/state_aid/scoreboard/index_en.html

Evolution of state aids as % GDP by member state graphically can be presents as in the below figure:
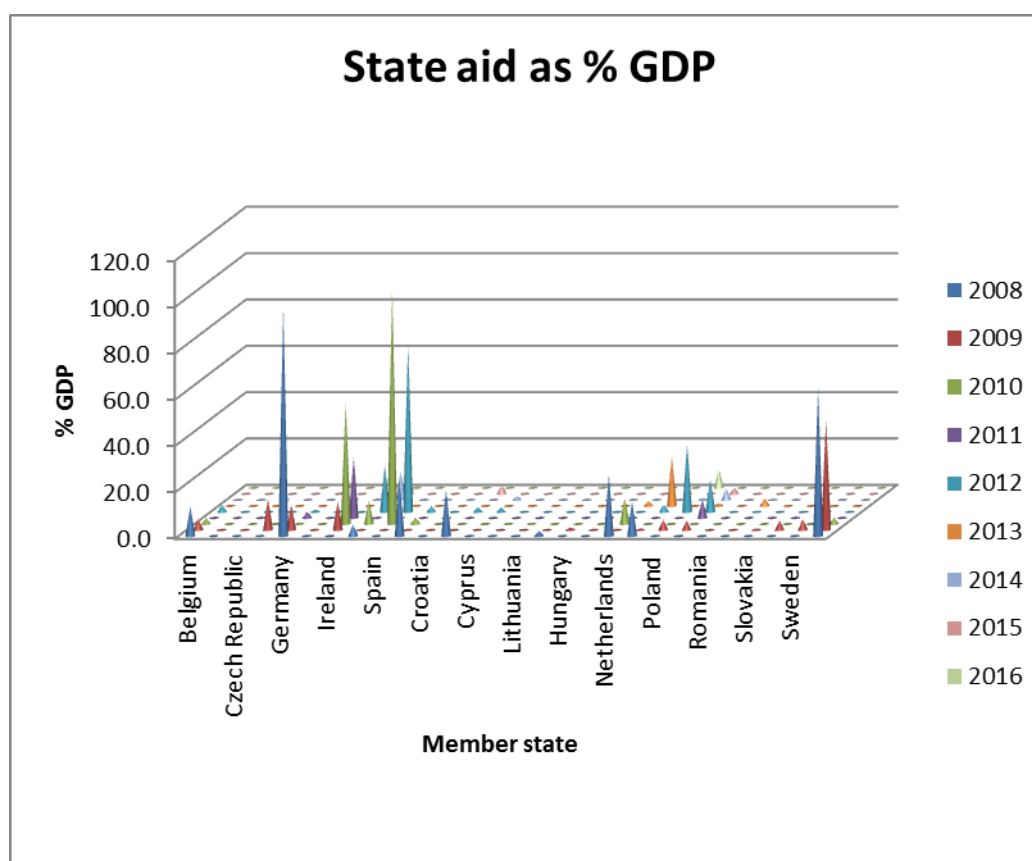
Figure 3. Evolution of state aids as % GDP by member state

2.5. Evolution of State Aid for Romania Spending in Million EUR, at Current Prices

Table 2

Romania								
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Total State aid, less railways (1+2)	**807.5**	**293.5**	**658.2**	**833.4**	**912.9**	**1177.0**	**1297.1**	**1033.9**
(1) Non-Agricultural Aid	**180.7**	**195.7**	**384.4**	**610.3**	**876.0**	**1052.5**	**1228.0**	**1029.4**
of which (by objective)								
Closure aid	*0.0*	*0.0*	*0.0*	*38.2*	*33.4*	*33.0*	*30.7*	*0.0*
Compensation of damages caused by natural disaster	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Culture	*6.3*	*0.3*	*0.6*	*0.4*	*0.2*	*3.0*	*5.7*	*4.8*
Employment	*0.2*	*0.0*	*0.1*	*0.2*	*0.0*	*0.0*	*0.0*	*0.0*
Environmental protection incl Energy saving	*0.0*	*0.0*	*231.7*	*462.3*	*628.0*	*618.4*	*714.2*	*803.4*
Heritage conservation	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Promotion of export and internationalisation	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Regional development	*46.3*	*94.8*	*139.1*	*90.3*	*158.9*	*348.0*	*404.4*	*196.1*
Rescue & Restructure	*17.9*	*3.4*	*4.1*	*8.8*	*10.4*	*9.0*	*29.1*	*0.0*
Research and development incl Innovation	*26.5*	*31.9*	*4.1*	*8.4*	*11.3*	*29.2*	*26.3*	*21.8*
Sectoral development	*77.5*	*59.3*	*0.0*	*0.0*	*33.7*	*9.4*	*14.6*	*0.4*
SME incl risk capital	*3.4*	*6.0*	*4.2*	*1.1*	*0.1*	*2.3*	*3.1*	*3.0*
Social support to individual consumers	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Training	*0.0*	*0.0*	*0.5*	*0.6*	*0.1*	*0.0*	*0.0*	*0.0*
Other	*2.5*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
of which (by aid instrument)								
Equity participation	*10.3*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*3.0*
Grant	*146.4*	*190.4*	*287.0*	*357.1*	*487.5*	*629.3*	*764.8*	*364.1*
Guarantee	*7.3*	*3.4*	*3.2*	*5.7*	*7.1*	*5.7*	*7.0*	*0.0*
Soft loan	*14.3*	*0.3*	*0.6*	*3.5*	*3.5*	*6.4*	*27.8*	*1.9*
Tax deferral	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Tax exemption	*2.4*	*1.6*	*93.6*	*244.1*	*377.9*	*411.2*	*428.5*	*66.5*
Other	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*594.0*
of which								
Co-financed	*3.6*	*11.3*	*19.7*	*12.9*	*14.0*	*49.9*	*77.5*	*15.5*
Not co-financed	*177.0*	*184.4*	*364.7*	*597.5*	*862.0*	*1002.6*	*1150.5*	*1013.9*
(2) Agricultural Aid (DG AGRI & MARE)	**626.9**	**97.8**	**273.8**	**223.0**	**36.9**	**124.5**	**69.0**	**4.4**
of which								
Agriculture and rural development	*626.9*	*97.8*	*273.8*	*223.0*	*36.9*	*124.5*	*69.0*	*4.4*
Aid granted to fisheries and aquaculture	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Transport aid (excluding railways)	**16.0**	**3.6**	**3.4**	**8.9**	**10.6**	**9.4**	**10.8**	**5.8**

of which								
Road	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*3.5*	*5.4*
Maritime transport	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Inland water transport	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Air transport	*16.0*	*3.6*	*3.4*	*8.9*	*10.6*	*9.4*	*7.3*	*0.4*
Other transport	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Romania								
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Total subsidies to the railways sector	**445.0**	**543.0**	**525.0**	**288.0**	**295.0**	**645.1**	**328.6**	**292.0**
of which								
PSO & pensions	*:*	*:*	*:*	*258.6*	*272.3*	*442.6*	*328.6*	*292.0*
Infrastructure and other aid	*:*	*:*	*:*	*29.4*	*22.7*	*202.5*	*0.0*	*0.0*

Source: http://ec.europa.eu/competition/state_aid/scoreboard/index_en.html

Evolution of state aid for Romania spending in million EUR, at current prices graphically can be presents as in the below figures:
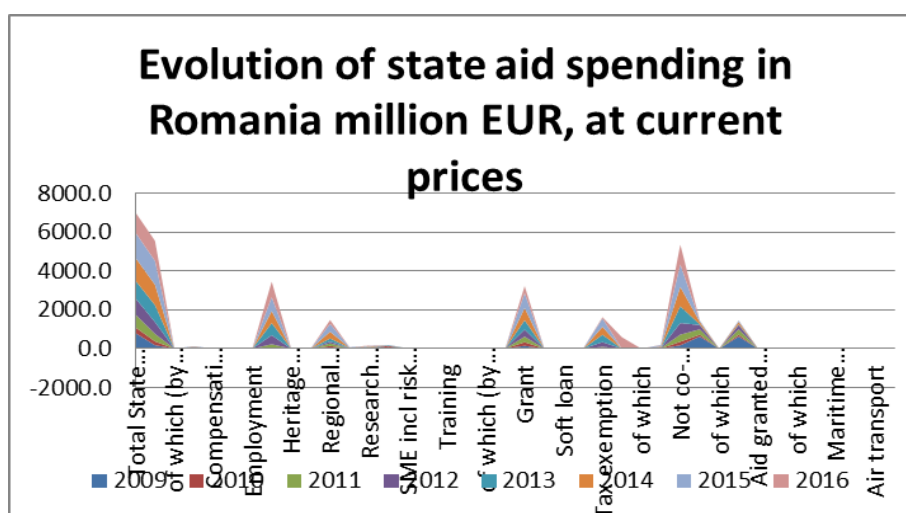
Figure 4. Evolution of state aid spending in Romania in million EUR, at current prices
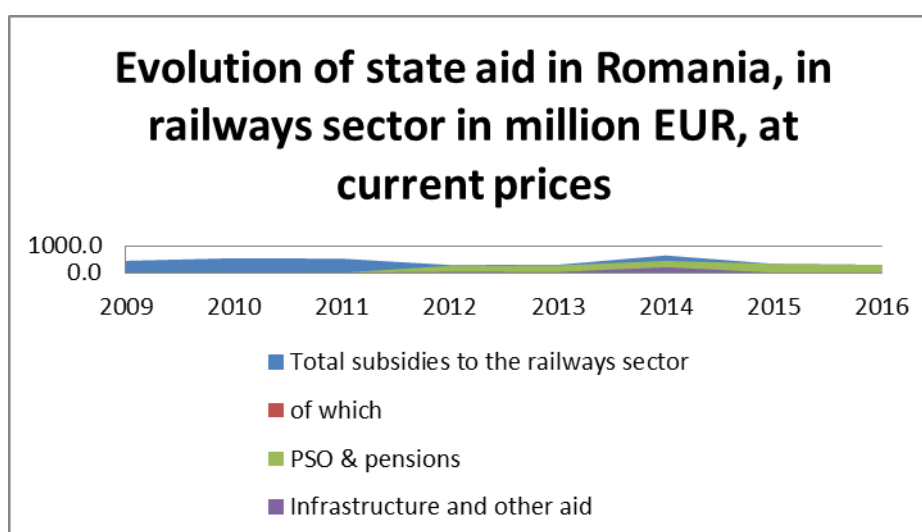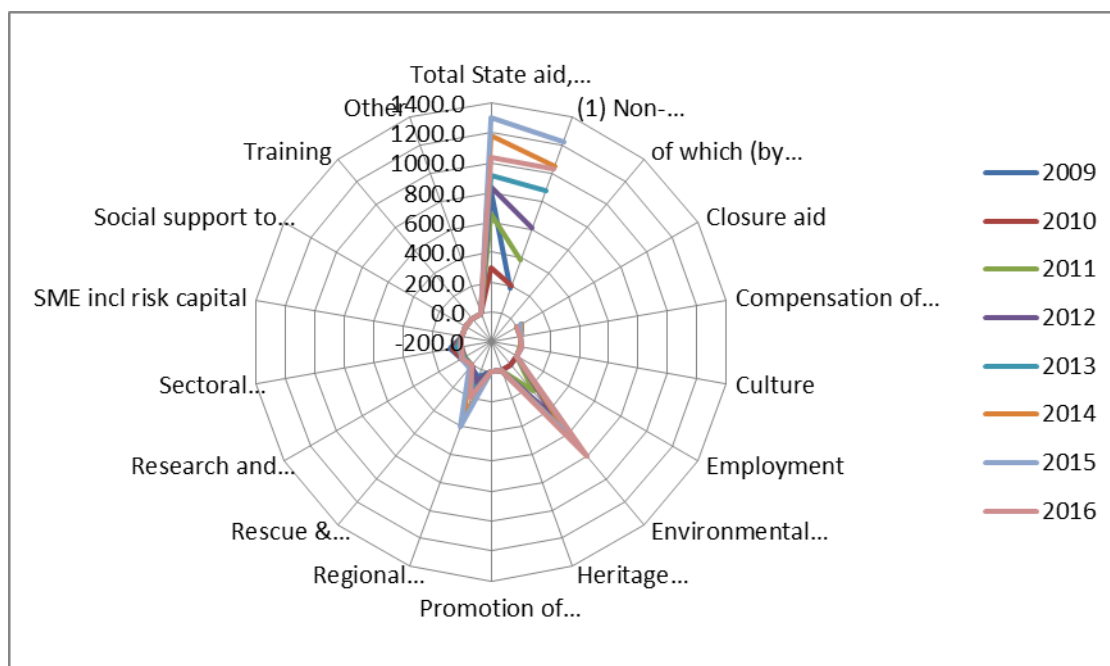
2.6. Conclusions

The annually Report of European Commission published, provides detailed information on the most important policy and legislative initiatives, and on decisions in application of EU competition law during the previous year.

The Europe's system of competition policy and enforcement on mergers, antitrust or state aid proves that everyone companies is welcome to do business in Europe's competitive markets, as long as they play by the rules. On the core level, these actions aim to restore equal competitive conditions for any companies. In times of globalization, these policies give to small business and individuals a fair chance. The competition is beneficial to the European businesses and citizens and not just the powerful few. That is exactly what competition enforcement is about.

Competition policy leads to the formation of a fair society, where all economic actors - large and small - follow the same rules. Merger control is also essential to ensure that mergers do not influenced negative the competition.

State Aid is refers to forms of public assistance, using taxpayer-funded resources, given to undertakings on a discretionary basis, with the potential to distort competition and affect trade between member states of the European Union. In general, state aid has anti-competitive effects, so between state aid and competition is an inverse dependence and an indirect correlation.

References

Dragomir, G. & Negru, M. (2011). The Financing of the Social Services in European Context. *EIRP,* http://proceedings.univ-danubius.ro/index.php/eirp/article/viewFile/928/847.

What is state aid? European Commission. 2016-07-01. OSO, Definition of Aid, Oxford Scholarship.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/443686/BIS-15-417-state-aid-the-basics-guide.pdf.

https://dbei.gov.ie/en/What-We-Do/EU-Internal-Market/EU-State-Aid-Rules/What-is-State-Aid-/.

http://ec.europa.eu/competition/state_aid/overview/transparency_and_evaluation.html.

http://ec.europa.eu/competition/publications/annual_report/index.html.

http://ec.europa.eu/competition/publications/annual_report/2016/fw_en.pdf.

http://ec.europa.eu/competition/state_aid/scoreboard/state_aid_scoreboard_%202017_final.pdf.

https://www.economy-ni.gov.uk/articles/de-minimis-aid.

https://www.economy-ni.gov.uk/articles/state-aid-rules-regulations-and-guidance.

https://www.eipa.eu/product/state-aid/.

https://www.gov.uk/guidance/state-aid.

THE 13TH EDITION OF THE INTERNATIONAL CONFERENCE
EUROPEAN INTEGRATION
REALITIES AND PERSPECTIVES

A Contested Politician, a Great Venerated Economist - Mihail Manoilescu

Florin Dan Puşcaciu[1], Viorica Puşcaciu[2]

Abstract: There are many attempts of arguing the mutual profitable character of the international exchanges from the part of authors for the classical theories of the international trade. Despite these trials, this intercession was not achieved and also aroused criticisms. The aim of this paper is that of analysing the original contribution of the great Romanian scientist M. Manoilescu to the economic theory of international trade. There were used both quantitative and qualitative methods, together with historical introspective in order to capture the research evidence. The implications of this study could be upon the academics, researchers, and also students interested in the economic theory and its applicability in practice. A reference demarche in approaching the unfair exchange succeeded Mihail Manoilescu - the first great Romanian economist. Together with him, our country comes into the universal Pantheon of the economical science, even if it could be considered of the entire "Agrarian East". He sustained its interests, having various contributions to the economical theory, even if the most representative is the study of the problems of international trade. The illustrious Romanian economist intuited that behind this criticism there are consciously or unconsciously covered deeper reasons.

Keywords: trade exchanges; comparative advantage; total productivity; national interest; production possibilities frontier

JEL Classification: B3; B12; B41; F1; F13

MOTTO: "No nation has yet suffer because of trade"

Benjamin Franklin

1. Introduction. Discussion's Framework

Authors of the classical theories of international trade, like Adam Smith and David Ricardo proved - by their argumentation - the proper character of the international exchanges. Even if they apply to numerical hypothetical examples - such as David Ricardo - his theory attired numerous supporters and appreciations. Thus, is due to mention Paul Samuelson's opinion whose assertion that the comparative advantage on which is based international exchanges constitutes "the best idea of the economic science". Of course, it is not disputed the beneficial character of the international exchanges, especially in the present time, when the world countries become more and more active on the international exchange market.

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[1] Professor, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, Corresponding author: fdpuscaciu@univ-danubius.ro.
[2] Professor, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, Corresponding author:ioricapuscaciu@univ-danubius.ro.

The real life confirms Benjamin Franklin's assertion that "no nation has yet suffer because of trade". But the problem that we approach is the often unfair character of these earnings coming from international trade.

2. Related Works

Philippe C. Schmitter (1978) considers M. Manoilescu "the most original and stimulating corporative theorist".

Lack of use the international prices made that at least the economists who have subsequently studied the comparative advantage, to supposes - in the example of Ricardo - equality of the two winnings (Viener, 1932), a strictly hypothetical situation.

Some ideas of M. Manoilescu were taken over 50 years later by Thomas H. Erikson (1993).

Vasile C. Nechita (1993) resembles M. Manoilescu with Nicolae Iorga, due to the impressive work in various fields left by him (he wrote 128 works).

Costin Murgescu (1987) referring to Manoilescu's fundamental work - a reference in the field, he appreciates it as "the first Romanian breach in universal economic thinking".

Gottfried von Haberler (1965) defined on Manoilescu as "a list of the Balkans," considering the German economist the father protectionism, whose doctrinal foundations date back to the nineteenth century.

Mihai Todosia (1992) appreciated that M. Manoilescu launches the theory of unequally exchange accepted and developed by Latin American economists, enjoying a wide spread, as well as the analysis of the most important economists.

In 1929, Eugênio Gudin wrote a letter to Jacob Viener mentioned Manoilescu, like that: "…Brazil has been and still is a Mainolesco's paradise…"

Sorin Şuteu (2016) said that: "The theory proposed by Manoilescu was best received in South America. His Portuguese publication in 1931 made it known in Brazil, which adopted it in 1970 as a national project for the country, bringing the country a few decades of rapid economic growth. Mihai Manoilescu is considered there one of the founders of modern Brazil".

Octavian Gh. Botez (2012) describes the international appreciation of the work of Mihail Manoilescu, one of the greatest contributors to the development of Romanian economic thinking. He appreciate that: "for the thought and economic thinking of Professor Mihail Manoilescu's work represented by its originality a contribution of great consistency to the enhancement of the patrimony of Romanian economic science".

Leonard Gomes (1990) dedicated a special chapter to M. Manoilescu in his book, named: "Manoilescu and Wage Differentials", as one of the arguments for protection. Gomes said about this: "the famous Manoilescu argument".

Andrea Maneschi (2008) thinks that Manoilescu even re-interpreted some key findings of his 1929 book on protectionism to make them consistent with his recently acquired corporate views. But M. Manoilescu was not the first intellectual to advocate protection in order to promote industrialization, being preceded in this by the American Alexander Hamilton (1791), the Scot John Rae (1834) and the German Friedrich List (1841) among others.

3. Problem Statement

Mihail Manoilescu was the greatest Romanian economist, together with him, our country entered into the universal Pantheon of the economic science, even if it could be considered of the whole "Agrarian East", whose interests he sustained. He also had various contributions in the economic theory, but the most representative is the studying of the international trade problems. His basic work on this field, appeared in French language in 1929, which in Romanian language means "The national productive forces and the foreign trade - the protectionism and the international trade theory", from 1986. Based on the labour productivity and also on an own model of analysis succeeds a critical and a demonstration of the inconsistency of the classical theories for the international trade made by Adam Smith and David Ricardo. Having a consistent statistical material from many countries, Manoilescu establishes that industry has an intrinsic superiority, these findings having as ground the quality of the labour factor, that is its productivity. He invokes as arguments the followings:

- the ratio in the national income of the agricultural for the analyzed countries is much smaller than that created by the industry;

- the labour productivity in industry is superior to that of the agricultural, concretely, the labor from any non-agricultural activity is more than 4,35 times productive, than that from agricultural activity;

- this gap between the productivity of the agricultural and industrial labour is more when the country is under-developed;

- agriculture always scores a disadvantage comparing to industry and also by the properties of capital, for achieving the same net production;

- the passing from the agricultural occupations to the industrial ones, in the less development countries offer them a bigger advantage than those more developed countries.

4. Solution Approach

Starting from the labor productivity concept in the two sectors, Manoilescu succeeds a critical of the theory and of the numerical example used by David Ricardo. In this line, our economist has two main objections:

- it is impossible that the productivity of the wine sector in Portugal to be higher than that of producing cloth in the same country;

- it is without historical considerations that England (which was in a full industrial revolution - in 1817 - at the moment of the issuing David Ricardo's book) and it seems unrealistic to produce both goods with bigger solicitations of labour than Portugal - that was a less developed economy.

Accordingly to these considerations, Manoilescu underlined that the argument which imposes the specialization of a country and the origin of the trade between the countries it was not the comparative advantageous of that country, but the productivity of labour. So, under his theory, "if in a country there are producing two goods with different productivity of labour, then it is useful to renounce of producing a good which scores a smaller afferent productivity and to exclusively direct to the production of another good that has a bigger productivity, even if the production of the first good could represent a relative or absolute superiority of that country towards abroad.

Mihail Manoilescu asserts and demonstrates that David Ricardo makes a big mistake considering that the exchange are made by a single rule inside a country: equal labour against equal labour. Thus he appreciates that: "it is far away that to exchange between them only depending by the quantity of incorporated work, the goods are exchanged even inside the same country, function both of the quantity of work, and to the labour productivity".

After demonstrating Ricardo's theory and starting from the numerical example used by him, Mihail Manoilescu proposed a general thematic scheme of the international trade. Thus, starting from two countries - an agrarian one -A and an industrial one -I, each of them producing both an agricultural good and an industrial one. Afferent to the two countries and to the two products, there are establishing the following variables, as per the table:

Table 1. Manoilescu's variable in his theoretical scheme of his model

	Labour productivity in a year	**Qantity**	**Price**
Industrial country			
industrial good	Pi	Qi	Vi
agrarian good	Pa	Qa	Va
Agrarian country			
industrial good	pi	qi	vi
agrarian good	pa	qa	va

The labour productivity is equal with the physic production multiplied with the price of the good, so:

1. $Pi = Qi\ Vi$

2. $Pa = Qa\ Va$

3. $p_i = q_i\ v_i$

4. $p_a = q_a\ v_a$

Note with $D = \dfrac{Pi}{Pa}$ și $d = \dfrac{p_i}{p_a}$ these expressing the disparities between the industrial labour productivity and the agricultural labour productivity from both countries A and I (agricultural and industrial).

Note with $a = \dfrac{Va}{v_a}$ the ratio between the price of the agricultural product in the industrial country I and the price of the agricultural product in the agrarian country A. If this ratio is bigger than the unit, it will express a superiority and if it is small than the unit, this will express the inferiority of the industrial product for the agrarian country towards the industrial one.

At this level, Manoilescu proposes for himself to establish if the agrarian country has any advantage in case it would produce only agricultural good and buying with it the industrial product from the industrial country, or if it not interested to achieve itself this industrial product. This alternative generates two ways of obtaining the industrial good:

• in the first case, when the agricultural country chooses the *indirect commercial way,* in order to obtain the industrial good, that is by exporting the agricultural product in order to import the industrial good, from the industrial country

- in the second case, in order to obtain the industrial good by a *direct commercial way*, in which the agrarian country becomes the producer of the industrial good and producing accordingly to the scheme, with one worker during an year, a q quantity from the industrial product.

M. Manoilescu established the following, on the basis of the general scheme and of previous notations:

the indirect commercial way is more advantageous if we have: $\dfrac{a}{i} > d$

the direct way is more advantageous if we have: $\dfrac{a}{i} < d$

We have to remember the notice:

$$a = \frac{Va}{v_a} \quad i = \frac{Vi}{v_i} \quad d = \frac{p_i}{p_a}$$

In order to demonstrate these inequities that are establishing the advantageous of the two ways for obtaining one industrial good by the agrarian country, Mihail Manoilescu covers the following steps: with an year of labour for one worker is achieved a quantity q_a from the agricultural product, in the agrarian country. By exporting this quantity, the agrarian country to the industrial one, then the exporting country will obtain q_a V_a, V_a being the price of the agricultural good on the market of the industrial country, then the value of this export of the good, would be used for buying the industrial good which has V_i price. Under these conditions, the agrarian country could buy from the industrial country $q_a \dfrac{Va}{v_a}$ from the industrial product.

This commercial way in order to be more favourable it is necessary and sufficiently to:

$$q_a \frac{Va}{v_a} > q_i$$

The ratio between the quantity obtained by the commercial way and that obtained by the industrial way is like this:

$$r = \frac{q_a Va}{Vi} : q_i$$

It is designed the advantage or disadvantage of the commercial way, comparative with the direct production way, if r>1 it is scored an advantage, meanwhile r<1 is a disadvantage. But on the basis of the relations from the general scheme, it could be written the following:

$$p_i = q_i \, v_i => q_i = \frac{p_i}{v_i}$$

$$p_a = q_a \, v_a => q_a = \frac{p_a}{v_a}$$

$$a = \frac{Va}{v_a} \quad i = \frac{Vi}{v_i} \quad d = \frac{p_i}{p_a}$$

$$r = \frac{p_a}{p_i} \cdot \frac{Va}{v_a} \cdot \frac{v_i}{Vi}$$

$$r = \frac{a}{i} : d$$

This r ratio expresses the advantage or disadvantage of the commercial way, as for an inverse ratio $\frac{i}{r} = d : \frac{a}{i}$ represents the advantage or disadvantage of the direct production, that is of the industrial way of obtaining the industrial good by the agrarian country. Thus in Manoilescu demonstrating the advantages offered by the alternative of getting the industrial good by the agrarian country. Starting from the two cases of the r formula and respectively $\frac{a}{i} < sau > d$ and replacing

$$a = \frac{Va}{v_a} \; ; \; i = \frac{Vi}{v_i}$$

$$d = \frac{p_i}{p_a} \frac{a}{i} < sau > d \; ,$$

we will obtain $\frac{Va}{v_a} : \frac{Vi}{v_i}$ or $\frac{Va}{v_a} \cdot p_a < sau > \frac{Vi}{v_i} \cdot p_i$.

In this analysis, Mihail Manoilescu uses the two forms of the labour productivity afferent to one good, that is PI or PE, having as basis the labour productivity afferent to the good, calculated on its internal price, or to that of the external price of it. Manoilescu demonstrated that between the two ways of measuring the labor productivity there is a relation of this type:

$$p'_t = p_t \frac{V}{v} \; ,$$

Or in other words, the internal productivity is equal with the external one, multiplied with the ratio between prices. Thus, the terms from the condition of advantage represent only the afferent labour productivity, based on external price PE of the two compared goods, which we note as p'_a and p'_i . These conditions are interpreted by Manoilescu as follows: in order to prefer the commercial solution, that is getting the good from import, to be preferred to that of direct production from the agrarian country in order to obtain an industrial good it is necessary and sufficient to have a relation like this: $p'_a > p'_i$. This means that PE, the labour productivity which was calculated on the basis of the external price of the exported good has to be bigger than PE of the good imported from the same country. On the basis of these conclusions, he generalized and ascertained: "if a country has a superiority in producing a good, comparing to the that from abroad and a bigger comparative superiority in producing the second good, then this country has an advantage importing from abroad this former product, instead of producing itself. This is valuable only in case that the labor productivity PE of the first cargo is bigger than the labour productivity PE of the latter good". They could notice that the

labour productivity PE have an absolute character and as the author noticed, they are decisive for the solutions that have to be adopted to the commercial policy problems.

The non-industrial state, taking into account the fact that this has an advantage in producing those industrial goods to which it scores a smaller comparative disadvantage in order to buy with these products another agricultural good, from an agrarian country, or if it is more advantageous to product itself the agricultural goods that it needs. So, the industrial country has also the alternative of procuring the agricultural good, as follows:

- on an *indirect commercial way* in which it exports its own industrial products, in order to get from the agrarian country the products achieved by this one and which it needs;

- on a *direct productive way* in which the industrial country produces alone the the quantity of Q_a from the agricultural product, with the work of an worker in one year.

Based on the general scheme, Mihail Manoilescu supposes that with the work of an worker achieved a quantity Q_i of industrial goods. If it exports this quantity to the agrarian country, it will achieve with the local price v_i a sum of $Q_i\, v_i$. With this sum it will buy the agricultural products with the price of the agrarian country v_a; in other words, the industrial country will get a quantity of $Q_i \cdot \dfrac{v_i}{v_a}$ agricultural products. Comparing the direct production of the agricultural good in the industrial country Q_a with the quantity which could be obtained by a indirect way (commercial one), $Q_i \cdot \dfrac{v_i}{v_a}$, is could be established the condition that the commercial solution to be advantageous in a necessarily and sufficiently way, when:

$$Q_i \cdot \frac{v_i}{v_a}$$

As a report, this will be

$$R = Q_i \cdot \frac{v_i}{v_a} : Qa$$

Thus, when R >1 it is advantageous the commercial way, comparatively to that productive (directly) way, and when R < 1, this is disadvantageous.

Based on the relations from the general scheme, one could write as follows:

$$Pa = Qa\, Va$$

$$Qi = \frac{Pi}{Vi}$$

$$Pi = Qi\, Vi$$

$$Qa = \frac{Pa}{Va}$$

$$\frac{Pi}{Pa} = D\frac{Va}{v_a} = a\frac{Vi}{v_i} = i$$

$$R = \frac{Pi}{Pa} \cdot \frac{v_i}{Vi} \cdot \frac{Va}{v_a}$$

$$R = \frac{a}{i} \cdot D$$

This last results be advantageous will express the advantage or disadvantage of the commercial way.

The inverse report of the form $\frac{1}{R} = \frac{1}{D} : \frac{a}{i}$ will represent the advantage or the disadvantage of the direct productive way. So, for the industrial country there are establishing the following conditions in order to obtain the agricultural good:

- the commercial or the indirect way will be more advantageous if $\frac{a}{i} > \frac{1}{D}$.

- the productive or the direct way will be more advantageous if $\frac{a}{i} < \frac{1}{D}$.

Manoilescu is interpreting these results, as follows:

- due to the comparative superiority of the agrarian country in the agricultural product, always $\frac{a}{i} > 1$;

- he appreciates as generality that D > 1, as it represents the ratio of the productivity from the industrial and agrarian field, from the industrial country, this ultimately being the expression of the intrinsic superiority of the industry. Due to these situations, there will achieve:

$$\frac{a}{i} > 1 \text{ și } \frac{1}{D} < 1 \text{ so that: } \frac{1}{D} < 1 < \frac{a}{i}$$

It results that the commercial way is always to prefer instead of that of direct production, for getting an agricultural good in an industrial country. By replacing the variables of the general scheme into this inequity, we shall obtain the following:

$$\frac{1}{D} < \frac{a}{i} => \frac{Pa}{Pi} < \frac{Va}{v_a} : \frac{Vi}{v_i} \quad \text{or} \quad Pa\frac{v_a}{Va} < Pi\frac{v_i}{Vi}$$

This condition reflects the labour productivity of the agricultural product afferent to PE has to be smaller than the labour productivity of the industrial product afferent to PE, condition which is always achieved.

Using the general scheme of the international trade, Mihail Manoilescu demonstrates on the base of a Ricardian model (also used by an American economist Taussig) the inconsistent of the classical theories of the trade, that is both Ricardo's comparative advantageous and also Smith's absolute advantage. But Manoilescu demonstrates that also in the example of Jacob Viner, otherwise a great researcher of this field, the theoretical theories are denied. Thus, we present Manoilescu's commentary to the Ricardian example presented into Taussig's work. This considers an eloquent example of absolute and relative superiority in producing two goods: copper and cloth. Which are dividing between two countries: USA and Germany. So, based on a worker's consume in the two ten days,

Taussig supposes that are produced in the two countries the following quantities expressed in the next table:

Table 2. Taussig's numerical example in a Ricardian model

Country/Good	Copper	Cloth
USA	30 pfunzi	15 m
Germany	15 pfrunzi	30 m

Accordingly to this example, Germany comparing to USA has an absolute superiority, equal with 30/15= 2 in the cloth production, meanwhile USA has an absolute superiority towards Germany equal with 30/15 =2 in the copper production. Accordingly to the classical theory, it will obviously result that Germany has to produce only cloth and USA only copper. If Germany would export in USA the 30 meters of cloth, that it costs a worker's labour for ten days, then this cloth. In USA has an equivalent value of 60 pfunds of copper, which for the same solicitation of 10 days in Germany could not produce but only 15 pfunds of copper. The trade seems obviously advantageous. Based on his analysis scheme of the international trade, Mihail Manoilescu ascertains and demonstrates that this exchange is not advantageous under any conditions. Thus, he proposes as prices calculated for producing in 10 working days cloth and copper would be as follows:

Table 3. Productivities, productions and prices suggested by Manoilescu

Country	Labour productivity in $	Production	Price in $
USA	54	30 pfunzi cooper	1,80
USA	10,5	15 m cloth	0,70
Germany	30	15 pfunzi cooper	2,00
Germany	18	30 m cloth	0,60

5. Analysis of Results

Mihail Manoilescu reaches two conclusions:

• The international trade will be achieved, as cloth exported by Germany (where it values 0.60 $/m) will be imported from USA, where will value 0.70 $/m. Copper exported by USA, where it values 1.80 $ / pfunzi, it will be imported by Germany, where would value 2.00 $/ pfunzi;

• This trade would be also useful both to Germany and to USA, each country obtaining by the help of exchange, a bigger quantity than that it would be capable to produce, with the same level of labour. Thus, Germany obtains 60 pfunzi of copper with 30 m of cloth, instead of 15 pfunzi of copper - that would produce Germany with the same quantity of labour. On its turn, USA obtains 60 m of cloth instead of 5 m, with 30 pfunzi, that would obtain alone, by using the same quantity of labour.

This Taussig's example illustrates the advantageous character of the trade on the basis of the absolute and comparative advantage, but however, Mihail Manoilescu invalidated this character of the trade and practically crumbles the classics' contribution of the political economy in this area. Thus means if Germany chooses the direct way of producing the copper, it will obtain a quantity of 15 pfunzi of copper, with 10 days of labour. If it chooses the indirect way, Germany will export in USA a size of 30 m cloth, which needs the same effort for producing it, that is 10 days of labour. In such situation, Germany achieved an income of: 30 x 0.70 = 21 $. But at the prices from USA (1.80 $/ pfunzi of copper), with the sum get from cloth, Germany can obtain 21: 1.80 = 11.6 pfunzi of copper, in other words less than 15 pfunzi - which Germany could get by producing itself the copper. Under such

conditions, the direct productive way is more advantageous than the indirect - commercial way, solution previously sustained by A. Smith and D. Ricardo. In this manner, despite the comparative and relative disadvantage and taking into account Taussig's numerical example, Mihail Manoilescu demonstrates that getting a good on a direct - productive way is more advantageous, or that producing in your country is more advantageous than trading it. This situation is also proved on the basis of the conditions from the general scheme, so as:

$$a = 0.70 : 0.60 = 1.66; \quad i = 1.80 : 2.00 = 0.9; \quad d = 30 : 18 = 1.30$$

$$\frac{a}{i} = \frac{1.166}{0.9} = 1.30$$

$\frac{a}{i} < d$, (respectively 1.30<1.67, representing the fundamental condition presented by Mihail Manoilescu, for establishing the preferences of Germany for getting on an industrial - direct way, comparatively with that commercial, indirect way.

So, Manoilescu criticised in a direction where other people have praised, affirming and demonstrating that not only Ricardo's principle of the comparative prices is false, but also Smith's principles of the absolute costs. As he dares to criticize the classical of the political economy, M. Manoilescu expose himself to a series of criticisms, besides the deserved appreciations.

Referring the international echoes of Mihail Manoilescu's contribution there could be commented two aspects: those about Costin Murgescu and respectively, Vasile C. Nechita. Mihail Manoilescu understood the criticism towards his conception, having a vigorously which can not be explained only by fanaticism in explaining the truth. The illustrious Romanian economist intuited that behind these criticisms there are conscious or unconscious hidden deeper rations, that is a defending instinct of the industrial countries against a danger coming from the agrarian east. In this context, we appreciate that there is understood M. Manoilescu's role, not only in the economical emancipation of Romania, but also of the whole eastern European space. This is proved by many aspects, one of them being the receptivity of the Latin America towards his theory.

6. Conclusion

Mihail Manoilescu also analyzed aspects of the commercial policy, that is by founding a protectionism based on the labour productivity. But Manoilescu is also an example of the unfortune in life: the patriot savant had the unlucky of signing the Dictate of Wien, from 1940; and that man which he had sustained at the restoration, he "thanked" to him with prison. The country he beloved and economically promoted in all his work it convicts by a foreign imposed regime, and subsequent exterminated him in Sighet prison, in 1950.

One of the best appreciation of Manoilescu's personality was made by Vasile C. Nechita (1993): "the economist Manoilescu was far too big, so as for the politician to have been able to influence him decisively and so cancel. We admit that a net dissociation between the economist and the politician is not possible and that an antithesis of mutual communication and inter-influence existed, but not so much as to justify the metaphysical denial of everything that is rational and perennial".

The issuing of some republished Manoilescu's works, as "The sense and the destiny of the Romanian bourgeoisie", but also of some exegesis of the M. Manoilescu's works represents important facts of recognition and also good steps in promoting his contribution. This is a historical reparation, by

bringing back this huge scientist from the common pit into the mind of those people ready to sustain with elegance and dignity the Romanian patriotism. We also wonder if the cost of ignoring Manoilescu's theory if it is not also expressed in our country, in the post-december (1989) stage, by imports without any national value, like as: toothpicks, napkins and even corn. It is just a point of view...

7. References

Botez, O. Gh. (2012). European and Latin-American Appreciation of the Work of Professor Mihail Manoilescu. *Revista Română de Statistic*ă.

Erikson, T.H. (1993). *Etnicity and Nationalism: Anthropological Perspectives.* London: Pluto Press,

Friedrich List. (1841). *The National System of Political Econom*y. Trans. S. S. Lloyd, London: Longmans, Green and Co.

Gomes, L. (1990). *Neoclassical International Economics*, *An Historical Survey.* London: Palgrave Macmillan Press Ltd.

Gudin, E. (1929). História do Pensamento Econômico Brasileiro, História Intelectual, *Revista Brasileira de Economia, Princípios de Economia Monetária*

Hamilton, A. (1791). "Report on the Subject of Manufactures", in Syrett, H. C. et al., *The Papers of Alexander Hamilton*, Vol. X, New York: Columbia University Press, 1966.

Maneschi, A. (2008). Mihail Manoilescu: an Appreciation and a Critique. *Romanian Journal of Economic Forecasting,* 1/2008

Manoilescu, M. (1986). *Forţele nationale productive şi comerţul exterior.* Bucharest: Editura Stiinţifică și Enciclopedică, p. 210.

Manoilescu, M. (1943). *Rostul si destinul burgheziei romaneşt*i. Dan Pavel's critical study, edition cared by Leonard Oprea, in Collecţion Cărţi fundamentale ale culturii române.

Murgescu, C. (1987). *Mersul ideilor economice la romani*. Vol. I. București: Editura Știintifică si Enciclopedică, p. 413.

Nechita, V.C. (1993). *Mihail Manoilescu creator de teorie economica*. Iași: Editura Cugetarea.

Rae, S.J. (1834). *Statement of Some New Principles on the Subject of Political Economy, Exposing the Fallacies of the System of Free Trade, and of Some Other Doctrines Maintained in the Wealth of Nations*. Boston: Hilliard, Gray and Co.

Schmitter, P.C. (1978). Reflexion on Mihail Manoilescu and the political consequences of delayed - dependent development on the periphery of Western Europe, published in *Social Change in Romania 1860-1940. A Debate on Development in an European Nation*, edited by Kenneth Jowitt, Institute of International Studies, University of California, Berkeley.

Șuteu, S. (2016). Mihail Manoilescu and the Theory of Protectionism. *Revista de Management și Inginerie Economică,* Vol. 15, No. 4.

Todosia, M. (1992). *Doctrine economice*. Iasi: Editura Universității Al. I. Cuza.

Viener, J. (1932). Mihail Manoilesco on the Theory of Protection. *Journal of Political Economy*, vol. 40, no. 1.

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REALITIES AND PERSPECTIVES

Aspects of the Economic Crisis in the Romanian Health System

Florin Dan Puşcaciu[1], Rose-Marie Puşcaciu[2]

Abstract: This paper represents a continuation of a previous contributions to the presentation of some of the most significant confrontations of the Romanian post-decade society, such as the demographic crisis, the situation of the road infrastructure and the education system. Unfortunately, it is also manifested in the health system, both through a sub-financing system, that is reflected in the material situation of the hospital units and in the salary level of the medical staff, thus generating an exodus towards the developed countries, as well as by a lack of coherence in health policies in the sense of prevention. As a direct consequence of these states of things, a series of diseases that before 1989 seemed to be eradicated, or at least kept under control, today are acutely manifested, placing Romania on the last place in the European Union and even more after some countries with a more modest economic development. Besides, throughout the article we propose a comparative approach with the European Union countries. The issue of the Romanian health system is also detailed in the territorial profile, as there are great differences between the counties of the country, regarding the number of doctors and the number of hospitals reported at the number of inhabitants. In order to accomplish this, we use in a balanced way the qualitative and quantitative aspects and the graphic method is a summary of the surprised aspects. Through our modest contribution, we want to sensitize potential readers to the difficulties, but especially to the magnitude of the crisis in this area of greatest importance that Romanian society is facing.

Keywords: public spending; health expenditure on GDP; EU countries; efficiency

JEL Classification: H4; H51; I1; I12

Motto: "Health is a treasure that few know to value, although almost everyone is born with it"

Hipocrate

1. Introduction

The health system is defined in the World Health Report as "all activities whose main purpose is to promote, restore or maintain health".

The health system is a nation's health insurance and because of its importance, it can also assess the level of economic and social development of the countries themselves. The American poet and essayist Ralph Waldo Emerson is right to consider that "the first wealth of man is health". The approach of this sector of greatest importance in Romania is a natural continuation after a series of

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[1] Professor, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, Corresponding author: fdpuscaciu@univ-danubius.ro.
[2] Senior Lecturer, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: rosemarie.puscaciu@univ-danubius.ro.

others in which we analyzed the demographic aspects, the situation of the road infrastructure, the education system, which all represent segments of the crisis that the Romanian society faces after December 1989. They can be considered political errors, although all governments considered them priorities, but in fact they were not realized. We can only notice the vision and the just evaluation that Mihai Eminescu's genius realizes when he states that: "The politician's mistakes are murders, because they suffer millions of innocent people behind them, prevent the development of a whole country and prevent, for decades, its future."

2. Literature Review

It is obvious that such an interesting subject presents a permanent concern, not only for the population, governments, but also for the researchers and specialists of this field. That is why, we first will take a look to some of these studies.

Milton I. Roemer (1993) provides essential tools for reforming the health system. The author describes the component elements of health systems and discusses the U.S. entrepreneurial health system - as a model, even if he also presents the German and Great Britain's system, comparing with that of Sri Lanka, which managed to provide near 100% of their populations with complete health services.

Trochim W.M. & more (2006) viewed from a systems perspective as dynamically interacting components in the growing awareness and support of systems thinking and modeling in public health, and they offer the promise that more effective public health systems will consequently emerge.

Mossialos, Allin and Figueras (2007) present a country-based reports that provide a detailed description of a health system and of policy initiatives in progress or under development.

Davies (2007) focuses on key perspectives of HP field (model specifications) health development - interaction between individual/population (health/health capacities) and environment (health opportunities) distinguish health development and intentional interventions health of individuals/populations at centre health, defined by three interacting dimensions distinguish health and health capacity.

Hakkinen and Joumard (2007) presents three main options for measuring effectiveness in the health care sector, discusses their pros and cons, including data availability and the possibility of whether these options would allow an analysis of how the institutional setting shapes spending effectiveness.

Andrei & more (2008) is revising the key issues that have to be taken into account when applying the reform process of the health care system and is analyzing some of the aspects of the reform process in the Romanian public health care system based on a survey that was conducted in 2007 among the medical doctors.

Subhashini (2012) opinion is that the national health policy should strive towards achieving the concept of "health-care for all" conceptualized by the World Health Organization (WHO) through health insurance scheme. He identifies and discusses the various gaps affecting the health care systems and to evolve strategic issues in health care in India through an exploratory survey.

Rubin & more (2018) see that "a future of health involving big data and analytics will happen; it is already happening. What they believe we're really fighting for is the soul of this future. Elaborating on what this notion means, he stated, in 2020, there's likely to be 50 times as much health data as there is today. Medical knowledge that took 50 years to double 50 years ago, will be doubling every 73 days". And under these circumstances, the authors of the study are wondering whether the power that comes

with all that will be concentrated in the hands of the few, or will it democratize health and serve the public good in the hands of the many?

3. Problem Statement

We consider that the Romanian health system faced at least two crises, on the one hand with the lack of a coherent policy, that refers to the whole system and on the other hand with a chronic under-financing.

We have in mind that the health system should benefit from a proper policy regarding both the medical services provided and the preventive ones, as it is said to be much easier and why not even more economical to go than to treat a certain illness, in other words an even greater pressure on the health budget. Either during this period in the Romanian society there are strong contradictions regarding the vaccination of children. Another issue regarding the lack of a sectoral policy is the status of medical staff, who are employed in the public system and also carry out activities in the private sector.

4. Solution Approach

Of course, the right to work is guaranteed by the Constitution, but the state sector was just a firewall in which the system was leaked to the private one. While for other areas, such as the education system, the provision of additional activities is limited, according to quality standards, the health care system is not regulated, with the medical staff oscillating between the state system and many other private medical units. It is obvious that these are not general, but significant for the Romanian health system. Besides the ethical aspect, we consider that the quality of medical services has been affected, given that a doctor reaches 10-12 hours a day.
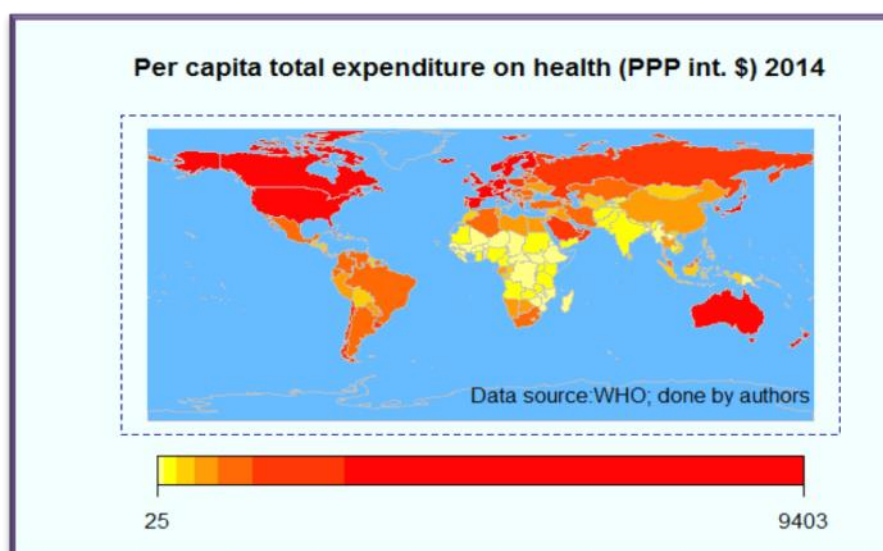
Figure 1

This situation can also be attributed to the under-funding of the medical system, reflected by the inadequate remuneration of the medical staff, who for the increase of the income was condemned to such practices.

In order to evaluate the financing of the Romanian health system, we propose the fitting of our country in an international context. The financing of the system is approached in terms of the total expenditure per inhabitant indicators with health, the share of private expenditures with health and the share of health expenditures in GDP.

Figure no. 1 shows the level of total health spending, estimated in $ 2014 in the world. This is a core indicator of health financing systems. The indicator contributes to understand the total expenditure on health relative to the beneficiary population, expressed in Purchasing Power Parities (PPP) to facilitate international comparisons.

As it can be seen, this indicator shows a high amplitude ranging from 25$ in the Central African Republic to 9403$ in the US, with 1079$ in Romania. The figure also reveals great differences between the world's regions and also between the income groups of the countries. These differences are presented in Figures number 2, 3 and 4.

Figure no. 2 shows world averages of total health expenditure. As anyone can see in Europe, the highest level of total health spending is 2.548$, while the African continent is only 274$. But in the interior of these geographic areas is registered with great variations. In this respect, Figure no. 3 presents the coefficients of variation of the zones. The European conglomerate being the most homogeneous in this respect. As far as Romania is concerned, as can be seen with the 1079$ per inhabitant spent on health, we are located the world average and more than 50% of the continental average.
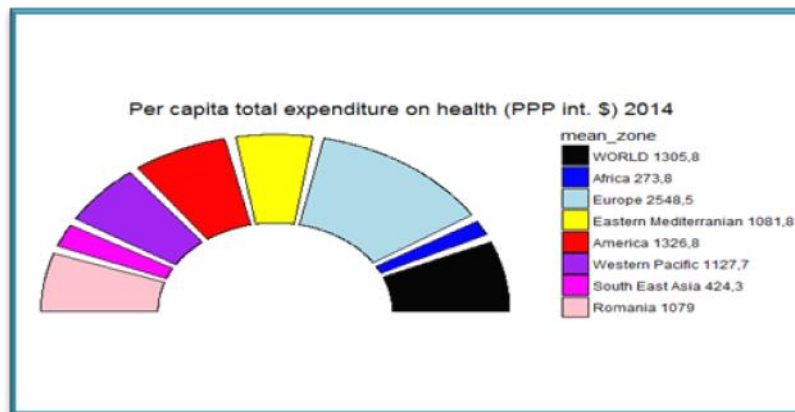
Figure 2
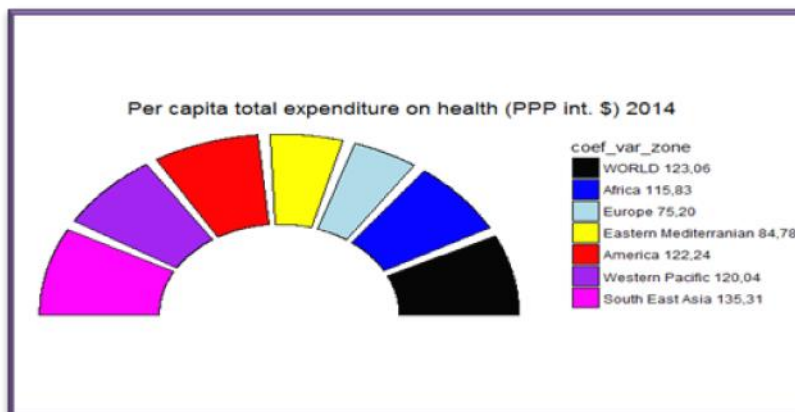
Figure 3

At the level of EU countries, Romania occupies the penultimate position, approximately three times below the Union average, as it could be seen in Figure no 4:
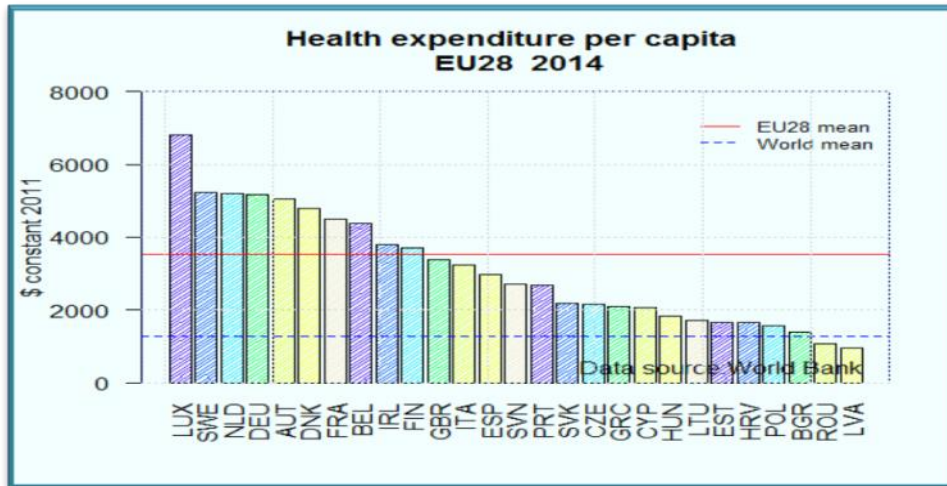
Figure 4
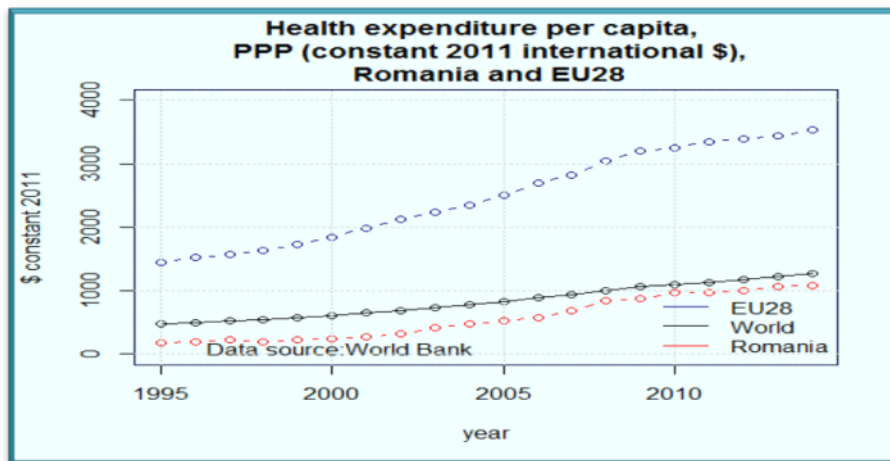
Figure 5

The chronological evolution of total per capita expenditures with health can be seen in Figure no. 5, which represents the evolution of the indicator at the world level, the EU 28 and at the level of Romania.

As in Romania anyone can see for the period 1995-2014 - although Romania has been on a rising trend - it has been found throughout the world under the global average. At the same time, there is a tendency to approach the world average. Note that all geographical structures recorded linear increases, whose trends are shown in Table no. 1:

Table 1. Regressions: Health expenditure per capita ves time

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===============================================================================
        Dependent variable:

    ------------------------------------------
      Romania    EU28    World
       (1)     (2)      (3)
-----------------------------------------------------------------------
time          55.353***  122.492*** 44.201***
            (2.972)   (3.416)  (1.168)


Constant        -12.294   1,194.501*** 371.681***
            (35.597)   (40.924)  (13.997)



-----------------------------------------------------------------------
Observations       20     20     20
R2          0.951    0.986   0.988
Adjusted R2        0.948    0.985   0.987
Residual Std. Error (df = 18)  76.631    88.098   30.132
F Statistic (df = 1; 18)   346.979***  1,285.606*** 1,431.003***
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Based on the above, it can be concluded that although Romania is on an upward trend, it is still below the global average and well below the EU average.

Figure no. 6 shows the health expenditures averaged across income-grouped countries. As you can see, the level of income has a devastating effect on the level of health spending.
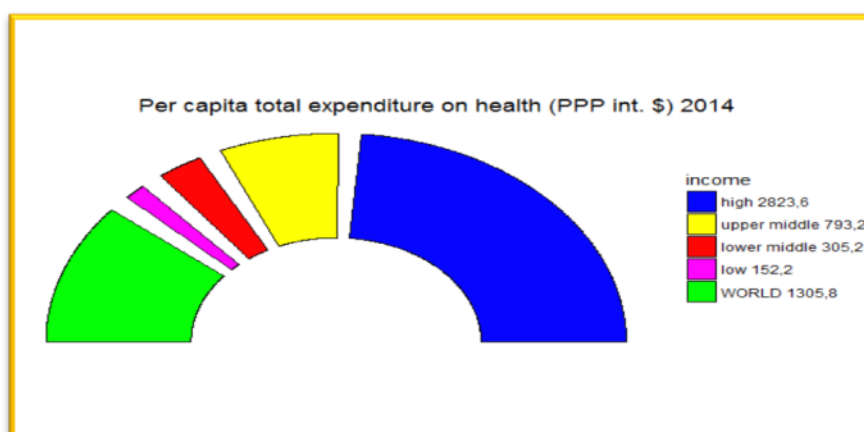
Figure 6

There shows the importance of assessing expenditure in the health system and the structure of these funding sources from the budget or from private sources. Figure no. 7 shows the share of private spending in total health-care spending worldwide.
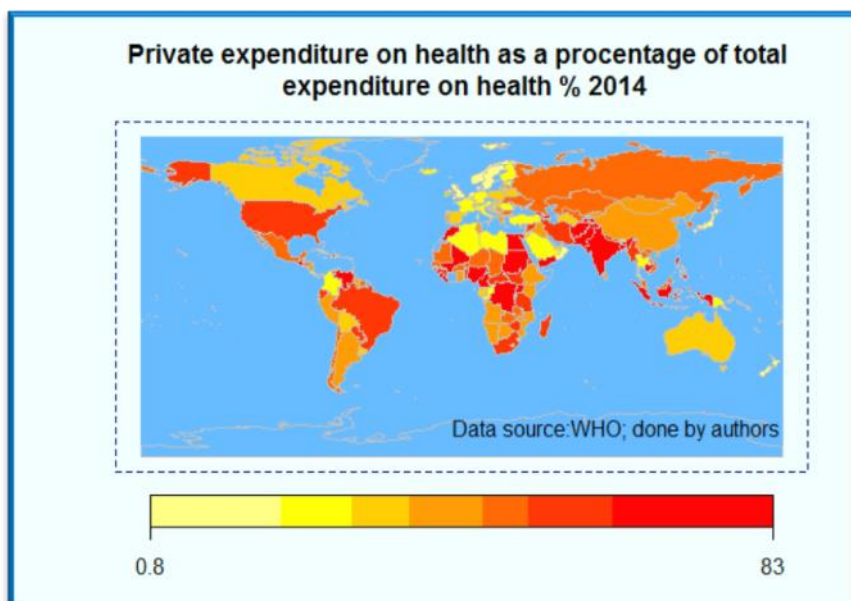
Figure 7

As anyone can see, this percentage ranged from 0.8% to 83%.
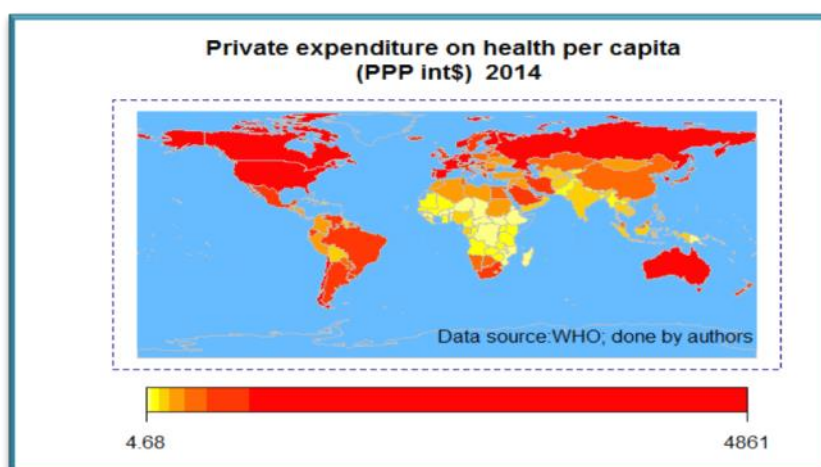
Figure 8

This so heterogeneous percentage between the countries of the world in terms of private health expenditure in total expenditure in this sector is reflected in the absolute values that are presented in Figure no. 8.

In the period 1995-2014 this percentage of private spending in total health expenditure worldwide has evolved oscillating, in the sense of an increase around 2000, after which it stabilizes about 40%, see Figure no. 9.
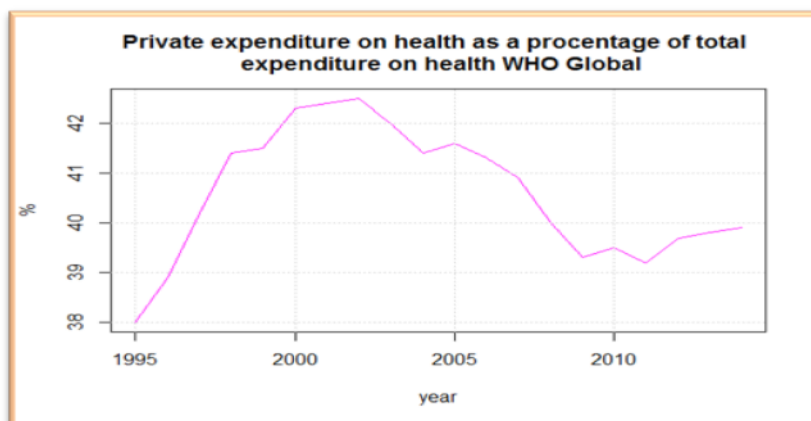
Figure 9
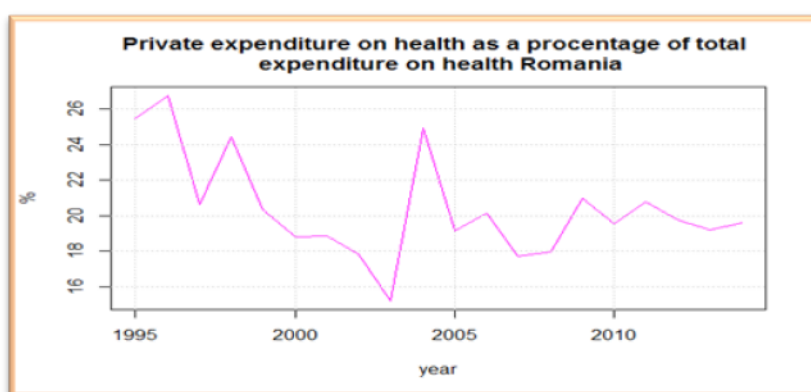
Figure 10

Romania also has an oscillating evolution, with higher amplitudes, but as you can see, this percentage is half the world average, as it could be seen in Figure no. 10.
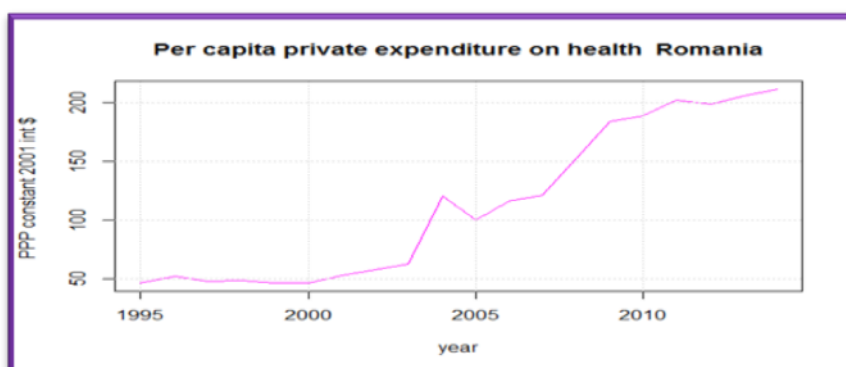
Figure 11

Although Romania has seen a fourfold increase in private health spending, it was not enough to support health care funding. This trend of private health spending growth is shown in Figure no. 11.

The total health expenditure reported per GDP is also an express indicator of the level of health financing. This indicator on a modal level registered values between 1.48% and 17.1%. Figure no. 12 shows this spread - indicator change in countries and continents.

A breakdown of the EU27 countries is also relevant, ranging from 5.5% to 12%. The lowest percentage of GDP allocated to health in the EU28 is registered by Romania, see Figure no. 13, which explains both the level of under-financing of the system and the real priority given to the health-care system. It is a fundamental element that has generated and maintained the entire crisis since 1989. This under-financing was reflected both in poor material endowment and by the salary level of medical staff.

As Romania is aware of the lack of an appropriate policy in the medical field and the under-funding of the cornice, it has generated an exodus of medical staff to other EU countries, which offered them much more attractive material and wage conditions. This phenomenon, although very well known, in the field have known their facts have not been definitively resolved. Thus, in the field of primary medicine, the average age of family doctors is around 55 years old and even higher in some areas. The National Family Doctors Association, under these conditions, warned that in the next ten years Romania risks not having any more family physicians. This aging tendency of family doctors is also due to the fact that young staff have migrated abroad. It is estimated that only between 2009-2015 14.000 doctors and over 28.000 nurses have gone abroad.
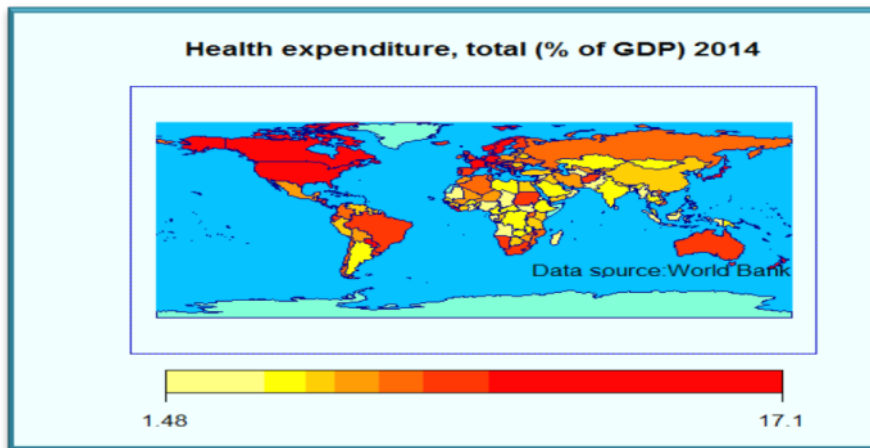
Figure 12
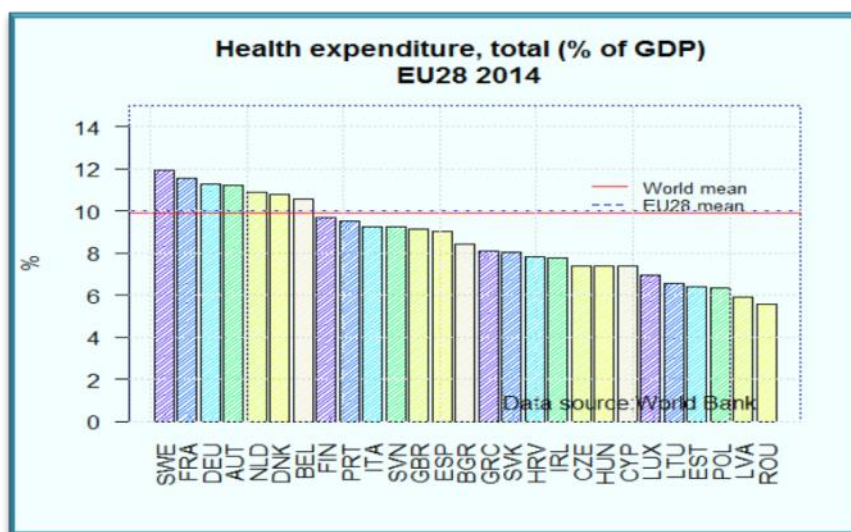
Figure 13

It may be worth mentioning that with the 5.5% of GDP allocated to health, Romania ranks behind other countries, such as Belarus, Albania, Azerbaijan etc.

5. Conclusion

In a desperate attempt to mitigate this exodus of the medical staff, the Romanian executive increased the salaries of medical staff, but this action proved to be hasty and unfounded, as it generated a series of inequities and for their straightening they resorted to protests and to a general strike on the system. It has come to paradoxical situations, as from a announced increase in salary actually the income of some medical staff drops. It has reached such a serious situation that a number of units to register resigns in block, like the resignations of the 40 doctors from Oradea, which could be followed by the resignations of 70 assistants from the Emergency Receiving Unit. Unfortunately, this is the expression of the lack of a coherent, ethical and professional policy that should benefit the Romanian health system.

6. References

Andrei, T.; Tusa, E.; Herteliu, C. & Stancu. S. (2008). Applying the Statistical Survey Method in Evaluating the Public Health Care System in Romania. *Journal of Applied Quantitative Methods*, Quantitative Methods in Medical Sciences, vol. 3, no. 4.

Davies, J.K. (2007). *European Health Promotion Indicator Development (EUHPID Project).* European Commission.

Evans, D.B.; Tandon, A.; Murray, C.J.L. & Lauer, J.A. (2001). Comparative efficiency of national health systems. *British Medical Journa.* London, pp. 323; 307-10.

Hakkinen, U. & Joumard, I. (2007). Cross-country Analysis of Efficiency in OECD Health Care Sectors: Options for Research. *OECD Economics Department Working Papers* No. 554, OECD Publishing.

Kinnaird, J. (1981). The British National Health Service: retrospect and prospect. *Journal of Public Health Policy*. 1981 Dec; 2(4), pp. 382-412.

Roemer, M.I. (1993). National Health Systems Throughout the World, Lessons for Health System Reform in the United States. *American Behavioral Scientist,* Vol 36, Issue 6, July 1st.

Mossialos, E.; Allin, S. & Figueras, J. (2007). Health Systems in Transition: Template for Analysis, Copenhagen, WHO Regional Office for Europe on behalf of the European Observatory on *Health Systems and Policies.*

Rubin, J.C. & more. (2018). Transforming the future of health together: The Learning Health Systems Consensus Action Plan. *Learning Health Systems.*

Saltman, R.B. & Ferroussier-Davis, O. (2000). The Management Concept in Health Policy, *WHO Bulletin*, 78, pp. 732-9.

Subhashini, R. (2012). National health policy, the need of the hour: an analysis in Indian perspective. Published by *Emerald Group Publishing* Limited.

Trochim, W.M.; Cabrera, D.A.; Milstein, B.; Gallagher, R.S. & Leischow, S.J. (2006). Practical challenges of systems thinking and modeling in public health. *Journal of Public Health*, 96(3), pp. 538-46.

*** American Public Health Association (1979). *A health and population brief: Republic of Sri Lanka*. Washington, DC.

*** World Health Organization (2000). *World Health Report*. Sanitary systems: Improving performance. Geneva: OMS.

https://www.hotnews.ro/stiri-sanatate-22435854-criza-pre-precedent-precedent-of-the-   NTR-hospital-in-Romana-all-the-40th-urgent doctor's reception-demisionat.htm.

https://www.libertatea.ro/stiri/romania-nu-va-mai-avea-medici-de-familie-10-ani-1811294.

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Human Capital Flight, or the Luxury of Indifference?

Rose-Marie Pușcaciu[1], Viorica Pușcaciu[2]

Abstract: This paper is meant to point out the phenomenon of loosing human capital, which became a characteristic aspects of the poor countries, that affects more and more their economy, in the favour of the developed countries. Even if this is a corollary of the globalization process, but the future for the developing countries will be not a good one, because of this exodus of brains; and even this is what our study is meant. The present approach is brought into light by qualitative means of observance, survey and study-case. The results of this research is quite a worrying situation for the donor countries, presenting the huge dimension, together with its economic and social consequences. Our paper could be useful both for the governments of these countries of origin, but also for researchers, academics and students. We hope that the readers will appreciate this attempt of awareness about the gravity of this situation and of its consequences for our country and remaining people here.

Keywords: international labor migration; brain drain; donor country; migration

JEL Classification: F22; J61; J24; O15

Motto: "The empires of the future will be true empires of the mind"

Winston Churchill

1. Introduction

The movement of skilled workers internationally represents brain gain for the countries that reap their skills and experience and a brain drain for their countries of origin. On the brain gain side of the divide countries increasingly are looking to position their immigration policies to attract the types of international workers and students whose skills they desire. On the brain drain side, the development impacts of losing educated workers are being assessed in immigrant-sending and receiving countries alike as the research presented here shows.

The expression of brain drain dates back to the 1960's, when it referred strictly to the phenomenon of losing high-skilled labor in poor countries. Over time, different scholars have developed various concepts about this phenomenon, but have nevertheless retained the essential meaning of migrating the

[1] Senior Lecturer, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: rosemarie.puscaciu@univ-danubius.ro.
[2] Professor, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: vioricapuscaciu@univ-danubius.ro.

intellectual population from underdeveloped countries to highly industrialized ones. Brain Drain is one of the most disputed phenomena when it comes to the economy of a country. Even in Romanian society, this phenomenon has taken a real magnitude over the last 25 years and may be one of the causes of the economic crisis. The phenomenon called Brain Drain is known under a number of other names: brain drain, brain migration, skill exodus, intelligence theft or human capital flight. However, this phenomenon is natural for any country, even for those developed.

We often ask why doctors, engineers, researchers, specialists have the desire to leave their country of origin. The reasons are the same as those of the rural-urban exodus. The natural desire of the individual to lead a better life, to find new perspectives and to have bigger gains! Many are uncertain about the future and therefore are looking for a stable job, professional recognition opportunities, an adequate working environment, endowed with all the utilities needed to carry out a profitable activity. In short, the reason for leaving is the economic underdevelopment of the emigrant country.

2. Related Work

Writer Ayn Rand introduced for the first time, the term Exodus of Brains in 1957, in his work "Atlas Shrugged." Subsequently, in 2004, H.B. Entzinger & more (2004) associated the concept of brain drain with the loss of human capital in developing countries. In 1989, I. Ahmad and N. J Bhat explained the phenomenon as the loss of competent, professional specialists for society on the domestic labor market. Also, Johnson and Regets (1998) introduced a new concept - Brain Circulation. It referred to the cycle that it is doing, especially young graduates of universities and young specialists. They are moving abroad to pursue their postgraduate studies, or to do an internship or exchange of experience, later to return home, bringing new knowledge, new skills and technology transfer. The more economic differences between countries will be, the more the migration process will increase.

W. Carrington and E. Detragiache (1998) present estimates of emigration rates from 61 developing countries to OECD countries for three educational categories built using 1990 U.S. Census data, Barro and Lee's data set on educational achievement and OECD migration data.

J.C. Dumont and G. Lemaitre (2005) presented some results in their paper, based on the new database on immigrants and expatriates in OECD countries, show that

• the percentage of foreign-born in European OECD countries is generally higher than the percentage of foreigners;

• international migration is quite selective towards highly skilled migrants;

• in most OECD countries the number of immigrants with tertiary education exceeds the number of highly qualified expatriates to other OECD countries;

• among non-member countries the impact of the international mobility of the highly skilled is diverse.

Çağlar Özden and Maurice Schiff (2007) mentioned more than ten years ago that the number of the people leaving their country of birth were estimated (by the World Bank, in 2006) to be about 180 million people, or about 3% of the world's population.

Nina Heuer (2011) appreciates that: "We find a robust negative impact on the incidence of high-skilled emigration on the level of human capital in the sending countries, thereby rejecting the

hypothesis of a beneficial brain drain. The negative effect was significantly stronger for professionals - the occupational category with the highest incidence of south-north migration and the highest educational requirements - than for technicians and associate professionals."

Giovanni Facchini and Anna Maria Mayda identify three channels through which migration can have impact on individual attitudes: the labor market channel, the welfare state channel and the efficiency channel.

Aniruddha Mitra & more (2011) analyse two themes that have come to occupy central positions in the debate: first, as the volume of skilled migration increased dramatically in the last decades of the twentieth century, there has been a resurgence of scholarly interest in the causes and consequences of the brain drain. Second, as countries have increasingly undertaken financial liberalization programs over the corresponding period, there has been a great deal of interest in the consequences of such policies, especially for developing nations.

Tito Boeri & more (2012) provide for the first time a measure of the net global impact of the brain drain on sending countries. The results indicate that most developing countries experience a net gain from skilled emigration. Adverse overall impacts are found to be limited only to a subset of countries exhibiting very high skilled emigration rates. A number of policy recommendations are also offered to increase the benefits of brain drain.

Philip Hunter (2013) revealed that in a related but distinct trend, the incidence of co-authorship reflecting greater international collaboration has similarly been on the upswing. New studies of the migration routes of scientists show that international mobility benefits all parties including countries that are net exporters of researchers. In the USA, a haven for researchers ever since the exodus of European scientists during the Second World War and to some extent before, the number of foreign citizens gaining a PhD has risen from 17% in the 1960s to nearly 40% in 2010. Almost 60% of post-docs now working in the USA are doing so on a foreign visa. Similarly, in Europe, 43% of postdoctoral researchers in the life sciences are working in a country that is not their place of birth. Until recently, this movement has been more between the EU member states than with countries outside, but growing efforts try to reach out beyond Europe's borders - the EU–US Science and Technology Agreement, for instance, signed in 1998 has increased cooperation and regular meetings. And the author concluded that: "At one time, migration in particular was regarded as little more than a form of trade, in which an individual country either has a surplus or a deficit".

Yui Suzuki and Yukari Suzuki (2016) examine how the rising inter-provincial migration of individuals with diverse educational backgrounds affected human capital formation in China in the 1990s. We find that gross outflow migration of those with higher and lower levels of education, respectively, has human capital incentive and disincentive effects. Our estimates suggest that the incentive effect eclipses the disincentive effect in general; however, a surge of migration, particularly among less educated groups, implies more of a disincentive effect in China in the 1990s. We also find that changes in the relative labor supply resulting from net outflow migration mitigate a direct brain drain by both encouraging and discouraging school enrolments.

Miloslav Bahna (2017) analyses the internationally mobile students coming more often from families with a higher level of cultural capital. Moreover, students from families with high cultural capital have a higher probability of studying in more prestigious study destinations. The study destination is, however, not influenced by the economic capital of the family. The author suggests that such a "cultural capital drain" could have positive consequences on vertical labour market mobility in the

source country. It is discussed the connection between international student mobility and labour migration in the case of international students from low income families.

3. Problem Statement

The problem of this study is about the brain drain, that is a very important one, especially by its consequences on the giving countries, which are - in their majority - developing countries. Even if there are some few advantages also - that is the sums of money sent in most cases to their country of origin, these migrating people become the largest "foreign" investors in their country, after their departure; as to illustrate this ascertain it should remind the sum of 582 $ billion, that were sent by immigrants to their relatives in their home countries in 2015. But without this exception, this phenomenon as a whole, is a very damaging one for these donors countries. Thus means that all the rest of the deriving aspects from this human capital loss are not only negative, but quite damaged. Furthermore, looking forward the perspectives for these developing countries are quite gloomy: they invest in the teaching and high education of these people who are then contributing with their skills - obtained on the expense of their native country - to the increase of GDP of the developed country where they go to. And thus, these developing countries will become poorer and the developed countries become richer.

Is there something wrong in society, theoretically unclear or in dispute?

This qualitative case-study will examine the corollary results of the immigration of human capital from the developing country to the developed ones. Many countries and increasing as number of high qualified people will be taken into account in this survey. The data to be gathered in this study may provide leaders with information relating to how they may address or mitigate factors contributing to the current brain drain.

4. Concept and Terms

The phenomenon of intellectual migration or "brain drain" is defined as a constant transfer of highly qualified staff from some countries, generally less developed, to more economically stronger ones. The phenomenon has grown in the Romanian society especially in the last 20 years and can be one of the causes of the current crisis situation. Improving this phenomenon can be an effective solution for the recovery of national social and economic difficulties. The phenomenon of migration of educated or talented people is called scientific brain drain or human capital flight. In Romanian, the term has been translated by: brain drain, brain migration or even brain theft, intelligence theft, exodus of skills and so on.

Why do the specialists go? What are the causes of the phenomenon? If we were to simplify things, the main cause is the individual's natural desire to find prospects, recognition, greater gains and a better standard of living, even if for that he has to go abroad. A study by the Department of Education of the Ministry of Human Resources Development in India reveals factors such as lack of jobs, economic underdevelopment, low salary levels, overproduction and under-utilization of specialists, lack of research and endowment, employment discrimination, lack of culture and scientific traditions, non-functioning institutions, or the desire for higher qualification and recognition.

However, the situation is more complex, the cause is not a single one, more in-depth studies of the phenomenon have identified two types of causes, those in the country of origin, pushing for emigration and, on the other hand, the country of destination, which attract immigrants. These factors are called "push-pull factors", rejection-attraction factors.

It is possible to make the following parallel between the rejection factors and the factors of attraction.

4.1. Causes of brain drai*n*

Factors of rejection versus attractive factors:

➢ lack of jobs;

➢ economic underdevelopment - better economic outlook;

➢ low salary levels - wages and higher earnings;

➢ overproduction and under-utilization of specialists - availability of experienced staff;

➢ lack of research and endowments - better research facilities;

➢ discrimination in employment and promotion - better working conditions and employment opportunities;

➢ precarious facilities - substantial funding for research;

➢ lack of culture and scientific traditions - rich cultural and scientific arts;

➢ inoperative institutions;

➢ desire for better urban life - attraction of urban centers;

➢ desire for higher qualification and recognition - better educational system and opportunities for specialists;

➢ prestige of foreign education - technological gap.

Generally speaking, a rejection factor has an equivalent factor of attraction, but there are also factors without a correspondent, but one can imagine an equivalent. In this vision of the rejection-attraction factors, the world appears divided into two economically less developed countries in which the rejection factors and the developed countries in which the factors of attraction act. On the other hand, in the developed countries, the number of specialists is insufficient because: the natural increase of the population is sometimes negative, the degree of aging increases, the cost of education is high, it is cheaper to cover the deficit of specialists through immigration.

4.2. "Brain Exodus" in Europe

Researchers have made a spectacular animation, which shows how the major European cities have been formed by brainwave migration, meaning intellectuals. They monitored the migration of 150.000 "notable people", linking through a curved line the place of birth and death of each of these personalities. Between 1600 and 2014, major European cities are formed (these are the most lighted ones). Researchers say, however, that cultural centers do not necessarily coincide with the economic ones of the time.

Researchers have found that over the last 400 years, the average distance between birth and death has changed little, from 214 km to 382 km. Another interesting map presented by American researchers shows a huge migration between the east and west coasts of the US, especially between the cities of Los Angeles, New York and San Francisco.

Migration of people with higher education from middle-income countries increased to 44% between 2000 and 2006, according to a study by the Organization for Economic Cooperation and Development. In low-income countries, the migration of people with higher education amounted to 28%. Those who choose to work abroad pay less than a few years ago and for limited periods. Certain industrial

branches, such as oil and gas exploitation in the undeveloped areas of the world, need skilled people. According to Brookfield's chief executive, Scott Sullivan, "mining is a field that brings a lot of challenges. On the one hand, there is a need for specialists with specific skills. On the other hand, the expert must also have management skills, leadership and extensive experience". Climate change offers more opportunities for people specializing in green energy, which is constantly developing.

Globalization will lead to an increase in the migration of people with higher education in the coming years. The level of training of people in poor countries is steadily decreasing. Countries like China, Brazil or India need industry specialists. Qualified persons will always be welcomed with arms open to foreign lands.

The figures provided by the World Bank show that in 2007 only about 318 billion $ had been transferred to the countries of origin of the emigrants. About 38.6 billion $ have been sent to a report by the Pew Institute shows that 582 billion $ was sent by immigrants to their relatives in their home countries in 2015. The figure is less than 2% less than last year, the report said. It's the first time the sum has fallen since 2009, when the global crisis hit the world.

They then sent home, globally, 28 billion $ less, says the Pew Research Center. Despite this small decline, the amount sent by immigrants is double that sent home ten years ago, before the recession. With the exception of 2009, money sent home for immigrants has increased steadily since the 1970s. The amount sent home to immigrants is, of course, in relation to the number of those who leave their home countries. And it rose from 191 million $ in 2005 to more than 243 million $. However, as a whole, the proportion of immigrants in the world's total population remained at 3% countries in Europe and Central Asia, as the World Bank communiqué precised.

4.3. "Brain Exodus" of Romania

Romanian people working abroad sent around 6.8 billion $ in 2007, according to a World Bank report. The amount places Romania on the first place in Europe, followed by Poland, where people leaving for work sent back 5 billion $ to the country, wrote "Financial Newspaper". In turn, our neighbors from the South of the Danube sent in the country in 2007 only 1.9 billion $. Remittances have fallen. For two reasons: firstly, 7 billion $ as it received in 2008, the figure has not met. The crisis has come, in all countries revenue has been reduced, and our outgoing Romanians have been able to send less. Lately, another phenomenon: stabilization. There are groups, stable teams, numerous masses of Romanians starting to settle in other countries. They took their family there, they became citizens there, they pay taxes there, they keep the family there, they do not send home; after the last economic crisis, for example in 2013, the remittances were at a level of around 4 billion euros.

Romanians leaving abroad were considered to date the largest "foreign" investors in Romania. In the years before the crisis of 2008-2010 and in the subsequent period, including in 2016, the ratio between the amounts sent home from abroad by Romanian expats on the one hand and the foreign investments made by companies on the other side was over-unitary, in the sense that remittances were higher than investments. In the first five months of 2017, this report became sub-unit, with remittances being overtaken for the first time by foreign investment.

Romania is the most modest innovative economy in the European Union. According to experts, Romania's spending for research and development represents less than a quarter of the European average, and the number of researchers that Romania lost in the last decade amounts to 5.500, a quarter of the total. Thus, Romania's spending on research and development is less than a quarter of the European average and a half compared to those in Bulgaria and this makes our country the most innovative economy in the European Union. Romania has the most pronounced speed of deterioration

of innovative performance in the EU. In the middle of last year, the European Commission tells us that Romania's innovation capacity declined in 2017 by 14% over the previous year. Other countries improve these perspectives, most than Romania does not stimulate innovation and this has made a quarter of the researchers it had 10 years ago to go abroad. Instead, the number of Romanian patents registered with the European Office increases to about 100 per year, compared to 20-25 ten years ago. We are glad, we are five times better than in 2006, but when we look at the European performer, Germany is doing 2.000 times more than we do, in the fields in which the invention could bring about performance in the Romanian economy.

4.4. Disastrous Effects on the Country they are Leaving

The "National Hemorrhage of National Values" in Romania is so great that it is beginning to be noticed by the diplomats of the great European powers for the present Romanian society: The phenomenon of brain migration is becoming more and more observable in Romania. There are at least two angles from which the phenomenon can be seen: on the one hand, it is observed the interest of multinationals to seek and hunt ultra-specialized brains, useful for the development of private research activity, a phenomenon observable especially in the hight tech industry. We notice the migration of the middle class, teachers, doctors, engineers, from economically slow countries to economically developed countries or with high potential for professional fulfillment. The reason for leaving is not only the economic one, but also the lack of professional prestige, as well as the humiliations of specialists from an inefficient and lacking social system. In spite of the reasons, behind the decision to brain drain, the effects are disastrous for the country from which they go.

How many costs involve the training of a specialist, health insurance, the cost of school and faculty, the destruction of a social system of which he belonged (family, friends, locality), as well as the shrinking of economic support for the pension budget? In addition, the State expects that, after at least 25-30 years of school and health care, it will benefit from the contribution of the young specialist, both through the fees he would receive from his work and the contribution as a specialist to the development of society.

As for Romania, the greatest loss is the doctors who choose to build a career and renown in other European Union countries as soon as they leave the faculty banks. A study by the Romanian Academic Society shows that Romania's main reason for losing doctors to the West is that they are not paid at the level they deserve.

Romania has a big problem with doctors who choose to leave the country, primarily attracted by the material benefits offered to other European countries. According to a European Commission statistics, more than 17.000 medical professionals have left Romania over the last 18 years. Of them, almost 9.000 are doctors and the rest of nurses. Over 36.000 doctors, dentists and pharmacists have been requesting compliance certificates since 2007 so they can perform abroad, according to the information provided to us by the Ministry of Health.

The statistics provided last year by the Ministry of Health are even more worrying than those in the countries where Romanian doctors left: about 15.000 doctors have chosen to practice elsewhere than in our country since Romania's accession to the European Union, in the last eight years. The situation is all the more worrying as the 2012 statistics, for example, showed a drastic decrease in the number of doctors per capita. More specifically, a doctor should have treated over 500 Romanian patients.

In addition, 2.450 applications were issued in 2014 to issue certificates that allow work abroad. As far as the countries where our medical graduates left, Germany is in the top - 33% of Romanian doctors

have chosen to practice in this country. Great Britain is second, followed by Belgium, Sweden and Ireland.

According to statistics, 2.000 doctors leave Romania each year. If you invest in training doctors for seven years and then give them as salary just 400 euros, then this is the result.

Countries that have been able to attract specialists and intellectuals back are now in full swing. The new economies in Ireland, India, China, South Korea, Taiwan attract many specialists who return to their motherland after they have been successful abroad. With their experience, their links and the capital they earn, they contribute to the development of industrial branches in the country of origin. For example, in Bangalore, India, the explosion of the soft industry has been done with US backers.

China has stored its intelligence over the ocean to be used later and now it is time to use it. There are just a few of the happy cases that have been able to turn brain drain into brain gain.

5. Analysis of Results

The first urgent action to do is that the State motivate, at least wages, to keep citizens in their countries of origin. This is, in fact, the logic of granting European grants, precisely to encourage the economic development of the member countries of the Union in order to strengthen the European social balance. And if the State has a major responsibility to respect the dignity of its specialists, the Church finds itself more involved in providing social and religious assistance to those left behind, whether children or the elderly alone and helpless. The fact that the current political class not only does nothing to stop, or at least to mitigate the migration of skilled brains and skilled workers, but even encourages it, may have more than a logical explanation. In other words, those left in the country, with a less developed critical spirit than those who have already emigrated, can be more easily manipulated by the electorate.

The role of Romanian researchers and intellectuals is all the more important as the results that can be gained from the activity of this elite of Romanian intelligentsia are enormous: the much-coveted economic recovery can be strongly stimulated by the existence of a scientific research based on healthy bases. The likelihood that they will give up the benefits offered by economically developed countries and their return to the country is diminished. However, repatriation of scientists is not the only way to capitalize on their knowledge and international experience for the benefit of the state of origin. A solution would be the so-called know-how transfer by organizing a "scientific diaspora" to facilitate contacts between intellectuals working in the country and abroad. The collaboration of the diaspora intelligentsia in projects taking place in their home country, the exchange of experience in conferences, symposia and other scientific events attended by both national and foreign specialists can bring solutions in the country for the economic and cultural recovery. The creation of a scientific diaspora is difficult to achieve because of the lack of an existing structure or network.

6. Conclusion

Over the last 25 years, Romania has become a true source of qualified personnel for the countries of the European Union.

An often advanced theory is that the "brain drain" of third world graduates to the first world generates a high income of foreign currency and that this income contributes to the development of third world. However, the theory that semi/unskilled emigrants currently contribute the higher income of foreign

currency. Although the highly skilled group may earn higher wages, they do not necessarily send large remittances back to the third world, mainly because they have settled into a good life in the country to which they have migrated. Moreover, the cost of producing a highly skilled individual is greater than that of semi-skilled or unskilled graduate. Stopping labour exodus requires an integrative approach, but first of all on the main incentive factor - inadequate wages. Personnel bleeding is not the effect of the poor economic situation but, firstly, is due to the total lack of interest of the political factor in stopping this phenomenon. Migration experts say there are cases where a campaign that deals with the cost of a person's travel can fail and may lose hundreds of thousands of dollars. The company may end up paying both the damage caused by the failed project and the cost of health care if the employee has suffered mental problems caused by the changes.

Globalization will lead to an increase in the migration of people with higher education in the coming years. The level of training of people in poor countries is steadily decreasing. Countries like China, Brazil or India need industry specialists. Qualified persons will always be welcomed with arms open to foreign lands.

Finally, there is a need for intervention by international donor organisations for global collaboration in order to facilitate the development of the third world by halting the "brain drain".

7. References

Ahmad, I. & Bhat, N.J. (1989). Postcolonialism: A Counter Discourse. *Indian Streams Reserach Journal*, Vol. 2, Issue. II/March; pp.1-4, ISSN:2230-7850.

Bahna, M. (2017). Study choices and returns of international students: On the role of cultural and economic capital of the family Population. *Space and Place*, Volume 24, Issue 2.

Boeri, T. & more. (2012). Brain Drain and Brain Gain: The Global Competition to Attract High-Skilled Migrants, Published to *Oxford Scholarship Online.*

Carrington, W.J. & Detragiache, E. (1998). How Big is the Brain Drain? *IMF Working Paper,* No. 98/102.

Dumont, J.C. & Lemaitre, G. (2005). Counting Immigrants and Expatriates in OECD Countries; a New Perspective. *OECD Social, Employment and Migration Working Papers*, no. 25/ 22nd June.

Entzinger, H.B.; Martiniello, M. & Wihtol De Wenden, C. (2004). *Migration Between States And Markets*. United Kingdom: Ashgate Pub Ltd., Surrey. ISBN-10: 0754642313, ISBN-13: 978-0754642312.

Facchini, G. & Mayda, A.M. (2009). From Individual Attitudes towards Migrants to Migration Policy Outcomes: Theory and Evidence. *Wiley Online Library*.

https://onlinelibrary.wiley.com/doi/abs/10.1002/9781444307238.ch2.

Hunter, P. (2013). Brain drain, brain gain or brain sharing? *Wiley Online Library, Science and Society*; 14(4), pp. 315–318.

Johnson, J.M. & Regets, M.C. (1998). International Mobility of Scientists and Engineers to the United States: Brain Drain or Brain Circulation. *National Science Foundation,* NSF 98-316.

Heuer, N. (2011). The effect of occupation-specific brain drain on human capital. Published in University of Tübingen *Working Papers in Economics and Finance*, No. 7/2011.

https://publikationen.uni-tuebingen.de/xmlui/handle/10900/47844.

Özden, C. & Schiff, M. (2006). International Migration, Remittances, and the Brain Drain. *Trade and Development*. Washington, DC: World Bank and Palgrave Macmillan. © World Bank.

https://openknowledge.worldbank.org/handle/10986/6929.

Özden, C. & Schiff, M. (2007). *International Migration Economic Development and Policy*. World Bank and Palgrave Macmillan. © World Bank.

https://openknowledge.worldbank.org.

Performance and Risks in the European Economy

Rand, A. (1992). Atlas Shrugged (ed. 35th anniversary). New York: *Dutton*. ISBN 0-525-94892-9. OCLC 60339555.

Suzuki, Y. & Suzuki, Y. (2016). Interprovincial Migration and Human Capital Formation in China. *Asian Economic Journal*, Volume 30, Issue 2.

THE 13TH EDITION OF THE INTERNATIONAL CONFERENCE
EUROPEAN INTEGRATION
REALITIES AND PERSPECTIVES

The Effect of Supportive Policies
on SME Development – Kosovo Case

Kosovare Ukshini[1]

Abstract: This paper examines the effect of government policies affecting the development of SMEs. SMEs are promoters of economic development, but being small, they are also very vulnerable to the unfavorable business environment thus they need to be supported. The paper will specifically address the impact of government subsidies and loans in supporting the development of the first SMEs in their turnover. Kosovo is a country in transition therefore it is expected that these effects will be interesting, as the opportunities of government institutions to help them are very poor either by the lack of means or by the wrong allocation of funds in sectors that have no influence in the economy. The analysis of the results was done using econometric models such as simple OLS regression and auto-correlation vector analysis VAR. There are many studies that have provided different opinions about the effects of these supporting policies on SME development. Hence, their findings and results from empirical analysis will draw useful conclusions and recommendations.

Keywords: SMEs; development; effects; subsidies; loans

Introduction

In order to promote the development of an entrepreneurial economy, it is necessary for the state to establish a system to support its development. This fact, in developed countries, has been clearly reflected since the 1980s. XX and also the results of this support are uncontested.

In this support system are locked state, private enterprises, voluntary organizations, non-governmental organizations, institutes and public agencies, which are organized and trained to provide various services and support to SMEs.

Entrepreneurship is the term that best suits and adapts to the free market economy, then the question arises, why should we propose that they should be helped, the implementation of the idea would be best done with a minimal intervention of other factors, especially the state?!

SMEs need a much more secure environment than financial capital, as it with the innovation and flexibility it characterizes as an enterprise generates revenue (without wanting to reduce the importance of financial support). The overall aim of SME support and entrepreneurship is to help those enterprises that have a good prospect in the future both in the production process and in the realization process, and on the other hand the entrepreneur's expenses somehow to be minimized.

[1] Senior Lecturer, PhD, AAB College, Faculty of Economics, Republic of Kosovo, Address: Zona Industriale Prishtinë - Fushë Kosovë, Prishtinë, Tel.: +383 38 600 005, Corresponding author:

Support is provided through organized institutional networks such us: public, private, state and voluntary. It seems that transition countries fail in this dimension, exactly in finding the correct way of delegating the support resources to the private sector. A great deal of influence, so that this process does not reflect positively, is corruption, which is a very negative phenomenon that is expressed especially in post-war countries such as Kosovo, but also in transition countries in general.

In the last decades, by the classical support of SME development and entrepreneurship (through financial support, tax, customs, subsidies, etc.), it has gradually shifted to other forms of support through business incubators, science parks, business networks, business angels, risk funds, etc. Thus, Kosovo has also created various agencies that have the role of business angels or parks.

In Kosovo there are established eight economic zones distributed to municipalities in need of private sector support, but who have met the conditions set by law on the establishment of these areas.

A great support for private sector development in Kosovo has also been provided by international organizations such as USAID, EBRD, WB, UNDP, and many other non-governmental organizations that operate in Kosovo. However, the focus of this paper is to see the effect of policies supporting the development of SMEs seen in their circulation. The paper deals with empirical approaches trying to verify and validate the following hypotheses:
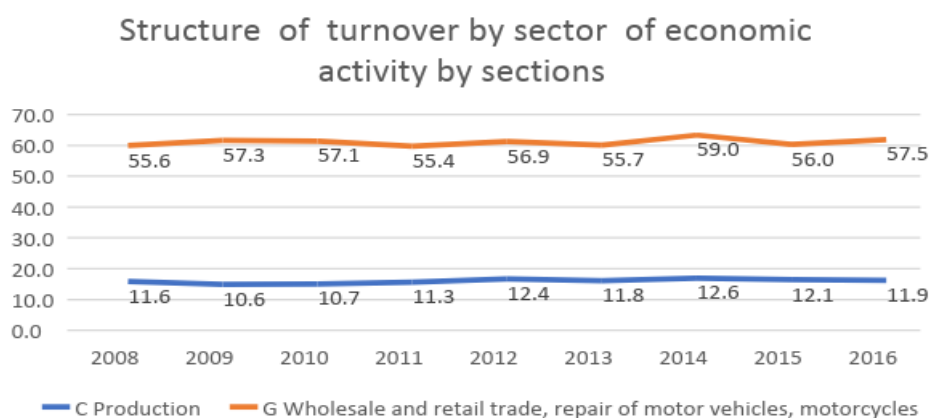
• H1 Subsidies granted by the government have positively impacted the turnover of SMEs;

• H2 SME loans have positively impacted the turnover of SMEs;

• H3 SMEs have a positive impact on employment growth.

Transition countries are in constant effort to build strong walls to secure sustainable economies. One of their forms of effort is the system of transferring funds to the beneficiary account which has provided projects contributing to increased production and employment, as well as the banking system that provides additional means with different financing costs to their needs.

Forms of Support to SME Development in Kosovo

SMEs, as in any other country, also in Kosovo carry a significant share of its economic development. They are really silent but have a great impact on economic development. But Kosovo continues to be the poorest country in Europe, and unfortunately, a major contribution to this situation is the poor functioning of the private sector, specifically the production sector. The share of production in the overall SME turnover in Kosovo is shown in the following graph:

Table 1

Structure of turnover by sector of economic activity by sections

G Wholesale and retail trade: 55.6, 57.3, 57.1, 55.4, 56.9, 55.7, 59.0, 56.0, 57.5

C Production: 11.6, 10.6, 10.7, 11.3, 12.4, 11.8, 12.6, 12.1, 11.9

Years: 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016

— C Production   — G Wholesale and retail trade, repair of motor vehicles, motorcycles

In fact, to know the economic development of any state, then we should look in production capability within the state, which in Kosovo is low, but recent developments, such as visa liberalization and improved relations with neighboring countries, will make Kosovo attractive for foreign investors.

As can be seen from the chart above, the share of trade in private sector companies turnover is very high, and this means that goods are being traded widely, and the more they are imported.

However, Kosovo is trying through various forms to support SME development. In this context, the government plays an important role through supportive forms such as grants and subsidies. On the other hand, the banking sector emerges as a very strong sector supporting the development of this sector.

The paper deals with the impact of these policies on the circulation of small and medium-sized enterprises.

The Government Support to SMEs

A very special form of SME support is that of state funding programs. These are generally forms of irreversible funding, such as subsidies and grants. The purpose of supporting state-owned SME development programs is to build a business environment, creating financial, administrative and technical facilities.

There are many papers that write about the government's impact on the private sector through various forms, and especially through the support of new initiatives and start-ups (Jahanshahi, 2008; Blackburn & Schaper, 2012) (Ligthelm & Cant, 2002), (Mbugua, Agnes & Ondabu) (Rafidah & Norfaridatul, 2014; Fred, Gregory & Mauric, 2016) (Giuseppe, Fabien & David) (Abonyi, 2005)

Subsidies

Subsidies are financial aid to unraveled enterprises and are a very useful tool for deficit recovery. Various works have looked at them from different aspects, as grants and subsidies are provided for many reasons, e.g., education, training, aspects of enterprise search and development, roads, tax-free facilities, interest in credit, promotion of products, creation of a glamorous environment for doing business, etc.. (Schumpeter, 1934; Birch, 1987; Weiss, 1981; Davidsson, 2006; Lopriore, 2010; Audretsch, 2002) This is not only interpreted if the policies concerned have succeeded, but whether it is necessary and reasonable to intervene with the government in creating business conditions (Fombasso & Cincerato)

Below we represent a graph of government subsidies distribution.

Table 2

Subsidies distributed from the Kosovo budget for the period 2010-2016
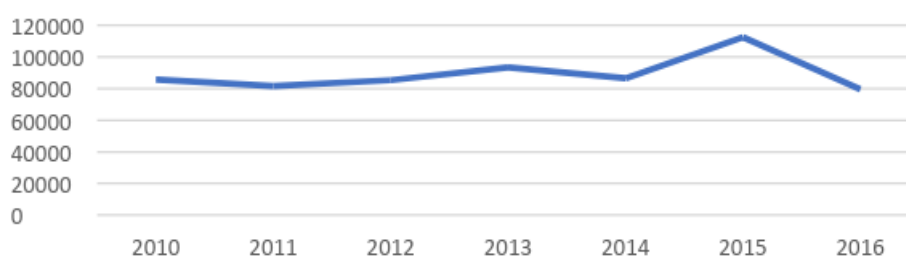
According to the data of above chart, these forms of support are taking proper account of the importance they have for the development of the private sector. According to the Kosovo Institute for Local Governance, for 2017, for all municipalities, the amount of funds allocated for the subsidy category is 2,576,299 euros, while in 2016 this amount was slightly lower, namely 8,447,811 euros.

Support from the Banking Sector

Kosovo as a country in transition deal with a lot of reforms especially in terms of loans. In developing countries loans seems to be expensive and with high criteria in the process of the fulfillment especially for small and medium enterprises. SMEs seemed to be unable to respond on time and on a regular basis to loans with high demand for loan cover documentation as well as high interest rates. High banking intermediation costs are typical for poor countries, first of all because of the high credit risk. There are several factors that characterize the developing countries because of high credit rating reasons, such as:

- the low level of savings in the respective countries, while the demand for loans is high and the trend is increasing;

- limited access to international financial resources to enable increased competition and lower credit prices;

- market structure (bank ownership, level of banking concentration, degree of competition, etc.);

- Lack of law enforcement in the case of compulsory collection of bad credit (the problem with the sale of mortgages - collateral);

- relatively high operating costs of banks;

- High level of informality that leads to wrong information on borrowing and increases the amount of bad credit (false financial report).[1]

The total amount of loans allocated in total, at the end of 2017 reached the value of 2.41 billion euros, which meant an increase of 10.2% compared to the same period of the previous year, this is addressed to easing policies for borrowing from SMEs.[2] According to this report, SME loans in this period compared to the same period of time in the previous year increased by 31.9%. In fact, the data cannot show a real growth in the economy, as about 41% of SME loans are granted for non-investment loans, which didn't affect the capacity growth of enterprises. In Kosovo, the distribution of credits by the sectors has changed since 2011, where the focus of loans has shifted towards investment loans. Below we will see how the access to credit from the household sector to the enterprise has changed.

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[1] Riinvest Institute: Banking system, assistance or barrier, 2015, p. 47.
[2] Central Bank of Kosovo, Quarterly Economy Report, TM4 2017, p. 14.

Table 3

The distribution of loans
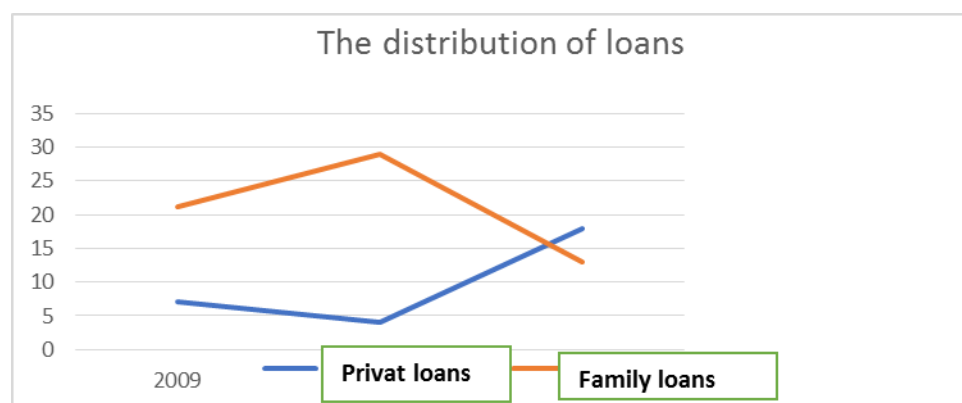
Source: Riinvest Institute: Banking system, assistance or barrier, 2015

From the graph above we can see that household loans have had a high turnout in financing loan applications. There is a positive trend for private loans which imply that the banking sector is oriented towards loans of an investment character. This gives signals for improving the funding opportunities for additional funds. The interest rate has been a crucial factor which since 2010 has fallen below 10%. In the graph below we represent the trend of loans in total value.

Table 4

The value of the loans
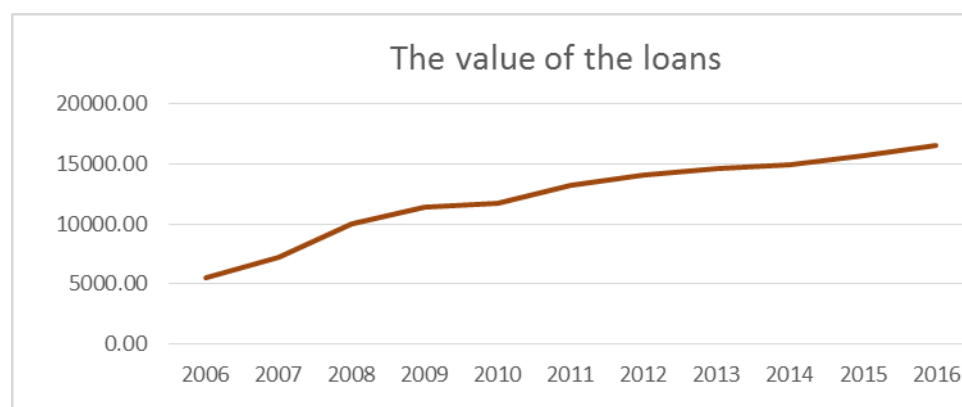
Source: Central Bank of Kosovo, www.bqk-ks.org

The situation seems very prosperous, given the growing trend of private loans, and thus the total value of loans is growing. On the other hand, the credit rate has been declining, this creates a more friendly and attractive environment for investment.

From this we understand that we are on the right path of economic prosperity, since as never before loans are being used by enterprises to increase their capacities or even to modify existing products, or even to improve their performance in market.

Research Methodology

To analyze the effect of these two forms of the support for SME that is seen in their circulation, a simple OLS model was used, and to measure the effect of SMEs on employment, vector autocorrelation was used.

OLS regression is one of the main techniques used to analyze data and forms the basis of many other techniques (for example ANOVA and generalized linear models). The utility of the technique can be extended extensively with the use of coding the variables dummy[1] to include grouped explanatory variables and data transformation methods.[2]

This econometric model represents an abstraction of reality. In the simple regression model, we have the dependent variables and an explanatory variable including the random error that implies all other factors that may affect the dependent variables but are not considered in the model.

So dependent variables = Constant + explanatory variables + random error

On the left-hand side of the equation is the dependent variable whereas on the right side of the equation appear:

$$\gamma_i = \beta_0 + \beta_1 X_1 + \mu_i$$

a) Constant;

b) Explanatory variables; and

c) Error term.

☐ In econometric models the influence of variables is evaluated through;

☐ T - statistics;

☐ P - value (probability value); represents the exact level of significance: indicates the lowest level of significance in which we can reject the hypothesis zero.

The coefficient of determinant indicated by R2 indicates how close are the observations with the regression line. The coefficient of determination takes the value:

1) $0 \leq R^2 \leq 1$;

2) Case R2 = 1 all observations lie on the regression line (impossible);

3) Case R2 = 0 no observation extends to the regression line;

4) Estimated coefficients should be presented and interpreted by paying attention to measuring units and explaining the economic and practical importance of the variables included in the model;

5) T-statistic or p-value, depending on group preference prefer to represent one or the other form.

To test the importance of the variables, we used the STATA software program.

 In this model as a dependent variable is the turnover of SMEs, while independent variables are subventions, the value of issued credit for SMEs

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[1] Variable "dummy" Is an artificial variable created to represent an attribute with two or more distinct categories / levels, Smita Skrivanek, Principal Statistician, MoreSteam.com LLC
[2] Graeme Hutcheson, Ordinary Least-Squares Regression, In (Moutinhoand & Hutcheson, 2011, pp. 224-228).

The abbreviations used in the model are

QI- SMEs turnover

sub- subventions

Cr- amount of issued credits to SMEs

The STATA program has produced data on which we build the econometric model in numeric form. The econometric model takes the following form:

$$Turnover\ in\ SMEs = \beta_0 + \beta_1 sub + \beta_2 Cr$$

The results lead to the model being significant and explains the growth of SMEs from the active supportive policies seen from the prism of data incorporated in the model.

The coefficients are significant and have a p - value lower than 0.05. Thus, to see the effect of these policies, OLS model was used which through STATA program has provided the following results:

Table 5

Source	SS	df	MS		Number of obs = 132
					F(2, 129) = 6.54
Model	5.8156e+17	2	2.9078e+17		Prob > F = 0.0020
Residual	5.7380e+18	129	4.4481e+16		R-squared = 0.0920
					Adj R-squared = 0.0779
Total	6.3195e+18	131	4.8241e+16		Root MSE = 2.1e+08
var1	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
var2	9050.374	4495.237	2.01	0.046	156.4373 17944.31
var3	146624.4	69469.02	2.11	0.037	9178.196 284070.5
_cons	3.08e+08	6.92e+07	4.45	0.000	1.71e+08 4.45e+08

STATA sources, author calculating

The p value in the whole model is less than 0.05, concretely, 0.0020 indicating significance between the variables used in the model.

The results show that subsidies as a supportive policy for SMEs have a positive impact and are important for SMEs turnover. That mean the H1 hypothesis is accepted. On the other hand, loans, as another form of SME support, have a positive impact, and are important in SMEs turnover. That mean the H2 hypothesis is accepted.

VAR model and results

The analysis of the relationship between the contribution of medium and small enterprises and employment in the case of the Republic of Kosovo during the relevant period 2006 Q1 - 2016Q4, also parks the second model of this paper.

Below are the variables that will be used in the model, and their abbreviations.

Variables

Rate of unemployment - **unemp**

SMEs turnover - **QI**

Subsides – **Sub**

In order to analyze the effects of turnover of medium and small enterprises in the unemployment rate in the case of Republic of Kosovo, the following equation was used that de facto structures the basic regression model

$$\ln unemp = \beta_0 + \beta_1 lnQI + \beta_2 \ln sub$$

To research the long-term link between variables, the vector autoregression model or otherwise known as the VAR model was applied, whereby the VAR results of the model are shown in the following table.

Table 6

Variables	Coefficient	Standard error	Z-s values	P>|z|
Δ (ln unemp)				
L1.Δ(ln unemp)	-.4111752	.1261757	-3.26	0.001
L2.Δ(ln unemp)	-.4245771	.1342605	-3.16	0.002
L3.Δ(ln unemp)	.0185506	.1227922	0.15	0.880
L4.Δ(ln unemp)	-.2248628	.1054362	-2.13	0.033
L1.Δ(ln QI)	-.3303871	.1636188	-2.02	0.043
L2.Δ(ln QI)	.2698722	.1444849	1.87	0.062
L3.Δ(ln QI)	.2461553	.1333653	1.85	0.065
L4.Δ(ln QI)	-.3531247	.1294696	-2.73	0.006

Source: STATA result, VAR autocorrelation. Author calculating

Moreover, the results dictate that there is a negative and significant relation between the turnover of medium and small enterprises and the unemployment rate in the Republic of Kosovo, such result is based on the negative coefficient and significance value p = 0.006, and even in the fourth delay time. That mean the H3 hypotheses rejected.

Furthermore, the following table presents the results of the Lagrange-multiplier-LM autocorrelation results, where, as we can see, the value of p is not significant, whereby it implies accepting the zero hypothesis, meaning that the variables do not possess autocorrelation in time lags.

Table 6. Lagrange-multiplier test

Lag	chi2	Prob > chi2
1	68.4437	0.10089
2	34.7150	0.52965

Source: Author

H0: no autocorrelation at la

Furthermore, the following are the results of the Jarque-Ber and Skewness results, so that normal distribution can be seen, and as we can see from the results of these tests, we have a normal distribution of data.

Table 7. Jarque-Bera test

Variables	Jarque – Berra	Prob > chi2
ln unemp	2.262	0.32272
ln QI	0.710	0.70116
ln sub	1.994	0.36904

Source: Author

Table 8. Skewness test

Variables	Skewness	Prob > chi2
ln unemp	.55747	0.15004
ln QI	.00888	0.98170
ln sub	-.28179	0.46688
ln Kr	-1.1921	0.20208

Source: Author

In the following table are presented the results of the Granger Causality Test, which also illustrates the short-term effects of turnover, subsidies and credits at the employment rate in the Republic of Kosovo for the period 2006m1-2016m9.

Table 9. Granger causality test

Independent variable (equation)				
		ln unemp	ln QI	ln sub
Indipendent vairables (time delays)	ln unemp		26.53 **(0.000)**	6.613 (0.158)
	ln QI	6.6792 (0.154)		34.023 **(0.000)**
	ln sub	.89441 (0.925)	10.355 **(0.035)**	
	ln Cr	20.097 **(0.000)**	25.344 **(0.000)**	14.479 **(0.006)**

Source: Author

Based on the results of the Granger test of causality, we can observe that there is a two-way correlation between the unemployment rate and the loans. There is also a two-way relationship between the turnover of small and medium enterprises and subsidies.

Conclusion and Recommendation

According to the data and the results from the two mentioned patterns, it is seen that these policies in the series of short time have positively impacted the growth of SME turnover, but in the long run there was not any impact on their turnover. This result finds explanation in the informal economy, enterprises do not report profit on one hand, but on the other hand, subsidies are an instrument that can easily be manipulated by a bad government. Their allocation is not done in those sectors where there is a greater profit, or where the criteria for profit are met, instead those who have corrupted the state officials for allocating subsidies. Also, subsidies in Kosovo are small values that do not motivate many citizens to engage in agricultural activities.

Loans seem to be in the middle of gold as they appear to be a good policy, but in Kosovo due to the insecurity and risk of return of loans, banks are reluctant to offer large loans for a long period. Thus, those at the expense of SMEs and the private sector in general, try to reduce their insecurity but also to increase profits as Kosovo is a bargaining market.

The government should pursue a broader policy by enabling citizens more financial support. Also, a strong recommendation comes here, the allocation of funds should be done in sectors where economic prosperity is seen but also the possibilities of expanding that sector to produce goods for export

The banking system now seems to be reflecting on the continuing market demand for reducing credit price. As we have done the research, we have already said that there is a positive trend in private loans and this is expected to affect the level of investment. Also, the amount of loans to SMEs is low compared to their need for funding, but with the establishment of the Kosovo Trust Fund for Credit Guarantee in 2016, thus the number of loans is increasing. In the short term, SME has increased employment. The strength of SMEs to be an engine for new jobs in Kosovo is limited. They need support for larger sums and fewer criteria, so for a more motivating conditions. Otherwise, SMEs in unfavorable conditions and circumstances cannot survive, they only arise and their life cycle is very short. Employment is an instrument through which state agencies manipulate figures to show their growth. In fact, there is an increase in informal scale which is one of the biggest limitations of such analysis in transition countries

References

Afshar, J.A.; Khaled, N.; Seyed, M.; Sadeq, K. & Amin, R.K.J. (2011). *The Relationship between Government Policy and the Growth of Entrepreneurship in the Micro, Small & Medium Enterprises of India*. Volume 6, Issue I.

Afshar, J.A.; Khaled, N.; Morteza, J.P. & S.M.S.K. (2011) The Role of Government Policy and the Growth of Entrepreneurship in the Micro, Small (&) Medium-sized Enterprises in India: An Overview Australian Journal of Basic and Applied Sciences, p. 1566.

Central Bank of Kosovo, Quarterly Economy Report, TM4 2017, p. 14. www.bqk-kos.org.

David, C.T. (1998). *South African small business growth through interfirm linkages. South Africa*: Rhodes University, p. 100.

European Investment Bank (2016). *Assessment on financing needs of SEMs in the Western Balkans Countrie*s. Synthesis Report, August, p. 6.

ERM Annual Report. (2015), *Job Creation in SMEs*, Eurofound, fq.25

Edith P., (1959) *The Theory of the Growth of the Firm*, 3rd edit., Oxford, Oxford University Press, pg.24

Fred M. S., Gregory S. N., Maurice S. (2016*) Effect of Government Policy and Regulations on the Growth of Entrepreneurial Women Micro and Small Enterprises in Kenya*, International Journal of Research in Business Studies and Management, Volume 3, Issue 10, pg. 12-26,

Giuseppe M., Fabien P.V (2012) *The Contribution of Large and Small Employers to Job Creation in Times of High and Low Unemployment*, American Economic Review 2012, 102(6): 2509–2539

Graeme D.H. (2011) *Ordinary Least-Squares Regression*, In L. Moutinhoand, The SAGE Dictionary of Quantitative Management Research, pp. 224-228.

Hirsch, P. (1998). Entrepreneurship. *The woman Entrepreneur, Starting, Financing, and Managing a Successful new Business*, fourth edition.

Kosovo Agency of Statistics, www.ask.rks-gov.net.

Ministry of Finance, Republic of Kosovo, www.mf.ks-org.net.

Marko, K. (2010). *Odredenje preduzetnistva*. Zagreb.

Organization for Economic Co-Operation and Development (2002). *High-Growth SMEs and Employment*. Pp.10—28.

Per, D. & Leif, L. & Christer, O. (1998). *The extent of overestimation of small firm job creation - an empirical examination of the regression bias Small Business Economics*, pp. 87-100.

Riinvest Institute (2015). *Banking system, assistance or barrier*, p. 47.

Robert, A.B. & Michael, T.S. (2012). *Government, SMEs and Entrepreneurship Development Policy.* Practice and Challenges. USA: Indiana University.

Tulus, T. (2008). *SMEs Development in Indonesia: Do Economic Growth and Government Support Matter?* IJAPS, Vol. 4, No. 2, p. 122.

Sothea, O.; Dionisius, N. & Charles, H. (2014). *Constraints, Determinants of SME Innovation, and the Role of Government Support.*

Strategy for Development of the Private Sector 2013-2017, March 2013, p. 10.

THE 13TH EDITION OF THE INTERNATIONAL CONFERENCE
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REALITIES AND PERSPECTIVES

IT Industry and its Role in the
Economic Development of Romania

Dumitru Daniel Leon[1], Neculai Tabără[2]

Abstract: The IT industry is currently one of the main engines of the Romanian economy, being undoubtedly the most attractive sector in terms of wages and other benefits. The Romanian IT industry is attractive to the world's major IT corporations due to the low cost of the workforce, and the high professional qualifications of employees, but also due to tax benefits offered by the Romanian state. It is very important that this sector of activity is not only developing in our country but also in other countries of the world. This study aims at an analysis of the IT industry in our country through which the author intends to better understand the factors that have led to its development. To achieve this goal, we will conduct various analyzes of the financial performance and position of enterprises in the IT industry, as well as the role in the development of the Romanian economy. The usefulness of the current study becomes more important as we look at the possible future measures that will lead to the development of this sector, but we will also try to present the risks that are likely to occur.

Keywords: Turnover; Net profit; Development; IT industry

JEL Classification: A10; L25; L86; M41

1. Introduction

This study aims to analyze the main factors that have led to the growth of this sector of activity to determine, on the basis of the main indicators, the financial performance and the position of enterprises in the IT industry. At the same time, we will determine what are the main opportunities for developing this sector of activity but also what are the main threats that are worthy of note. For this analysis, we took into account a sample of 65 companies, whose code of Classification of Activities in the National Economy (CAEN) is 6201 Custom Software Execution Activities (Customer-oriented Software) companies operating in all the historical regions of the country. The representative cities in which most companies operate are Bucharest, Cluj, Iasi and Timisoara. The IT industry in Romania has been the star of economic growth in recent years, currently accounting for about 5% of the Gross Domestic Product, which shows that of the total of 190 billion dollars as Romania's GDP, close to 20 billion dollars are given by the IT industry.

[1] PhD, Alexandru Ioan Cuza University of Iasi, Romania, Address: Blvd. Carol I, no. 22, Iasi, Romania, Tel.: +40232201102, int. 2377, Fax: +40232217000, Corresponding author:
[2] Associate Professor, PhD, Alexandru Ioan Cuza University of Iasi, Romania, Address: Blvd. Carol I, no. 22, Iasi, Romania, Tel.: +40232201102, int. 2377, Fax: +40232217000, E-mail:

2. Literature Review

In the literature, there are many approaches to analyzing the position and financial performance of economic entities, among which we can mention Professor Mironiuc Marilena (Mironiuc, 2006), Professor Petrescu Silvia (Petrescu, 2010), Professor Alexandru Gheorghiu (Gheorghiu, 2004) etc. The financial analysis tracks the behavior and changes of a whole, through the examination of each component. By analysis is understood the decomposition in several elements of some factors which adversely affects certain behaviors. Peter Druker, following research, has come to the conclusion that an effective manager, in order to get results, must allocate about 50% of his time to financial analysis. (Thibaut, 1989) Therefore, in light of the elements presented above, but also in accordance with International Standard IAS 1 Presentation of Financial Statements, the persons performing financial analyzes must take into account that the main objective of the financial statement analysis is to accurately present information about the position and performance of the entity. Also by carrying out these analyzes, is also being pursued the capacity of enterprises to adapt to environmental changes with the help of the available (active) economic resources, their financing structure (debt and equity) and financial indicators. (liquidity and solvency) (Moscviciov, 2011)

3. Analysis of Assets and Liabilities

Financial analysis is a science of interpretation, which is based on an information system to be collected, treated and processed. Financial analysts take over the raw information and turn it into another kind of information, which reflects their ability to understand, synthesize and interpret information as raw material using three types of information activities. (Feleagă & Feleagă, 2005) Given the increasing complexity of decision making, the financial analysis can be and is considered to be a complex assessment of the enterprise, namely as an approach of global diagnosis, which according to the literature can be described by the existence of some phases: a competitive position in the social environment in which it operates, a phase of assessing the company's potential, as well as a phase of evaluation of strategic options for future activities.


Financial analysis is the discipline by which the analytical tools are applied to financial statements and other information of this kind for the purpose of interpreting trends and relationships in a consistent and disciplined manner, in which the analyst has the role of dealing with data converting into information in order to accomplish the process of conducting research and forecasting information. (Tabără, 2015)
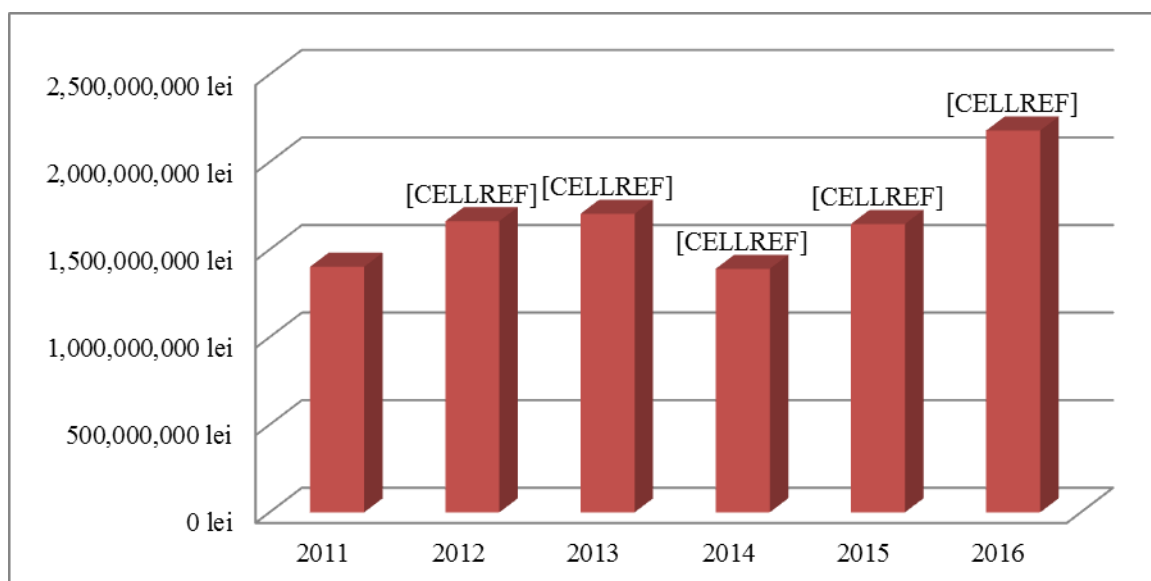
Figure 1. Evolution of total assets during (2011-2016) - 65 IT enterprises

Source: Own Illustration Based on Aggregate Financial Statements (2011 - 2016)

In Fig. no.1, there is a fluctuation in the evolution of the total assets during the analyzed period, indicates that the companies in the analysis have tried to strengthen their position on the market. There is an increase of 16% for the period 2011-2012, then a slight increase for the period 2012 - 2013, this increase being mainly due to the increase in receivables from clients. The increase in receivables is due to the fact that most companies have terms for collecting very large claims, for about 60 days. For the period 2013 - 2014, there is a significant drop, this being mainly the result of the decrease in receivables, by faster cashing out of billed amounts from customers. Starting with 2015, the total assets are up 16%, and later in the period 2015 to 2016, it increased by about 24%.
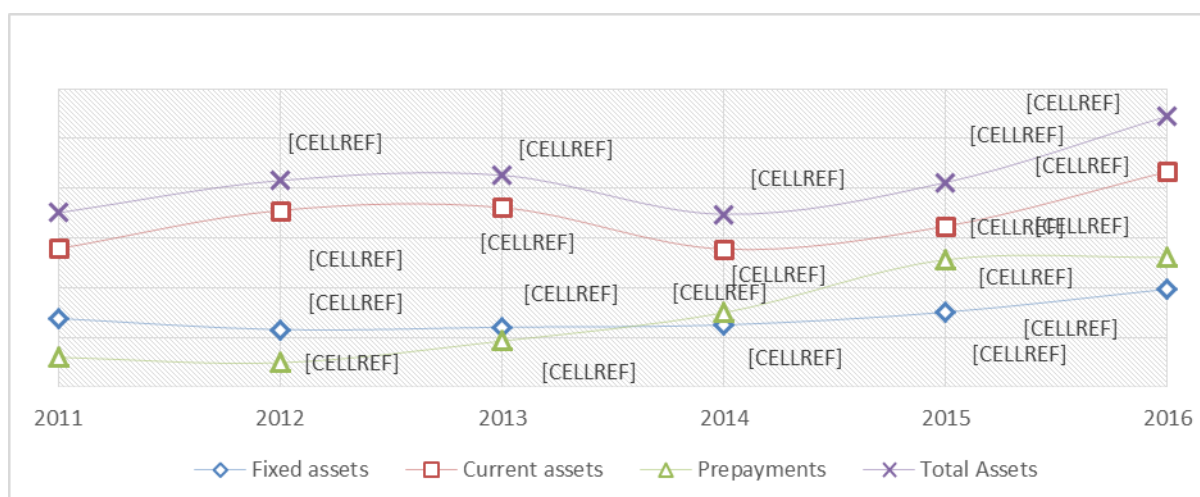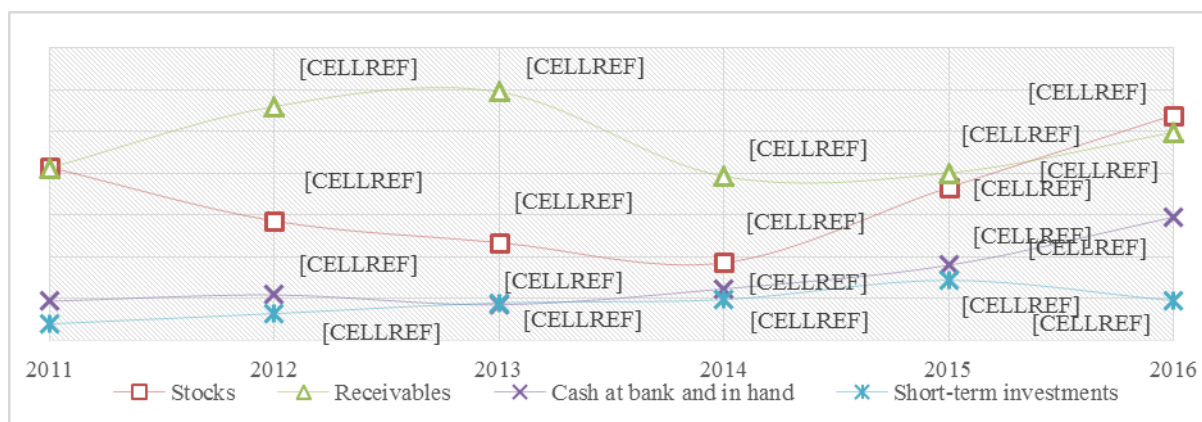

Figure 2. **Structure of total assets for (2011 – 2016) - 65 IT enterprises**

Source: Own Illustration Based on Aggregate Financial Statements (2011 - 2016)

In Fig. no. 2 a breakdown can be observed regarding the evolution of the total asset, as well as the composition of its structure which acts directly on its evolution. We see that for the entire analyzed

period, the greatest influence on the net asset growth is given by circulating assets, these being representative due to the specificity of the activity. Below we will show you what is the evolution of the current assets structure, in Figure 3.

Figure 3. Structure of current assets for (2011-2016) - 65 IT enterprises

Source: Own Illustration Based on Aggregate Financial Statements (2011 - 2016)

Receivables show high values for the entire analyzed period, with a significant decrease for the period 2013-2014, but this is, as I said earlier, reflected in the reduction in the collection of receivables from customers. As for stocks, they also show fluctuating values for the period under review, characterized by a significant decrease in the first analyzed period.
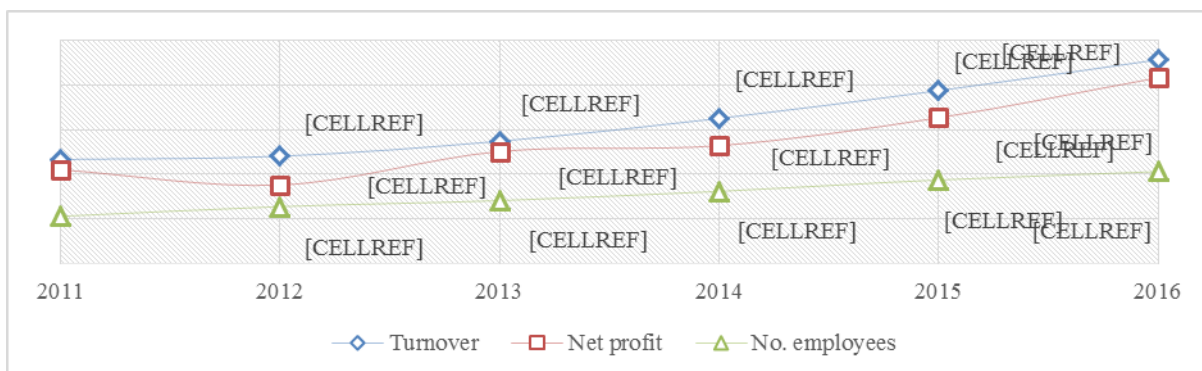
Figure 4. Structure of current assets for (2011 – 2016) - 65 IT enterprises

Source: Own Illustration Based on Aggregate Financial Statements (2011 - 2016)

The IT industry has helped to mitigate the current account deficit over time, by the fact that most of our existing companies are largely owned by non-resident companies, or those residing mostly work for external customers, so they are more export-oriented. According to a study by the Romanian Software Industry Employers Association, in 2016, approximately 73% of IT & C revenues were made up of companies owned by non-residents and only 27% of revenues were receipts from the domestic market. This proportion increases in 2017, where it reaches about 77% of the revenues of the export companies and only 23% of the sales revenue on the domestic market, resulting in an increase in the positive balance of the net export balance (Software & IT Services in Romania - 2017 Edition).

Table 1. Contributions to GDP formation

	Contributions to GDP formation - %					
	2011	**2012**	**2013**	**2014**	**2015**	**2016**
Agriculture, forestry and fishing	6.50%	4.70%	5.40%	4.70%	4.20%	3.90%
Industry	28.80%	24.40%	25.20%	24.00%	23.20%	23.10%
Construction	8.10%	8.50%	7.00%	6.30%	7.40%	6.00%
Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; hotels and restaurants	11.30%	17.30%	14.70%	15.80%	15.80%	18.10%
Information and communications	**3.40%**	**4.50%**	**4.90%**	**6.00%**	**5.70%**	**5.60%**
Financial intermediation and insurance	2.50%	3.00%	3.90%	2.90%	3.50%	3.70%
Real estate transactions	8.40%	8.00%	8.00%	9.40%	8.00%	8.20%
Professional, scientific and technical activities; administrative service activities and support service activities	5.60%	5.00%	6.40%	7.10%	7.30%	7.40%
Public administration and defense; social security in the public system, education, health and social assistance	10.00%	9.50%	10.00%	9.30%	10.20%	10.20%
Activities of cultural and recreational performances, repair of household products and other services	2.90%	2.90%	2.50%	3.00%	2.60%	3.30%
Net taxes on product	12.50%	12.20%	12.00%	11.50%	12.10%	10.50%
GROSS GDP	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: National Institute of Statistics, Source: Author's calculations

Making an analysis, as can be seen in Figure no. 4, the turnover shows an upward trend over the entire analyzed period, with constant growth.
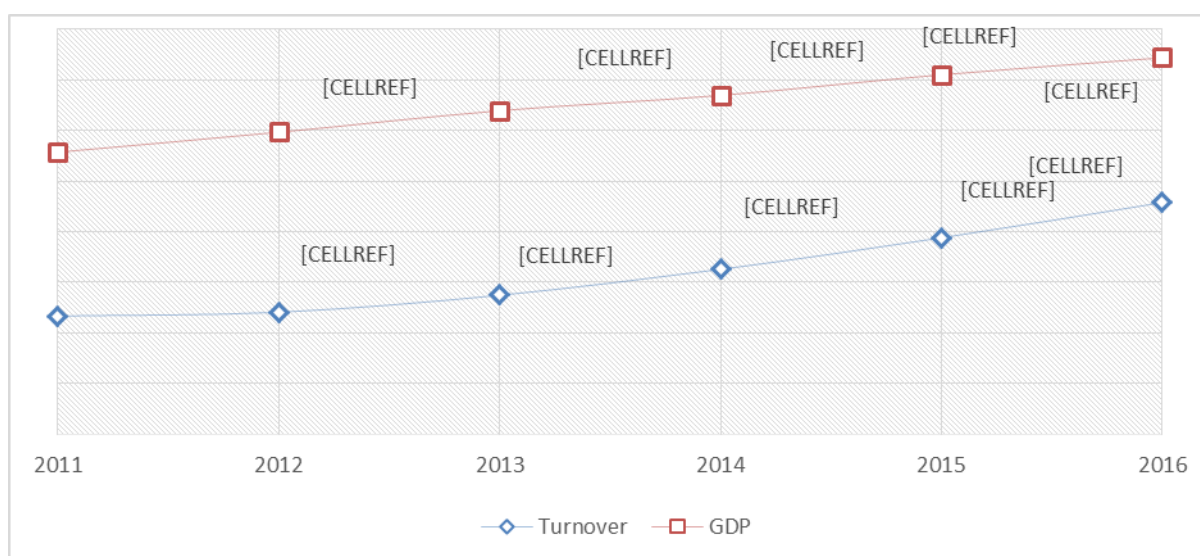
Figure 5. GDP growth vs. Turnover for 2011 - 2016 - 65 IT enterprises

Source: Own Illustration Based on Aggregate Financial Statements (2011 - 2016)

It is possible that the turnover increase is much higher, at least for the period 2015-2016, but there are many entities that have their main clients outside the European Union to pay US dollar (USD) services, so we can talk about a more modest increase in turnover in this area, and that due to the influence of the exchange rate. However, the same figure shows a similar increase in Gross Domestic Product, so as a first conclusion we can say that the IT sector has contributed to maintaining an accentuated trend of GDP, the gross added value that is used in this sector is quite representative.

4. Invoices of Influence

The IT sector in Romania is one of the most growing emerging markets in recent years with constant growth and managed, in hard times, for the country's economy, to keep the flag up. The number of companies operating in this sector is growing, and the number of people working in this sector is also growing, with over 120,000 people working in this area now. Among the opportunities, first of all, can be noticed people who work in this field, people who are very well trained, who can easily match the requirements of the buyer. Another factor that has led the orientation of big corporations was also the low labor cost they found here. This cost has been and is relatively small compared to other European countries directly competing and as a result of government policies not to tax people who work directly in this field. However, all the policies adopted by the government have made, with the introduction of the transfer of contributions from the employer to the employee, the labor cost to grow by about 6.55%, which has led, for part of the companies, to divide this cost with employees, taking measures to reduce wages.

As the main threats, besides the previously presented is also the fact that our system of schooling does not cover the job offer demanded by employers. It is known that this sector of activity is experiencing a deficit of approximately 20,000 people, which should be offset by an increase in the number of places in the relevant universities. Another threat is represented by other countries with potential, whose main threat is the low cost of labor, given that international companies have not made big investments here so that they can determine them to stay in the long run.

5. Conclusions

So the IT industry in Romania is currently one of the most prosperous industries, managing to stay for years in the forefront of the Romanian economy. I think it is very important to maintain the current growth rate by adopting some measures that will further stimulate its development. First of all, we need to see what are the main factors to help expand this industry and then apply the best solutions. At present, much of the IT industry in Romania is based on outsourcing services, is it provides various services to entities that have outsourced their services. This is not even beneficial because at some point there is a risk that the wage level required by the employees will exceed the budget of the outsourcing entities, this leading them to turn to other cheaper markets. From my point of view, in order to be able to stay in the top, IT industry in Romania needs to develop more of its own products, to focus more on designing and developing own programs.

Bibliography

Feleagă, L. & Feleagă, N. (2005). *Contabilitate financiară: o abordare europeană şi internaţională.* Bucharest.

Gheorghiu, Al. (2004). *Analiză economico-financiară la nivel macroeconomic*. Bucharest: Editura Economică.

Mironiuc, M. (2009). *Analiza economico-financiară.* Iasi.

Mironiuc, M., (2006). *Analiza economic-financiara, Elemente teroretico-metodologice si aplicatii.* Iaşi.

Moscviciov, A. (2011). *Ratingul întreprinderilor romaneşti din industria IT*. Cluj Napoca.

Petrescu, S. (2010). *Analiză şi diagnostic financiar contabil. Ghid teoretico-aplicativ*. Bucharest.

Tabără, N. (2015). *Sisteme contabile comparate*. Iaşi.

National   Institute   of   Statistics,   www.insse.ro.

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Sustainable Development of a Water
Cleaning System from a Coating Section

Dragomir Stefan[1], Dragomir Georgeta[2]

Abstract. The problems related to the protection of the environment by acuity in particular as a result of the local pollution of the environment factors by the industry and agriculture or by the population centers, as well as of a trans boundary pollution, which have led to the disturbance of ecosystems and the worse the living conditions of the people. The use of chemical substances in more and more in the technological processes advertise special measures concerning the protection of the environment. A major problem is the purification of industrial waste water.

Keywords: coating industry; industrial water cleaning

1. Introduction

In the framework of this work shall be submitted to a solution of the cyanides waste water treatment plant from galvanic industry (section accessories).

The removal of the pollutants existing results in the effluent purification stations mechanical-biological waste water implies the use of the effects of the processes of the electrolysis to resolve the issues related to the addressed.

A series of conditions covered locally in Romania by the technical rules of protection of waters (NTPA001 and NTPA002), and on the European plan for the Member States by the Directives KEPCO no. 271/91, no. 676/91 are designed to fit within the limits acceptable level of pollutants in the effluent.

NTPA- 001 refers to the waste waters of any kind, namely to waste water, waste, waste water industrial, sentenced to life imprisonments, or lump, tipped by systems arranged the fire from the technological processes its own, as well as the sewage joint venture, which have or have not been cleaned. The values laid down in these norms are maximum values are admissible.

NTPA-002 concerns the quality of waste water, from both social activities or economic in nature, which is to be the exhaust in the networks of the sewerage of localities and those directly in the treatment plants.

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[1] Professor, PhD, Dunarea de Jos University of Galati, Romania, Address: 47 Domnească Strada, Romania, Tel.: 0040 0336 130 108, Romania, Corresponding author: gretadragomir@univ-danubius.ro.
[2] Professor, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: gretadragomir@univ-danubius.ro.

The establishment of technological process of the origin and the quality characteristics of the waste water requires knowledge of the industrial process for a judicious design of the purification stations. Therefore it is necessary to know the origin of the flow into the main and their main characteristics to define how the waste water treatment plant. The reduction of waste water requires the use of new technologies.

The main harmful substances of industrial waste water are organic substances, the substances in the suspension, toxic substances and heavy metals, cyanide synthetic detergents etc. the recovery of valuable substances in the waste waters is aimed at their recovery and reduction of harmful substances discharged. (Ianculescu, 2002)

As a result of this chemical analysis has chosen to preserve the existing process by neutralization and in order to continue to apply an electrolytic oxidation followed by a process of adsorption on activated charcoal and a final filter in a granular filter with sand.

2. Waste Water Neutralization

For neutralization of polluted water from a metal plating section we use the equipment from figure no.1. An acceptable pH for clean water is between 6.5 and 8.

2.1. We must to make the next steps: adjust the pH of the solution between 7÷8. If the pH is 7 add sodium hydroxide. If the pH>8 add The hydrochloric acid: Add 4 l solution of calcium chloride inside of cleaning tank and then add 3 liters ferric chlorite at 1000 liters ground. Shake for 15 minutes; add 2.5 l electrolyte/1000 l solution from the tank; mix 3÷5 minutes after; agitation is expected÷2 3 hours for decantation of sludge.

2.2. For the waste water in B basin (with metallic ions)

Add the sulphuric acid to pH = 0÷2; add quantity of ground sodium, for reducing hexavalent chrome from tetravalent chrome, to the point of change of color from red to blue-green.

Add all the time the ground metabisulphite. The solution is obtained by dissolving 10 Kg quantity of sodium in 100 l of hot water.

After a primary settling the waters of the tanks B1 and B2 are entered in the B3 and then takes place the final decantation and then filtering (fig. no. 1)

The waste water resulting from washing the parts covered galvanic or from treated electro-chemical, contain toxic substances that are not bio- degradability's. Often hexavalent chromium, cyanide etc. require cleaning them before discharge to the natural circuit. Remove combinations hexavalent chromium shall be carried out by chemical reduction or electro-chemical ion at tetravalent chrome, less toxic and whose combinations are mostly insoluble. (Ionescu & Racoviţeanu, 2003)
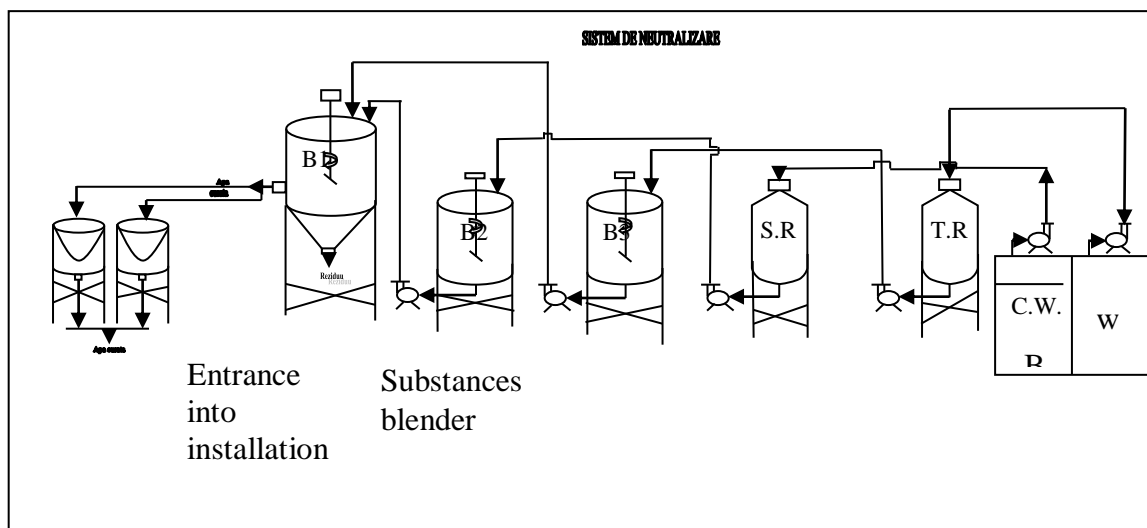
Figure1. Water cleaning system from a coating section, were: B1, B2, B3- blenders; S.R- secondary reactor; C.W. - clean water; T.R. - tertiary reactor.

The methods of chemical they have the disadvantages that are effective in an area limited by the pH-acid - and require the catalytic for carrying out the reaction of reduction.

Electrochemical methods eliminate these disadvantages and in addition with the removal of ions containing hexavalent chrome can be removed and other harmful matter.

Electrochemical Treatment consists in the obedience of the contaminated water a electrolyze with water-soluble anode manufacture of alloyed aluminum with 0.01-1 % indium or galiu and of iron or ferrous material (NTPA – 001 & NTPA – 002).

In the case of use sheet punching iron, as a result of the conduct of the electrolysis take place of the following processes: - on the cathode side: a) to reduce chloride ions of hydrogen and therefore alkalinized cathode space; (b) reduction of chloride ions hexavalent chrome at tetravalent chrome, which together with the ions OH-forming an insoluble precipitate chrome hydroxide.

The Ions ferric precipitated in the form of copper hydroxide ferrous rough, which in the presence of dissolved oxygen passes partly in the ferric hydroxide. Product total reaction time is a complex insoluble hidroxidic that incorporates harmful mater, ions in the form of chromium hydroxide.

The presence of the complex of iron makes free chromium substance, which normally require a specific area of pH for the precipitation-full should no longer be sensitive to pH, it can vary within the limits of the very broad (pH=11).

Studies have been carried out on the synthetic waters, containing 200 ppm hexavalent chrome and 20 g/l sodium sulphate necessary to increase the conductivity (SR EN 12566-7:2016); the original solution and the filtrate after the electrolysis of have been the subject of analysis for the determination of hexavalent chrome and tetravalent chrome, after the" iodine metric" determination method and manganese-metrical. Is used a cell of parallelepiped shape made of acrylic display, having a useful 0,3l. Anodes and cathodes with the dimensions 50x30x1 mm (the grilling surface-30cm^2), were made of the same material (SR EN 12566-7:2016).

3. Experiments

The experiments under have pursued the effectiveness of the cleaning of the polluted waters and specific consumption of energy in depending on the density of the anode (number of anode manufacture) and the time of the electrolysis.

There have been such tests with a number of four anode manufacture to the density of the current and the faster the electrolysis of smeller's found that both the decrease of the density of the anode current less than 0.2 A/dm^2, as well as reducing the time of electrolysis below 30 minutes have adverse effects on the effectiveness of treatment (tab.1).

The effectiveness of the cleaning the parameters of the electrolysis of links the point A. anode surface is 1.2 dm^2.

Table 1. Efficiency of polluted water treatment

The density of the anode current A/dm^2	Time for electrolyses (min)	Efficiently of treatment E,%
0,2	30	100,0
0,18	30	92,3
0,15	30	83,9
0,2	25	83,0
0,2	20	64,2

Dependent on specific consumption of energy from the density of the current to the anode areas variables: 1- 0.3dm^2; 2- 0.6dm^2; 3-0,9dm^2; 4-1,2dm^2.

In accordance with the fitting of the electrodes in parallel, a anode surface of 1,2 dm^2 (four anode manufacture) provides an effective way of 100% at a density of current 0.2 A/dm^2 and the duration of the treatment of 30 minutes, energy consumption being 0.45 kWh/m^3.the precipitate which has formed ,that gathers in him harmful matters in the form of copper hydroxide chromium, has the appearance of powder and is easily filtered.

The Only disadvantage of this procedure consists of the duration of the relatively high treatment which does not allow the achievement of a continuous process.

4. Electrolytic Cleaning of Industrial Waste Water

Among the processes at present applied for cleaning waste water, a special place it occupies electrochemical methods, because of the possibilities that offers them recovery or the regeneration of products to be valuable in depending on how is done removing the substances that water polluted, by using electrochemical methods can be classified into three main processes.

Oxidation of electro-chemical of cyanide of waste waters (destruction of cyanide-free and complex), the destruction of cyanides, after the electrolysis, is the result the process of oxidation that adds frequently

small quantities of chlorides in the polluted waters. Chlorine released on anode exercises an oxidizing action on cyanides.

One of the methods of purification of the solutions containing the ferrous and potassium ferry-cyanide propose their treatment in a electrodes anode with graphite and cathode of steel at a density of current by 0,8-30 A/dm^2.to intensify the process shall be entered in the solution to 6 g/l calcium chloride for 1 g ferrous- and potassium ferri-cyanide. So 500 ml, containing 1 g/l Ferro cyanide to which have been added 3g calcium chloride have been subjected to the electrolysis at a density anode current of 2.3A/dm^2, under a voltage of 5 V, at a temperature of 90°C and pH=3. After 30 minutes of alkali solution was pure, devoid of ions cyanide or Fe_2+ and Fe_3+ (which have been precipitated as hydroxides).

Degree of purification depends to a great extent on the density of the current. The optimum density of electrical power is 1.9 A/dm^2, to which the degree of purification is 99,7 %(concentration of arsenic) (SR EN 12255 – 16:2006).

5. Conclusions

Waste waters from the metal plating plant, contain between 1000 and 3000 mg/l metallic ions of various anion exchanger, complexion agents or agents of shine, showing a high degree of toxicity.

The electrolysis of such waters, under certain conditions allows non harmful their often engaged to the recovery of metals.

Metallic ions toxic can be removed by reduction in the process of CRT, when performing and recovery or by embedding in their hydro-precipitated, resulting from the chloral alkali electrolysis with water-soluble anode manufacture (the rule of iron). At the same time with the removal of the metallic ions, shall be carried out and the oxidation of harmful anion, such as cyanides or organic compound existing into the water such toxic metals with chrome, led, zinc, manganese, cadmium and cyanides have been removed from waste water through electrolysis, in the presence of the sodium chloride, using the soluble anode manufacture of iron and cathodes from a insoluble material.

Toxic metals ions have been precipitated that keep and remove by filtration and has been oxidized at charbon dioxide and azot.

For the recovery of metals in the diluted solutions, is carried out by using our proposal, an electrolysis process with a cathode composed of conductive particles of current enclosed in a perforated cylinder rotating, waste water (the electrolyte) is circulated among the cathode ray particles using a pump.

The developments of the industry and in particular of the chemical industry advertise special measures concerning the protection of the environment.

In this context a major problem is the purification of industrial waste water.

The development and implementation of technologies of sewage sludge at a technical level contemporary require addressing modern processes, to ensure the responsible removal as advanced harmful matters at a cost as low.

Using this method of neutralization for polluted waters from a metal plating section we reduce the total production costs with about 37%.

6. References

Ianculescu, Dan Ovidiu (2002). *Staţii de epurare de capacitate mică/ Small scale wastewater treatment plants.*. Bucharest: Editura MatrixRom.

Ionescu, Gh., & Racoviţeanu, Raluca. (2003). *Epurarea apelor uzate/ Sewage treatment*. Bucharest: Editura MatrixRom.

Normativ tehnic privind stabilirea limitelor de încărcare cu poluanţi a apelor uzate NTPA – 001/2002 şi NTPA – 002/2002/ Technical Norms on Setting Pollutant Loading Limits for Wastewater NTPA - 001/2002 and NTPA - 002/2002. NTPA-001/2002; NTPA-002/2002.

SR EN 12566-7:2016. Staţii mici de epurare a apelor uzate până la 50 LE. Partea 7: Unităţi prefabricate de epurare terţiară/ SR EN 12566-7: 2016. Small sewage treatment plants up to 50 LE. Part 7: Prefabricated tertiary treatment units. http://www.asro.ro/?p=3864.

SR EN 12255–16:2006. Staţii de epurare. Partea 16. Filtrare fizică/ Wastewater treatment plants. Part 16. Physical filtration. http://www.asro.ro/?p=3864 .

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REALITIES AND PERSPECTIVES

Risk of Work Place in the Context of Environmental Policies

Stefan Dragomir[1], Georgeta Dragomir[2]

Abstract: The main elements of environmental security assessment in an investment shall be determined taking into account the effects on health, safety of the workplace and the environment. It is necessary to collect a larger number of information in particular concerning the conditions for the use of various chemical agents. It is necessary to make a deep analysis of work place, to see what the types of chemical substance and materials are used frequency in industry that can infest the environment and it must to know how much damage can produce all of these materials. When we know the risks that characterize equipment, we can protect the life and we can protect the environment for a sustainable development.

Keywords: safety investment; risk strategies assessment

1. Introduction

When it is developed an industry investment it is necessary to highlight the elements of environmental security to comparing different kind of risks and to make an analysis of all risk factors by using adequate weightings. Modifying factor – a constant used in developing a minimal risk level to reflect an uncertain in data that is not accounted for the uncertain factor.

It must to make a prospective study, where the information about the exposure and response are obtained after the study has begun.

2. Paper Objectives

The main objectives are to establish the global security risk level and the safety measures that are necessary to take by the units.

Risk means the probability of an adverse effect the results of a particular exposure. Risk Factor can be variable in a casual model that is related to a vast response. That variable may act with other factors or in some other way (multiplications).

[1] Professor, PhD, Dunarea de Jos University of Galati, Romania, Address: 47 Domnească Strada, Romania, Tel.: 0040 0336 130 108, Romania, E-mail: gretadragomir@univ-danubius.ro.

[2] Professor, PhD, Danubius University of Galati, Romania, Address: 3 Galati Blvd., Galati 800654, Romania, Tel.: +40372361102, E-mail: gretadragomir@univ-danubius.ro.

3. Identified Risk Factors

The risk factors are identified like:

  a)   **Risk factors of input**

► Mechanic risk factors

F.1. workers that movement on the access roads inside the unit by means of transport (supply, delegate, service providers etc.);

F.2. bumping, or crushing grip in traffic accident at the movement in the interests of the service (for action);

F.3. defect-parts and mechanisms, the deviation from the normal trajectory of movement, impact, overthrow.

►Electric risk factors

F.4. electrocution by direct accidental unprotected pathways voltage at the venue of the activity: plugs damaged makeshift cables stripped portion, makeshift electrical connections etc.

  b)   **Risk factors while the work**

► Physical factors

F.5. alternate of the winter temperature;

F.6. currents of air corridors or rooms, or the simultaneous opening of doors and windows;

F.7. drop at the same level, through the slip, due to the condition of the roadway, the climate conditions (ice), wet floors etc.

► Biological factors

F.8. contamination caused by the presence of patients carriers of viruses, bacteria etc.

F.9. wrong actions and moving, staying in hazardous areas, in the vicinity of access roads, roadway in access of the gauge;

F.10. skip taking measures to prevent traffic accidents at pedestrian movement (insurance, diminished, crossing through illegal places, meaning failure indicators etc.);

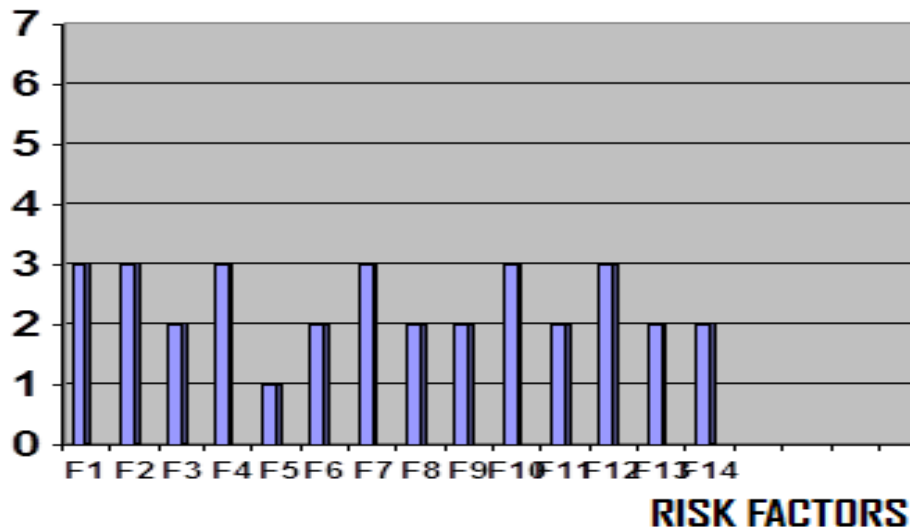F.11. psychic due to this solicitation of patients, relatives, media.

Risk levels

Figure 1. Diagram of risk levels on risk factors (Ricci, 2010)

4. Calculus of Global Risk Level

For calculus of global risk level is necessary to analised the diagram of risk factors, where is showing the most dangerous factors for human activity in an industrial activity,taking into account the effects on health, safety of the workplace and the environment.

Risk Ratio – the ratio fond by the responses in which those with the risk factors are related to those without that risk factor. If the ratio is greater than 1 the risk factor increased the risk to those exposed to it. (Ricci, 2010)

In conformity with the diagram of risk level (figure no.1) we must to choice the risk factors that have the greatest risk level and to use the formulas (1) for this calculus.

In the next is showing the explicitly of each of each risk factor that existing in figure no.1. like:

F.1. Pedestrian movement on the impact or access roads inside the unit by means of transport (supply, delegate, service providers etc.);

F.2. Bumping, or crushing grip in traffic accident at the movement in the interests of the service (for action);

F.3. Defect-parts and mechanisms, the deviation from the normal trajectory of movement, impact, overthrow;

F.4. Electrocution by direct accidental unprotected pathways voltage at the venue of the activity: plugs damaged makeshift cables stripped portion, makeshift electrical connections etc.

F.5. Alternate interior exterior temperature winter;

F.6. Currents of air corridors or rooms, or the simultaneous opening of doors and windows;

F.7. Drop at the same level, through the slip, due to the condition of the roadway, the climate conditions (ice), wet floors, etc.

F.8. Contamination caused by the presence of patients carriers of viruses, bacteria, etc.

F.9. Moving, staying in hazardous areas, in the vicinity of access roads, roadway in access of the gauge;

F.10. Skip taking measures to prevent traffic accidents at pedestrian movement(insurance, diminished, crossing through illegal places, meaning failure indicators, etc.);

F.11. Psychic due to this solicitation of patients, relatives, media;

F.12. Failure to take measures to restricted the pedestrian traffic for avoid the accidents (insurance, diminish the attention, crossing the forbidden places, Failing signs, etc.);

F.13. Due to this mental request of patients, relatives, media;

F.14.Stress caused by the intense pace of work, quick decisions in a short time and negotiation.

We use a formula that is used to calculus of Global risk level.

Global risk level - N_{rg} (Bedford & Cooke, 2003):

$$N_{rg} = \frac{\sum_{i=1}^{14} r_i \cdot R_i}{\sum_{i=1}^{14} r_i} = \frac{6(3 \times 3) + 7(2 \times 2) + 1(1 \times 1)}{6 \times 3 + 7 \times 2 + 1 \times 1} = 2.51$$
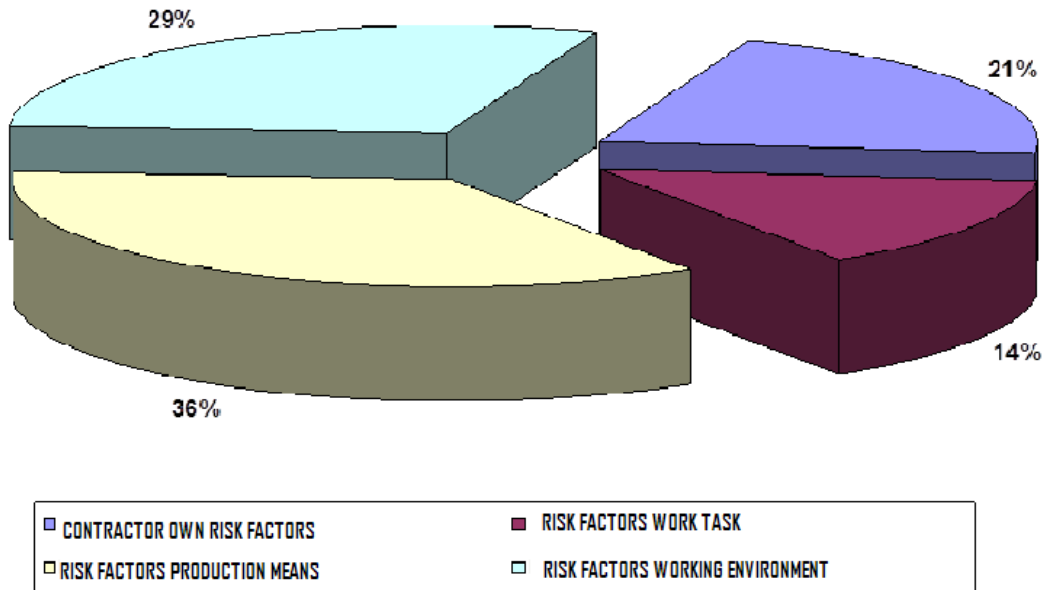
(1)

Safety measures proposed are the followings**:**

- workers movement on the access roads inside the unit by means of transport (supply, delegate, service providers etc.) must be made in maximum safety;

- speed control vehicle access inside the unit by placing limit signs at the entrance to the establishment;

- restrict access of vehicles depending on unit needs.

Like organizational measures we can take the next measures:

- training of workers on safety consequences of failure to movement restrictions inside the unit;

- preparation of instructions/procedures on the conduct domestic workers (general obligations, and pedestrian travel by car etc);

- an adequate protected pathways voltage at the venue of the activity: plugs damaged makeshift cables stripped portion, makeshift electrical connections;

- maintaining electrical work equipment by specialized and authorized personnel;

- daily visual check of the integrity of the casing cord electrical work equipment, the condition of the outer casing and power plug;

- the use of extension cords provided with protective null;

- supply of equipment for electrical work and will be only effectuated with extension cords from outlet provided with protective null;

- avoid the crossing through illegal places, meaning failure indicators etc.);

- it must to respect rules of the road while moving on road traffic routes and verified with road traffic regulations.

Like measures it must to proceed at thematic training plan will include provisions of law, marking the traffic section.

29%

21%

14%

36%

☐ CONTRACTOR OWN RISK FACTORS   ☐ RISK FACTORS WORK TASK

☐ RISK FACTORS PRODUCTION MEANS   ☐ RISK FACTORS WORKING ENVIRONMENT

Figure 2. Risk factors identified by source generated (http://leafmarque.com/resources/000/690/511/)

This diagram shows that a high percentage of 36% represents the risk caused by production means.In this case the manager must to bring in his factory the production means that ensure the maximum protection for the workers. The second percent of 29% represent risk factor working environment and also identify those features that will must take in consideration when is make the analysis. The prioritization of risks is made for an efficient allocation of investment resources.

It observe that the next risk "contractor own risk factors "of 21%, transfer the work tasks and the work risks to the worker and that is not normal. We also see that workloads with 14% risk factors are not acceptable in a modern factory, with new and productive equipment that must to ensure a high security degree viewing the work risk.

5. Conclusions

Can say about the performance of risk management measures, if we know the pollutant substance and how to neutralization.

Risk screening tools may also adopt qualitative reasoning, belief nets or qualitative systems tools to explore the interaction between hazards and receptors.

Usually, screening assessments are designed to be precautionary in that, where uncertainty remains about the probability and consequences of harm, risks are escalated to the next tier of analysis as a precaution. (Dragomir & Dragomir, 2014)

Participatory risk assessment has been recognized as a valuable method to support public engagement.

In planning a risk assessment in an industrial investment it is must take in account that:

• employment and the public's views can be taken into account in the decision;

• the futures employment may know what means the risks because a lot of them maybe work in another plant and they take contact with security risks and know about minimal risk level;

• in an investment shall be determined to taking into account the effects on health, safety of the workplace and the environment.

Relating to the specificity risk of an industrial investment, it is necessary to prepare a management scheme and a bunch of decision that must be create discussion with groups of futures employees.

In the case of an industrial investment, because are large number of possible combinations of hazardous agents, exposure pathways and receptors that could be affected, these methods can be expensive and necessity time and money.

The study considered that the main risks are guilt for damage that can produce inside of a factory, viewing the workers, the equipment, the productivity and the type of product made. When we must to develop an investment it must to take in account, first of all the work security of the workers, risk of production means, risk factors working environment, contractor own risk factor and risk factors work tasks.

6. References

Ricci, F. Paolo (2010). *Environmental and Health Risk Assessment and Management, Principles and practices*. Netherlands: Ed. Springer.

Dragomir, Ștefan & Dragomir, Georgeta (2014). *Risk Assessment and Environmental Security*. Galati: Editura Zigotto.

Bedford, T. & Cooke, R. (2003). *Probabilistic Risk Analysis-Foundations and Methods*. Cambridge: Cambridge University Press.

http://leafmarque.com/resources/000/690/511/Guidelines_for_Environmental_Risk_Assessment_and _Management.pdf.