Assessing alternatives to the development of administrative-economic units applying the FARE-M Method

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Abstract: *The socio-economic development of economic-territorial units subordinate to administrative-management institutions appears as one of the main tasks. The values of alternative indicators reflecting socio-economic development may differ, which makes it difficult to unambiguously assess the importance of the indicators. The applied available methods are either too receptive or does not provide sufficient accuracy. The proposed FARE-M methodology for determining the importance of indicators is the prolongation of the technique for establishing the importance of FARE (Factor Relationship) weights already used for research purposes. The employed technique is based on the internal balance of system elements that is the essential systemic feature. This allows, unlike in the case of the AHP method, the weights of the indicators to be determined with reference to the first row of the data matrix only.*

Keywords: administrative-management institutions, socio-economic development of economic-territorial units, multi-criteria methods.

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Introduction

One of the most important operational functions of both national and local administrative-management institutions (AMIs) is the adoption of measures for the development of administrative territories and economic entities subordinate to administrative management institutions. The measures cover economic, social, ecological, etc. aspects. Under market economy conditions, it is common practice for several or more alternatives to the solutions to be developed in the first place (Androniceanu et al., 2021). This is not accidental, because the problem of socio-economic development is, by nature, complex, integrated, and therefore manifests

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itself in reality in a variety of respects. Upon the examination of possible alternatives to the above introduced problem, responsible persons must choose the one they consider most appropriate to achieve the goal. At present, such alternative is frequently selected in a purely intuitive way with reference solely on experience and intuition. Meanwhile, the values of the indicators reflecting one alternative may be higher compared to the analogous values of other alternatives, whereas the other values may be lower. In the event of a sufficient number of such indicators, an adequate picture of assessment is hardly possible when neglecting specific methods capable of considering the created complex situation. The situation may further encounter problems in the case indicators are multi-dimensional and change in opposite directions, i.e. an increase in some of the values of certain indicators improves the situation while other indicators may degrade, but most importantly, they are not equally relevant in terms of dealing with the problem. In order to perform an integrated assessment of alternatives, all above discussed indicators must be combined into a single aggregate. The possibility is provided employing multi-criteria methods gaining more and more application (MacCrimmon, 1968; Hwang & Yoon, 1981; Opricovic & Tzeng, 2004; Bathaei et al., 2019; Brans et al., 1984; Brauers et al., 2010; Srinivasan & Shocker, 1973; Brauers & Ginevičius, 2010).

By their nature, these methods are universal for several reasons. First, they can be applied to any kind of quantitative assessment of a SES's condition. Second, in case the situation under assessment changes, it is possible to freely change both a set of indicators representing a SES's condition and evaluations of the significance of these indicators. Namely because of these features, MCDMs are widely applied in engineering, social and humanitarian sciences, and other fields of research.

In addition to application of MCDMs, great attention is paid to their improvement, as evidenced by the growing number of the methods developed (SAW − MacCrimmon, 1968; TOPSIS − Hwang, Yoon, 1981; VIKOR − Opricovic, Tzeng, 2004; Bathaei et al., 2019; COPRAS − Kaklauskas et al., 2005; ELECTRE III and ELECTRE IV − Roy, 1968; Roy, 1996; PROMETHEE − Brans et al., 1984; LINMAP − Srinivasan, Shocker, 1973; MOORA and MULTIMOORA − Brauers, Ginevičius, 2010; Brauers et al., 2010, etc.).

This is because it is unanimously acknowledged that there can hardly be any ideal method. Hence, each of the existing and newly proposed methods has both strengths and weaknesses.

The philosophy of multi-criteria assessment is reflected in the classical SAW (Single Additive Weighting) method. Its core is summation of the values of weighted indicators. The word "weighted" means that the actions are performed with transformed values, i.e. normalized values of indicators are multiplied by their significance (Hwang & Yoon, 1981).

The product of indicator values and weights is employed in many multi-criteria assessment methods. This leads to a relevant scientific problem of how to

adequately estimate indicator significance. At present, it is usually done through expert evaluations (Podvezko, 2007).

A method of evaluating indicator significance largely depends on the number of indicators. When this number is small, direct evaluation can be employed, i.e. significance of various indicators can be divided into unit parts. The problems related to social-economic development can only be adequately reflected by a number of indicators, which raises a dilemma: on one hand, an expert can adequately evaluate the significance of only a limited number of indicators (Ginevičius, 2009; Ginevičius & Podvezko, 2005); on the other hand, a significant reduction in the number of indicators will result in the loss of adequacy of the quantitative evaluation of a phenomenon under consideration. Therefore, in addition to simple methods, more complex ones, aimed at expanding the adequacy of expert evaluation, i.e. enabling experts to evaluate a larger number of indicators, were developed (Saaty, 2001). An in-depth analysis revealed not only the strengths, but also the weaknesses of these methods, making it relevant to continue research in this direction.

1. Literature review

The problem of evaluating the significance of multi-criteria assessment indicators was analysed by many scientists (Hwang & Yoon, 1981; Chu et al., 1979; Hwang & Lin, 1987; Sawaragi et al., 1987; Zavadskas & Kaklauskas, 1996; Podvezko, 2007; Pekelman & Sen, 1974; Rogers, 2000; Song et al., 2017; Prasuvic & Prasuvic, 2017; Turskis et al., 2017; Ramkumar & Samenta, 2018). It should be noted that indicator significance can be categorised as objective and subjective. Objective significance methods describe indicator dominance levels in an alternative under consideration, so they are most commonly applied in engineering, technological and similar sciences, and the main purpose of multi-criteria assessment in this case is to arrange the priority order of the alternatives of the objects under consideration (projects, engineering-technological solutions, etc.). Subjective significance methods indicate how significant particular indicators are in assessing the condition of a phenomenon in question not only in terms of individual indicators, but also with regard to comparing some of them. For this reason, subjective significance methods are widely spread in social sciences (Zavadskas et al., 1994; Kaklauskas et al., 2016; Brauers & Zavadskas, 2006; Cinelli et al., 2014; Baležentis et al., 2010; Zavadskas et al., 2014; Keshavarz et al., 2015; Slavinskaitė, 2017; Nugaras, 2014; Oželienė, 2019; Volkov, 2018). In order to evaluate the significance of objective indicators, the entropy method is commonly applied (Hwang, Yoon, 1981). Other methods, such as LINMAP (Linear Programming Techniques for Multidimensional analysis of Priviledged) (Srinivasan & Shocker, 1973), mathematical programming models (Pekelman & Sen, 1974), etc. are also employed. Nevertheless, subjective methods for evaluating indicator significance are more common (Saty, 1977; Chu et al., 1979; Hwang & Yoon, 1989; Zavadskas & Kaklauskas, 1987).

The following approaches to the determination of indicator weights can be distinguished: direct, ranking, assignment of coefficients, AHP (Tutygin & Korobov, 2010). A different approach was later proposed, which was named FARE (Ginevičius, 2009; Saaty, 2001).

Direct determination of indicator weights. In this case, the experts assign weights to the indicators immediately following the condition: $\sum_{i=1}^{n} \omega_i = 1$, where ω_I is the weight of the i-th indicator, $i = \overline{1,n}$, where n is the number of indicators.

The disadvantage of this method is that the expert, when giving weight to an indicator, has to bear in mind the importance of all other indicators for the phenomenon in question. The complexity of evaluation increases geometrically as the number of indicators increases. There is a limit at which an expert can no longer adequately assess the weights of indicators.

Ranking of indicators. This method of determining indicator weights is easier than the first one because the expert does not need to control the total sum of the weighting factors, leaving the rankings in ascending or descending order, as can be seen in Figure 1 (Kendall and Gibbons, 1990).

Figure 1. Ranking of indicators

$$\left.\begin{matrix} R_{11} & R_{12} & \cdots & R_{1j} & \cdots & R_{1r} \\ R_{21} & R_{22} & \cdots & R_{2j} & \cdots & R_{2r} \\ \vdots & \vdots & & \vdots & & \vdots \\ R_{i1} & R_{i2} & \cdots & R_{ij} & \cdots & R_{ir} \\ \vdots & \vdots & & \vdots & & \vdots \\ R_{m1} & R_{m2} & \cdots & R_{mj} & \cdots & R_{mr} \end{matrix}\right\}, \tag{1}$$

where R_{ij} is the estimate of the i-th indicator given by the j-th expert.

Experts can give the same rank to several or more indicators. In this case, the terminal values can be obtained as averages of the estimates. On the other hand, in this case, the expert must also bear in his mind the relationship between the importance of all the indicators.

Assignment of coefficients to indicators. In this case, the expert must assess the importance of each indicator individually in the range of the adopted scale, independently of the other indicators, as can be seen in Figure 2 (Tutygin and Korobov, 2010).

Figure 2. Assignment of coefficients to indicators

$$\left.\begin{array}{cccccc} Q_{11} & Q_{12} & \cdots & Q_{1j} & \cdots & Q_{1r} \\ Q_{21} & Q_{22} & \cdots & Q_{2j} & \cdots & Q_{2r} \\ \vdots & \vdots & & \vdots & & \vdots \\ Q_{i1} & Q_{i2} & \cdots & Q_{ij} & \cdots & Q_{ir} \\ \vdots & \vdots & & \vdots & & \vdots \\ Q_{m1} & Q_{m2} & \cdots & Q_{mj} & \cdots & Q_{mr} \end{array}\right\}, \tag{2}$$

where Q_{ij} is the estimate of the $i\text{-}^{th}$ indicator on the accepted score scale given by the $j\text{-}^{th}$ expert.

In this case, the weight of indicator $i\text{-}^{th}$ will be determined as follows:

$$\omega_i = \frac{\sum\limits_{j=1}^{r} Q_{ij}}{\sum\limits_{j=1}^{r} x_{ij} \sum\limits_{i=1}^{m} Q_{ij}}, \tag{3}$$

where ω_I is the weight of the $i\text{-}^{th}$ indicator.

In this case, the expert must inevitably take into account the importance of estimates he will give to other indicators when assessing the indicator.

Determining the weight of indicators applying the FARE method (Ginevičius, 2011). It provides for a fundamentally different approach to this problem. In contrast to the AHP method, it relies on the interaction of indicators that are treated as elements of the same system. The method requires expert assessments by filling in only the first line of the basic matrix, which indicates the extent to which the indicators influencing the phenomenon in question depend on the most important indicator. All other rows of the matrix derive from the first row and are filled in by analytical calculations. This results in an ideally matched matrix that does not require a peer review of the consistency of the assessment. On the other hand, the practical application of the method has shown that it is expedient to improve the procedure for filling in the first row of the matrix.

Determining the weight of indicators applying the AHP method (Saaty, 2001). The Saaty pairwise comparison method expands the capacities of expert evaluation, i.e. it enables experts to simultaneously evaluate the significance of a larger number of indicators. At the time when it emerged, this method was a step forward in comparison to direct evaluation of indicator significance, when indicator weights are estimated immediately for unit parts, subject to the

condition $\sum_{i=1}^{n} w_i = 1,0$; here w_i represents significance of the ith indicator, and n – the number of the indicators under consideration. The essence of the Saaty method is significance of a pair of indicators to a phenomenon in question. The result of such evaluation is a square matrix **P**, which is completed by each of the experts according to the evaluation scale proposed by T. Saaty (Saaty, 1980) (Figure 3).

Figure 3. The Saaty pairwise comparison matrix

$$\mathbf{P} = \begin{bmatrix} p_{11} & p_{12} & \cdots & p_{1n} \\ p_{21} & p_{22} & & p_{2n} \\ \cdots & \cdots & & \cdots \\ p_{n1} & p_{n2} & \cdots & p_{nn} \end{bmatrix} = \begin{bmatrix} \dfrac{\overline{q_1}}{\overline{q_1}} & \dfrac{\overline{q_1}}{\overline{q_2}} & \cdots & \dfrac{\overline{q_1}}{\overline{q_i}} & \cdots & \dfrac{\overline{q_1}}{\overline{q_n}} \\ \dfrac{\overline{q_2}}{\overline{q_1}} & \dfrac{\overline{q_2}}{\overline{q_2}} & & \dfrac{\overline{q_2}}{\overline{q_i}} & & \dfrac{\overline{q_2}}{\overline{q_n}} \\ \cdots & & & \cdots & & \cdots \\ \dfrac{\overline{q_n}}{\overline{q_1}} & \dfrac{\overline{q_n}}{\overline{q_2}} & \cdots & \dfrac{\overline{q_n}}{\overline{q_i}} & \cdots & \dfrac{\overline{q_n}}{\overline{q_n}} \end{bmatrix} \qquad (4)$$

(*Source:* compiled by the author)

Figure 3 indicates that, in an ideal case, when the elements in matrix **P** are ratios of unknown weights, the matrix is inversely symmetric, i.e. $p_{ij} = 1 / p_{ji}$. In fact, $p_{ij} = \dfrac{w_i}{w_j}$, and $p_{ji} = \dfrac{w_j}{w_i}$; here w_i, w_j represent the weights of the ith and jth indicators respectively. It follows that it is possible to fill the part of the matrix above or below the main diagonal.

The inverse symmetry of matrix **P** in an ideal case is interpreted as follows: for instance, if one object is three times heavier than another, then the latter is three times lighter or 1/3 times heavier than the former.

In this way, the corresponding elements of any two columns in the matrix will be proportional, which means that the ratios of the elements in the respective columns will be the same. For example, let us consider the ratio of the elements in the first and second columns:

$$\frac{p_{i1}}{p_{i2}} = \frac{\dfrac{w_i}{w_1}}{\dfrac{w_i}{w_2}} = \frac{w_2}{w_1}, \ (i = 1, ..., m). \qquad (5)$$

This will be the case with any other elements in the rows of any matrix **P**. Based on its application practice, it makes sense to examine its pros and cons. This is discussed in some sources (Tutygin & Korobov, 2010).

Pair evaluation of the impact of indicators. Due to the impact of socio-economic conditions on the phenomenon in question, the number of indicators included in the system often changes. The AHP method allows no significant losses, as all that remains is to add or subtract columns and rows, i.e. to form a new matrix. Previous evaluation results remain unchanged and a full update of the evaluation form is not required. In other words, it is just an increase or decrease in the linear space of the matrix.

Presence of a verbal-digital scale. Conventional digital scales are not always convenient for comparing indicators because they are often multidimensional. This comparison is particularly difficult when some factors are quantitative and others are qualitative. The Saaty verbal-digital scale avoids this inconvenience.

The AHP approach integrates the peer review compatibility criterion. Various numerical indices are commonly used to determine compatibility. In the case of AHP, the free choice of the optimal criterion provides wider possibilities for this. As a result, the compatibility ratio is also convenient, especially in terms of the programming of the whole process and the automation of calculations.

The AHP approach to indicator weights raises the most doubts about the interpretation of the results and, in particular, concerns the quality control of the peer review. In particular, the question of the ideal expert remains open. Calculations show that in some cases, strict adherence to the principle of transitivity yields a result that contradicts logic (Tutygin & Korobov, 2010).

2. Methodology

When evaluating indicator weights by AHP method, experts fill all the rows of the pairwise comparison matrix (Figure 3). It means that if an expert, for instance, is evaluating 10 indicators, he/she needs to weigh the significance of 45 indicator pairs, i.e. $\dfrac{m(m-1)}{2}$ pair interactions (m – the number of interactions between indicators) (Ginevičius, 2009; Ginevičius, 2011), which is hardly possible.

The question then arises as to how reduce the number of evaluations. A solution to this problem was proposed based on FARE method (Ginevičius, 2011). The core of this method is the assumption that the essential feature of the evaluated set of indicators, as of a system, is stability provided by its initial elements, i.e. indicator equilibrium. This equilibrium can be achieved by balancing two parameters of an indicator system – direction and strength of the interaction. In accordance with this principle, an initial limited amount of information on the direction and strength of the interactions between one and the rest of indicators is

sufficient to form the whole system. In this case, experts evaluate not $\dfrac{m(m-1)}{2}$,

but $m-1$ interactions, i.e. $\dfrac{m}{2}$ times fewer interactions. The direction and strength of the interactions between all other indicators derive from the system equilibrium requirements, thus they are obtained analytically, without participation of experts. At the same time, full consistency in the indicator significance evaluation matrix is achieved.

An important role in the FARE approach is played by the baseline potential of the indicator impact on or significance to a phenomenon under consideration, which is assumed the same for all indicators. An increase or decrease in this potential stems from differences in the significance of the indicators compared. The weight of an indicator is estimated as a ratio of its actual potential to the total baseline potential of all indicators in a system. The analysis of FARE application revealed that in order to raise its adequacy, it is appropriate to improve the method of obtaining initial expert information.

The basic matrix for evaluating the significance of multi-criteria assessment indicators by FARE-M method is depicted in Figure 4.

Figure 4. Basic matrix for evaluating the significance of multi-criteria assessment indicators by FARE-M method

$$\mathbf{F} = \begin{vmatrix} - & \Delta p_{12} & \Delta p_{13} & \dots & \Delta p_{1i} & \dots & \Delta p_{1m} \\ -\Delta p_{21} & - & \Delta p_{23} & \dots & \Delta p_{2i} & \dots & \Delta p_{2m} \\ -\Delta p_{31} & -\Delta p_{32} & - & \dots & \Delta p_{3i} & \dots & \Delta p_{3m} \\ \vdots & \vdots & \vdots & & \vdots & & \vdots \\ -\Delta p_{i1} & -\Delta p_{i2} & -\Delta p_{i3} & \dots & - & \dots & \Delta p_{im} \\ \vdots & \vdots & \vdots & & \vdots & \vdots & \vdots \\ -\Delta p_{m1} & -\Delta p_{m2} & -\Delta p_{m3} & \dots & -\Delta p_{mi} & \dots & - \end{vmatrix} \qquad (6)$$

As it can be seen from Figure 4, the basic matrix $\mathbf{F}$ is inversely symmetric with respect to the diagonal. This can be explained as follows. The estimates over the diagonal of matrix $\mathbf{F}$ indicate the extent to which an indicator with a higher rank of significance raises the baseline potential of its impact on a phenomenon under consideration relative to an indicator with a lower rank of significance. The baseline potential of the impact of the latter indicator decreases by the same amount. For instance, if the baseline potential of the impact of indicator 2 increased

by Δp_{23} relative to indicator 3, then the baseline potential of the impact of indicator 3 decreased by the same amount, i.e. by $-\Delta p_{32}$ (Figure 4).

According to their meaning, all rows (columns) in matrix **F** can be divided into two parts: first row (first column) and all remaining rows (columns). Values e_{1i} (first row) represent an increase in the baseline potential of the most significant indicator, obtained by ranking the significance of the impact of all indicators in this row on a phenomenon under consideration, due to its greatest significance in comparison to the significance of other indicators. These values are obtained through expert evaluation, for instance, on a 10-grade scale indicating the extent to which a particular indicator is less significant in comparison to most significant one.

The other rows in the matrix (Figure 4) reflect an increase or a decrease in the baseline potential of the significance of all other indicators, depending on the level of their significance indicated in the first row of the matrix. Before performing these calculations, the first row of matrix **F** needs to be transformed so that an indicator with a higher rank of significance would raise its baseline potential by accordingly reducing the potential of an indicator with a lower rank of significance:

$$\Delta \widetilde{p}_i = \Delta p_{11} - \Delta p_{1i}, \tag{7}$$

here $\Delta \widetilde{p}_i$ – an increase in the baseline potential of the ith indicator; Δp_{11} – the impact of the most significant (highest-ranked) indicator on a phenomenon under consideration (highest score on the rating scale); Δp_i – the same, of the ith indicator.

Based on the first row of matrix **F**, an analytical method can be invoked to evaluate an increase in the baseline potential of all other indicators, depending on the ranks of their significance. An increase in the baseline potential of the first, most significant, indicator in relation to lower significance of the second and third indicators is already known. Based on that, an increase in the baseline potential of the second indicator in relation to the third indicator can be evaluated. This can be done on the basis of a triangle formed by considering the interactions between the three indicators (Figure 5):

Figure 5. The initial graph of the impact of particular indicators on a phenomenon under consideration
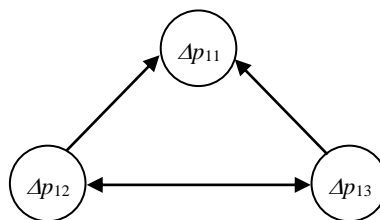
(*Source:* compiled by the author)

So that the microsystem depicted in Figure 3 would keep its equilibrium, i.e. so that it would be stable, the direction and strength of the interactions between its elements need to be matched. The direction and strength of the interactions Δp_{11} Δp_{12} and Δp_{11} Δp_{13} are already known. Based on the transitivity properties of the quantities in question (Ginevičius & Podvezko, 2004), it follows that indicator Δp_{11} is more significant than indicator Δp_{12}; thus, indicator Δp_{12} is more significant than indicator Δp_{13} with a lower rank of significance. In this case, the graph depicted in Figure 3 will be transformed as follows (Figure 6).

Figure 6. The graph of the matched significance of the three indicators
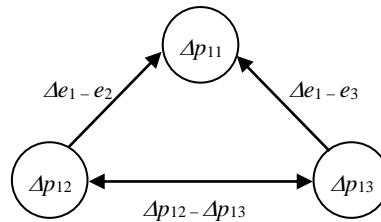
(*Source:* compiled by the author)

Based on the principle depicted in Figure 6, the directions and strengths of the interactions between all indicators are matched.

Figure 4 indicates that in relation to its diagonal, the basic matrix has two symmetrical sides which carry opposite signs. The positive sign indicates an increase in the baseline potential of the impact of an indicator, while the negative sign marks a decrease in the baseline potential of the impact of an indicator by the same amount.

By summing the rows of matrix **F** filled in this way, the total increase or decrease in the baseline potential of the indicators is obtained. The actual potential P_i^f of the impact of the *i*th indicator is estimated as follows:

$$P_i^f = P + \sum_{i=1}^{m} \Delta p_i \, , \tag{8}$$

here: P – baseline potential of the impact of the indicators on a phenomenon under consideration; $\sum_{i=1}^{m} \Delta p_i$ – total increase (decrease) in the baseline potential of the *i*th indicator depending on its significance rank.

The baseline potential of the impact is estimated as follows:

$$P = \Delta p_{11}(m-1). \tag{9}$$

In order to estimate indicator significance weights, value P_i^f needs to be compared with the baseline potential of the entire indicator system, which is estimated as follows:

$$P^s = m \cdot P = \Delta p_{11} m (m-1), \tag{10}$$

here: P^s – baseline potential of the impact of the entire indicator system on a phenomenon under consideration.

Indicator weights are estimated as follows:

$$w_i = \frac{P_i^f}{P^s}, \tag{11}$$

here: w_i – weight of the ith indicator.

A deeper analysis of matrix **F** indicated that the matrix is characterised by certain regularities that allow all other rows to be filled quickly and easily based on the first row. This can be performed as follows:

$$\Delta p_{ij} = \Delta p_{1j} - \Delta p_{1i}; \ i, j = 2, 3, ..., m, \ \Delta p_{ji} = -\Delta p_{ij}; \ i \neq j; \ i \neq 1; \ j \neq 1, \tag{12}$$

here: Δp_{ij} – value of the element in the jth column of the ith row in matrix **F**; Δp_{1j}, Δp_{1i} – elements of the first row, respectively.

The actual total baseline potential P_i^f of the impact of the ith indicator can be estimated based on only the first row of matrix **F**, i.e. filling in all other rows becomes completely unnecessary. This can be performed as follows:

$$P_i^f = P_1^f - m \cdot \Delta p_{1i}. \tag{13}$$

Based on formula (10), weight of the ith indicator in its extensive form is expressed as follows:

$$w_i = \frac{P_i^f}{P^s} = \frac{P_1 - m\Delta p_{1i} + \Delta p_{11}(m-1)}{m\Delta p_{11}(m-1)}. \tag{14}$$

The methodology proposed for estimation of the weights of particular indicators by FARE-M method differs fundamentally from FARE method in terms of the order in which first (base) row of matrix **F** is filled. The former methodology is more understandable and adequate to real situations.

3. Empirical Research

Let us presume that a phenomenon under consideration is reflected by seven indicators. Experts awarded the following ranks of the indicator significance (Table 1).

Table 1. Significance ranks of the indicators representing a phenomenon under consideration

Indicators	1	2	3	4	5	6	7
Significance ranks	2	6	3	7	1	5	4

(*Source:* compiled by the author)

Table 1 shows that indicator 5 is awarded the highest rank. Experts need to consider indicator significance ranks, and based on a selected 10-grade scale, need to indicate to which extent the impact of all other indicators on a phenomenon under consideration is smaller compared to the impact of the indicator with the highest rank (the impact of the indicator with the highest rank is awarded 10 points). Let us presume that expert evaluation provided the following results (Table 2):

Table 2. Evaluations of the impact of particular indicators on a phenomenon under consideration

Indicator	1	2	3	4	5	6	7
Evaluation of the indicator impact on a phenomenon under consideration	9	3	7	1	10	4	6

(*Source:* compiled by the author)

The evaluations of the impact of particular indicators provided in Table 2 need to be transformed based on formula (6) (Table 3).

Table 3. Transformed values of the indicator significance

Indicators	1	2	3	4	5	6	7
Transformed values of the indicator significance	1	7	3	9		6	4

According to the above-describe procedure (Figures 5-6), all rows in matrix **F** are filled.

Figure 7. Aggregate matrix of the impact of particular indicators representing a phenomenon under consideration

Indicator	5	1	3	7	6	2	4	$\sum_{i=1}^{m} \Delta p_i$	P_i^f	w_i
5		1	3	4	6	7	9	30	90	0.214
1	−1		2	3	5	6	8	23	83	0.198
3	−3	−2		1	3	4	6	9	69	0.164
7	−4	−3	−1		2	3	5	2	62	0.148
6	−6	−5	−3	−2		1	3	−12	48	0.114
2	−7	−6	−4	−3	−1		2	−19	41	0.098
4	−9	−8	−6	−5	−3	−2		−33	27	0.064
Σ	−30	−23	−9	−2	12	19	29	0	420	1.000

(*Source:* compiled by the author)

Values P_i^f are estimated based on formula (12).

$$P_1^F = 30 - 7 \cdot 1 = 23,$$
$$P_3^F = 30 - 7 \cdot 3 = 9,$$
$$P_7^F = 30 - 7 \cdot 4 = 2,$$
$$P_6^F = 30 - 7 \cdot 6 = -12,$$
$$P_2^F = 30 - 7 \cdot 7 = -19,$$
$$P_4^F = 30 - 7 \cdot 9 = -33.$$

Based on formulas (10) and (13), indicator weights are estimated. The results are provided in Figure 7.

The methods FARE, and especially FARE-M, developed for estimation of the weights of multi-criteria assessment indicators are comparatively new, which raises the question of their validity. It is logical to assume that they could be treated as valid if the indicator weights, estimated based on these methods, correlate with the weights, estimated by applying the AHP method, which is widely used today.

4. Discussion

In order to justify the usefulness of the proposed FARE-M method, it is appropriate to compare it with perhaps the most widely used AHP method today.

For comparing AHP and FARE-M methods, an expression characterized by 12 indicators has been selected. The weights of the indicators determined applying both methods are provided in Table 4.

Table 4. The weights of the indicators of the investigated expression established applying AHP and FARE-M methods

No of the indicator	1	2	3	4	5	6	7	8	9	10	11	12
Weight of the indicator (AHP method)	0,195	0,150	0,099	0,071	0,035	0,104	0,061	0,090	0,071	0,087	0,018	0,019
Weight of the indicator (FARE-M method)	0,135	0,107	0,089	0,073	0,067	0,098	0,071	0,085	0,076	0,080	0,062	0,057

(*Source:* Ginevičius, 2011)

Table 4 shows that similar weights have been obtained in both cases. A close relationship between the obtained results is also confirmed by the value of the correlation coefficient. It was found that $r = 0.98$. In addition, a comparison of both methods and other weighting methods has disclosed that FARE rather than AHP method gives a more accurate result (Ginevičius, 2011). Thus, two conclusions can

be drawn. First, the FARE-M method provides an adequate assessment of indicator weights; second, applying the FARE-M method requires a significantly smaller volume of calculations, is more understandable, eliminates the risk of inconsistency in the initial expert assessment and is therefore much more appropriate for practical calculations (Grondys et al. 2021).

5. Conclusions

The socio-economic development of economic-territorial units subordinate to administrative-management institutions emerges as one of the main functions, and therefore the reached strategically adequate decisions are of utmost importance. The intercomparison of possible alternatives commonly leads to making decisions. The values of the indicators reflecting alternatives may vary. Thus, the gained experience or intuition might be not enough to rank the alternatives conforming to their importance in terms of the objective pursued. For integrated assessment, all indicators need to be combined into a single aggregate employing multi-criteria methods. Establishing the weight of indicators plays a substantial role. The accuracy of the available proposals, including the widely used AHP method, depends largely on the number of indicators and is strongly biased or too receptive to calculations.

The proposed FARE-M method is the extension of the FARE approach already used in research and provides for a simpler and more comprehensible completion of the first line of the expert evaluation matrix. Similarly, to the FARE method, the suggested technique is based on internal balance that is one of the essential systemic features. Balance can be achieved if the direction and strength of the element interactions are matched to each other, which proposes that some limited information, e.g. the impact of an indicator with a lower significance rank on a phenomenon under consideration in relation to the impact of an indicator with highest significance rank, is sufficient to form a system.

All indicators, as elements of their system, have equal baseline impact potential. On the other hand, this potential can fluctuate, increase or decrease, depending on an indicator significance rank. Thus, actual potential of the impact is equal to the sum of the baseline potential and its increment, depending on an indicator significance rank. The total potential of the impact of an entire indicator system is equal to the sum of baseline potentials of all indicators. Indicator weights are estimated as a ratio of their actual baseline potential to baseline potential of the entire indicator system.

Filling in the matrix reflecting the baseline potential of the impact of the indicators representing a phenomenon under consideration revealed some regularities which allow to estimate indicator weights based on the first matrix row only.

The method FARE-M proposed for estimation of indicator weights is understandable, simple in calculations and allows to adequately evaluate a significantly higher number of indicators compared to AHP method, and can therefore be widely applied for multi-criteria assessment.

References

Amid, A., Ghodsypour, S.H. and O'Brien, C. (2009). A weighted additive fuzzy multiobjective model for the supplier selection problem under price breaks in a supply Chain. *International Journal of Production Economics, 121*(2), 323-332. doi:https://doi.org/10.1016/j.ijpe.2007.02.040

Androniceanu, A., Kinnunen, J. and Georgescu, I. (2021). Circular economy as a strategic option to promote sustainable economic growth and effective human development. *Journal of International Studies, 14*(1), 60-73. doi:10.14254/2071- 8330.2021/14-1/4

Arabsheybani, A., Paydar, M.M. and Safaei, A.S. (2018). An integrated fuzzy MOORA method and FMEA technique for sustainable supplier selection considering quantity discounts and supplier's risk. *Journal of Cleaner Production, 190*, 577-591.

Ayağ, Z.; Samanlioglu, F. (2018). Fuzzy AHP-GRA approach to evaluating energy sources: a case of Turkey. *International Journal of Energy Sector Management, 14*(1), 40-58. doi:https://doi.org/10.1108/IJESM-09-2018-0012

Baležentis, A., Baležentis, T. and Valkauskas, R. (2010). Evaluating situation of Lithuania in the European Union: Structural indicators and MULTIMOORA method. *Technological and Economic Development of Economy, 16*(4), 578-602.

Bathaei, A., Mardani, A., Baležentis, T., Awang, S.R., Streimikiene, D., Fei, G.C. & Zakuan, N. (2019). Application of Fuzzy Analytical Network Process (ANP) and VIKOR for the Assessment of Green Agility Critical Success Factors in Dairy Companies, Symmetr. *Symmetry, 11*, 2520. doi:10.3390/sym11020250

Behm, M. (2005). Linking construction fatalities to the design for construction safety concept. *Safety Science, 43*(8), 589-611. doi:https://doi.org/10.1016/j.ssci.2005.04.002

Beshelev, S.D. and Gurwich, F.G. (1974). *Matematiko-statiticheskie metody ekspertnych ocenok.* Moskva: Statistika.

Boral, S., Howard, I., Chaturvedi, S.K., McKee, K. & Naikan, V.N.A. (2020). An integrated approach for fuzzy failure modes and effects analysis using fuzzy AHP and fuzzy MAIRCA. *Engineering Failure Analysis, 108*, 104195.

Brans, J.P., Mareschal, B. & Vincke, P. (1984). PROMETHEE: A new family of outranking methods in multicriteria analysis. *Operational Research, 3*, 477-490.

Brauers, W.K.M. and Zavadskas, E.K. (2006). The MOORA method and its application to privatization in a transition economy. *Control and Cybernetics, 35*(2), 443-468.

Brauers, W.K.M., Ginevičius, R. & Podvezko, V. (2010). Regional development in Lithuania considering multiple objectives by the MOORA method. *Technological and Economic Development of Economy, 16*(4), 613-640.

Brauers, W.K.M. and Ginevičius, R. (2010). The economy of the Belgian regions tested with MULTIMOORA. *Journal of Business Economics and Management, 11*(2), 173-209.

Chen, Z., Ming, X., Zhang, X., Yin, D. & Sun, Z. (2019). A rough-fuzzy DEMATEL-ANP method for evaluating sustainable value requirement of product service system. *Journal of Cleaner Production, 228*, 485-508. doi:https://doi.org/10.1016/j.jclepro.2019.04.145

Cheung, F.K.T. and Kuen, L.L. (1991). Multi-criteria evaluation model for the selection of architectural consultants. *Construction Management and Economics, 20*(7), 569-581.

Churchman, C.W., Ackoff, R.L. & Smith, N.M. (May, 1954). An Approximate Measure of Value. *Journal of the Operations Research Society of America, 2*(2), 172-187.

Cinelli, M., Coles, S.R. & Kirwan, K. (2014). Analysis of the potentials of multi criteria decision analysis methods to conduct sustainability assessment. *Ecological Indicators, 46*, 138-148. Retrieved from https://doi.org/10.1016/ j.ecolind.2014.06.011

Dabbagh, R. and Yousefi, S. (2019). A hybrid decision-making approach based on FCM and MOORA for occupational health and safety risk analysis. *Journal of Safety Research, 71*, 111-123. Retrieved from https://doi.org/10.1016/j.jsr.2019.09.021

Dinçer, H., Yüksel, S. & Martínez, L. (2019). Interval type 2-based hybrid fuzzy evaluation of financial services in E7 economies with DEMATEL-ANP and MOORA methods. *Applied Soft Computing, 79*, 186-202. Retrieved from https://doi.org/10.1016/ j.asoc.2019.03.018

Fang, D.P., Xie, F., Huang X.Y. & Li, H. (2004). Factor analysis-based studies on construction workplace safety management in China. *International Journal of Project Management, 22*(1), 43-49. Retrieved from https://doi.org/10.1016/S0263-7863(02)00115-1

Figueira, J., Greco, S. & Ehrgott, M. (2005). *Multiple criteria decision analysis: state of the art surveys.* Springer.

Gedvilaitė, D. (2019). *The assessment of sustainable development of a country's regions. Doctoral dissertation.* Vilnius: Technika. Retrieved from http://dspace.vgtu.lt/ bitstream/1/3797/1/Gedvilaite%20 disertacija%2005%2016nn.pdf

Ginevičius, R. (2009). Socioekonominių sistemų būklės kiekybinio vertinimo problematika. *Verslas: teorija ir praktika, 10*(2), 69-83.

Ginevičius, R. (2011). A new determining method for the criteria weights in multicriteria evaluation . *International Journal of Information Technology & Decision Making, 10*(06), 1067-1095. Retrieved from https://doi.org/10.1142/S0219622011004713

Ginevičius, R. and Podvezko, V. (2005). Generation of a set of evaluation criteria. *Business: Theory and Praxis , 6*(4), 199-207.

Grondys, K., Slusarczyk, O., Hussain, H. I. & Androniceanu, A. (2021). Risk assessment of the SME sector operations during the COVID-19 pandemic. *Int. J. Environ. Res. Public Health* 18, 4183. https://doi.org/10.3390/ ijerph18084183

Hwang, C.L. and Lin, M.-J. (1987). *Group Decision Making under Multiple Criteria: Methods and Applications.* Berlin-Heidelberg: Springer.

Hwang, C.L. and Yoon, K. (1981). *Multiple Attribute Decision Making. Methods and Application a State-of-the-Art Survey. Lecture Notes in Economics and Mathematical Systems 186.* Berlin, Heidelberg: Springer.

Kaklauskas, A. (2016). *Analysis of the life cycle of a built environment. Monograph.* New York: Nova Science Publishers, Inc.

Kaklauskas, A. (2016). Degree of Project Utility and Investment Value Assessments. *International Journal of Computers, Communications & Control, 11*(5), 666-684.

Kaklauskas, A., Gudauskas, R., Kozlovas, M., Pečiūrė, L., Lepkova, N., Čerkauskas, J. & Banaitis, A. (2016). An affect-based multimodal video recommendation system. *Studies in Informatics and Control. Bucharest: National Institute for Research & Development in Informatics, 25*(1), 5-14.

Kaklauskas, A., Zavadskas, E.K. & Raslanas, S. (2005). Multivariant design and multiple criteria analysis of building refurbishments. *Energy and Buildings, 37*(4), 361-372. doi:https://doi.org/10.1016/j.enbuild.2004.07.005

Kartam, N.A., Flood, I. & Koushki, P. (2000). Construction safety in Kuwait: issues, procedures, problems, and recommendations. *Safety Science, 36*(3), 163-184. Retrieved from https://doi.org/10.1016/S0925-7535(00)00041-2

Kendall, M.G. (1975). *Rank Correlation Methods, 4th edition.* London: Charles Griffin.

Kendall, M. and Gibbons, J.D. (1990). *Rank Correlation Methods.* London: Edvard Arnold.

Keshavarz Ghorabaee, M., Zavadskas, E.K., Olfat, L. & Turskis, Z. (2015). Multi-Criteria Inventory Classification Using a New Method of Evaluation Based on Distance from Average Solution (EDAS). *Informatica, 26*(3), 435-451.

Klee, A.J. (1971). The Role of Decision Models in the Evaluation of Competing Environmental Health Alternatives Competing Environmental Health Alternatives. *Management Science, 18*(2), B52-B67. Retrieved from https://www.jstor.org/stable/2629528

MacCrimmon, K.R. (1968). *Decision making Among Multiple-Attribute Alternatives. A Survey and Consolidated Approach.* RAND Memorandum RM-4823-ARPA.

Mavi, R.K., Goh, M. & Zarbakhshnia, N. (2017). Sustainable third-party reverse logistic provider selection with fuzzy SWARA and fuzzy MOORA in plastic industry. *International Journal of Advanced Manufacturing Technology, 91*, 2401-2418. doi:https://doi.org/10.1007/s00170-016-9880-x

Mete, S. (2019). Assessing occupational risks in pipeline construction using FMEA-based AHP-MOORA integrated approach under Pythagorean fuzzy environment, Human and Ecological Risk Assessment. *International Journal, 25*(7), 1645–1660. Retrieved from https://doi.org/10.1080/10807039.2018.1546115

Naesens, K., Gelders, L. & Pintelon, L. (2009). A swift response framework for measuring the strategic fit for a horizontal collaborative initiative. *International Journal of Production Economics, 121*(2), 550-561. Retrieved from https://doi.org/10.1016/j.ijpe.2007.04.004

Nugaras, J. (2014). *Assessment of networking of higher education institution. Doctoral dissertation: social sciences, management (03S).* Vilnius: Technika.

Ocampo, L.A., Himang, C.M. & Kumar, A. (2019). A novel multiple criteria decision-making approach based on fuzzy DEMATEL, fuzzy ANP and fuzzy AHP for mapping collection and distribution centers in reverse logistics. *Advances in Production Engineering & Management, 14*(3), 297-322. Retrieved from https://doi.org/10.14743/apem2019.3.329

Opricovic, S. and Tzeng, G.-H. (2004). Compromise solution by MCDM methods: A comparative analysis of VIKOR and TOPSIS. *European Journal of Operational Research, 156*(2), 445-455. Retrieved from https://doi.org/10.1016/S0377-2217(03)00020-1

Ozdemir, M.S. and Saaty, T.L. (2006). The unknown in decision making: What to do about it. *European Journal of Operational Research, 174*(1), 349-359. Retrieved from https://doi.org/10.1016/j.ejor.2004.12.017

Oželienė, D. (2019). *Modelling the factors of a company's sustainable development. Doctoral dissertation.* Vilnius: Technika.

Pilevar, A.R., Matinfar, H.R., Sohrabi, A. & Sarmadian, F. (2020). Integrated fuzzy, AHP and GIS techniques for land suitability assessment in semi-arid regions for wheat and maize farming. *Ecological Indicators, 110*, 105887. Retrieved from https://doi.org/10.1016/j.ecolind.2019.105887

Podvezko V. and Podviezko, A. (2014). Kriterijų reikšmingumo nustatymo metodai [Criteria significance estimation methods]. *Lietuvos matematikos rinkinys [Lithuanian mathematics collection], 55*, 111-116.

Podvezko, V. (2007). Determining the level of agreement of expert estimates. *International Journal of Management and Decision Making , 8*(5/6), 586-600. Retrieved from http://www.inderscience.com/link.php?id=13420 (text/html)

Podvezko, V. (2011). The Comparative Analysis of MCDA Methods SAW and COPRAS. *Engineering Economics, 22*(2), 134-146. Retrieved from http://dx.doi.org/10.5755/ j01.ee.22.2.310

Pracevic, N. and Pracevic, Z. (2017). Application of fuzzy AHP for ranking and selection of alternatives in construction project management. *Journal of civil Engineering and Management, 23*(8), 1123-1135.

Roy, B. (1968). Classement et choix en présence de points de vue multiples (la Methode Electre). *Revue française d'informatique et de recherche opérationnelle, 8*, 57-75. Retrieved from http://www.numdam.org/item?id=RO_1968__2_1_57_0

Roy, B. (1996). *Multicriteria methodology for decision aiding.* Dordrecht, Netherlands; Boston, Mass: Kluwer Academic Publishers.

Saaty, T.L. (1980). *The Analytic Hierarchy Process.* New York: McGraw-Hill.

Saaty, T.L. (1994). *Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process.* Pitsburg: RWS Publications.

Saaty, T.L. (2001). *Fundamentals of the Analytical Hierarchy Process.* Pitsburg: RWS Publications.

Saaty, T.L. (2005). The Analytic Hierarchy and Analytic Network Processes for the Measurement of Intangible Criteria and for Decision-Making. In J. R. Figueira, S. Greco, & M. (. Ehrogott, *Multiple Criteria Decision Analysis: State of the Art Surveys* (pp. 345-408). Springer.

Saaty, T.L. and Shih, H.-S. (2009). Structures in decision making: On the subjective geometry of hierarchies and networks. *European Journal of Operational Research, 199*(3), 867-872. Retrieved from https://doi.org/10.1016/j.ejor.2009.01.064

Seyedmohammadi, J., Sarmadian, F., Jafarzadeh, A.A. & McDowell, R.W. (2018). Integration of ANP and Fuzzy set techniques for land suitability assessment based on remote sensing and GIS for irrigated maize cultivation. *Archives of Agronomy and Soil Science, 65*(8), 1063-1079. Retrieved from https://doi.org/10.1080 /03650340.2018.1549363

Slavinskaitė, N. (2017). Fiscal decentralisation and economic growth: Is there a relationship?. New trends and issues proceedings on humanities and social sciences. *Selected papers of 6th world conference on Business, Economics and Management (BEM-2017), 04. 4(10)*, pp. 73-81. Acapulco hotel and Resort convention center, North Cyprus. Kyrenia: SciencePark Research: Organization & Counselling.

Slavinskaitė, N. (2017). Fiscal decentralization and economic growth in selected European countries. *Journal of business economics and management, 18*(4), 745-757.

Slavinskaitė, N. (2017). Fiscal decentralization in Central and Eastern Europe. *Global journal of business, economics and management, 7*(1), 69-79.

Song, Y., Yao, S., Yu, D. & Schen, Y. (2017). Risky multi-criteria group decision on green capacity investment projects based on supply chain. *Journal of Business Economics and Management, 18*(3), 355-372.

Srinivasan, V. and Shocker, A. (1973). Linear programming techniques for multidimensional analysis of preferences. *Psychometrika, 38*(3), 337-369.

Turskis, Z., Morkūnaitė, Z. & Kutut, V. (2017). A hybrid multiple criteria evaluation method of ranking of cultural heritage structures for renovation projects. *International Journal of Strategic Property Management, 21*(3), 318-329.

Ubartė, I. (2017). *Daugiakriterė sprendimų paramos ir rekomendacijų sistema sveikam ir saugiam būstui užstatytoje aplinkoje vertinti [Multiple Criteria Decision Support and Recommender System for the Assessment of Healthy and Safe Homes in the Built Environment].* Vilnius: Technika.

Ustinovičius, L. (2003). *Statybos investicijų efektyvumo nustatymo sprendimų paramos sistema [Construction investment efficiency measuring solution support system]. Hab. Doctoral Thesis.* Vilnius: Technika.

Volkov, A. (2018). *Assessment of the impact of the common agricultural policy direct payments system on agricultural sustainability. Doctoral dissertation.* Vilnius: Technika.

Wang, Y., Xu, L. & Solangi, Y.A. (2020). Strategic renewable energy resources selection for Pakistan: Based on SWOT-Fuzzy AHP approach. *Sustainable Cities and Society, 52*, 101861. Retrieved from https://doi.org/10.1016/j.scs.2019.101861

Yoon, K. (1980). *Systems selection by multiple attribute decision making. Ph. D. dissertation.* Kansas: Kansas State University. Retrieved from https://trove.nla.gov.au/version/20403381

Yoon, K. and Hwang, C-L. (1980). *TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) – A Multiple Attribute Decision Making.* Berlin: Springer Verlag.

Yousefzadeh, S., Yaghmaeian, K., Hossein Mahvi, A., Nasseri, S., Alavi, N. & Nabizadeh, R. (2020). Comparative analysis of hydrometallurgical methods for the recovery of Cu from circuit boards: Optimization using response surface and selection of the best technique by two-step fuzzy AHP-TOPSIS method. *Journal of Cleaner Production , 249*, 20. doi:https://doi.org/10.1016/j.jclepro.2019.119401

Zagorskas, J., Burinskienė, M., Zavadskas, E.K. & Turskis, Z. (2007). Urbanistic assessment of city compactness on the basis of GIS applying the COPRAS method. *Ekologija, 53*, 55-63.

Zavadskas, E.K., Antuchevičienė, J., Razavi, H. S.H. & Hashemi, S.S. (2014). Extension of weighted aggregated sum product assessment with interval-valued intuitionistic fuzzy numbers (WASPAS-IVIF). Applied soft computing. *24*, 1013-1021.

Zavadskas, E.K. and Kaklauskas, A. (1996). *Pastatų sistemotechninis vertinimas [Building systemic-technical assessment].* Vilnius: Technika.

Zavadskas, E.K., Kaklauskas, A. & Kvederytė, N. (2001). Multivariant Design and Multiple Criteria Analysis of a Building Life Cycle. *Informatica, 12*(1), 169-188. doi:10.3233/INF-2001-12111

Zavadskas, E.K., Vilutienė, T., Turskis, Z. & Šaparauskas, J. (2014). Multi-criteria analysis of Projects' performance in construction. *Archives of civil and mechanical engineering, 14*(1), pp. 114-121.

Евланов, Л.Г. (1984). *Теория и практика принятия решений.* Москва: Экономика.

Завадскас, Э.К. (1987). *Комплексная оценка и выбор ресурсосберегающих решений в строительстве.* Вильнюс: Мокслас. Retrieved from http://economy-lib.com/kompleksnaya-otsenka-i-vybor-resursosberegayuschih-proektnyh-resheniy#ixzz6KRavrnGn

Тутыгин, А.Г. and Коробов, В.Б. (2010). Преимущества и недостатки метода анализа иерархий. *Естественные и точные науки, 122*, 108-115.

Digital methods of analysis of subjective quality of life: case of Russian Regions

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Abstract: *The paper presents a method for measuring subjective quality of life in the regions of the Russian Federation on the basis of digital data. Information about online activity of users in the largest social media in Russia - VKontakte was taken as the data source. Quality of Life Index was calculated based on the obtained data. The results show that overall users tend to negatively assess the quality of life in their regions, with the highest estimates of the quality of life observed in the "ethnic" areas of the Russian Federation – republics, autonomous territories, districts and regions, first of all, in North Caucuses, Siberia and the Russian Far East. The lowest quality-of-life assessments of are noted in some regions in West Siberia. The paper analyses how the results of measuring quality of life with digital methods correlate with objective social-and-economic and demographic indicators of regional development. Several regularities for the "ethnic" areas are revealed while in other areas (regions, territories, cities of federal status) no significant correlations were established. The paper also gives a comparative analysis of quality of life assessments obtained through traditional questionnaire methods and digital methods.*

Keywords: subjective quality of life, digital sociology, digital methods, social network, Russia

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Introduction

Digital sociology has been one of the most actively developing areas of sociology in recent years. Digital sociology studies a wide range of phenomena – whether analyzing the place of digital technologies in people's life or researching people's life on the basis of digital data created by users in the digital environment (Lupton, 2015; Androniceanu et al., 2021). Employing "digital methods" for studying various social phenomena, that occur both online and offline, also falls in the competence of digital sociology (Rogers, 2013). As a new research direction, digital sociology has become a subject of vivid discussions and acquired fervent advocates as well as fierce challengers, especially with regard to use of powerful computer technologies (such as Big Data and Data Mining) to study social behavior of humans.

In a polemic heat, some advocates of digital methods in social sciences tend to announce a new era of knowledge production based on Big Data, emerging new approaches to data analytics and machine learning which mark "the end of theory" and make the traditional scientific research method obsolete (Anderson, 2008). This point of view has become rather popular outside sociology and the academic science. Digital methods are most actively employed in the "corporate science" pursued by such companies as Microsoft, Facebook, Google, in particular branches of applied research, and so on (Burrows & Savage, 2014).

Critics, in their turn, bring forward a counter-accusation that digital method does not conform to the standards of the scientific principle; digital data are unrepresentative and nonobjective (Marres, 2017). The concerns of the disciples of academic sociology are quite understandable since use of digital sociology methods in humanities and social sciences, for example, big data analysis, requires reviewing fundamental ontological, epistemological and methodological principles of these sciences, and a series of basic concepts such as thing, agent, time, context, causality must be redefined (Wagner-Pacifici et al., 2015; Ciobanu et al., 2019). Use of digital methods equally leads to reconsidering many methodological principles, for instance, rejecting deduction in social sciences to the benefit of the induction principle, etc. In this paper, we do not set the goal to scrutinize vivid theoretical discussions regarding the value and reliability of digital methods. Let's just point out that we agree with the opinion of Burrows and Savage (2014) that if sociologists do not engage in the new research area based on digital technologies, sociology as a science may lose its predominant right to talk about social issues.

As an umbrella concept, digital sociology covers numerous separate areas, themes and research approaches united by use of digital methods or digital data in order to study social life. Digital sociology is actively applied, inter alia, in wellbeing studies and quality of life studies. The paper objective is to demonstrate with a particular empirical study how digital methods and digital data can be used to research the quality of life of the population in regions across Russia and make a comparative analysis of traditional approaches to measuring wellbeing and quality

of life of the population on the basis of statistical and polling data, and digital methods.

Therefore, the research agenda of the paper can be formulated as follows:

1. To what extent data measuring the level of subjective quality of life, obtained through digital methods, and statistical indicators used to evaluate particular aspects of wellbeing and quality of life, conform?

To this purpose, we conducted a large-scale study of subjective quality of life of the population in Russian regions based on the data from the largest Russian social network - VKontakte. Then using correlation analysis, we identified presence of any correlations between the subjective level of quality of life, estimated on the basis of the social media data, and a set of statistical data characterizing qualify of life in a particular region.

2. To what extent data measuring the level of subjective quality of life, obtained though digital methods, conform to the findings of sociological surveys evaluating the wellbeing level of the population of Russia?

To get an answer to this question, we used correlation analysis to expose regularities between estimates of subjective quality of life made on the basis of data from VKontakte social media and data of sociological surveys carried out by the largest Russian sociological centers (VCIOM, FOM, Levada-Centre), concerning particular indicators of wellbeing and quality of life.

1. Literary review

Since we use social media as the data source in this study, the review is limited to similar studies. It should be pointed out that social media are the most popular source of data about wellbeing and quality of life, but not the only one. Other sources of digital traces can be users' search queries (Algan et al., 2019) or words in Google Books (Hills et al., 2019), but few such works have been completed. Overall, one can see three areas at the intersection of social media and wellbeing studies. The first is related to use of new information technologies for analyzing and processing data that can serve as a source of information in wellbeing studies. An example is use of the technology of automatic recognition of human emotions in group images in social media to determine "happiness" intensity (Dhall et al., 2015).

The second considers social media as a new social phenomenon that influences various sides of human wellbeing (Sabatini & Sarracino, 2017; Verduyn et al., 2017). In this case social media is taken as a significant factor that can have a negative or positive effect upon such parameters of human wellbeing as social capital (Burke et al., 2010; Ciobanu & Androniceanu, 2018), marriage satisfaction (Valenzuela et al., 2014), depression (Appel et al., 2016; McCloskey et al., 2015), loneliness (Song et al., 2014), social support (Lee et al., 2013), evaluating one's life as happy compared to other people (Chou & Edge, 2012) and so on.

Finally, the third area of studies sees social media as a self-sufficient data source for evaluating wellbeing. Taking into account the role that social media started playing in people's daily life in recent decades, the attempts seem to be quite

productive (Haseeb et al., 2019). For instance, Hao et al. (2014) used machine learning technology to predict subjective quality of life of social media users. The authors took data in Sina Weibo on 1785 volunteers to learn an algorithm, asking them a priori to fill in questionnaires in order to evaluate positive and negative affects (PANAS) and assess psychological wellbeing (PWBS). Schwartz et al. (2016) undertook a similar study based on Facebook materials. In other work, Schwartz et al. (2013) evaluated subjective wellbeing in various US counties using Twitter. Chen at al. (2017) analyzed status updates on Facebook user pages to predict subjective wellbeing of users. Wu et al. (2015) used data from Sina Weibo to build the City Happiness Index. The authors analyzed statements about users' life in various cities.

Wang et al. (2014) studied profiles of Facebook users for a year and evaluated their wellbeing level under Diener's Satisfaction With Life Scale (SWLS) and compared the findings with the index of Facebook's Gross National Happiness, calculated on the basis of analyzing the number of positive and negative words in user status updates. The authors questioned possibility of applying linguistic analysis of online messages for analyzing users' psychological state. Yang and Srinivasan (2016) studied life satisfaction of the population on materials from Twitter. Studies on "happiness geography" also fall in this category, for example, relations between emotions and mobility (Mitchell et al., 2013). Interesting findings were obtained in several studies as to how positive and negative emotions correlate with life satisfaction measured on the basis of Facebook data. It appeared that positive emotions have low correlation with Facebook data on life satisfaction while negative emotions demonstrate such link. One can assume that social pressure can stimulate unhappy people to pretend that they are happier than they actually are which is less likely in case of negative emotions.

It can be pointed out that in the past ten years the number of studies where social media are the main source of information about subjective user wellbeing has been increasing rapidly. At the same time, an essential question is to what extent the results of digital and traditional studies of wellbeing and quality of life are consistent and whether digital studies enable to predict the "true" level of wellbeing. Bellet and Frijters (2019) identified two types of data for predicting the level of wellbeing on the basis of digital data: individual data (updating status in user accounts, likes put by a user, etc.) and aggregated data, i.e., not tied to a particular user, averaged for a particular group (search queries, average network values, tags, updates, words from Google Books, etc.). Bellet and Frijters concluded that aggregated indicators of wellbeing and quality of life derived from the text content of social media have a much higher prediction capacity compared to predictions based on individual data.

2. Study methodology on subjective quality of life based on social media data

The study methodology includes several consistent stages:
1) Developing a model of subjective quality of life.
2) Choosing communities in VK social media.
3) Classifying messages and posts in communities.

4) Automatically analyzing content in the chosen communities.

5) Building up an quality of life index for various regions of Russia.

2.1 The quality of life model

Research literature describes a vast number of approaches and models of wellbeing and quality of life, many of which have common components (Androniceanu A.-M et al., 2020). The most popular include the level of life, the level of social infrastructure development, the ecological state of the environment, the state of health, and so on.

We did not employ some popular quality of life indicators in our model due to the complexity of operationalizing and the specifics of the chosen communities in social media. For example, such things as income level, family life, demographic situation and social connections are not widely discussed in the mass regional communities. We have also excluded quality of work life, quality of leisure and recreation and inequality as separate parameters, because studies of these indicators require a deeper analysis. However, we have included several additional parameters. First of all, we have added the assessment of various administrative solutions and political situation in the region, because today the Russian authorities have direct and strong impact on the other parameters of quality of life. We have also included such parameters as general emotional state (psychological subjective well-being) and relationships between people to assess the emotional environment in the region. One more parameter of quality of life, very important but frequently forgotten in the Russian studies, is the situation with political rights and freedom (Veenhoven, 1996). Table 1 gives an overview of subjective quality of life parameters we have used in our study.

Table 1. Structure of quality of life parameters

Areas	Categories
Social	*Education* *Housing and utilities sector* *Healthcare* *Infrastructure* *Safety (situation in cities)* *Environment* *Relationships between people*
General emotional state	
Economic	*Work* *Products* *Taxes* *Lending and entrepreneurship* *Social support on behalf of the state*

Areas	Categories
Political	*Media freedom* *Remonstrative potential* *(resentment of population)* *Election freedom* *Attitude towards authorities* *Political resolutions* *Domestic politics*

(*Source:* Authors model)

2.2 Selection of VK communities

In our study we have included 83 out of 85 regions of the Russian Federation. We have not managed to collect data on two regions: Chechnya and Mordovia. In each of these 83 regions we have determined 3 largest cities and selected 10 VK communities discussing life there. We have defined them as 'urban communities'. We have filtered the communities according to several criteria:

1. They publish informative posts on social, economic and political life.

2. They publish posts of their subscribers with info on social, economic and political life.

3. The published posts contain sentiments on news and events.

We have excluded the following communities:

1. Online shops and other commercial groups.

2. Groups with information on sports and cultural events and personalities.

3. Communities of public places (restaurants, clubs, cinemas, etc.).

4. Food delivery services.

5. Communities on health, nutrition, fitness, etc.

6. Communities on exchange of items and charity.

7. Communities with storytelling, stories and questions.

8. Dating communities.

9. Job offers communities.

In some regions (the Buryat Republic, Dagestan, Ingushetia, Tatarstan) we have included 10 regional groups not connected with any definite city. In these regions there are more than 3 large towns where the majority of the population is concentrated, so here we have included general regional groups to increase representativeness. In some regions with high population density in large towns we have selected only two or even one of them (like in Nenets Autonomous Area). We have searched for the communities manually and selected the largest ones corresponding to the above mentioned criteria. In doing so, we have built a cluster of 2410 communities.

2.3 Classification of messages and posts in communities

At the next stage of our study we have used the social media data collection and analysis platform of the University consortium of Big Data researchers (www.opendata.university), developed by the team of the Laboratory of Big Data in Social Sciences of Tomsk state University to download the materials from the selected communities. We have downloaded all messages, posts and comments for the period between January 1 and December 31, 2018. After that we have deleted all 'junk' like advertising, as well as the information beyond the scope of this study (job offers, sports and cultural events, free exchange, contests and campaigns, recipes, delivery and food, astrological predictions, sales of items, dating offers, discussions of private life of participants, etc.). We have deleted the 'junk' in two stages:

1) manual cleanup of approximately 60 thousand messages.

2) automatic cleanup based on the specially designed algorithm trained during manual cleanup. We have left only the messages of 20 words and longer and we have deleted all repeated messages.

After cleanup we have left only approximately 3 300 000 messages. At the same time we have categorized the messages according to topics (given in Table 1) and style (positive, negative, neutral).

2.4 Automatic content analysis in selected communities

The database set includes posts from the walls of the regional VK communities retrieved through its public API (Application Programming Interface). Each post had to be categorized into one of the 19 categories or as 'junk'. The method is based on machine learning technologies of retrieval of unknown patterns from these texts. To create an automatic algorithm of texts classification we have used the following conventional libraries of machine learning: Scikit Learn, Pandas, Numpy as well as a set of tools known as NLTK (Natural Language Toolkit) for the natural language analysis. The algorithm is based on Python 3 programming language.

At the data preprocessing stage we have deleted symbols belonging to neither English nor Russian alphabet. We have used stemming to bring all words to their basic forms. We have deleted all rare terms, which could have been typos. To be able to use different classification methods we had to present the texts in the vector form. To transform the texts into the terms significance vector we have applied TF-IDF (TF – term frequency, IDF – inverse document frequency), where the word weight is used in proportion to the frequency these words occur in a document and in inverse proportion to the frequency of the words use in all documents from the sample. TF-IDF is frequently applied to present documents as numeric vectors reflecting the significance of each term from a certain term set (a number of terms determines the vector dimension) in each document. For each vector we have taken into account not only separate terms but also diagrams, that is, pairs of consecutive terms.

We have conducted a number of experiments to determine the best data for learning. To do that we have checked several data sets including: number of comments, likes, reposts, views, number of words in a post. All these values have been scanned in accordance to their average value in a community the corresponding text was taken from. We have also considered the vectors of significance for the comments to the posts retrieved the same way, as well as for the posts texts. After that we have determined the best data set for this task: significance vectors of the words in the posts, the scanned number of words and the number of comments, likes, reposts and views.

Based on the obtained data we have built the machine learning models. We have conducted a number of experiments, where we have categorized the samples as the one for learning and the one of a text, with their subsequent validation to select the most accurate model to classify categories and attitudes. After that we have checked the models of Gradient Boosting, where we have used a prediction model as an ensemble of weak predictive models and the Random Forest with variations of hyper parameters. In the end we have selected the models demonstrating the best result for the corresponding task. We have implemented the gradient boosting from LightGBM library. We have validated the data to determine the accuracy of the obtained models. The accuracy of the categories classifier is 73%, the accuracy of the attitudes classifier is 77,5%.

2.5 Subjective quality of life index for regions of the Russian Federation

After that we have built the subjective quality of life index (QLI) for each selected region. The method of aggregates such as the index is widely used in various well-being and life quality studies. In this article we have also used the indices of online activities to calculate the SWBI. We have calculated the QLI according to the following formula:

$$I_{kjt} = A_{kjt}/B_k \tag{1}$$

where I_{kjt} is the Online Activity Index (OAI) for the region (k) for this subjective quality of life value (j) for the certain attitude of message. This index determines the intensity of discussion of this topic in the certain attitude in the certain region. The online activity index demonstrates how topical the subject of the message is (quality of life value) for the region and subjective assessments of this value by the social network users.

A_{kjt} is the value on online activity in the certain region for the certain value of subjective well-being; it is calculated according to the formula:

$$A_{kjt} = L + 2 \times C + 5 \times R \tag{2}$$

where L is the amount of likes collected by the messages on or around a certain value of subjective quality of life in the certain region in the certain attitude.

C is the number of comments collected by the messages related to the certain value of subjective quality of life in the certain region. We have equated each comment with 2 likes, because, in our view, this action of a user is an evidence of importance of these messages for the commentator. Here a like is a passive form of demonstrating support of this message.

R is a number of reposts of the messages on the certain value of subjective quality of life in the certain region. We have equated each repost with 5 likes, because, in our view, a repost is an evidence of complete and active support of this message by the user. This action means that the user not only expresses his or her consent with this message but also openly demonstrates his or her solidarity with the message. As compared to various forms on online activities, a repost is an evidence of the greatest topicality of this subject for the user.

B_k is a total number of subscribers in all selected communities in the region. This value demonstrates a relative value of online activity for this region.

k is a number of each region (1 to 83). The study involves 83 out of 85 regions of the Russian Federation. We have not managed to collect reliable data for two regions: Mordovia and Chechnya.

j is a topic of messages, that is, an indicator of well-being, which we have included into the model of life quality (1 to 19) (according to Table 1)

t is the attitude of messages (0, 1 or 2).

Thus, I_{kjt} shows intensity of discussion of a topic in the selected communities in the selected region. It is an evidence of urgency and topicality of this subject for the population of the region. I_{kjt} has been calculated for each attitude, that is, for each region OAI has three values: one for positive attitude, one for negative attitude and one for neutral attitude. Attitude is defined as an emotional evaluation of a message, thus, the positive attitude means that the message contains some positive evaluation or expression of approval of some news or situation mentioned in the message; the negative attitude means it contains disapproval, resentment towards the contents of the message, while the neutral attitude means the message is purely informative and contains no evaluation.

We have calculated the monthly value of the index for each subject and each attitude; after that we have calculated the mean monthly value for each subject and each attitude. Mean monthly values have been calculated by addition of the online activity index for definite attitude and dividing the sum by 12. Later, by simple subtraction of mean values of the online activity index for positive and negative attitudes, we have calculated the mean value of the subjective quality of life index QLI_{kj} for the corresponding region and for the corresponding topic/value of subjective quality of life:

$$QLI_{kj\Delta m} = I_{kj1m} - I_{kj2m} \qquad (3)$$

where I_{kj1m} is the mean monthly online activity index with the positive attitude
I_{kj2m} is the mean monthly online activity index with the negative attitude.

We have not included neutral messages into the QLI. We have calculated the total Russian value of subjective quality of life QLI_{tot} as the sum of the index for all quality of life subjects/values for each region:

$$QLI_{tot} = \Sigma\ QLI_{kj\Delta m} \qquad\qquad (4)$$

The suggested method is perfect to study the life quality of the 'digital' population in the region, that is, the part of the population, which can be referred to as active users of social media. This study does not include the population groups, which, for whatever reasons, do not use social media. The second limitation is caused by technical aspects of this method: we have not used botnets in the social networks to manipulate the public opinion. We have not managed to level up this issue. Another limitation is related to psychological peculiarities of the users' behavior. It is a well-known fact that users tend to react to negative messages.

At it was pointed out, users tend to more actively react to negative events and phenomena (Liebrecht et al., 2019; Stafford, 2014; Trussler & Soroka, 2014).

3. Statistical indicators for comparative analysis

For a comparative analysis of the study findings and statistical data characterizing the quality of life of the population in regions, we took data published on the website of the Federal State Statistical Service (https://www.gks.ru/). Statistical indicators used in the analysis are listed in Tables 4-7. Data on statistical indicators are published on a yearly basis and with a breakdown by particular regions. Therefore, to perform Pierson correlations we used statistical indicators for particular regions in 2018 as the predictor variable and the Quality of Life Index for particular regions in a year – as the dependent variable.

4. Sociological surveys for comparative analysis

Choosing sociological surveys for the comparative analysis with the findings of the online study, we were guided by the following several rules:

1) Surveys are conducted on a regular basis by a reputable research body. We used open-access data produced by VCIOM, FOM and Levada-Centre.

2) Surveys should cover some quality of life indicators that we use in our study (summarized in Table 1). The sociological surveys taken for the comparative analysis are presented in Table 2.

Since all surveys that we used for the comparative analysis are national and there is no regional data breakdown and the surveys are carried out on a monthly or quarterly basis, we recalculated our Quality of Life Index (OLI). We estimated it for all regions by each quality of life indicator. To this purpose, we calculated QLI in the positive and negative modes separately in each month for all regions of Russia on each quality-of-life indicator:

$$QLI_{njt} = \Sigma\ QLI_{knit} \qquad\qquad (5)$$

where k – number of regions (from 1 to 83)

n – number of months (from 1 to 12)

j – quality-of-life indicator (from 1 to 19)

t – message mode (1 – positive or 2 – negative).

It means that we got two national indices per each month of 2018 on two modes. Then we calculated the overall Quality of Life Index QLI_{total} for each month as the difference between QLI_{nj1} in the positive mode and QLI_{nj2} in the negative mode. We also normalized QLI pro rata to the share of the population of a particular region in the total population of Russia.

We used Spearman correlations for monthly sociological surveys; and Kendall correlations for quarterly (Happiness Index, Economic Protest Potential, Political Protest Potential) or bi-quarterly (Consumer Sentiment Index, Social Sentiment Index, Family Index, Index of Russia, Expectations Index, Power Index) surveys. Data from sociological surveys were used as the predictor variable and the national Quality of Life Index values per each months of a year – as the dependent variable.

Table 2. Correlation analysis of QLI indicators and data of sociological surveys

Data of sociological survey / QLI Indicators	Housing-and-Utilities	Medicine	Job	Goods	Market relations	Protest potential	Political decisions	Home policy
Social Assessment Indices	0.46		0.52		0.55			0.71
Social Sentiments Indices – "To what extent does your current life suit you?"								0.46
Social Sentiments Indices – "Do you think that in a year you (your family) will live better than now?"						0.50	0.53	0.50
Social Sentiments Indices – "How would you evaluate the current financial		-0.49				0.58	0.71	

Data of sociological survey / QLI Indicators	Housing-and-Utilities	Medicine	Job	Goods	Market relations	Protest potential	Political decisions	Home policy
situation of your family?"								
Indices on the situation in Russia – "How would you assess the situation in Russia in general?"					0.58			0.61
Indices on the situation in Russia - "How would you assess the current political situation in Russia in general?"			0.49		0.52	0.49		
Indices on the situation in Russia – "To what extent do you agree that things in Russia are developing in the right direction?"			0.52		0.55			0.55
Inflation perception indices - How would you evaluate the price growth?	-0.52	0.52		-0.73				-0.45
Inflation perception indices - In your opinion, how will prices for the main consumer goods and services change in the next 1-2 months?	-0.64			-0.55	-0.55			-0.58
Frustration with the authorities - In the past month, did you hear critical						-0.71	-0.46	

Data of sociological survey / QLI Indicators	Housing-and-Utilities	Medicine	Job	Goods	Market relations	Protest potential	Political decisions	Home policy
statements about Russian authorities from people around you? (Yes)								
Frustration with the authorities - In the past month, did you hear critical statements about Russian authorities from people around you? (No)						0.70	0.57	
Frustration with the authorities - In the past month, were you frustrated, outraged with actions of Russian authorities? (Yes)						-0.49	-0.62	
Frustration with the authorities - In the past month, were you frustrated, outraged with actions of Russian authorities? (No)	0.46				0.52		0.46	
Sentiments of the environment – "Which sentiments, in your opinion, dominate today among your relatives, friends, colleagues and acquaintances? (Calm)	0.53	-0.47					0.47	0.72

Data of sociological survey / QLI Indicators	Housing-and-Utilities	Medicine	Job	Goods	Market relations	Protest potential	Political decisions	Home policy
Sentiments of the environment - "Which sentiments, in your opinion, dominate today among your relatives, friends, and acquaintances? (Worries)	-0.56	0.50					-0.47	-0.75
Home policy of the government							0.48	0.55
Government economic policy						0.46	0.46	0.55
Government social policy						0.46	0.68	0.46
Assessing the current state of things in Russia – In the right direction					0.49			
Assessing the current state of things in Russia – On a wrong path					-0.57			
Consumer Sentiments Index								0.83
Index of the authorities						0.83		
Social protest potential						-0.53	-0.69	

(*Source:* Authors calculation)

5. Results

Table 3 represents the results of calculating the Quality of Life Index in 83 regions of the Russian Federation in 2018.

Table 3. The overall QLI by regions in 2018 (the total of all quality-of-life indicators for a particular region)

Region	QLI$_{\Delta av}$	Region	QLI$_{\Delta av}$
Adygeya	-0.04637	Nenetsky Autonomous District	-0.07537
Altai Territory	-0.18246	Nizhny Novgorod Region	-0.06259
Amur Region	-0.02586	Novgorod Region	-0.09415
Arkhangelsk Region	-0.07722	Novosibirsk Region	-0.10585
Astrakhan Region	-0.04684	Omsk Region	-0.07532
Bashkortostan	-0.03384	Orenburg Region	-0.19532
Belgorod Region	-0.05497	Orel Region	-0.04635
Bryansk Region	-0.08234	Penza Region	-0.08399
Buryatia	-0.04452	Perm Territory	-0.00481
Vladimir Region	-0.06636	Primorye Territory	-0.0101
Volgograd Region	-0.02053	Pskov Region	-0.00093
Vologda Region	-0.15559	Altai Republic	-0.00463
Voronezh Region	-0.04727	Rostov Region	-0.09866
Dagestan	-0.03179	Ryazan Region	-0.00225
Jewish Autonomous Region	-0.00869	Samara Region	-0.00711
Zabaikalie Territory	-0.03046	St Petersburg	-0.00326
Ivanovo Region	-0.0245	Saratov Region	-0.15107
Ingushetia	-0.00102	Sakha (Yakutia)	-0.00924
Irkutsk Region	-0.0589	Sakhalin Region	-0.11088
Kabardino-Balkaria	-0.00212	Sverdlovsk Region	-0.05464
Kaliningrad Region	-0.07651	Sevastopol	-0.05698
Kalmykia	-0.05434	North Ossetia Alania	-0.00453
Kaluga Region	-0.04576	Smolensk Region	-0.01138
Kamchatka Territory	-0.00313	Stavropol Territory	-0.03365
Karachaevo-Cherkessia	-0.00374	Tambov Region	-0.11993
Karelia	-0.06089	Tatarstan	-0.05849
Kemerovo Region	-0.10255	Tver Region	-0.05037
Kirov Region	-0.02238	Tomsk Region	-0.11716
Komi	-0.03621	Tula Region	-0.03143
Kostroma Region	-0.09263	Tyva	-0.00853
Krasnodar Territory	-0.04428	Tyumen Region	-0.07588

Region	QLI$_{\Delta av}$	Region	QLI$_{\Delta av}$
Krasnoyarsk Territory	-0.05809	Udmurtia	-0.09363
Crimea	-0.0212	Ulyanovsk Region	-0.069
Kurgan Region	-0.07369	Khabarovsk Territory	-0.02739
Kursk Region	-0.05522	Khakassia	-0.0664
Leningrad Region	-0.08755	Khanty-Mansiisky Autonomous District	-0.0202
Lipetsk Region	-0.04889	Chelyabinsk Region	-0.7561
Magadan Region	-0.00687	Chuvashia	-0.1696
Marii El	-00412	Chukotka Autonomous District	0.009571
Moscow	-0.01925	Yamalo-Nenetsky Autonomous District	-0.4034
Moscow Region	-0.03322	Yaroslavl Region	-0.8844
Murmansk Region	-0.08631		

(*Source:* Authors calculation)

The obtained data show that negative QLI values dominate in the overwhelming majority of the regions, with the ex caption of the Chukotka Autonomous District, which is the only area where positive online activity index is higher than the negative index value. The overall positive QLI value in Chukotka is due to such indicators as the state of infrastructure, work, and social support from the state, assessment of political decisions and home policy of the authorities. Other indicators are either negative or equal zero. Areas with tentatively "high" QLI, i.e., negative but close to 0 comprise a group of North Caucuses Republics (Ingushetia, Kabardino-Balkaria, Karachaevo-Cherkessia, and North Ossetia Alania) and the Altai Republic. The Pskov and Ryazan regions, the Kamchatka and Perm Territories, and St Petersburg also have a rather low negative QLI. The Orenburg region and several regions in Western Siberia (the Altai Territory, the Tomsk, Novosibirsk and Kemerovo regions) are on the opposite pole of the list with the highest negative QLI. The Volgograd, Saratov, Tambov and Sakhalin regions are also in the same group.

Thus, we see a rather prominent division of Russian regions by types of administrative arrangements. To improve the correlation analysis accuracy, let's divide all regions of the Russian Federation into two groups: A) ethnic republics, autonomous districts and regions, and B) all other – territories, regions and cities of federal status. The results of the correlation analysis of statistical indicators and QLI for the A Group are given in Tables 4 and 5, and for the B Group – in Tables 6 and 7. For perception convenience, we keep the indices that register at least weak relations (the correlation rate r≥|0.25|).

Table 4. Correlation analysis of the statistical indicators characterizing regional economic development, and QLI (the A Group)

	Average wage in the region	GRP	Gini index	Per capita monetary income by regions	Available resources in urban area	Murder and attempted murder	Base index of consumer prices	Number of unemployed	Number of active enterprises	Number of " dead" enterprises	Consumer price indices	Cost-of-living index for particular cities
Education		-0.46									0.37	
Housing-and-Utilities	-0.36	-0.74	-0.30	-0.47				0.26			0,.9	-0.44
Healthcare		-0.51		-0.26							0.5	
Infrastructure	0.44	0.57	0.53	0.54		-0.29		-0.27	-0.40	-0.43	-0.28	0.52
Safety (urban situation)			-0.26			-0.27				-0.30		
Ecology		-0.50		-0.27							0.38	
Relations between people		-0.27							-0.34	-0.35		
General emotional state						-0.42			-0.73	-0.69		
Job	-0.27	-0.69	-0.36	-0.42	-0.25						0.54	-0.32
Goods	-0.32	-0.73	-0.44	-0.47	-0.32						0.55	-0.36
Taxes		0.36		0.28					-0.28	-0.28	-0.37	0.31
Lending and entrepreneurship						-0.54			-0.51	-0.47		
Social support from the state									-0.34	-0.35	0.39	
Freedom of mass media			-0.27			-0.60		-0.36	-0.54	-0.51		
Protest potential (frustration of the population)	-0.35	-0.78	-0.44	-0.51							0.60	-0.44
Freedom of elections		-0.58	-0.25	-0.32				0.29			0.40	-0.30
Attitude to the authorities	-0.54	-0.77	-0.43	-0.67	-0.33			0.27			0.37	-0.66

	Average wage in the region	GRP	Gini index	Per capita monetary income by regions	Available resources in urban area	Murder and attempted murder	Base index of consumer prices	Number of unemployed	Number of active enterprises	Number of " dead" enterprises	Consumer price indices	Cost-of-living index for particular cities
Political decisions		-0.48					0,34				0.66	
Home policy		-0.59		-0.26							0.60	

(*Source:* Authors calculation)

Table 5. Correlation analysis of the statistical indicators characterizing regional demography, and QLI (the A Group)

	Net migration rate	Population change	Population natural increase rate	Life expectancy at birth	Number of students	Population younger than the working age	Working-age population	Population older than the working age
Education	0.33	0.27						
Housing-and-Utilities	0.25				0.38			
Healthcare	0.28	0.27						
Infrastructure					-0.53			-0.25
Safety (urban situation)			0.36			0.31		-0.38
General emotional state	-0.28				-0.43	0.25		-0.32
Taxes					-0.49			
Lending and entrepreneurship					-0.26			
Social support from the state					-0.25	0.25	0.29	-0.36
Protest potential (frustration of the population)					0.41			
Attitude to the authorities	0.28			0.26	0.56			
Political decisions							0.25	
Home policy					0.27			

(*Source:* Authors calculation)

Table 6. Correlation analysis of the statistical indicators characterizing regional economic development, and QLI (the B Group)

	Average wage in the region	Gini index	Per capita monetary income by regions	Available resources in urban area	Murder and attempted murder rate	Number of unemployed	Consumer price indices	Cost-of-living index for particular cities
Education		0.25						
Healthcare					0.33			
Infrastructure	0.29		0.32	0.25				0.33
Safety (urban situation)			0.25				0.28	0.35
Ecology							0.26	
Relations between people			0.26					
General emotional state							-0.26	
Taxes	0.26		0.29	0.31				0.33
Social support from the state							0.27	0.29
Freedom of mass media						-0.41		
Political decisions			0.28				0.25	0.30
Home policy								0.26

(*Source:* Authors calculation)

Table 7. Correlation analysis of the statistical indicators characterizing regional demography, and QLI (the B Group)

	Number of students	Working-age population
Ecology	0.25	
Taxes		0.33
Social support from the state		0.33

(*Source:* Authors calculation)

We see two very different pictures for different groups of regions: the A Group regions have some rather strong correlations that cannot be considered a coincidence, between data on social-and-economic and demographic development in a region and online estimates of the quality of life in the same region. Such relations are not registered for the regions from the B Group, the highest correlation rate in the B Group is -0.41. These findings demonstrate practically complete absence of interrelations for the B Group between social-and-economic and

demographic development of the regions and online quality-of-life estimates by the residents of regions. It can partly be explained by the considerable heterogeneity of the regions within the B Group on various parameters.

Let's now move to a comparative analysis of QLI and results of sociological surveys. To simplify data perceptions, we did not include the quality-of-life parameters and indices in Table 2, if no significant correlations were found. For example, we did not expose any considerable correlations on such quality-of-life indicators as: education, medicine, infrastructure, safety, relations between people, general emotional state, taxes, social support from the state and freedom of mass media. For such indicators as ecology, we revealed significant correlation with the results of sociological surveys on Social Protest Potential (-0.47); for the "attitude to the authorities" indicator, significant correlation is found with the results of sociological surveys on Social Sentiments Index (0.87) and Expectations Index (0.87); for the Freedom of Elections indicator, correlation is observed with the Social Sentiments Index – "Do you believe that in a year you (your family) will live better or worse than now?" (-0.47). We also did not identify any significant relations between quality-of-life indicators and some sociological surveys – Happiness index, Economic Protest Potential – Quite possible, Economic Protest Potential – Would take part, Political Protest Potential - Quite possible, Political Protest Potential - Would take part, Family Index and Index of Russia. Other results are presented in Table 8 (only values for p<0.05 are given).

Therefore, we see that the results of online studies and results of sociological surveys on some aspects demonstrate quite strong and logically explainable correlations. It suggests presence of solid interrelations between these data.

6. Conclusions

In the paper, we have attempted to study relations between the traditional approaches to measuring quality of life on the basis of statistical indicators (objective quality of life) and data of sociological surveys (subjective quality of life) and a new approach to assessing quality of life of the population that relies on social media data. The obtained data lead to several conclusions essential for developing research in this area. As can be noted, we were not able to establish general correlations between the statistical parameters of social-and-economic and demographic development and quality-of-life assessment in a particular region on the basis of social media data. The exceptions are some rather interesting and noticeable interrelations between the level of gross regional product and some quality-of-life indicators for the regions from the A Group (republics, autonomous districts and regions). The result is not surprising: a lot of international studies show no linear correlation between the level of social-and-economic development of a particular society and wellbeing and happiness sentiments of the members of this society (for example, Global End of Year Survey, Happy Planet Index , etc.).

At the same time, we observe good correlations on some quality-of-life parameters measured using digital methods and questionnaires. It encourages

particular optimism and reasonable expectations. One can assume that further improvement of quality-of-life measurement on the basis of social media data, comparative studies, when quality of life is researched with digital and questionnaire surveying methods will enable us to create a rather reliable tool to measure quality of life in the near future. In our opinion, it is essential that digital and questionnaire methods capture different sides of human wellbeing: the former registers emotional wellbeing, and the latter - satisfaction with life. The difference between these two edges of wellbeing is that emotional wellbeing, the emotional quality of human daily experience – the frequency and intensity of experiencing joy, stress, sadness, anger and attachment, that make life pleasant or unpleasant, while satisfaction with life means assessing life, general statements, considerations about life made by people when they think about life (Kahneman & Deaton, 2010). Evidently, quality of life measured on the basis of social media data is much closer to emotional wellbeing since it registers human immediate experiences, feelings that overwhelm a person at a particular moment of time. Sociological surveys (Tamulevičienė & Androniceanu, 2020) tend to measure satisfaction with life as questions asked by interviewer's force respondents to contemplate and assess their lives.

Authors Contributions

Conceptualization, Methodology, Investigation, Writing - Original Draft, Evgeniy Shchekotin; Software, Data Curation, Validation, Formal analysis, Viacheslav Goiko; Supervision, Mikhail Myagkov; Writing - Review & Editing, Vitaliy Kashpur.

Conflict of Interest Statement

Authors declare that they do not have any competing financial, professional, or personal interests from other parties.

References

Algan, Y., Murtin, F., Beasley, E., Higa, K., & Senik, C. (2019). Well-being through the lens of the Internet. *PLoS ONE, 14*(1), e0209562. doi: 10.1371/journal.pone.0211586

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Anderson, C. (2008, June 23). The end of theory: The data deluge makes the scientific method obsolete. *Wired*. Retrieved from http://www.wired.com/science/ discoveries/magazine/16-07/pb_theory

Androniceanu, A., Kinnunen, J., & Georgescu, I. (2021). Circular economy as a strategic option to promote sustainable economic growth and effective human development. *Journal of International Studies, 14*(1), 60-73. doi:10.14254/2071- 8330.2021/14-1/4

Androniceanu, A.-M., Kinnunen, J., Georgescu, I., & Androniceanu, A. (2020). A multidimensional approach to competitiveness, innovation and well-being in the EU using Canonical Correlation Analysis. *Journal of Competitiveness*, *12*(4), 5-21. https://doi.org/10.7441/joc.2020.04.01

Appel, H., Gerlach, A. L., & Crusius, J. (2016). The interplay between Facebook use, social comparison, envy, and depression. *Current Opinion in Psychology, 9*, 44-49. doi: 10.1016/j.copsyc.2015.10.006

Bellet, C. and Frijters, P. (2019). Big Data and Well-being. In Helliwell, J., Layard, R., Sachs, J. (Eds.), *World Happiness Report 2019*. New York: Sustainable Development Solutions Network, 97-122.

Burke, M., Marlow, C., & Lento, T. (2010). Social Network Activity and Social Well-Being. *Proceedings of the 28th International Conference on Human Factors in Computing Systems, CHI 2010, Atlanta, Georgia, USA, April 10-15*, 1909-1912. doi: 10.1145/1753326.1753613

Burrows, R. and Savage, M. (2014). After the crisis? Big Data and the methodological challenges of empirical sociology. *Big Data & Society, 1*(1), 1-6. doi: 10.1177/2053951714540280

Chen, L., Gong, T., Kosinski, M., Stillwell, D., & Davidson, R. L. (2017). Building a profile of subjective well-being for social media users. *PloS one, 12*(11), e0187278. doi: 10.1371/journal.pone.0187278

Chou, H.-T. G. and Edge, N. (2012).'They Are Happier and Having Better Lives than I Am': The Impact of Using Facebook on Perceptions of Others' Lives. *Cyberpsychology, behavior, and social networking, 15*(2), 117-121. doi: 10.1089/cyber.2011.0324

Ciobanu, A., Androniceanu, A. & Lazaroiu, G. (2019). An integrated psycho-sociological perspective on public employees' motivation and performance. *Frontiers in Psychology*, 10, Article number: 36. Doi: 10.3389/fpsyg.2019.00036

Ciobanu A. and Androniceanu A. (2018). Integrated human resources activities - the solution for performance improvement in Romanian public sector institutions, *Management Research and Practice*, *10*(3), September, 60-79.

Dhall, A., Goecke, R. & Gedeon, T. (2015). Automatic group happiness intensity analysis. *IEEE Transactions on Affective Computing, 6*(1), 13-26. doi:10.1109/TAFFC.2015.2397456

Hao, B., Li, L., Gao, R., Li, A. & Zhu, T. (2014). Sensing Subjective Well-Being from Social Media. In Ślęzak, D., Schaefer, G., Vuong, S.T., Kim, Y.S. (Eds.), *Active Media Technology. AMT 2014. Lecture Notes in Computer Science, vol 8610.* Springer, Cham, 324-335. doi: 10.1007/978-3-319-09912-5_27

Haseeb, M., Hussai, H. I., Kot, S., Androniceanu, A. & Jermsittiparsert, K. (2019). Role of social and technological challenges in achieving a sustainable competitive advantage and sustainable business performance. *Sustainability*, *11*(14), Article Number: 3811

Hills, T., Proto, E. & Sgroi, D. (2019). Historical analysis of national subjective well-being using millions of digitized books. *Nature: Human Behaviour, 3* (12), 1271-1275. doi: 10.1038/s41562-019-0781-5

Kahneman, D. and Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *PNAS, 107 (38),* 16489-16493. doi: 10.1073/pnas.1011492107

Lee, K.-T., Noh, M.-J. & Koo, D.-M. (2013). Lonely people are no longer lonely on social networking sites: The mediating role of self-disclosure and social support. *Cyberpsychology, Behavior, and Social Networking, 16* (6*),* 413-418. doi: 10.1089/cyber.2012.0553

Liebrecht, C., Hustinx, L. & van Mulken, M. (2019). The Relative Power of Negativity: The Influence of Language Intensity on Perceived Strength. *Journal of Language and Social Psychology, 38*(2), 170-193. doi:10.1177/0261927X18808562

Lupton, D. (2015). *Digital Sociology*. London, New York: Routledge.

Marres, N. (2017). *Digital Sociology: The Reinvention of Social Research.* Cambridge: Polity Press.

McCloskey, W., Iwanicki, S., Lauterbach, D., Giammittorio, D.M. & Maxwell, K. (2015). Are Facebook 'Friends' Helpful? Development of a Facebook-Based Measure of Social Support and Examination of Relationships Among Depression, Quality of Life, and Social Support. *Cyberpsychology, behavior and social networking, 18*(9*),* 499-505. doi: 10.1089/cyber.2014.0538

Mitchell, L., Frank, M.R., Harris, K.D., Dodds, P.S. & Danforth, C.M. (2013). The Geography of Happiness: Connecting Twitter Sentiment and Expression, Demographics, and Objective Characteristics of Place. *PLoS ONE, 8(5),* e64417. doi: 10.1371/journal.pone.0064417

Rogers R. (2013). *Digital Methods*. Cambridge, MA: MIT Press.

Sabatini, F. and Sarracino, F. (2017). Online Networks and Subjective Well-Being. *Kyklos, 70*(3*),* 456-480. doi: 10.1111/kykl.12145

Schwartz, H.A., Eichstaedt, J.C., Kern, M.L., Dziurzynski, L., Lucas, R.E., Agrawal, M., Park, G.J., Lakshmikanth, S.K., Jha, S., Seligman, M.E. & Ungar, L. (2013). Characterizing geographic variation in well-being using tweets. *Proceedings of the Seventh International AAAI Conference on Weblogs and Social Media.* Cambridge, MA, 583-591.

Schwartz, H.A., Sap, M., Kern, M.L., Eichstaedt, J.C., Kapelner, A., Agrawal, M., Blanco, E., Dziurzynski, L., Park, G., Stillwell, D., Kosinski, M., Seligman, M.E. & Ungar, L.H. (2016). Predicting individual well-being through the language of social media. *Pacific Symposium on Biocomputing, 21,* 516-527. doi: 10.1142/9789814749411_0047

Stafford, T. (2014, July 29). Psychology: Why Bad News Dominates the Headlines. *BBC.* Retrieved from https://www.bbc.com/future/article/20140728-why-is-all-the-news-bad

Song, H., Zmyslinski-Seelig, A., Kim, J., Drent, A., Victor, A., Omori, K. & Allen, M. (2014). Does Facebook make you lonely?: A meta analysis. *Computers in Human Behavior, 36,* 446-452. doi: 10.1016/j.chb.2014.04.011

Tamulevičienė, D. and Androniceanu, A. (2020.) Selection of the indicators to measure an enterprise's value and its changes in the controlling system for medium-sized enterprises. *Entrepreneurship and Sustainability Issues, 7*(3), 1440-1458. Doi: https://doi.org/10.9770/jesi.2020.7.3(1)

Trussler, M. and Soroka, S. (2014). Consumer Demand for Cynical and Negative News Frames. *The International Journal of Press/Politics, 19*(3), 360-379. doi: 10.1177/1940161214524832

Valenzuela, S., Halpern, D. & Katz, J.E. (2014). Social network sites, marriage well-being and divorce: Survey and state-level evidence from the United States. *Computers in Human Behavior, 36,* 94-101. doi: 10.1016/j.chb.2014.03.034

Veenhoven, R. (1996). Happy life-expectancy. A comprehensive measure of quality-of-life in nations. *Social Indicators Research, 39,* 1-58. doi: 10.1007/BF00300831

Verduyn, P., Ybarra, O., Resibois, M., Jonides, J. & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review. *Social Issues and Policy Review, 11*(1), 274-302.

Wagner-Pacifici, R., Mohr, J. W. & Breiger, R. L. (2015). Ontologies, methodologies, and new uses of Big Data in the social and cultural sciences. *Big Data & Society 2(2),* 1-11. doi: 10.1177/2053951715613810

Wang, N., Kosinski, M., Stillwell, D.J. & Rust, J. (2014). Can Well-Being be Measured Using Facebook Status Updates? Validation of Facebook's Gross National Happiness Index. *Social Indicators Research, 115,* 483-491. doi:10.1007/s11205-012-9996-9

Wu, K., Ma, J., Chen, Z. & Ren, P. (2015). Analysis of Subjective City Happiness Index Based on Large Scale Microblog Data. In Cheng, R., Cui, B., Zhang, Z., Cai, R., Xu, J. (Eds.), *Web Technologies and Applications. APWeb 2015.* Lecture Notes in Computer Science, vol 9313. Springer, Cham, 365-377. doi: 10.1007/978-3-319-25255-1_30

Yang, C. and Srinivasan, P. (2016). Life Satisfaction and the Pursuit of Happiness on Twitter. *PLoS ONE, 11*(3), e0150881. doi: 10.1371/journal.pone.0150881

The effects of the implementation of Law no. 153/2017 on the unitary remuneration of personnel paid from public funds

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Abstract: *Regarding remuneration, the last 20 years in the Romanian public sector have been marked by extensive debates on the discrepancies between the incomes of the different categories of public personnel, the differences in the application of the legal framework, as well as the lack of correlation between the results of individual work performance and the level of remuneration. The low level of remuneration and the lack of legal forms for rewarding public personnel for their achievements as a form of developing motivation, led to low performance in the public sector. In 2017, the Romanian authorities conducted a reform regarding public personnel remuneration through the adoption of Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds. The purpose of the mentioned law was to ensure a uniform remuneration framework in the public sector by applying clearly formulated principles and criteria as well as to decentralize the decisions taken in this area. From this perspective, the purpose of the present study is to analyze the impact of the implementation of Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds from the perspective of its application, its effects, and the correlation of individual performance with the level of payment. Within the framework of the research, the process of applying the new rules, the principles underlying the new payment system, the criteria for adopting the new payment system, the level of income increases, the correlation between civil servants' activities and the level of remuneration as well as, the objectivity of the individual evaluations were considered. The research methodology consists of an opinion survey conducted in public administration institutions using as a research instrument, a self-administered questionnaire where 320 civil servants participated. The study revealed a high degree of dissatisfaction among civil servants regarding the new remuneration system as well as the existence of certain factors that are more relevant and important than the income level, for developing civil servants' motivation, such as the hierarchical superiors' attitudes and the appreciation expressed by the beneficiaries of the provided services. The study also revealed that the current remuneration system does not support sufficiently the modernization process in the public administration and more than that, it led to an increase in the costs of implementing the regulations of the normative act because a significant proportion of public servants have contested in court the manner in which this law was applied.*

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The effects of the implementation of Law no. 153/2017 on the unitary remuneration of personnel paid from public funds

Introduction

One of the most important problems of the Romanian public administration is the low administrative capacity, with negative impact on the administrative reform, on the proper functioning of public institutions and public services, on the quality of the services provided to citizens, as well as on the economic and social development. More than that, this particular problem is also mentioned in the Country Reports (European Commission, 2019), where it is affirmed that the low administrative capacity has a negative impact on the efficient functioning and performance of the public institutions and services. The partnership agreement between Romania and the European Union (2014-2020) mentions the main causes of the low administrative capacity that includes human resources management, an area with no integrated long-term policy that would lead to unitary and stable management. Reports and documents issued by the European Commission (2019), the World Bank (2017), or OECD (2018) summarized the main problems faced by Romania concerning human resources management in the public sector. These problems are the inflexible methods used for civil servants' recruitment, selection, evaluation, and promotion, the instability of execution and management positions, bureaucracy, the measurement of performance based on procedures and not on the achievements of the established objectives, the lack of an integrated approach to ethical values and professional integrity, the lack of a strategy to promote the public sector as an employer, the low number of young people working in this sector, the need to improve and review motivational policies in the field of human resources in public administration or the lack of performance of the system.

The Third Pillar – Human Resources in The Strategy for Strengthening Public Administration (SCAP) 2014-2020 (Romania Government, 2014) aimed to reform the institutional framework and the existing policies regarding human resources in public administration, including the aspects related to public personnel's motivation and remuneration.

In the context of improving human resources management in public administration and to increase the attractiveness of the public sector as an employer, *Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds* was adopted, being applied in 2017-2022 period. As a consequence, the incomes of all public sector personnel have increased. The law also mentions bonuses, incentives, prizes, premiums, food, and holiday allowances for civil servants and other categories of public personnel. As consequence, after applying the regulations mentioned in the law, the income increases in the public sector exceeded private sector salaries as a growth rate. Even if further increases are

foreseen by 2022, it is expected that the Covid-19 pandemic and its impact on the economy to slow down or even stop the raises in public personnel's income (European Commission, 2019).

Although the application of this law had a positive impact on the increase of public personnel income, there was no development regarding the nonfinancial motivational instruments that could be used by managers in public institutions or concerning the orientation towards a performance-based remuneration system. Although the law mentions performance criteria, they are difficult to enforce and quantify. Consequently, this regulation has not reduced or eliminated the malfunctions and unclarities that authorities and public institutions have (POCA, 2020).

In this context, the present study aims to analyze the impact produced by the application of Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds in Romanian public institutions from multiple perspectives such as the method of application, its effects, and the correlation of individual performance to income levels.

1. **The literature review regarding the remuneration of the personnel paid from public funds and the correlation between the income level and individual work performance**

For all countries, regardless of their geographical location or degree of development, public sector remuneration costs are substantial (Schiavo-Campo et al., 2005), with a share of 10 up to 40 % of central government expenditure and even more for regional or local governments (Monks, 2013).

The process of remuneration is complex and comprises multiple actions such as the establishment of staff budgets, individual compensation at career stages (employment, promotion, holidays, and retirement), and the process of calculating and managing salaries, involving high costs and human resources. In this situation, applying the cost-benefit theory in the public sector (Fuguitt & Wilcox, 2002) would be relevant as to reflect the financial efforts in the public service quality and the citizens' benefit (Giordano et al., 2011).

During time, countries used different remuneration systems in their public sectors. Until the 1980s, most countries were applying a remuneration system based on the position in the institutional hierarchy and seniority. After that, the income level started to be correlated with performance criteria (Hasnain, Manning & Pierskalla, 2012). The introduction of the salaries correlated with individual performance is based on the theories of Vroom Victor (1964) or Porter Liman (1968) and became a universal model.

However, as mentioned in a report of the European Institute of Public Administration (Cardona, 2007) performance-related payment schemes presume high costs and require a lot of time for implementation. Furthermore, they do not apply to all categories of employees, and measuring performance, especially in areas where quantifiable results are not obvious, is a very difficult process.

Furthermore, "there is insufficient, positive or negative evidence of the effects of performance-related incomes in organizational contexts, which are similar to those of the public service in order to reach a generalized conclusion on such reforms" (Hasnain, et al., 2012).

Various studies argue that a performance-based remuneration system can be implemented in any type of administration (Jensen & Murph, 1990). In opposition, other authors (Hasnain, et al., 2012) who consider that there are few examples to draw firm conclusions. Moreover, performance-based salaries can have negative effects (Weibel et al., 2010).

Therefore, the performance-based remuneration model has many supporters being implemented in different administrative systems, but there are also many criticisms. The arguments against this system are based on the analysis of the results from previous studies and the psychological effects produced by such a model. In this respect, the income scale model that combines elements of status (basic salary), complexity, and nature of work (basic salary adjustments) as well as performance (variable pay component) is more preferred and suited for the public sector (O'Riordan, 2008).

Good practices in the area of remuneration in the public sector should take into account elements such as: creating control mechanisms, establishing the level of remuneration according to a reference element (basic salary, average salary, function specificity), adjustment of salaries with the inflation rate, correlation with performance policy, leading to a combination of fixed and variable remuneration (Bruni, 2017).

Moreover, the legislative changes regarding the remuneration of the personnel paid from public funds should be based on the introduction of a modern public management system that considers performance improvements in the quality of public services, and on identifying sources of funding that enable sustainable and steady income growth (Andrei et al., 2009).

By implementing *Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds*, Romania aimed to introduce a model of the income scale that combines the elements of status and complexity with performance aspects, given that the previous regulations were focused exclusively on a salary system based on the position in the institutional hierarchy and seniority.

2. **The evolution of the legislative framework regarding
   the remuneration of Romanian public personnel
   in 2000-2020 period**

In Romania, the remuneration of the personnel paid from public funds has been an issue included in all governments' programmes and reform strategies over the last 20 years. Thus, the Government's Strategy on accelerating reform in public administration (2001) comprised a system of unitary remuneration, reviewing the modalities of remuneration of local elected officials, the development and

implementation of a system of recruitment, evaluation, and promotion based on competence and continuous training of civil servants (Romanian Government, 2001).

Additionally, the 2001-2004 Government's Programme aimed to depoliticize public administration structures and eliminate political clientelism, and the mentioned actions included the consistent and correct management of civil servants' careers through adequate pay, stimulating and ensuring normal working conditions in order to respect the principle of stability and continuity of work (Romanian Parliament, 2000).

The 2009-2012 Government Program aimed to gradually reduce personnel expenditures in Central and Local Public Administration to 20% compared to those registered in 2008, to eliminate 139.500 vacancies and reduce expenses for travels, bonuses, premiums, or incentives. Moreover, the 2012 Governing Programme aimed to reform the payroll of the personnel paid from public funds (Parliament of Romania, 2009).

The Strategy on the development of the Public Service 2016-2020 noted that the public administration in Romania lacks "a general and transparent approach to human resources management, especially regarding recruitment, evaluation, payroll, career development for all categories of staff and training" (Romanian Government, 2016).

Based on the objectives in the Government's programs and administration reform strategies, differentiated income regulations for civil servants and other public personnel were adopted between 2000 and 2017. Each year, new regulations or changes to the existing ones that mainly concern income indexations or changes regarding the calculation manner, were introduced.

However, much of these changes concerned special situations, such as granting staff bonuses or equal percentage income increases for other categories. More than that, an increase in remuneration for one category led to similar demands from other categories.

There have been attempts to establish a ratio between the minimum base income and the maximum salary in the public sector (1 to 12 in 2009) or to establish the maximum share in the Gross Domestic Product for personnel costs (to gradually reduce the costs from 9.40 % in 2009 to 8.70 % in 2010, to 8.16 % in 2011, to 7.88 % in 2012, to 7.58 % in 2013, to 7.34 % in 2014 and to 7 % in 2015 and the next years).

This discordant approach regarding public personnel's income led to a low level of remuneration, which made the public sector unattractive being perceived as a corrupt system. Major pay gaps between similar institutions and public positions generated migration among civil servants to the public institutions with a higher remuneration level (7127 in 2011) (National Agency of Public Servants, 2013).

In this context, *Law No. 153/2017 on the unitary remuneration of the personnel paid from public funds* was adopted, which aimed to establish a remuneration system for the personnel paid from the consolidated general budget of the State (Article 1). In addition, the law presents the principles of the remuneration

system (Article 6), including the principle of vertical and horizontal hierarchy within the same field, depending on the complexity and importance of the work carried out. The regulation also comprises performance criteria that must be used for personnel's promotion, and the conditions for receiving bonuses and prizes (Romanian Parliament, 2017). The novelty brought by this normative act is the decentralization of the decisions regarding the remuneration of local public administration personnel. The maximum and minimum wage levels are established and also the fact that the performance criteria and incomes are established by the decision of the Local Councils, after consulting the employees.

Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds represented an important step in increasing the incomes of all categories of public personnel and for granting bonuses and incentives, food and holiday allowances, prizes, and premiums. However, it was not successful in eliminating the unclarities and malfunctions identified in the public authorities and institutions. The performance criteria set out in the law are difficult to quantify and apply on an objective basis, and the content of the performance criteria specific to each field of activity, as well as the evaluation procedure are established according to the regulations applicable to each category of staff (Impact Assessment Report of measures implemented under SCAP 2014-2020). In addition, the law has generated a multitude of legal conflicts, and the large number of disputes should be in the attention of the decision-makers (Carp, 2019).

The presented regulations and strategies managed to address only some of the problems related to human resources management and, as noted in the Impact Assessment Report on the measures implemented under SCAP 2014-2020, Romania's progress in public administration reform remains limited.

Moreover, the income increases generated by the application of the Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds, solved some of the problems related to remuneration and motivational policies in the public sector but may have negative consequences on the economy. Salaries in the public sector have risen significantly, exceeding the level of income from the private sector. This situation may have a negative impact on inflation and competitiveness if these increases will not be accompanied by productivity growth. Another negative aspect remains the unsolved problem regarding the nonfinancial motivational instruments that should be used by managers as well as the fact that the remuneration system is not correlated with policies that might increase public sector's performance (Assessment Report on the impact of measures implemented under SCAP 2014-2020).

3. The research methodology and data collection

By adopting Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds, a reform regarding the income of the staff paid from public funds was sought. In this respect, the purpose of this research is to analyze the impact of the Law no. 153/2017 implementation in the Romanian public administration, from the perspective of the application, its effects, and the correlation of individual performance with the income level.

The main objective of the research is to analyze the impact of the current remuneration system on the development and modernization of public administration institutions in Romania.

The study is based on three specific objectives:

Ob.1: The analysis of the effects produced by the implementation of Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds.

Ob.2: The analysis of civil servants' level of satisfaction concerning the remuneration system applied in the public administration.

Ob.3: The analysis of civil servants' perceptions regarding the application of Law no. 153/2017 and on the implementation of a system that correlates individual performance with the income level.

The research methodology consists of an opinion survey conducted using a self-administered questionnaire built by the authors. The research was conducted in Romanian public administration institutions. The questionnaire was designed by the authors in order to investigate the impact of Law no. 153/2017 implementation and civil servants' perceptions on the effects and manner of application of this law, as well as on the extent to which it is successful to correlate the individual performance with the income level.

The 320 participants in the study were chosen using the convenience sampling method. The sample chosen for this study reflects a representative distribution of gender, age, administration experience, administrative level, and hierarchical level.

4. The main results of the study and discussions

In order to analyze the effects of the implementation of Law no. 153/2017 on the unitary remuneration of the personnel paid from public funds and civil servants' perception on the new remuneration system, the collected data was processed in SPSS and interpreted. For this analysis, averages, synthetic variables, correlations, and regressions were computed.

Figure 1. Civil servants' perception regarding the income growth generated by Law no. 153/2017 implementation
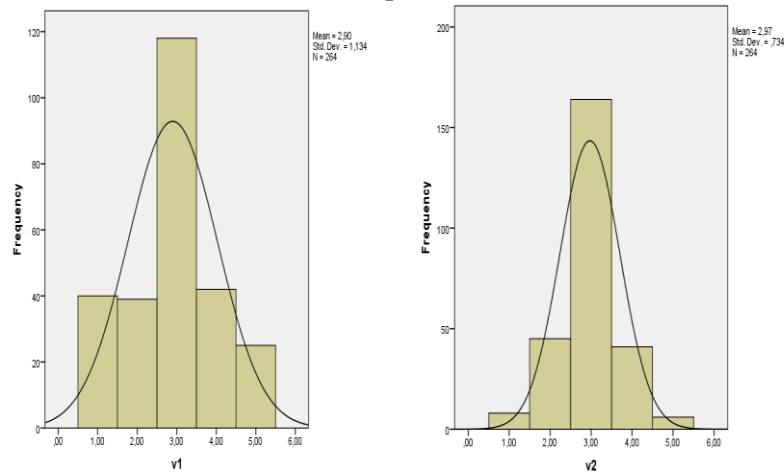
(*Source*: Authors, 2021)

Civil servants were asked to express their opinions regarding the income increases generated by Law no. 153/2017 implementation and how they appreciate their income growth. The responses were measured on a scale from 1 to 5. For both questions, they considered that their personal income increased to a medium extent, having the same opinion regarding the increases generated in the whole public sector. The average of their responses was 2.90, respectively, 2.97.

Figure 2. The average distribution regarding civil servants' perception on the appreciation of their work
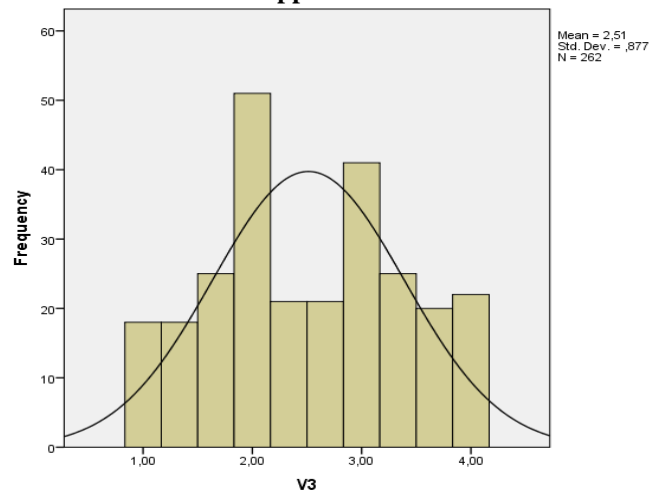
(*Source:* Authors, 2021)

Respondents were asked if they consider that their activity is appreciated, based on three variables: the level of their earnings, the appreciation from their hierarchical superiors, and from society. Each variable was measured on a scale of 1 to 4, where: 1 showed a negative perception of civil servants in relation to the three mentioned attributes, 2 showed a satisfactory perception, 3 represented a good perception and 4 showed a positive perception. In order to measure civil servants' perception regarding the level of appreciation of their work and activities, a synthetic characteristic was defined based on the three mentioned variables. The synthetic variable represents a simple arithmetic average of the three variables used to measure respondents' perception regarding the appreciation of their work: $V: N \rightarrow [1,4]$, $V = (V_1 + V_2 + V_3)/3$. A high value of the variable V means that the participants consider that their work is appreciated by society, hierarchic superiors and related to the level of remuneration they receive.

As shown in Figure 2, the averages of the three primary variables computed based on the values recorded among the respondents are 2.6 for the perception of their activity appreciation related to the level of the received income; 2.5 for the variable that measures the level of appreciation from the hierarchical superiors and 2.5 in the case of the variable used to assess civil servants' perception regarding the appreciation from the beneficiaries of the services provided by them. The three average values highlight a high degree of dissatisfaction among civil servants, caused both by the internal factors of the public administration system, represented in this case by the public service remuneration system and the attitude of hierarchical superiors, but also because of the external factors that are represented in this case, by the appreciation they received from the beneficiaries of the services provided by them. The synthetic variable computed from the scores obtained for the three mentioned components revealed that civil servants' work is considered on average from satisfactory to good, which represents a rather low level indicating a high degree of dissatisfaction from the respondents' part.

In order to analyze the aspects related to the remuneration system adopted in 2017, the respondents were addressed three questions which meant to evaluate:

1. To what extent the new remuneration system encourages performance in public administration.

2. The impact of the application of the new remuneration system on public services' quality.

3. To what extent some important aspects concerning the modernization of the public administration are stimulated by this new remuneration system. Aspects related to: attracting young people, encouraging mobility, stimulating personal development, reducing corruption, increasing the quality of public services, encouraging competition between employees to improve the quality of the performed work, and attracting European funds, have been considered.

Figure 3. Civil servants' perception regarding the existence of a correlation between the income level and individual work performance
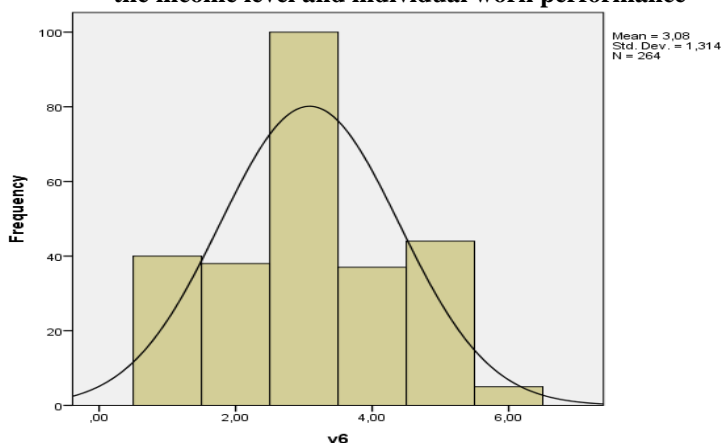
(*Source:* Authors, 2021)

In order to investigate civil servants' opinions regarding the correlation between the level of remuneration and individual work performance, a five-value measurement scale was used, where the values of the scale meant: 1 – there is no correlation, 2 – the correlation is insignificant, 3 – the correlation is moderate, 4 – there is a significant correlation and 5 shows a strong correlation between the two considered variables. The highest proportion of respondents (38%), considered the existence of a moderate correlation, and the other four response variants have relatively equal weights ranging from 14 up to 16 %. The average value of this variable is 3.1. The results showed that, in the participants' opinions, the changes implemented regarding the public sector remuneration system managed to correlate the income levels with civil servants' performance only to a medium extent.

Figure 4. Civil servants' perception regarding the impact of Law no. 153/2017 implementation on the increase of public services' quality
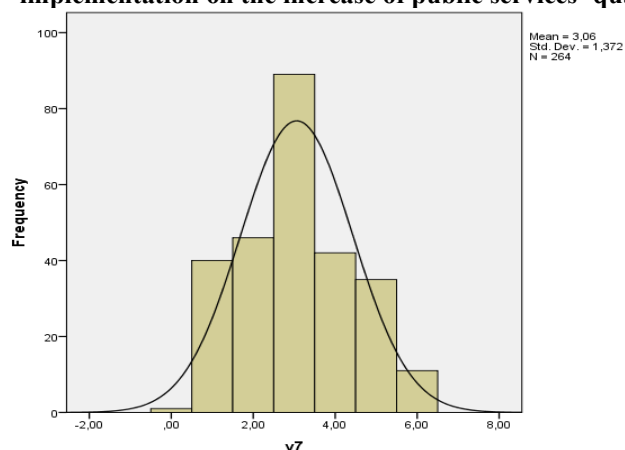
(*Source:* Authors, 2021)

In order to evaluate the extent to which the implementation of the new remuneration system generated a positive impact on the public services' quality, a five-value measurement scale has been used, where the values of the scale meant: 1 – it had no impact, 2 – the impact was insignificant, 3 – the impact was moderate, 4 – the quality of public services has improved quite much and 5 – the quality of services has greatly improved. The highest share of respondents considered that the impact of the new remuneration system on public services quality was a moderate one. The average of the responses to this question is equal to 3, indicating that the current remuneration system impacts the increase of public service quality only to a medium extent.

**Figure 5. The average distribution of the variables measuring the quality
of the remuneration system and its effects on stimulating the process of modernization
in public administration**
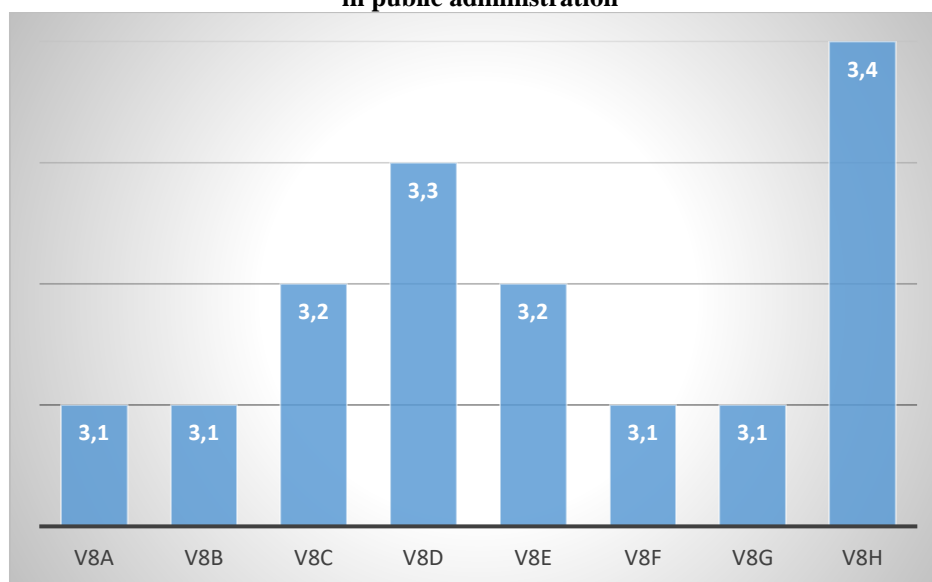
(*Source:* Authors, 2021)

In order to evaluate the quality of the current remuneration system and its effects on stimulating the process of modernization in public administration, civil servants were asked to what extent the new remuneration system encourages a series of actions such as: attracting young people to public sector (v8a), stimulating employees' mobility in public administration (v8b), boosting individual performance (v8c), reducing corruption in public administration (v8d), increasing the quality of public services (v8e), increasing competition between employees (v8f), increasing the level of responsibility on the part of employees (v8g) and boosting European funds access (v8h). To measure respondents' perception related to the eight mentioned items, a scale of five values was used, where the scale meant:

1 – it does not stimulate at all, 2 – it stimulates to a small extent, 3 – it stimulates to a medium extent 4 – it stimulates quite a lot and 5 – it stimulates to a high extent.

Considering civil servants' opinions related to the eight criteria outlined above, the results revealed that the law regarding public personnel's remuneration stimulates the modernization process of the public institutions, on average, only to a medium extent. For each of the mentioned items, the majority of respondents (between 58 and 67%) considered that the current remuneration system encourages the modernization of public administration to a medium extent. Moreover, for most of the above-mentioned criteria, civil servants' proportion who considered that the actual remuneration system does not stimulate public administration modernization or it stimulates only to a small extent is between 25 % (in the case of variable 8c) and 35 % (in the case of variable 8a).

For each mentioned criterion, the average distribution of the responses was computed. The results are presented in Figure 5 and reveal the reduced capacity of the current remuneration system to support the modernization process in the Romanian public administration. The only positive identified aspects are related to the increased capacity of the public administration to access and use European funding (the average for this item is 3.4) and the reduction of corruption in the public institutions (the average for this item is 3.2).

Figure 6. The average distribution of civil servants' responses regarding the contribution of the actual remuneration system to public administration modernization (V8)
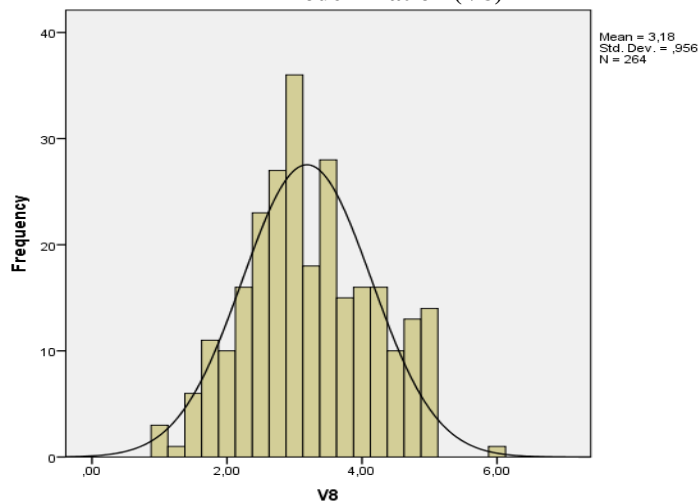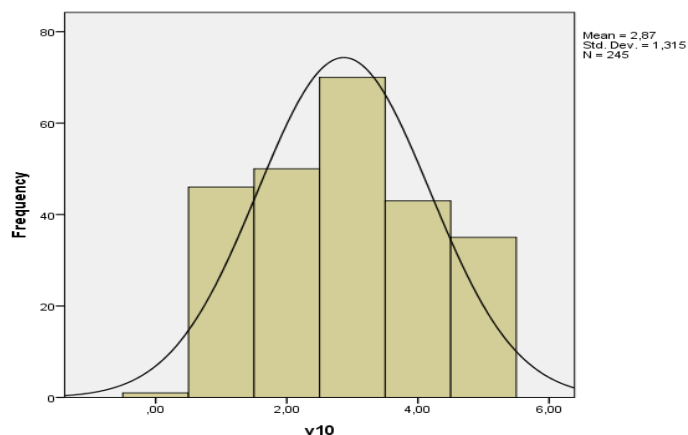

(*Source:* Authors, 2021)

In order to evaluate the capacity of the actual remuneration system to contribute to public administration modernization, based on the eight primary variables presented above, the variable V8 was defined using the following relationship: $V_8: N -> [1,5], V8 = (V_{8a} + \cdots + V_{8h})/8$. The distribution of these

variable values is presented in Figure 6, revealing that, in civil servants' opinions, the current remuneration system contributes to public administration modernization from a small to a medium extent.

Figure 7. Civil servants' perception regarding the difficulties encountered in the process of the Law no. 153/2017 implementation

(*Source:* Authors, 2021)

In order to evaluate the difficulties in implementing the regulations of the analyzed law, the civil servants were asked to appreciate the extent to which they found it difficult to implement this law, using a scale from 1 to 5, where the values of the scale meant: 1 – not difficult, 2 – to an insignificant extent, 3 – to a medium extent, 4 – quite difficult and 5 – to a high extent. The average distribution of responses revealed that the majority of the participants considered that Law no. 153/2017 was difficult to implement only to a medium extent.

Table 1. The distribution of responses regarding the conflicts generated by the application of the remuneration law (%)

Quite a lot (over 50% of the civil servants)	Many (between ¼ and ½ of the civil servants)	Quite many (between 10% si ¼)	An insignificant number (the most 10%)	No conflicts
34.0	10.0	4.0	9.5	42.5

(*Source:* Authors, 2021)

An important aspect related to the application of the analyzed normative act is related to the difficulty of its implementation, as well as to the number of generated legal conflicts or processes. The results presented in Table 1 highlight two important aspects concerning the implementation of this law, namely, the high costs supported by the public institutions for the implementation of this law, as an important share of civil servants contested in Court the administrative acts resulted from the

application of this law. One-third of the study's participants reported that more than half of civil servants contested this legislative act in Court, generating a climate of mistrust among civil servants due to the high number of labor disputes being resolved through justice.

Table 2. The average distribution of the responses regarding civil servants' satisfaction on the actual remuneration system (%)

Very satisfied	Satisfied	Moderately satisfied	Very little satisfied	Not satisfied
12.1	18.9	39.8	13.6	15.6

(*Source*: Authors, 2021)

The implementation of any regulation related to the public sector may also have a negative impact on civil servants' satisfaction. Consequently, respondents were asked about their degree of satisfaction concerning the existent remuneration system. The distribution of their responses is presented in Table 2 and shows that there is a high proportion of civil servants who are dissatisfied with the adopted remuneration system.

The research results revealed that the actual remuneration system that was adopted in 2017 is an expensive one, being difficult to implement. More than that, it seems that the motivation of most civil servants has not increased. At a first glance, the situation seems paradoxical because, with the introduction of the new remuneration system of public sector personnel, inclusively civil servants', the ratio between the average monthly net wage earnings in the public and private sectors per total and by gender has re-entered an upward trend.

Figure 8. The ratio between the monthly average net earnings in the public and private sectors per total and by gender
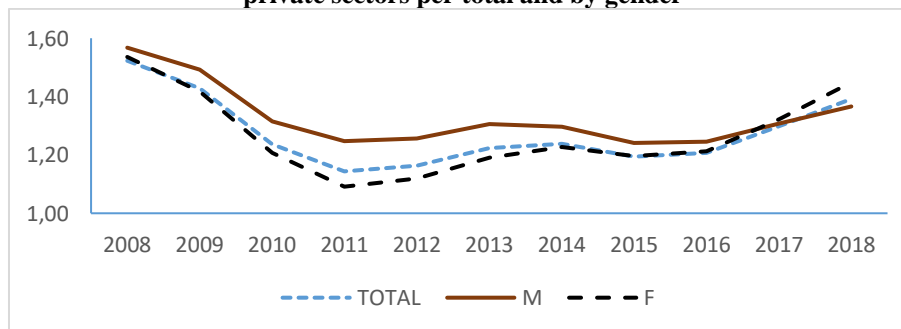
(*Source:* Authors, 2021)

Figure 8 presents the evolution of the ratio between the monthly average net earnings in the public and private sectors per total and by gender, in the 2008-2018 period. The data reveals some important aspects such as: throughout the mentioned period, the ratio per total and by gender, was over unitary, the maximum values

above 1.5 were reached in 2008, and the minimum values in 2011. In the period following the crisis in 2008, the value of the indicator steadily decreased as a result of the decrease in the average nominal net earnings in 2011 compared to 2008 in the public sector by almost 9% and the increase in the private sector by 22%. In the 2012-2016 period, a recovery in the value of this ratio was registered, and in 2012 the ratio increased to 1.2 as a result of the higher rate of growth in the average net earnings in the public sector (the 2016 growth rate compared to 2011 was 48%) than in the private sector (40%). In the 2016-2018 period, there was an increase in the public-private imbalance, with the ratio reaching 1.4 as in 2018 the average monthly net earnings growth rate in the public sector was 43%, while in the private sector was 24%. In 2018, compared to the previous year, the average monthly net earnings growth rate in the public sector was 19%, while in the private sector was 11%.

**Table 3. Regression models based on the dependent variable -
the degree of appreciation of civil servants' activity (V3)**

	Model 1	Model 2
c	1.751^* (0.228)	0.961^* (0.243)
V_8	0.346^* (0.063)	0.231^* (0.055)
V_{24a}	0.019^* (0.007)	
V_1		0.126^* (0.059)
V_2		0.174^* (0.090)

(*Source:* Authors, 2021)

In order to investigate how certain characteristics influence civil servants' perceptions regarding the level of appreciation of their activity, two regression models have been defined. The results are presented in Table 3. The first regression model reveals a significant linear dependence between the level of appreciation of civil servants' activity based on the remuneration system's capacity to contribute to the public administration's modernization (V8) and on civil servants' seniority in the public institutions (V_{24a}). The second model highlights a linear dependence between civil servants' perception regarding the level of appreciation of their work and the capacity of the remuneration system to contribute to the public administration's modernization (V8) the immediate impact of the application of the new regulations of the law (V1) and the income received by civil servants (V2).

5. Conclusions

Law no. 153/2017 was intended to be a reform for the public sector that would contribute to increasing institutional and individual performance by applying a motivating, objective, and balanced remuneration system. However, there is a high degree of dissatisfaction among civil servants regarding the new remuneration system. Moreover, the collected data revealed that, despite some income increases, the internal factors of the public administration system, such the hierarchic superiors' attitudes or external factors represented by the appreciation of civil servants' work

by the beneficiaries of their services, are more relevant than remuneration, in developing motivation.

The mechanism implemented by the requirements of the remuneration law, generated changes that, according to the respondents, are not in line with the process of public administration modernization. Thus, the new remuneration system is not linked to the level of performance and slightly encourages the increase in public services' quality, resulting in a negative impact on civil servants' professional development.

Overall, the study's results led to the conclusion that the current remuneration system does not sufficiently support the modernization process in the public administration, especially since the allocated financial resources have led to the decrease of public investments. The positive aspects resulting from the application of the new regulations are related to the increasing of public administration capacity to attract European funds and reducing corruption.

The study also revealed the high costs generated by the regulations of the normative act implementation, as an important proportion of civil servants contested the law, in court. The legal conflicts generated additional expenses for public institutions and led to the development of a climate of mistrust between civil servants and public institutions.

Therefore, although an increase in civil servants' incomes has been observed, reaching a similar level with the private sector's, the benefits of the remuneration system are few in terms of modernization, performance, and quality, the only obvious benefit being the reduction of corruption.

In conclusion, the regulatory act requires adjustments in the light of applicable criteria, correlation with other normative acts, and clarification on the application mechanism. There is also a need for better reporting of the civil servants' income levels with the individual performance assessment system and the implementation of measures aiming to increase the nonfinancial motivation of the human resources from public administration.

References

Andrei, T., Profiroiu, C.M., Oancea, B. & Nedelcu, M., (2009), Considerations on the Remuneration System of the Public Administration – an Analysis on Electoral Cycles and Scenarios Development, *Theoretical and Applied Economics*, 03(532). 57-70.

Bruni, P., (2017). *The Regulation of Executive Pay in the Public and Semi-Public Sector across the European Union*, European Institute of Public Administration, Maastricht, the Netherlands.

Carp, A., (2019). Conflicte privind aplicarea legii salarizării în sectorul bugetar', 2019, *Romanian Statistical Review – Supplement*, 11, 132-138.

Cardona, F., (2007). *Performance Related Pay in the Public Service In OECD and EU Member States*, SIGMA, Support for Improvement in Governance and Management, 2007.

European Commission, (2019). *Country Report Romania 2019'. Including an In-Depth Review on the prevention and correction of macroeconomic imbalances*, Online,

available at: https://ec.europa.eu/info/sites/info/files/file_import/2019-european-semester-country-report-romania_en.pdf. Accessed June 24, 2020.

Fuguitt, D. and Wilcox, S.J. (2002). *Cost-Benefit Analysis for Public Sector Decision Makers, Quorum*, SUA, Doi 10.1007/s100220100042.

Giordano, R., Depalo, D., Pereira, M.C., Eugène, B., Papapetrou, E., Perez, J.J, Reiss, L. & Rotea, M. (2011). *The public sector pay gap in a selection of euro area countries*, Working paper series no 1406.

Hasnain, Z., Manning, N. & Pierskalla, J. (2012). *Performance-related pay in the public sector: a review of theory and evidence.* World Bank Policy Research Working Paper.

Monks, B. (2013). Public Sector Payroll Management'. In: Allen R., Hemming R., Potter B.H. (eds) *The International Handbook of Public Financial Management*. Palgrave Macmillan, London, 2013, https://doi.org/10.1057/9781137315304_16.

National Agency of Civil Servants, (2013). *Raport privind managementul funcţiei publice şi al funcţionarilor publici pentru anul 2012*. Online, available at: http://www.anfp.gov.ro/R/Doc/Raport%20Management%202012.pdf. Accessed August 19, 2020.

OECD, (2018). *Rethinking Regional Development Policy-making, OECD Multi-level Governance Studies*, OECD Publishing, Paris.

O'Riordan, J. (2008). *A Review of the Civil Service Grading and Pay System*, Institute of Public Administration, Ireland.

Parlamentul României, (2003). *Legea nr. 53 din 2003 - Codul muncii, actualizată.* Published in the Official Monitor no. 72 from 5 February 2003.

Parlamentul României, (2017). *Lege-cadru nr. 153 din 28 iunie 2017 privind salarizarea personalului plătit din fonduri publice*. Published in the Official Monitor no 492 from 28 June 2017.

Raport de evaluare a impactului măsurilor implementate în cadrul SCAP 2014-2020 pe Pilonul III - Resurse umane.

Romanian Government, (2000). *Program de Guvernare pe perioada 2001 - 2004, anexă la Hotărârea Parlamentului României nr. 39 din 28 decembrie 2000, pentru acordarea încrederii Guvernului*. Published in the Official Monitor no. 700 from 28 December 2000.

Romanian Government (2001), *Strategia Guvernului privind accelerarea reformei în administraţia publică. Guvernul României - Strategii, politici, programe*, Online, available at: http://gov.ro/ro/obiective/strategii-politici-programe/strategia-guvernului-privind-accelerarea-reformei-in-administratia-publica&page=1. Accessed August 28, 2020.

Romanian Government. (2004), *Program de Guvernare pe perioada 2005-2008, anexă la Hotărârea parlamentului României nr. 24 din 28 decembrie 2004 pentru acordarea încrederii Guvernului*. Published in the Official Monitor no. 1265 din 29 decembrie 2004.

Romanian Government, (2009). *Program de Guvernare 2009-2012*, anexă la Hotărârea Parlamentului nr. 31 din 22 decembrie 2008 privind acordarea încrederii Guvernului. Published in the Official Monitor no. 869 from 22 December 2008.

Romanian Government, (2011). *Hotărârea de Guvern nr. 286 din 23 martie 2011, actualizată, pentru aprobarea regulamentului-cadru privind stabilirea principiilor generale (...) a personalului contractual din sectorul bugetar plătit din fonduri publice*. Published in the Official Monitor no. 221 from 31 March 2011.

Romanian Government. (2012), *Program de Guvernare 2013 – 2016*. Online. Available at: http://gov.ro/fisiere/pagini_fisiere/13-08-02-10-48-52program-de-guvernare-2013-20161.pdf. Accessed August 20, 2020.

Romanian Government, (2014). *Strategia pentru consolidarea administraţiei publice 2014-2020*, Online. Available at: http://www.dpfbl.mdrap.ro/documents/strategia_administratiei_publice/Strategia_pentru_consolidarea_administratiei_publice_2014-2020.pdf. Accessed 28 August 2020.

Romanian Government. (2016). *Programul de Guvernare 2017 - 2020. postat pe site-ul Camerei Deputaţilor*, Online. Available at: http://www.cdep.ro/pdfs/oz/Program%20de%20Guvernare.pdf. Accessed August 28. 2020.

Romanian Government (2018). *Programul naţional de reformă 2018*. Online. Available at: https://afacerieuropene.mae.ro/sites/ae.mae.ro/files/pnr_2018_ro.pdf. Accessed August 28, 2020.

Romanian Government, (2019). *Ordonanţă de urgenţă nr. 57 din 3 iulie 2019, privind Codul administrative*. Published in the Official Monitor no. 555 from 5 July 2019.

Schiavo-Campo, R., De Tommaso G., & Mukherjee, A. (2005). *Government Employment and Pay in Global Perspective: A Selective Synthesis of International Facts, Policies and Experience*. Washington, DC: World Bank.

Weibel, A., Rost, K. & Osterloh, M. (2010). Pay for Performance in the Public Sector-Benefits and (Hidden) Costs, *Journal of Public Administration Research and Theory*, *20*(2), DOI: 10.1093/jopart/mup009.

The World Bank, (2017), *Raportul Evaluării Impactului Reglementărilor: Un sistem de ocupare mai bun la nivelul administraţiei publice centrale*, Online, available at: https://sgg.gov.ro/new/wp-content/uploads/2016/04/RIA-Report-NACS_RO.pdf, accessed May 21, 2020.

Public support and administration barriers towards entrepreneurial intentions of students in Poland

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Abstract: *The extant literature on entrepreneurial intentions has examined the relationship between human entrepreneurial activity and entrepreneurship policy, especially in terms of institutional environment and institutionalism or the role of supporting policies. The aim of this article is to empirically verify the impact of perceived public support and institutional barriers on students' entrepreneurial intentions. The article uses the quantitative approach typical for social sciences. Based on a literature review, two hypotheses were retrieved, and then empirically verified. The primary tool was a survey conducted on a relatively large sample of 719 students of seven different universities from Krakow (Poland). The multiple regression was applied as a leading tool for hypotheses verification. The results confirmed that positively perceived public support in favour of entrepreneurship strengthens the young generation's entrepreneurial intentions to start their own business, while negatively perceived administration barriers against entrepreneurship blunts the young generation's entrepreneurial intentions to start their own business. Therefore, this article's contribution to extant literature is the replication of research from well-advanced economies in the discussed scope and its transfer to the realities in Poland. Furthermore, the contribution of this article is a verification of the postulated negative perception of institutional barriers, and not just obstacles related to obtaining financial support, as it is the case in various articles.*

Keywords: public support, administration barriers, institutional barriers, entrepreneurship education, entrepreneurship, entrepreneurial intentions

JEL: L26, L38, D73

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Introduction

Although derived from social psychology, intention-based models are successfully applied in management research, particularly in entrepreneurship studies. On their basis, we can predict future behaviour, which is essential both to

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managers, economic analysts, and decision-makers responsible for shaping an appropriate system of support for entrepreneurship, including its important element, namely entrepreneurship education (Bartha *et al.*, 2018; Wach & Głodowska, 2019) whose main task is to shape proper entrepreneurial attitudes. An appropriate education system stimulating entrepreneurship is significant for economic practice (Gubik & Bartha, 2018), the European Union has recommended such solutions has recommended such solutions for many years, but also in Poland the implementation of those recommendations is becoming more and more critical, not only at economics universities but also in non-economic fields of study (Płaziak & Rachwał, 2014), especially in the aspect of the internationalization and Europeanization of Polish universities (Dobbins & Kwiek, 2017). In this context, Sułkowski et al. (2020) notice the necessity for the adequate transformation of Polish universities, especially in the context of demographic changes (Sułkowski et al. 2019). One of university's tasks is to shape entrepreneurial attitudes, inspire to think creatively and stimulate entrepreneurial intentions among university students (Kuehn, 2008). As Nowiński *et al.* (2020) emphasize, in shaping entrepreneurial attitudes not only education in the area of entrepreneurship is important but also the perception of public support and barriers. Wannamakok *et al*. (2020) based on their empirical study, observed that each dimension of the institutional environment plays a decisive role in Estonian university 'students' entrepreneurial intentions.

The aim of the article is the empirical verification of the impact of the perceived public support and administration barriers on entrepreneurial intentions of students. The primary tool was a survey conducted among students (n = 719) of a few universities from Krakow (Poland). The survey results were subject to statistical processing with the use of the Statistica® software.

1. Theoretical background and literature review

In order to understand what mechanisms govern entrepreneurial intentions of individuals, it is worth using a well-established psychological and sociological concept dating back to mid-1980s – the theory of planned behaviour (TPB), developed by Ajzen (1991). According to this theory, intentions to perform behaviour depend on three antecedents (i) what attitude we have towards this behaviour, (ii) perceived behavioural control, that is feasibility, and (iii) social norms which shape the perception of this behaviour. The first two factors, namely the attitude towards given behaviour, or rather results related to that behaviour, and the perception of social norms towards this behaviour, reflect the purpose and desire for the occurrence of such behaviour. The third factor reflects the personal perception of the possibility to control given behaviour and is identical to the sense of self-efficacy. However, it is worth expanding this model with external factors inherent to the external environment (Figure 1) and to separate attitude towards risk from the general attitude towards entrepreneurship, as risk-taking is one of the key features of entrepreneurial orientation (Głodowska *et al.*, 2019; Kusa, 2020). Although numerous times applied and tested, but this model is not conclusive all

read the globe, and some researchers noted different relations (Zamrudi & Yulianti, 2020; Udayanan, 2019).

Figure 1. The extended theory of planned behaviour by Icek Ajzen
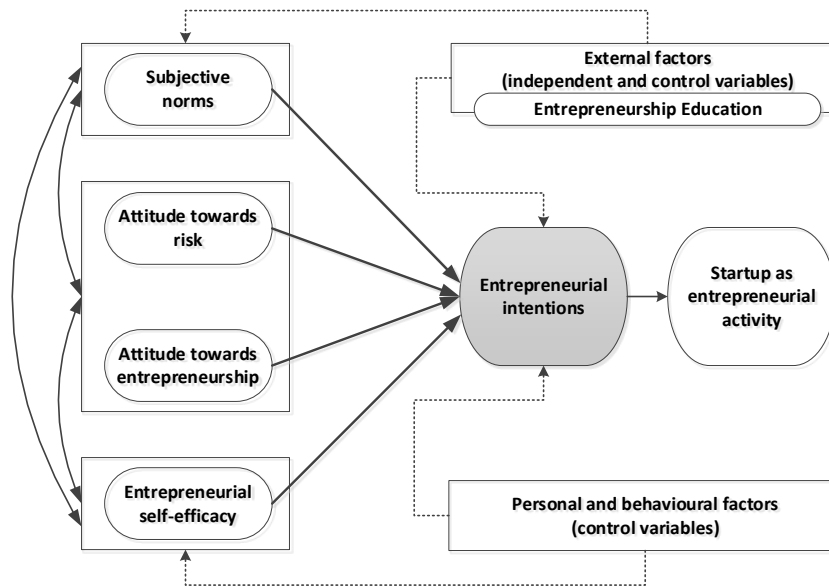
(*Source:* developed from Ajzen, 1991, p. 182)

This general concept of the intention to perform given behaviour was applied to analyze entrepreneurial intentions which are defined by Thompson (2009, p. 367) as the realized by oneself conviction about setting up a business venture and conscious planning to initiate or create this process in the future. Krueger (1993) defines entrepreneurial intentions similarly, as the propensity and possessing potential to start one's business activity in the near future. Koçoğlu and Hassan (2013) emphasize that while entrepreneurial intentions depend on those three mentioned variables (entrepreneurial attitude, subjective norms, perceived behaviour control), they also depend on personality traits, mainly on how an individual perceives his or her conditions and capabilities leading to the desired state (Azjen, 1991). Byabashaija and Katono (2011), as well as Bae at al. (2014) stress an essential role of situational factors (such as the ability to employ or the ability to make sacrifices and commitments) and characterological and personality traits (purposefulness, feasibility, efficacy) in stimulating entrepreneurial intentions and their transformation into specific behaviour - the establishment of one's own business activity (Tamulevičienė & Androniceanu, 2020). It can be confirmed by results obtained in research of discrimination in employment – it is higher for the young employees and often has form of limited possibilities of successful career planning and decent remuneration (Bilan *et al.*, 2020). Therefore, in countries with essential barriers to start own business and narrowed perspectives for successful

employment growing migrants' outflows of the youth are observed. Appropriate institutional support in the receiving countries becomes an essential driver for youth migration intentions (Mishchuk *et al.*, 2019).

To mitigate the problem of youth human capital effective usage and to increase the entrepreneurial aspiration of students, entrepreneurship course in the universities have risen. As it proved by Eyel *et al.* (2020), the effectiveness of these courses differs for public university students and foundation university students, however, the tendency for increase of entrepreneurial incentives and values is common for all groups engaged in the courses. No doubts, entrepreneurial aspiration can significantly differ depending on social conditions and family experience. Kumar *et al.* (2018) argue that attitudes towards business establishing have links with income of household, years of schooling and even experience of unemployment of household heads. While in this research gender differences have not been found, other researchers stress that male students declared a statistically higher interest in entrepreneurial activity as compared to female students (Çera *et al.*, 2018). These findings are important to design study programs in entrepreneurship more sensitive to gender needs in order to increase entrepreneurial participation.

Recent empirical evidence also linked leadership with the entrepreneurial intentions (Fauzi *et al.*, 2021). Psychological profiles and personal traits are important not only for potential entrepreneurs, but also for nascent entrepreneurs and mature entrepreneurs (Wach & Głodowska, 2021; Basuki *et al.* 2021; Reissová *et al.*, 2020). Wardana *et al.* (2021) emphasize that entrepreneurial culture, as a part of widely understood socio-cultural environment in a particular country, successfully affects students' intention to start their own business.

The second, equally often quoted theoretical conceptualization of entrepreneurial intentions is the entrepreneurial event model (EEM), very often called the SEE concept (Shapero's entrepreneurial event) whose foundations were created by Shapero (1975), who then developed it with his collaborators (Shapero & Sokol, 1982), although also Krueger (1993) contributed to its development introducing external factors, thus it is sometimes called the Shapero-Krueger model (Krueger *et al.*, 2000). Shapero model assumes that human activity is guided by inertia until an action disturbing the balance occurs and is most often negative (e.g. the loss of a job). Such impulses motivate to act (Heuer, 2012). In addition to the propensity to act, also the credibility of behaviour is important, understood dychotomically as its desirability and feasibility. The factors shape entrepreneurial intentions. Entrepreneurial intentions in the model are shaped in a broader context, since it is necessary to consider a number of personality and behavioural traits (Elfving *et al.*,2009).

Schlaegel and Koenig (2013, p. 292) emphasize that "TPB and SEE are two theories most competing with each other, commonly tested empirically in order to explain entrepreneurial intentions (EI)", which is also stressed by the co-creator of the other concept himself (Krueger *et al.* 2000). Models based on

intentions work well not only in social psychology but also in marketing and management (Krueger *et al.*, 2000, p. 416).

Karyaningsih *et al.* (2020) proved that entrepreneurship education impacts entrepreneurial mindsets and entrepreneurial intentions. Based on the recognized international GUESSS survey Gubik and Bartha (2018) observed that educational institutions in all four Visegrad countries support analytical skills, but not social skills for entrepreneurship. Hassan *et al.* (2021) proved that the empowering students during their higher education has a positive impact on their entrepreneurial intentions. Kurczewska *et al.* (2020) observed that graduates' entrepreneurial success is influenced not only by the academic knowledge itself but also by practical skills gained due to cooperation between universities and employers and entrepreneurs. On the other hand, Wagner and Sternberg (2004) underline the role of regional policy and regional milieu in shaping entrepreneurial intentions in Germany (based on REM surveys), while Nowiński *et al.* (2020) underscore that the intentions are shaped by universities and widely understood institutional environment. As there is not a lot of empirical evidence linking the perceived public support and perceived administration barriers, this is why we would like to combine entrepreneurial intentions with these institutional issues. Cong Doanh (2021) observed empirically in Vietnam very interesting dimensional impact of institutional environment on entrepreneurial intentions, which are rooted in cultural issues, and what is more, observed different influence of different dimensions of the environment (regulative, normative and cognitive environment) as well as the important role of social capital in the environment. Baharuddin and Ab Rahman (2021) proved similar relations among students in Indonesia.

2. Hypothesis development and research methodology

The existing literature on entrepreneurial intentions has studied the relationship between an entrepreneurial activity of a human being an and the entrepreneurship policy, particularly in the institutional approach (Autio & Fu, 2015; Simón-Moya *et al.*, 2014). Some research focuses on showing the role of policies supporting entrepreneurial intentions (Román *et al.*, 2013; Nowiński *et al.*, 2020). Van der Zwan *et al.* (2016) observed that the perception of public support determined entrepreneurial intentions. Therefore, on that basis, the following hypothesis should be adopted:

H1: Perceived public support for entrepreneurship strengthens the young generation's entrepreneurial intentions to start their own business.

Schwarz *et al.* (2009) postulate that the perceived barriers to entrepreneurship considerably diminishes the entrepreneurial intentions of people who consider establishing their own business. The quoted literature of the subject inclines to adopt the following research hypothesis:

H2: Perceived administration barriers to entrepreneurship blunt entrepreneurial intentions of the young generation to start their own business.

The empirical research aimed to implement Ajzen's theory of planned behaviour in a group of students in the Polish reality. It is one of the most frequently applied concepts when analysing behavioural intentions (Rantanen *et al.*, 2015; Wach & Wojciechowski, 2016). For the empirical research the quantitative approach was used. As the leading research tool a survey among Polish and foreign students was conducted. The survey questionnaire (Entrepreneurial Intention Questionnaire, EIQ) was divided into six parts, four of which concerned independent variables (entrepreneurial attitude, attitude towards risk, subjective norms, perceived control over behaviour), one dependent variable (entrepreneurial intentions), whereas the last one included the basic characteristics of the respondent, which served as control variables. The first six parts included from 4 to 7 questions evaluated on the 7-point Likert scale, which were then standardized and given the form of quasi-continuous variables through building aggregated indices. The survey's individual parts were determined in accordance with the developed research model (Figure 2) based on Ajzen's theory of planned behaviour (1991, 2011), extending it with all the control variables and one explanatory variable.

Figure 2. The research model for the hypotheses verification
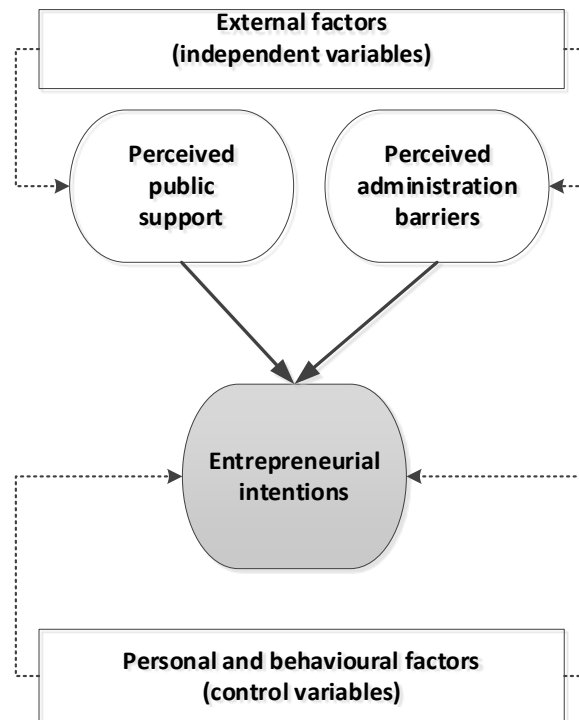
(*Source:* own study)

The EIQ survey was conducted in seven different universities in Krakow (out of 21 public and private universities operating in this truly academic city), including: (i) Cracow University of Economics, (ii) Jagiellonian University, (iii) Pedagogical University of Cracow, (iv) AGH University of Science and Technology, (v) Cracow University of Technology, (vi) University of Agriculture in Krakow, (vii) Jesuit University Ignatianum in Krakow.

Women constituted 66.8%, and men only 33.2% of the research sample. By age, the research sample was dominated by people aged 20-21 (43.6%) and 22-23 (58.9%), only 9.7% of students were below 20, and 8% were above 25. The majority of students were from bigger cities (37.2%), and 26.1% were from smaller towns, whereas 36.1% were from the country. The surveyed students studied mostly at the bachelor level (67%), but also at master's level (25.9%), while PhD students constituted only 7.1% of the respondents.

The results of the survey were subject to statistical processing with the use of the Statistica® software. In order to verify the assumed hypotheses, multiple regression was applied, which enables to show relations between a few explanatory variables and one dependent variable (entrepreneurial intentions), to be more exact, the impact (force, direction if it is significant) of the selected factors on the dependent variable.

3. Empirical findings and discussion

For the analysis, we used one dependent variable ("entrepreneurial intentions") and two explanatory variables (the first one was "perceived public support", and the other one was "perceived administration barriers"). At the level of significance $\alpha = 0.000$, we find that selected determinants together have a significant impact on the surveyed students' entrepreneurial intentions (Table 1). The assessment of the b parameter with the "perceived public support" variable equal to (+) 0.333 means that the positively perceived public support favoured the entrepreneurial intentions of students. The p-value determined for the t test statistic indicates that this variable has a statistically significant impact on the chances of entrepreneurial intentions, which means that the hypotheses H1 was confirmed. The assessment of the parameter b with the variable "perceived institutional barriers" equal to (-) 0.163 means that negatively perceived barriers in the institutional environment were accompanied by reduction of entrepreneurial intentions of students. The p-value means statistically significant effects, which means that we can confirm the hypothesis H2. The disadvantage of the calculations is its estimation, which explains changes in the dependent variable only in 15.1%.

When building Model 2 for estimations we applied three basic variables of the theory of planned behaviour of Ajzen (subjunctive norms, attitude toward behaviour and self-efficiency as perceived behavioural control) and extended the model of two new variables, namely perceived public support and perceived administration barriers, which allowed to explain changes in the depended variable in 65.3% when we treat these five variables together.

Table 1. The summary of the regression of the "entrepreneurial intentions" dependent variable among the surveyed students

Model 1	R= 0.388 R^2= 0.151 adjusted R2 = 0.148 F(2.716)=63.526 p<0.0000 Standard error of estimation: 0.332					
Variables	**b***	**Std. Err. b***	**b**	**Std. Err. b**	**t(716)**	**p**
Constant			3.346	0.315	10.615	0.000
Perceived public support	0.332	0.034	0.464	0.048	9.593	**0.000**
Received administration barriers	-0.163	0.034	-0.244	0.052	-4.699	**0.000**
Model 2	R= 0.808 R^2= 0.653 Adjusted R2= 0.650 F(5,712)=268.18 p<0,0000 Standard error of estimation: 0.853					
Variables	**b***	**Std. Err. b***	**b**	**Std. Err. b**	**t(716)**	**p**
Constant			-0.355	0.260	-1.366	0.172
Subjunctive Norms	0.016	0.024	0.020	0.030	0.681	0.495
Attitude	0.726	0.025	0.815	0.029	28.046	**0.000**
Self-efficiency	0.095	0.026	0.123	0.034	3.615	**0.000**
Perceived public support	0.052	0.024	0.073	0.034	2.124	**0.033**
Received administration barriers	-0.038	0.022	-0.056	0.034	-1.669	0.095

(*Source:* own study)

The positive impact of the positive perception of public support on students' entrepreneurial intentions is accordant with findings from other countries of the world (van der Zwan *et al.*, 2016; Román *et al.*, 2013; Nowiński *et al.*, 2020), but also with research into widely understood institutional environment for entrepreneurship (Autio & Fu, 2015; Simón-Moya *et al.*, 2014). What Schwarz *et al.* (2009) postulate only theoretically has been confirmed in this article, therefore negative barriers to the development of entrepreneurship significantly diminish entrepreneurial intentions of people who consider the establishment of their own business.

Moreover, in our empirical study, a number of control variables were used, such as the respondent's gender and age, level of studies, place of residence. Inferring on the significance level 0.01 we can say that any experience in family business in one's own household contributed to higher entrepreneurial intentions among the studied students. This is line with the majority of results round the globe, but there are few exceptions with a contrary confirmation (Moussa & Kerkeni, 2021).

The empirical research was conducted before the coronavirus pandemic. The Covid-19 disease spreading all over Europe throughout 2020, and now, in 2021, totally changes the situation, and Androniceanu (2020) noticed it also caused major changes in EU policies. Due to coronavirus pandemic, one's own business activity is undoubtedly less popular nowadays, thus the studied entrepreneurial intentions would obtain lower values in the survey.

Tartavulea *et al.* (2020), based on the research conducted during the first wave of Covid-19 pandemic in as many as 13 European countries, proved that it has rather a moderate effect on education. In this context, public aid and support for e-learning, in technical issues in particular, seem indispensable (Smatkov *et al.*, 2019), and so is the professionalization of managing universities as public institutions (Sułkowski *et al.* 2020) or also mergers and acquisitions in higher education (Sułkowski *et al.* 2019), especially in the era of international entrepreneurship on universities (Sułkowski & Patora-Wysocka, 2020) and Europeanization of universities (Marques *et al.*, 2020).

4. Conclusions

The statistical results presented in the article allow to adopt the assumed hypotheses. Positively perceived public support for entrepreneurship strengthens entrepreneurial intentions of the young generation to start their own business. Negatively perceived administration barriers to entrepreneurship blunt entrepreneurial intentions of the young generation to start their own business.

As every empirical research based on perception, also the one discussed in this article has its own limitations. Firstly, the research sample (n = 719) was relatively big, although it included only students from the second biggest city in Poland, Krakow. It would be worth including the whole population of students in a given country in such research. Secondly, the number of questions in the survey was limited, however, in the future, it would be a good idea to extend it with other research strands. Thirdly, inference based on perception, although fully acceptable by psychologists and management researchers, and what is more, having a lot of confirmations in reality, still does not allow to absolutize conclusions in research into entrepreneurship.

Therefore, firstly, this article's contribution to extant literature is the replication of research within the discussed scope and their transfer to the Polish reality. Secondly, the contribution of this article consists in the verification of the postulated negative perception of institutional (administration) barriers, and not only barriers related to obtaining financial support, as it takes place in different articles (Nguyen, 2020).

The collected empirical material and most of all the research findings indicate possibilities to extend research by new research strands, such as positive and negative motives behind taking the decision about setting up business activity, or problems of the impact of family entrepreneurship on students' entrepreneurial intentions. It is also worth conducting a comparative study of students of different

fields of study, although based on a homogenous sample, the statistical inference is much simpler.

Authors Contributions

The authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication. KW – conceptualisation, methodology, calculations, findings, supervision. SB – conceptualisation and administration.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behaviour and Human Decision Processes*, 50, 179-211.

Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health*, *26*(9), 1113-1127. https://doi.org/10.1080/08870446.2011.613995

Androniceanu, A. (2020). Major structural changes in the EU policies due to the problems and risks caused by COVID-19. *Administratie si Management Public*, 34, 137-149. https://doi.org/10.24818/amp/2020.34-08

Autio, E. and Fu, K. (2015). Economic and political institutions and entry into formal and informal entrepreneurship. *Asia Pacific Journal of Management*, *32*(1), 67–94. https://doi.org/10.1007/s10490-014-9381-0

Bae, T.J., Qian, S., Miao, Ch. & Fiet, J.O. (2014). The Relationship Between Entrepreneurship Education and Entrepreneurial Intentions: A Meta-Analytic Review. *Entrepreneurship Theory and Practice*, *38*(2), 217-254.

Baharuddin, G. and Ab Rahman, A. (2021). What is the most effective antecedent for developing entrepreneurial intention among Muslim youth in Indonesia? *Entrepreneurial Business and Economics Review*, *9*(1), 75-87. https://doi.org/10.15678/EBER.2021.010105

Bartha, Z., S. Gubik, A. & Bereczk, A. (2018). The Social Dimension of the Entrepreneurial Motivation in the Central and Eastern European Countries. *Entrepreneurial Business and Economics Review*, *7*(1), 9-27. https://doi.org/10.15678/EBER.2019.070101

Basuki, B., Widyanti, R. & Rajiani, I. (2021). Nascent entrepreneurs of millennial generations in emerging market of Indonesia. *Entrepreneurial Business and Economics Review*, *9*(2), 151-165.

Bilan, Y., Mishchuk, H., Samoliuk, N. & Mishchuk, V. (2020). Gender discrimination and its links with compensations and benefits practices in enterprises. *Entrepreneurial Business and Economics Review,* *8*(3), 189-204. https://doi.org/10.15678/EBER.2020.080311

Byabashaija, W. and Katono, I., (2011). The Impact of College Entrepreneurial Education on Entrepreneurial Attitudes and Intention to Start a Business in Uganda. *Journal of Developmental Entrepreneurship*, *16*(1), 127-144.

Cong Doanh, D. (2021). The role of contextual factors on predicting entrepreneurial intention among Vietnamese students. *Entrepreneurial Business and Economics Review*, *9*(1), 169-187. https://doi.org/10.15678/EBER.2021.090111

Dobbins, M. and Kwiek, M. (2017). Europeanisation and globalisation in higher education in Central and Eastern Europe: 25 years of changes revisited (1990–2015). *European Educational Research Journal*, *16*(5), 519-528. https://doi.org/10.1177/1474904117728132

Eyel, C. Ş., Kaplan, B. & Ünkaya, G. (2020). The effect of business administration students' individual values on their entrepreneurial tendency in Istanbul. *Economics and Sociology, 13*(4), 187-212. https://doi.org/10.14254/2071- 789X.2020/13-4/12

Elfving, J, Brännback, M. & Carsrud, A. (2009). Toward A Contextual Model of Entrepreneurial Intentions (chapter 2). In: A.L. Carsrud, M. Brännback (Eds.), *Understanding the Entrepreneurial Mind* (International Studies in Entrepreneurship Series, vol. 24). https://doi.org/10.1007/978-1-4419-0443-0_2

Fauzi, M.A., Martin, T. & Tamyez, P.F.M. (2021). The roles of transformational leadership on student's entrepreneurial behaviour. *Entrepreneurial Business and Economics Review, 9*(1), 89-103. https://doi.org/10.15678/EBER.2021.090106

Georgescu, I., Kinnunen, J., Androniceanu, A. & Androniceanu, A.-M. (2020). A computational approach to economic inequality, happiness and human development. *Informatica economica*, *24*(4), December, 16-27.

Çera, G., Cepel, M., Zakutna, S. & Rozsa, Z. (2018). Gender differences in perception of the university education quality as applied to entrepreneurial intention. *Journal of International Studies, 11*(3), 147-160. https://doi.org/10.14254/2071- 8330.2018/11-3/13

Gubik, A.S. and Bartha, Z. (2018). The role of university in influencing the entrepreneurial intention of university students. *International Entrepreneurship Review*, *4*(3), 177-188.

Głodowska, A., Maciejewski, M. & Wach, K. (2019). How Entrepreneurial Orientation Stimulates Different Types of Knowledge in the Internationalisation Process of Firms from Poland? *Entrepreneurial Business and Economics Review*, *7*(1), 61-73. https://doi.org/10.15678/EBER.2019.070104

Hassan, Z., Lashari, M.K. & Basit, A. (2021). Cultivating entrepreneurial culture among the students in Malaysia. *Entrepreneurial Business and Economics Review*, *9*(1), 119-136. https://doi.org/10.15678/EBER.2021.090108

Heur, A. (2012). *Perspectives on Parameters Influencing Entrepreneurial Intentions.* Doctoral Dissertation, HEC Management School University of Liege, Liege.

Karyaningsih, R.P.D., Wibowo, A., Saptono, A. & Narmaditya, B.S. (2020). Does entrepreneurial knowledge influence vocational students' intention? Lessons from Indonesia. *Entrepreneurial Business and Economics Review*, *8*(4), 138-155. https://doi.org/10.15678/EBER.2020.080408

Koçoğlu, M. and Hassan, M.U. (2013). Assessing Entrepreneurial Intentions of University Students: A Comparative Study of Two Different Cultures: Turkey and Pakistani. *European Journal of Business and Management*, *5*(13), 243-252.

Krueger, N. (1993). Impact of prior entrepreneurial exposure on perceptions of new venture feasibility and desirability. *Entrepreneurship Theory and Practice*, 18(1), 5-21.

Krueger, N.F., Reilly, M.D. & Carsrud, A.L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, *15*(5-6), 411–432, https://doi.org/ 10.1016/S0883-9026(98)00033-0

Kuehn, K.W. (2008). Entrepreneurial Intensions Research: Implications for Entrepreneurship Education. *Journal of Entrepreneurship Education*, 11, 87-98.

Kumar, N., Al Mamun, A., Ibrahim, M. D. & Yusoff, M. N. H. (2018). Entrepreneurial orientation and antecedents of low-income household heads in Kelantan, Malaysia. *Journal of International Studies, 11*(1), 140-151. https://doi.org/10.14254/2071-8330.2017/11-1/10

Kurczewska, A., Doryń, W. & Wawrzyniak, D. (2020). An Everlasting Battle between Theoretical Knowledge and Practical Skills? The Joint Impact of Education and Professional Experience on Entrepreneurial Success. *Entrepreneurial Business and Economics Review*, 8(2), 219-237. https://doi.org/10.15678/EBER.2020.080212

Kusa, R. (2020). Linking relational capabilities and entrepreneurial orientation of an organization. *International Entrepreneurship Review*, 6(3), 49-60.

Marques, M., Zapp, M. & Powell, J.J.W. (2020 – in press). Europeanizing Universities: Expanding and Consolidating Networks of the Erasmus Mundus Joint Master Degree Programme (2004-2017). *High Education Policy*. https://doi.org/10.1057/s41307-020-00192-z

Mishchuk, H., Roshchyk, I. Sułkowska, J. & Vojtovič, S. (2019). Prospects of Assessing the Impact of External Student Migration on Restoring the Country's Intellectual Potential (Case Study of Ukraine). *Economics & Sociology*, 12(3), 209-219. https://doi.org/10.14254/2071-789X.2019/12-3/14

Moussa, N.B. and Kerkeni, S. (2021). The role of family environment in developing the entrepreneurial intention of young Tunisian students. *Entrepreneurial Business and Economics Review*, 9(1), 31-45. https://doi.org/10.15678/EBER.2021.000102

Nguyen, T. (2020). The Impact of Access to Finance and Environmental Factors on Entrepreneurial Intention: The Mediator Role of Entrepreneurial Behavioural Control. *Entrepreneurial Business and Economics Review*, 8(2), 127-140. https://doi.org/10.15678/EBER.2020.080207

Nowiński, W., Haddoud, M., Wach, K. & Schaefer, R. (2020). Perceived public support and entrepreneurship attitudes: A little reciprocity can go a long way! *Journal of Vocational Behavior*, 121, 103474. https://doi.org/10.1016/j.jvb.2020.103474

Płaziak, M. and Rachwał, T. (2014). Entrepreneurship Courses in Spatial Management Studies in Polish Universities. *Procedia - Social and Behavioral Sciences,* 110, 710-718. http://dx.doi.org/10.1016/j.sbspro.2013.12.915

Rantanen, T., Pawlak A. & Toikko, T. (2015). The Significance of Social Welfare Attitudes in Young People's Entrepreneurial Intentions. *Entrepreneurial Business and Economics Review*, 3(1), 43-60. http://dx.doi.org/10.15678/EBER.2015.030104

Reissová, A., Šimsová, J., Sonntag, R. & Kučerová, K. (2020). The influence of personal characteristics on entrepreneurial intentions: International comparison. *Entrepreneurial Business and Economics Review*, 8(4), 29-46. https://doi.org/10.15678/EBER.2020.080402

Román, C., Congregado, E. & Millán, J. M. (2013). Start-up incentives: Entrepreneurship policy or active labour market programme? *Journal of Business Venturing*, 28(1), 151-175. https://doi.org/10.1016/j.jbusvent.2012.01.004

Schlaegel, Ch. and Koenig, M. (2014). Determinants of Entrepreneurial Intent: A Meta-Analytic Test and Integration of Competing Models. *Entrepreneurship Theory and Practice*, 38(2), 291-332.

Schwarz, E. J., Wdowiak, M. A., Almer-Jarz, D. A. & Breitenecker, R. J. (2009). The effects of attitudes and perceived environment conditions on students' entrepreneurial intent: An Austrian perspective. *Education+Training*, *51*(4), 272-291

Shapero, A. (1975). The displaced, uncomfortable entrepreneur. *Psychology Today*, 9, 83–88.

Shapero, A. and Sokol, L. (1982). Social dimensions of entrepreneurship. In: C.A. Kent, D.L. Sexton, & K.H. Vesper (Eds.), *The encyclopaedia of entrepreneurship* (pp. 72-90). Englewood Cliffs, NJ: Prentice-Hall.

Simón-Moya, V., Revuelto-Taboada, L. & Guerrero, R. F. (2014). Institutional and economic drivers of entrepreneurship: An international perspective. *Journal of Business Research*, 67(5), 715-721. https://doi.org/10.1016/j.jbusres.2013.11.033

Smatkov, S., Kuchuk, N. & Sieja, M. (2019). The method of centralised distribution of electronic educational resources in academic e-learning. *Technical Transactions*, 2, 119-128. https://doi.org/10.4467/2353737XCT.19.026.10162

Sułkowski, Ł., Seliga, R. & Woźniak, A. (2019). Strategic Challenges of Mergers and Acquisitions in the Higher Education Sector. *Entrepreneurial Business and Economics Review*, 7(2), 199-215. https://doi.org/10.15678/EBER.2019.070211

Sułkowski, Ł., Seliga, R., Bula, P. & Kolasińska-Morawska, K. (2020). Professionalization of university management in Poland. *Administraţie şi management public*, 35, 167-183. http://dx.doi.org/10.24818/amp/2020.35-11

Sułkowski, Ł. and Patora-Wysocka, Z. (2020). International entrepreneurship of universities: Process-oriented and capabilities perspectives. *Entrepreneurial Business and Economics Review*, 8(3), 175-188. https://doi.org/10.15678/EBER.2020.080310

Tamulevičienė, D. and Androniceanu, A. (2020.) Selection of the indicators to measure an enterprise's value and its changes in the controlling system for medium-sized enterprises. *Entrepreneurship and Sustainability Issues, 7*(3), 1440-1458. Doi: https://doi.org/10.9770/jesi.2020.7.3(1)

Tartavulea, C.V., Albu, C.N., Albu, N, Dieaconescu, R.I. & Petre, S. (2020). Online Teaching Practices and the Effectiveness of the Educational Process in the Wake of the COVID-19 Pandemic. *Amfiteatru Economic*, 22(55), 920-936. https://doi.org/10.24818/EA/2020/55/920

Thompson, E.R. (2009). Individual Entrepreneurial Intent: Construct Clarification and Development of an Internationally Reliable Metric. *Entrepreneurship Theory and Practice*, 3(33), 669-694.

Udayanan, P. (2019). The Role of Self-Efficacy and Entrepreneurial Self-Efficacy on the Entrepreneurial Intentions of Graduate Students: A Study among Omani Graduates. *Entrepreneurial Business and Economics Review*, 7(4), 7-20. https://doi.org/10.15678/EBER.2019.070401

van der Zwan, P., Thurik, R., Verheul, I. & Hessels, J. (2016). Factors influencing the entrepreneurial engagement of opportunity and necessity entrepreneurs. *Eurasian Business Review*, 6(3), 273-295. https://doi.org/10.1007/s40821-016-0065-1

Wach, K. and Głodowska, A (2019). The Role of University in the Development of Entrepreneurial Intentions of Younger Generations: Selected Models. In M.

Pietrzykowski (ed.), *Fostering Entrepreneurial and Sales Competencies in Higher Education*. Poznań (Poland): Bogucki Wydawnictwo Naukowe. pp. 45-63. https://doi.org/10.12657/9788379862801-4

Wach, K. and Głodowska, A. (2021). How do demographics and basic traits of an entrepreneur impact the internationalization of firms? *Oeconomia Copernicana*, 12(2), ahead-of-print.

Wach, K. and Wojciechowski, L. (2016). Entrepreneurial Intentions of Students in Poland in the View of Ajzen's Theory of Planned Behaviour. *Entrepreneurial Business and Economics Review*, 4(1), 83–94. https://doi.org/10.15678/EBER.2016.040106

Wagner, J. and Sternberg, R. (2004). Start-up activities, individual characteristics, and the regional milieu: Lessons for entrepreneurship 867 support policies from German microdata. *The Annals of Regional Science*, 38, 219-240. https://doi.org/10.1007/s00168-004-0193-x

Wardana, L.W., Narmaditya, B.S., Wibowo, A., Fitriana., Saraswati, T.T. & Indriani, R. (2021). Drivers of entrepreneurial attitude among economics students in Indonesia. *Entrepreneurial Business and Economics Review*, 9(1), 61-74. https://doi.org/10.15678/EBER.2021.090104

Wannamakok, W., Chang, Y.-Y. & Täks, M. (2020). The Relationship between Institutional Environments and Entrepreneurial Intention in Estonia: Mediating Roles of Desirability and Feasibility. *Entrepreneurial Business and Economics Review*, 8(2), 111-126. https://doi.org/10.15678/EBER.2020.080206

Zamrudi, Z. and Yulianti, F. (2020). Sculpting Factors of Entrepreneurship among University Students in Indonesia. *Entrepreneurial Business and Economics Review*, 8(1), 33-49. https://doi.org/10.15678/EBER.2020.080102

Shadow economy and its impact on the public administration: aspects of financial and economic security of the country's industry

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Abstract: Many countries face with a shadow economy today. This phenomenon is a real problem for the governments, especially in the context of significant upheavals, reducing fiscal potential, distorting the development indicators and complicating any analytical conclusions about the state of the economic system. Given these facts the study analyses the problem of shadow industry in the Ukraine's regions, in particular by evaluating the integral index of financial and economic security of the industry. Its goals are: 1) development of the theoretical and applied approaches to the impact of the shadow economy on the public administration in relation to financial and economic security of industry in the regions of the country; 2) improvement of the methodology for governmental policy analysis of the level of the shadow economy in the said industry. Recommendation of the public policy measures to reduce the level of shadow industry in the regions were also presented. The method of analytic hierarchy process, the expert methods and the method of calculating the integral index as research methods were used in the study. Based on the analysis conducted, the matrix of strategic zones "Level of the shadow economy - level of the financial and economic security" was constructed. The proposed matrix should be useful in taking public management decisions, depending on the strategic area in which the region is located.

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Introduction

The problem of the shadow economy is urgent in the modern world, as it poses one of the most dangerous threats to the public administration, especially in relation to financial and economic security of the country, region or industry. Attention to solving this problem is gaining in character, as the shadow economy causes corruption in the economic, social, public policy and many other spheres (Podhorska et al., 2019). One may add here that some scholars link the prone to corruption with religion (Valdovinos-Hernandez et al., 2019) or culture (Valdovinos et al., 2019; Placek at al., 2019). In addition, shadow economy incorrectly reflects indicators of the development of economic systems and destructively affects the socio-economic development of industry of country's regions.

High level of shadow economic activity has a negative impact on the image of the country, its competitiveness, and international economic interactions and on the efficiency of structural and institutional reforms (Markina et al., 2018; Todorovic et al., 2019). The level of the shadow economy is one of the most important factors influencing the financial security of the social protection system (Malyovanyi et al., 2016; Islam et al., 2020; Çera et al., 2020). Ivanova et al., (1999) consider the problem of the shadow economy as a component of the economic security problem in the country.

An essential economic feature of a shadow economy is its destructiveness, which has a direct negative impact on the public administration of the country, an industry, or a region. Taking action to counter this threat is a complex process. It requires the interaction of all structures at all levels of economic activity. Only properly designed measures can effectively combat illegal business.

According to a study by the international Association of Chartered Certified Accountants (ACCA) on assessing and forecasting the development of a global shadow economy, Ukraine is in the top five countries with the largest level of shadow economy and is ranked third out of 28 countries with 46.12% of official GDP volume in 2017 compared to 45.96% in 2016. Other countries with high levels of shadow economy are Azerbaijan (66.12%), Nigeria (47.4%), Russia (39.29%) and Sri Lanka (37.33%). Instead, the lowest shadow economy was observed in the United States – 7.69%, Japan – 9.89%, and China – 10.17% [*Ukraine is in the top 5 countries*]. In other words, the shadow economy constitutes a large sector of the economy and contributes to the significant shadowing of foreign economic activity of domestic producers (Martyniuk and Yakubowska, 2020).

Assessing the level of the shadow economy is important as it answers the question of how strong and targeted public policy measures should be taken to

overcome it, how much the state expects to benefit from the fight against the shadow economy and how much it is willing to spend on it. As the shadow economy is not evenly distributed between particular sectors, its measurement makes it possible to decide on which sectors of the economy urgently need to target corrective public policy measures. Given these deliberations, the study of the impact of the shadow economy on the level of financial and economic security is critical, because this problem is insufficiently addressed by the researchers. Particularly, the peculiarities of the shadow sector and its impact on ~~ensuring~~ public administration of the necessary level of financial and economic security in industry across the country's regions are under-researched. All this necessitates further research and scientific substantiation of scientific and methodological approaches to the formation of public policy for improving the level of financial and economic security by counteracting and combating the shadow economy. Therefore, the paper's goals are: 1) development of the theoretical and applied approaches to the impact of the shadow economy on the public administration in relation to the financial and economic security of industry in the regions of the country; 2) improvement of the methodology for governmental policy analysis of the level of the shadow economy in the said industry.

1. Literature review

Many studies are devoted to the study of the shadow economy and its impact on the financial and economic security of the country's industry. Various aspects of the issue were researched, such as: a) the formulation of the content of the concept; b) the negative impact of the shadow economy on the social, financial, economic spheres of the country; c) features of the influence of the shadow economy on various industries; d) identification of common features of the shadow economy as a negative phenomenon for different countries of a particular economic region, etc.

Considering the economic essence of the concept of "shadow economy", it should be noted that among researchers there is no consensus on its formulation and interpretation (Olah et al., 2019). One can find the following alternative names for the concept of "shadow economy": informal economy (Goel et al., 2020; Chavdarova, 2018; Bayar et al., 2020); black economy (Bevan et al., 1989; Lyssiotou et al., 2004; Dilnot and Morris, 1981), underground economy (Bajada, 1999; Feige and Urban, 2008), hidden economy (Giles, 1999; Kazemier and van Eck, 1992), second economy (Bagachwa et al., 1995), informal economy (Johnson et al., 1998), undeclared economy (Williams and Horodnic, 2015), unobserved (unregistered) economy (Feige and Urban, 2008;). Such alternative names have been given by scientists to activities that belong to the shadow sector, if they are illegal and informal. This phenomenon may be interpreted as a set of economic processes that bypass laws and state control (Markina et al., 2017; Androniceanu and Tvaronavičienė, 2019; Siekelova et al., 2020).

In addition, different authors have explored different aspects on which it has a negative impact. In particular, Malyovanyi, et al., (2016) studied the impact of the shadow economy on the public administration and proved that the growth of

the shadow economy leads to a decrease in social benefits per capita. In turn, Bilan et al., (2019) assessed the normal distribution of capital investment and the level of the shadow economy of the European Union and Ukraine. They showed that with the growth of the shadow economy, the amount of capital investment in the country decreases. Other researchers have studied the impact of the shadow economy not only on the economic development of the country as a whole, but also on the development of its individual industries (branches). In their works, scientists have taken into account that the branches of the economy are characterized by their specific functioning and development (Bayar et al., 2020). In particular, Kozlova (2017) as well as Burroni et al., (2008) analyzed the impact of the shadow economy on the development of the textile industry. Furthermore, Williams et al., (2007) as well as Chancellor and Abbott (2015) described the impact of the shadow economy on changes in labor productivity in the construction industry. And Kopytko (2013) reveals the features of the shadow economy on the efficiency of industrial enterprises. That's also worth adding that Markina et al., (2018) identified the main features of the shadow economy, common to all countries of a particular economic region. According to them, the average shadow economy level is 18% for OECD countries (an international organization of 35 countries, most of which are high-income countries and high HDI and are considered as developed ones), and about 37% for countries with a transitional economy, which confirms the concept of regionalization of the economy. The authors argued that the shadow economy depends not only on economic but also on public policy.

There is no single method of calculation that would accurately reflect the level of the shadow economy and fully take into account all the factors that may cause it or affect its level. The Multiple Indicators Multiple Causes (MIMIC) approach has become widespread. Dell'Anno (2007) estimates the Portuguese Shadow Economy (SE) from 1977 to 2004 and tests the statistical relationships between the SE and other economic variables. In order to carry out the econometric analysis, a multiple indicators multiple causes (MIMIC) model with means and intercepts is applied. Furthermore, they predict the evolution of the shadow economy in three Mediterranean countries, namely France, Spain and Greece using a multiple indicators and multiple causes model based on the latent variable structural theory. Alañón and Gómez-Antonio (2005) adopted this approach to the Spanish case that is based on the theory of unobservable variables. This methodology involves the estimation of structural models (MIMIC) which analyses a set of causes of the shadow economy while simultaneously taking into account its influence upon a series of indicators.

In turn, Feige and Urban (2008) examine the conceptual and empirical relationships between new National Income and Product Accounts (NIPA) methods for obtaining "exhaustive" measures of total economic activity and the two most popular macro-model approaches (electric consumption and currency ratio models) for estimating the size and growth of the shadow sector. In contrast to it, Lyssiotou et al., (2004) propose a consumer demand system approach to estimate the size of the shadow economy where alternative hypotheses affecting the empirical results can be tested in a nested framework. This approach allows the estimation of the under-reporting of household income from various sources,

dispensing with the need to use arbitrary criteria to classify households by their main source of income (Oláh et al., 2017).

For the estimation of the extent of the shadow economy in the regions of the European Union Tafenau et al., (2010) combine the multiple-indicators multiple-causes approach with elements of spatial econometrics. This is also worth mentioniong that Feige (1990) uses alternative micro and macro methodologies for measuring shadow activities including census and survey procedures, discrepancy and monetary methods.

According to Shpak et al., 2019, systematization of the basic requirements for the state institution where the new generation of employees will work may directly affect the reduction of the shadow economy and its impact on public administration of financial and economic security of the industry. The researchers identified crucial criteria shaping the characteristics of civil servants, and systematized distinctive features of generations X, Y and Z. The distribution of the number of civil servants in Ukraine was analyzed by gender, age and position. Based on the correlation and regression analysis, the authors investigated the trend of the share of civil servants in Ukraine by an age category up to 2020. Thus the hypothesis about the dependence of effectiveness of the reform of the Ukrainian civil service on interaction and cooperation of all generations of civil servants was confirmed.

In Ukraine, the most appropriate methods for determining the size of the shadow economy are the official methods of the Ministry of Economic Development and Trade which include: "population expenditures – retail turnover", financial, monetary, electrical, method of loss-making of enterprises. Each method covers a specific area of the national economy (with a correspondingly different proportion of the illegal sector). Therefore, only the integral indicator of the level of the shadow economy is a complex indicator, which fully characterizes such a phenomenon. We claim that for estimating the level of shadow economy of the Ukrainian regions' industry, the most appropriate method is "enterprise loss". This method is to determine the marginal minimum and maximum coefficients of the shadow economy as a fraction of GDP within which the shadow economy level is located. In our study, to calculate the level of the shadow sector in the industry of the regions, the method of enterprise loss will be used. When using the enterprise loss method, we adopt the following assumptions: all loss-making enterprises according to official statistics are actually profitable, which is considered as an overestimation of the shadow economy scale; the profitability of unprofitable enterprises is equal to the profitability of profitable enterprises in the analyzed period; the expense ratio of loss-making and profitable enterprises is identical to the ratio of the number of such enterprises.

2. Methodology approach

Considering that in the scientific sources the threshold of 30% is considered as a critical level of the shadow economy (e.g. Boryusevych, 2012, p.

117) we divided the regions of Ukraine into three groups: regions with permissible (0-30%), critical (31-50%) and catastrophic (more than 51%) levels of the shadow sector in the industry. To assess the financial and economic security of the region's industry, we propose to use the partial indicators that characterize the financial and economic aspects of the activity of industrial enterprises and are collected and published by the State Statistics Service of Ukraine (Table 1).

Table 1. Indicators of financial and economic security assessment of the region's industry

Indicators	Symbol	The direction of change
Volume of industrial production (goods, services), mln UAH	x_1	Stimulator
Volume of industrial production (goods, services) per capita, UAH	x_2	Stimulator
Industrial production index, in % compared to the previous year	x_3	Stimulator
Average monthly nominal wage of full-time employees, UAH	x_4	Stimulator
Proportion of profit-making enterprises, in % of total enterprises quantity	x_5	Stimulator
Volume of profit received by enterprises, mln UAH	x_6	Stimulator
Proportion of loss-making enterprises, in % of total enterprises quantity	x_7	Destimulator
Volume of loss received by enterprises, mln UAH	x_8	Destimulator
Profitability (unprofitability) of operating activity of enterprises, %	x_9	Stimulator
Structure of capital investment, in % of total investment in the region	x_{10}	Stimulator

(*Source*: own elaboration)

To determine the weight of indicators, the most appropriate is to use hierarchy analysis method (Saati method) (Saati, 1993). This method involves calculating the priority vectors of alternatives against the selected criteria. Pairwise comparisons are defined as an advantage of one element over another according to the relative importance scale (Table 2).

Table 2. The scale of the relative importance of the Saati's hierarchy analysis method

Score, k	Definition	Characteristics
1	Equal importance	Equal contribution of two elements to the overall score
3	Moderate preference	Minor preference of one item over another
5	Substantial advantage	A significant advantage of one element over another
7	Considerable advantage	The virtually significant advantage of one element over another

Score, k	Definition	Characteristics
9	A very big advantage	The obvious advantage – the dominance of one element over another
2, 4, 6, 8	Intermediate values	Used in transient cases
1/k	Symmetric elements values	Used to evaluate non-dominant elements

(*Source*: Saati, 1993)

The value of the integral indicator of financial and economic security of industry of the regions of a country ranges from 0 to 1. The higher the value of this indicator, the higher the level of financial and economic security of the industry in the region and vice versa.

In the literature, there is no unambiguous scale of the division of regions by the level of financial and economic security of industry. Kornienko (2013, p. 337) claims that the indicators characterizing economic security fluctuate in the range from 0 to 1, depending on the deviation from the limit value. Based on this, a country, region or enterprise can be classified into 4 groups in terms of economic security: 1) absolutely safe when the main characteristic is 1; 2) safe – 0.7-0.9; 3) safe enough – 0.5-0.6; 4) dangerous – 0-0.4. Harrington's Universal Scale (Harrington, 1965) is popular as well; it is used by scientists to divide regions by the value of the integrated financial and economic security indicator into the following groups: 0-0.2 – unacceptable; 0.2-0.37 – acceptable; 0.37-0.63 – sufficient; 0.63-0.80 – good; 0.80-1.00 – very good. In turn Demchenko (2012, p. 116) presents the following scale of the integral indicator of the financial security level of the enterprise: 0-25 points – catastrophic level of financial security; 26-50 points – low level of financial security; 51-75 points – average level of financial security; 76-100 points – high level of financial security of the enterprise. We propose to adapt this scale to the results of our research and to distinguish two groups of regions of the country by the value of the integral index of financial and economic security of the industry: 0-0.5 – critical level of financial and economic security; 0.51-1.00 – acceptable level of financial and economic security. We can separately distinguish catastrophic level of financial and economic security – 0-0.25 and high level of financial and economic security – 0.80-1.00.

We propose to make public management decisions to reduce the level of the shadow economy both at the level of public administration and at the level of regions or districts on the basis of a combined method (Table 3), which is to position the regions by comparing the level of the shadow sector (*S*) and the integrated indicator of financial and economic security of industry in the regions (*I*) with the subsequent formation of priority measures to reduce the shadow economy.

Table 3. Combined method for the selection of public policy measures to reduce the shadow economy of the regions

Stages of the combined approach		Rating scale, limit value	Formulas, indicators and methods for determining the components
Calculation of parameters	1. The level of the shadow sector in the industry of the regions (S)	S = 0-30% – allowable level of the shadow sector; S = 31-50% – critical level of the shadow sector; S > 51% – catastrophic level of the shadow sector	The level of the shadow sector in the industry of the regions is determined by the method of enterprises' unprofitability. This method is to determine the marginal minimum and maximum coefficients of the shadow economy as a share of GDP, within which the level of the shadow economy is.
	2. Integrated indicator of financial and economic security of industry in the regions (I)	I = 0-0.25 – catastrophic level of financial and economic security; I = 0.26-0.50 – critical level of financial and economic security; I = 0.51-0.79 – acceptable level of financial and economic security; I = 0.80-1.00 – high level of financial and economic security	The sequence of determining the integrated indicator of financial and economic security of industry in the regions: 1. Selection of indicators for assessing the financial and economic security of industry in the regions. 2. Determining the weight of indicators (w_i) by the T. Saati hierarchy analysis method. 3. Standardization of indicators according to the formulas: – for stimulator indicators: $$Y_{ij} = \frac{z_{ij} - z_{\min}}{z_{\max} - z_{\min}},$$ – for disincentive indicators: $$Y_{ij} = \frac{z_{\max} - z_{ij}}{z_{\max} - z_{\min}},$$ where Z_{ij} is the value of the i-th indicator of the j-th region; Z_{min} – the minimum value of the i-th indicator for all regions; Z_{max} – the maximum value of the i-th indicator in all regions. 4. Calculation of the integrated indicator of financial and economic security of industry in the regions (I) by the formula: $$I = \sum_{i=1}^{m} n_i \cdot w_i$$ where w_i – weights of indicators of financial and economic security of industry in the region; n_i – normalized values of the i-th indicator of financial and economic security of industry in the region; m – the number of indicators of financial and economic security of industry in the region.

Stages of the combined approach	Rating scale, limit value	Formulas, indicators and methods for determining the components
Comparison of parameters and construction of a matrix of strategic zones	Strategic zone A: $S \leq 30\%$; $I > 0,5$ Strategic zone B: $S > 30\%$; $I > 0,5$ Strategic zone C: $S \leq 30\%$; $I \leq 0,5$ Strategic zone D: $S > 30\%$; $I \leq 0,5$	A matrix is built in which 4 strategic zones A, B, C, D are formed at the intersection of the values of two parameters. The criterion for division into strategic zones for the shadow sector level is the critical threshold value of 30%, and for the integrated indicator of financial and economic security – 0,5. Regions are positioned in the matrix depending on the level of the shadow sector and the integrated indicator of financial and economic security of industry
Formation of a system of recommended public policy measures to reduce the level of the shadow economy of the regions' industry		Public policy measures to reduce the level of the shadow economy of the regions in the field of industry and the expected results that increase the financial and economic security of the regions are proposed for each strategic zone

(*Source*: own elaboration)

To calculate the level of the shadow sector in industry (*S*), the official data for 2018 of the Main Statistics Departments of the regions of Ukraine and the State Statistics Service of Ukraine were used.

The experts were 23 senior managers of industrial enterprises and 6 experts of the Departments of Economics and Industrial Policy of Lviv and Ternopil regional state administrations, as well as 24 economists (Lviv Polytechnic National University, Odesa National Polytechnic University, National Technical University, Kharkiv Polytechnic Institute, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"). Experts were asked to compare in pairs the advantage of one indicator over another according to the 10-point scale of Saati (Table 2).

3. Conducting research and results

3.1 Calculation of the shadow sector in the industry

Based on the data for 2018 of the Main Departments of Statistics of Regions of Ukraine and the State Statistics Service of Ukraine, the level of the shadow sector in the industry of the regions was calculated (Table 4).

Table 4. Ranking and grouping of regions of Ukraine by the level of the shadow sector in industry, 2018

Regions of Ukraine	The share of the shadow sector in industry, % of the volume of GVA	The level of the shadow economy
Cherkasy	10	Acceptable level
Kirovograd	13	
Rivne	13	
Chernihiv	14	
Ivano-Frankivsk	14	
Kharkiv	15	
Vinnytsia	15	
Poltava	16	
Mykolayiv	16	
Odesa	17	
Ternopil	17	
Zaporizhzhia	18	
Khmelnytsky	18	
Volyn	18	
Zhytomyr	18	
Kherson	22	
Lviv	23	
Transcarpathian	24	
Chernivtsi	25	
Donetsk	26	
Sumy	31	Critical level
Dnipropetrovsk	43	
Luhansk	68	Catastrophic level
Kyiv	72	

According to the rule of "three sigma" in the normally distributed data, the deviation of the value from its mathematical expectation should not exceed $\pm 3\sigma$ (i.e. the probability of such situation is P = 0.01).

According to the table 4, for the share of the shadow sector in industry mean and rms values are:

$\bar{x}$ = 23,58;

σ = 15,58;

2σ = 31,16;

3σ = 46,74.

According to the results of the calculation (Table 4) it can be seen that only the share of the shadow sector in the industry of Luhansk and Kyiv regions exceeds the value $\pm 3\sigma$, that can be considered as an anomalous value. The share of the shadow sector in the industry of all other areas is within $\bar{x} \pm \sigma$.

Considering "abnormal" values for our analysis, it can be stated that anomalous value is - the value of the sample, which differs sharply from the entire data set and at the discretion of a specialist in statistics can be excluded from further processing. This solution will make the sample homogeneous, but this approach is only correct when dealing with an unlimited amount of information (in practice, when the number of values is more than 30). At present, it is recommended to use the provision (ISO 5725-2: 1994) to detect anomalous value in small samples, in which it is proposed to use the Grabbs test to determine anomalous values, which is to check the largest or smallest of the test results for anomalous value.

Let's check by the Grabbs criterion whether the maximum value of the share of the shadow sector in the industry of Kyiv region is anomalous by the formula (ISO 5725-2: 1994):

$$G_{max} = \frac{x_{max} - \bar{x}}{\hat{s}},\qquad(1)$$

where $\bar{x}$ – is the average value of the data set;

$\quad\hat{s}$ – standard deviation.

$$\bar{x} = \frac{1}{p}\sum_{i=1}^{p} x_i,$$

$$\hat{s} = \sqrt{\frac{1}{p-1}\sum_{i=1}^{p}(x_i - \bar{x})^2}.\qquad(2)$$

The value of the Grabbs criterion is compared with the critical value.

For Kyiv region the following result can be obtained:

$G_{max} = 3{,}024 < G_{cr} < 3{,}112$.

G_{cr} is the 1% critical value of the Grabbs test (for twenty-four values it is 3,112).

For Luhansk region the following result can be obtained:

$G_{max} = 2{,}791 < G_{cr} < 3{,}112$.

Since $G_{max} < G_{cr} < 3{,}112$, the share of the shadow sector in the industry of Kyiv and Luhansk regions is not recognized as anomalous value, which allows to exclude this value from the further processing.

According to calculations, the acceptable level of the shadow economy in industry in 2018 was in 20 regions, critical – in 2 regions. In 2018, 2 regions – Luhansk and Kyiv – were classified as having a catastrophic level. The study shows that the level of the shadow economy in the industry of Luhansk region exceeds 50% and is 68% of GVA in 2018. This can be explained by the military conflict in the eastern Ukraine, financial destabilization, growing panic of economic agents and increasing administrative pressure. Another reason for this is the inaccuracy and imperfection of the collection of statistical information. All these factors have a significant impact on the high level of the shadow economy, as Luhansk is a center of hostilities, where in such conditions it is impossible to control the transparency of industrial enterprises.

In Kyiv region, the level of the shadow sector in industry, as well as in Luhansk region, also exceeds the 50% threshold, and significantly increased by

72% in 2018. In Kyiv region the reason was an increase in the amount of loss in 2018, which amounts to -273,69 mln. EU. The level of development of industrial enterprises depends on the implementation of innovative developments. Insufficient financial condition of industrial enterprises (about half of them are unprofitable) does not meet their needs for modernization and replenishment of obsolete fixed assets. The industry is dominated by backward technologies that lead to the consumption of large amounts of materials and energy resources.

3.2 Calculation of the integrated indicator of financial and economic security

Based on the conducted expert assessment, the importance of indicators of financial and economic security of industry in the regions was determined. The method of determining the eigenvalue of an inversely symmetric matrix of pairwise comparisons (λ_{max}), consistency index (CI), coherence ratio (CR) and local priority vector (w_i) taking into account the basic provisions of the Saati method is described in more detail in (Shpak, 2020). Summary results of the matrix of pairwise comparisons with the definition of local priorities are presented in Table 5.

Table 5. Matrix of pairwise comparisons for indicators of financial and economic security of the industry

No.	Symbol of the indicator	The value of pairwise comparisons										Vector of local priorities (weight)
		x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	w_i
1	x_1	1	3	1/4	2	1/4	1/2	1/6	1/4	1/6	3	0.04
2	x_2	1/3	1	1/3	1/2	1/7	1/6	1/9	1/7	1/9	1/3	0.02
3	x_3	4	3	1	3	1/4	1/2	1/5	1/2	1/5	2	0.06
4	x_4	1/2	2	1/3	1	1/6	1/4	1/8	1/6	1/8	1/2	0.02
5	x_5	4	7	4	6	1	2	1/2	2	1/3	5	0.15
6	x_6	2	6	2	4	1/2	1	1/4	1	1/4	3	0.08
7	x_7	6	9	5	8	2	4	1	3	1/2	7	0.23
8	x_8	4	7	2	6	1/2	1	1/3	1	1/4	5	0.10
9	x_9	6	9	5	8	3	4	2	4	1	7	0.28
10	x_{10}	1/3	3	1/2	2	1/5	1/3	1/7	1/5	1/7	1	0.03
$\lambda max = 10.51$; $CI = 0.06$; $CR = 0.04 \leq 0,1$												

(*Source*: own elaboration)

The results of ranking and grouping of the regions of Ukraine by the value of the integrated indicator of financial and economic security of industry in ascending order are presented in Table 6.

Table 6. Ranking and grouping of regions of Ukraine by the value of the integrated indicator of financial and economic security of industry (*I*), 2018

Regions of Ukraine	Integral indicator, *I*	Change to the previous year, % (+/-)	The level of financial and economic security
Luhansk	0,17	+0,09	Catastrophic level
Chernivtsi	0,24	-0,23	
Vinnytsia	0,39	-0,16	Critical level
Kherson	0,39	-0,08	
Kirovograd	0,42	-0,23	
Lviv	0,42	-0,16	
Zhytomyr	0,46	+0,06	
Kyiv	0,47	-0,22	
Rivne	0,48	+0,07	
Ternopil	0,48	0	
Transcarpathia	0,49	-0,08	
Odesa	0,52	-0,1	Acceptable level
Sumy	0,53	-0,05	
Mykolayiv	0,54	-0,1	
Khmelnytsky	0,54	-0,02	
Chernihiv	0,54	-0,01	
Kharkiv	0,57	-0,1	
Poltava	0,62	-0,07	
Volyn	0,64	+0,01	
Donetsk	0,69	+0,15	
Cherkasy	0,69	-0,04	
Dnipropetrovsk	0,78	-0,11	
Ivano-Frankivsk	0,80	-0,04	High level
Zaporizhzhia	0,91	-0,05	

(*Source*: own elaboration)

The results of the study show that during 2017-2018 the catastrophic level of financial and economic security of industry is inherent in Luhansk region, which can be explained by the war, the cessation of normal operations of industrial enterprises etc. The leaders with a high level of financial and economic security of industry are Ivano-Frankivsk and Zaporizhzhia regions. 9 regions of Ukraine are characterized by a critical level, and 11 regions – an acceptable level of financial and economic security of industry.

3.3 Matrix of strategic zones

We propose to make the choice of public management actions depending on the strategic zone of each region in the matrix "The level of the shadow

economy – the level of financial and economic security." Taking into account the results of our study, we present the positioning of the regions of Ukraine in the matrix of strategic zones "The level of the shadow economy – the level of financial and economic security" (Figure 1).

Figure 1. Positioning of regions in the matrix of strategic zones "The level of the shadow economy – the level of financial and economic security", 2018

		The level of the shadow economy, % of the volume of official GVA (*S*)	
		Acceptable (up to 30%)	**Critical (more than 30%)**
Integrated indicator of financial and economic security (*I*)	Acceptable (more than 0.5)	Strategic zone "A"	Strategic zone "B"
		Cherkasy, Chernihiv Ivano-Frankivsk, Kharkiv, Poltava Mykolayiv, Odesa, Zaporizhzhia Khmelnytsky, Volyn, Donetsk	Sumy Dnipropetrovsk
	Critical (up to 0.5)	Strategic zone "C"	Strategic zone "D"
		Chernivtsi, Vinnytsia, Kherson Kirovograd, Lviv, Zhytomyr Rivne, Ternopil, Transcarpathian	Luhansk Kyiv

(*Source*: own elaboration)

Strategic zone "A" is characterized by the best ratio of parameter values for the assessed industry of the region: lower than the critical level of the shadow economy and higher than the critical level of financial and economic security. The regions that fall into this zone are the most transparent in their activities, and are characterized by high financial and economic performance of industrial enterprises, support high innovation activity of enterprises in industry etc. This zone includes 11 regions of Ukraine.

Strategic zone "D" is critical for the state and requires the most radical and urgent public policy measures to combat the shadow sector of industry and increase the financial and economic efficiency of industrial enterprises. Zone "D" is characterized by a high (critical) level of the shadow sector in industry and a low (critical) level of financial and economic security of industry. This zone includes Luhansk region, territories where military operations are being conducted, which poses a danger to the country's industrial production, as well as Kyiv region.

Strategic zone "B" is characterized by a high level of financial and economic security, which indicates the high efficiency of the public administration of industrial complex of the region, however, poor government policy leads to the transition of a certain part of the industry into the "shadow", which increases the share of the shadow sector. This zone includes Sumy and Dnipropetrovsk regions.

Low financial and economic performance of industrial enterprises in the regions and a low share of the shadow sector in industry are characteristic of the **strategic zone "C".** This zone includes Chernivtsi, Vinnytsia, Kherson, Kirovograd, Lviv, Zhytomyr, Rivne, Ternopil, Transcarpathian regions.

A characteristic feature of the division into strategic zones is the development and adoption of public policy measures to reduce the level of the shadow economy, which increase their influence, urgency and necessity for their implementation in the direction of transition from zone "A" to zone "B". Logically, the implementation of a more effective measure can be more expensive for the state, so it is necessary to balance between the cost and scope of the impact of the measure on the target results. The costs of developing and implementing public policy measures to reduce the level of the shadow economy should not exceed the financial results obtained by reducing the level of the shadow economy. Moreover, public policy measures to reduce the level of the shadow economy should lead to a strengthening of the level of financial and economic security of the region and the state as a whole.

4. Discussion

Ukraine has the highest level of the shadow economy in Eastern Europe (Markina et al., 2017; Schneider, 2014). According to the research on 162 countries on the level of the shadow economy in 1999-2014, the level of the shadow economy of Ukraine was 54.8% of GDP (Schneider, 2015). According to preliminary calculations of the Ministry of Economic Development, the level of the shadow economy of Ukraine in 2018 amounted to 30% of official GDP, which is 2% less than in 2017 and is the lowest level since 2009. The downward trend in the shadow sector in 2018 compared to 2017 was observed in most major aggregate economic activities, including in the mining industry – by 8%, in the processing industry – by 4%. Taking into account the results of the above research, we propose a list of priority measures to reduce the shadow economy scope and the expected results that increase the financial and economic security of industry in the regions for each of the proposed strategic areas (Table 7).

Table 7. Recommended public policy measures to reduce the level of the shadow economy of the regions

Strategic zones	Measures to reduce the level of the shadow economy	Expected results that increase financial and economic security
Strategic zone "A"	- improving the investment climate in the region; - ensuring the balance of supply and demand in the labor market and improving the quality of vocational education; - improving the mechanism of social assistance to the unemployed; - improvement of the information base	- increasing the competitiveness of industry in the region; - intensification of industrial enterprises' activity; - increase of analytical possibilities of calculations

Strategic zones	Measures to reduce the level of the shadow economy	Expected results that increase financial and economic security
Strategic zone " B"	- simplification of business activities, as well as its stimulation; - "amnesty" of capital of non-criminal origin, especially those directed to the innovation sphere and to other socially significant and priority sectors	- elimination of contradictions between entrepreneurs and regulatory authorities; - increase in the volume of production of innovative products, introduction of innovative technologies
Strategic zone " C"	- improving the business climate by increasing the level of confidence of businesses in the state; - real and radical simplification of conciliation and permitting procedures for doing business, especially in the field of innovation	- strengthening the role of the middle class; - elimination of contradictions between entrepreneurs and regulatory authorities; - intensification of entrepreneurial activity
Strategic zone " D"	- reducing the level of monopolization of production; - ensuring transparency and openness of public authorities; - taking effective measures in the fight against corruption; - strengthening responsibility for committing economic crimes, tax evasion, non-compliance with labor laws, etc.; - encouraging the investment use of legalized funds (in particular, by exempting from taxation of legalized invested funds); - state guarantee of non-prosecution of the owners of capital obtained illegally, provided that these funds are invested in the productive sphere of the economy	- expansion of production capacity; - increase in the number of enterprises; - intensification of industrial enterprises' activity; - withdrawal of funds from the "shadow"; - strengthening the role of market mechanisms and tools; - growth of investment resources in the development of industry in the region

(*Source*: own elaboration)

Of course, one shouldn't be limited only to these recommended measures. They can be used both separately and in combination. In addition, it is worth emphasizing the measures to increase the de-shadowing of the economy, which should be carried out at the national level in all regions of the country, in particular: the introduction of tax incentives in the form of reducing tax liabilities to the state; promoting the development of the banking system and reducing interest rates on loans; increasing the effectiveness of state control over business activities; adapting foreign experience to measures on combating the illegal economy; reducing the level of monopolization of production; ensuring transparency in the activities of the executive authorities; improving the business climate by increasing the level of business' confidence in the state; ensuring transparency and openness of public

authorities; taking effective measures to combat corruption; carrying out financial, pension, judicial, medical, educational and other reforms; strengthening the responsibility for committing economic crimes, tax evasion, non-compliance with labor laws, etc.; improving the country's investment climate; counteraction to money laundering, etc.

5. Conclusions

Much attention around the world is paid to the study of the shadow economy. This is due to the need for society to maintain a state of sustainable positive socio-economic development. The emergence and resumption of shadow activity is a kind of reaction of society to shortcomings in the development of legislation, authorities etc. Despite the fact that the shadow economy is an almost insurmountable element of social relations, it must be fought, because with the sustainable reproduction of the shadow sector, the inevitable destruction of the legal economy is equal to the loss of national economy's profitability and competitiveness, and country's financial and economic security.

It is impossible to eliminate the shadow sector of the economy as an economic phenomenon, even in the most effective ways. The task of all branches of government is to curb the informal economy within the framework in which it does not destroy the economic system. The problem of the shadow economy in the countries will remain relevant for a long time. Keeping this fact in our mind, we propose a scientific and methodological approach, which consists in positioning the regions by comparing the level of the shadow sector (S) and the integrated indicator of financial and economic security of industry in the regions (I) with the subsequent formation of priority measures to reduce the shadow economy.

Based on the data of the Main Departments of the State Statistics Service of Ukraine and the State Statistics Service of Ukraine, we calculated the level of the shadow sector in the industry of the regions in 2018. The results achieved showed that: the acceptable level of shadow economy in industry in 2018 was in 20 regions, critical – in 2 regions, catastrophic – in 2 regions. In two regions (Luhansk and Kyiv) the level of the shadow economy was more than 50%. Thus, the level of the shadow economy in industry in 2018 ranged from 10% to 72%. The lowest values are typical for Cherkasy region – 10%. The highest level, according to our calculations, were recorded in Luhansk and Kyiv regions (68% and 72%, respectively).

The catastrophic level of financial and economic security of industry was revealed in Luhansk and Kyiv regions. 9 regions of Ukraine are characterized by a critical level, and 11 regions – by an acceptable level of financial and economic security of the industry.

Taking into account the results of calculations, the regions of Ukraine were positioned in the proposed matrix of strategic zones "The level of the shadow economy – the level of financial and economic security." This allowed to propose a

list of measures to reduce the level of the shadow economy of the regional industries.

Using the measures proposed in the study, it becomes possible to reduce the level of the shadow economy by increasing budgetary discipline, legalization of capital, business opportunities, property rights, – all this will facilitate investment attractiveness and competitiveness of the economy, as well as strengthen financial and economic security of the country in general.

The method developed by us is characterized by the several advantages compared to the methods proposed by other scholars: 1) *complexity and integrity.* The assessment comprehensively took into account those indicators that best reflect the specifics of the industry of the regions of Ukraine and allow to make complete and adequate conclusions about the level of its financial and economic security by calculating the integrated indicator; 2) *taking into account the weigh*t, which allows to consider the strength of the impact of each of the partial indicators on the integrated indicator and the specifics of the study area. Ignoring the importance in assessing the level of financial and economic security of industry in the region can lead to distortion of the results of the study in the direction of the predominance of one of the factors.

The practical significance of the study is that the proposed scientific and methodological approach can be applied in practice by the authorities to form patterns of behavior for de-shadowing and improving the financial and economic security of regional industries.

In turn, as a limitation of the study, two main points should be mentioned: 1) when forming a system of indicators, it is proposed to exploit the indicators that are used in the practice of evaluating the effectiveness of industry in Ukraine and may be specific only to Ukraine; 2) this methodology cannot be applied to other sectors of the economy, as it takes into account the specifics of the industrial sphere.

In the future it is necessary to deepen research in this direction by calculating the levels of shadow economy and financial and economic security of Ukraine's regions in dynamics, which will identify trends as a result of the government's measures to de-shadow the economy, as well as using modeling methods to predict the direction of change in the level of the shadow economy in some regions and in the whole industry.

References

Alañón, A. and Gómez-Antonio, M. (2005). Estimating the size of the shadow economy in Spain: A structural model with latent variables. *Applied Economics*, *37*(9), 1011-1025. doi.org/10.1080/00036840500081788.

Androniceanu, A. and Tvaronavičienė, M. (2019). Developing a holistic system for social assistance services based on effective and sustainable partnerships. *Administratie si Management Public*, 33, 103-118. DOI: 10.24818/amp/2019.33-06.

Bagachwa, M.S.D. and Naho, A. (1995). Estimating the second economy in Tanzania. World Development, 23(8), 1387-1399.

Bajada, C. (1999). Estimates of the underground economy in Australia. Economic Record, *75*(231), 369-384.

Bayar, Y., Remeikiene, R., Androniceanu, A., Gaspareniene, L. & Jucevicius, R. (2020). The shadow economy, human development and foreign direct investment inflows. *Journal of Competitiveness*, *12*(1), 5-21. DOI: https://doi.org/10.7441/joc. 2020.01.01.

Bevan, D., Collier, P. & Willem Gunning, J. (1989). Black markets: Illegality, information, and rents. *World Development*, *17*(12), 1955-1963.

Bilan, Y., Vasylieva, T., Lyeonov, S. & Tiutiunyk, I. (2019). Shadow economy and its impact on demand at the investment market of the country. *Entrepreneurial Business and Economics Review*, *7*(2), 27-43. DOI: 10.15678/EBER.2019.070202.

Borusevich, H.Yu. (2012). The current state and trends in the development of the shadow economy in the post-crisis period. Financial and Credit Activity: Problems of Theory and Practice, 1, 117-123.

Burroni, L., Crouch, C., Kaminska, M.E. & Valzania, A. (2008). Local economic governance in hard times: The shadow economy and the textile and clothing industries around Łódź and Naples. *Socio-Economic Review*, *6*(3), 473-492. DOI: 10.1093/ser/mwn005.

Çera, G., Phan, Q. P. T., Androniceanu, A. & Çera, E. (2020). Financial Capability and Technology Implications for Online Shopping. *E&M Economics and Management,* 23(2), 156-172.

Chancellor, W. and Abbott, M. (2015). The Australian construction industry: is the shadow economy distorting productivity? *Construction Management and Economics*, *33*(3), 176-186.

Chavdarova, T. (2015). The informal economy in Bulgaria: Historical background and present situation. In: Manuela Stanculescu (Ed.), The Social Impact of Informal Economies in Eastern Europe (pp. 56-76), London: Routledge. DOI: 10.2478/v10033-012-0010-x.

Dell'Anno, R. (2007). The shadow economy in Portugal: An analysis with the MIMIC approach. *Journal of Applied Economics*, *10*(2), 253-277.

Dell'Anno, R., Gómez-Antonio, M. & Pardo, A. (2007). The shadow economy in three Mediterranean countries: France, Spain and Greece. A MIMIC approach. *Empirical Economics*, *33*(1), 51-84.

Demchenko, I. (2012). Problems of assessing the financial security of agribusiness entities and the main directions of its strengthening. *Scientific Works of the Tavriya State Agrotechnological University (Economic Sciences), 2*(18), 114-121.

Dilnot, A. and Morris, C.N. (1981). What do we know about the black economy? *Fiscal Studies*, *2*(1), 58-73.

Feige, E.L. (1990). Defining and estimating underground and informal economies: The new institutional economics approach. World Development, *18*(7), 989-1002. doi.org/10.1016/0305-750X(90)90081-8.

Feige, E.L. and Urban, I. (2008). Measuring underground (unobserved, non-observed, unrecorded) economies in transition countries: Can we trust GDP? Journal of Comparative Economics, *36*(2), 287-306. DOI: 10.1016/j.jce.2008.02.003.

Giles, D.E.A. (1999). Measuring the hidden economy: Implications for econometric modelling. *Economic Journal*, *109*(456), F370-F380.

Goel, R.K., Ram, R., Schneider, F. & Potempa, A. (2020). International movements of money and men: impact on the informal economy. *Journal of Economics and Finance*, *44*(1), 179-197. DOI: 10.1007/s12197-019-09480-w.

Harrington, E.C. (1965). The desirability function. *Industrial Quality Control*, *21*(10), 494-498.

Islam, A.M., Khan, A.M., Popp, J., Sroka, W. & Oláh, J. (2020). Financial development and Foreign Direct Investment - the moderating role of quality institutions. *Sustainability*, *12* (9), 3556, 1-22. DOI: 10.3390/su12093556.

Ivanova, N.Y. and Buslayeva, O.V. (1999). The dark side of the moon: Shadow economy in Ukraine. *Ekonomicky casopis*, *47*(4), 630-648.

ISO 5725-2:1994 Accuracy (trueness and precision) of measurement methods and results – Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method.

Johnson, S., Kaufmann, D. & Zoido-Lobató N, P. (1998). Regulatory discretion and the unofficial economy. *American Economic Review*, *88*(2), 387-392.

Kazemier, B. and van Eck, R. (1992). Survey investigations of the hidden economy. Some methodological results. *Journal of Economic Psychology, 13*(4), 569-587.

Kopytko, M.I. (2013). Peculiarities of shadow activities at industrial enterprises. *Actual Problems of Economics*, *147*(9), 102-107.

Kornienko, T.O. (2013). Methods for assessing the level of economic security of agricultural enterprises. *Sustainable Economic Development*, 4, 336-342.

Kostyuchenko, N., Starinskyi, M., Tiutiunyk, I. & Kobushko, I. (2018). Methodical approach to the assessment of risks connected with the legalization of the proceeds of crime. *Montenegrin Journal of Economics, 14*(4), 23-43. DOI: 10.14254/1800-5845/2018.14-4.2.

Lyssiotou, P., Pashardes, P. & Stengos, T. (2004). Estimates of the black economy based on consumer demand approaches. *Economic Journal*, *114(*497), 622-640. DOI: 10.1111/j.1468-0297.2004.00234.x.

Lytvyn, V.V. (2014). Methodological aspects of shadow savings determination in the economy of Ukraine. *Actual Problems of Economics*, *159* (9), 401-409.

Malyovanyi, M., Rolinskyi, O. & Lysa, N. (2016). Selected aspects of the social protection system's financial security in the context of shadow economy. Economic Annals-XXI, 158 (3-4), 88-91. DOI: 10.21003/ea.V158-20.

Markina, I., Hniedkov, A. & Somych, M. (2017). The Development of the Shadow Entrepreneurship in Ukraine. *Revista Espacios*, *38* (54), 25.

Martyniuk, V. and Muravska, Y. (2020). Forming a foreign trade partnership strategy in the context of strengthening national economic security: A case study of Ukraine, *Forum Scientiae Oeconomia, 8*(2), 5-24. DOI: 10.23762/FSO_VOL8_NO2_1.

Markina, I., Sharkova, A. & Barna, M. (2018). Entrepreneurship in the shadow economy: the case study of Russia and Ukraine. *International Journal of Entrepreneurship, 22*(3), 13.

Mishchuk, H., Bilan, S., Yurchyk, H., Akimova, L. & Navickas, M. (2020). Impact of the shadow economy on social safety: The experience of Ukraine. *Economics and Sociology, 13*(2), 289-303.doi:10.14254/2071-789X.2020/13-2/19.

Oláh, J., Karmazin, Gy., Máté, D., Grabara, J.K. & Popp, J. (2017). The effect of acquisition moves on income, pre-tax profits and future strategy of logistics firms.

Journal of International Studies, *10* (4), 233-245. DOI: 10.14254/2071-8330.2017/10-4/18.

Olah, J., Virglerova, Z., Popp, J., Kliestikova, J. & Kovacs, S. (2019). The assessment of non-financial risk sources of SMES in the V4 countries and Serbia. *Sustainability, 11*(17), 4806, DOI: 10.3390/su11174806.

Plaček, P., Půček, M. & Ochrana, F. (2019). identifying corruption risk: a comparison of Bulgaria and the Czech Republic, *Journal of Comparative Policy Analysis: Research and Practice*, *21*(4), 366-384, DOI: 10.1080/13876988.2018.1472473.

Podhorska, I., Gajanova, L., Majerova, J. & Popescu, G.H. (2019). Analysis of Internally Generated Goodwill Indicators: A Case Study of the Slovak Republic. *Organizacija, 52*(4), 271-280, DOI: 10.2478/orga-2019-0017.

Saati, T. (1993). Decision making. Method of hierarchy analysis. Moscow: Radio and Communication.

Schneider, F. (2014). Size and development of the shadow economy of 31 European and 5 other OECD countries from 2003 to 2014. Linz: Johannes Kepler University.

Schneider, F. (2015). Shadow Economies all over the World: New Estimates for 162 Countries from 1999 to 2014.

Shpak, N., Podolchak, N., Karkovska, V. & Sroka, W. (2019). The Influence of Age Factors on the Reform of the Public Service of Ukraine. *Central European Journal of Public Policy 13*(2), 40–52. DOI: 10.2478/cejpp-2019-0006.

Shpak, N., Kulyniak, I., Gvozd, M., Malynovska, Y. & Sroka, W. (2020). Estimation of the Marketing Activity of Banking Structures. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *68(*1), 229-242. DOI: 10.11118/actaun202068010229.

Siekelova, A., Androniceanu, A., Durana, P. & Frajtova Michalikova, K. (2020). Earnings Management (EM), Initiatives and Company Size: An Empirical Study. *Acta Polytechnica Hungarica*, 17(9), 41-56.

Tafenau, E., Herwartz, H. & Schneider, F. (2010). Regional estimates of the shadow economy in Europe. *International Economic Journal*, *24*(4), 629-636. DOI: 10.1080/10168737.2010.526010.

Todorovic, S., Radisic, M., Takaci, A., Borocki, J. & Kliestikova, J. (2019). Impact of internal additional compensations policy on revenues in cross-sectoral SME environment. *European Journal of International Management, 13*(6), 843, DOI: 10.1504/EJIM.2019.102838.

Valdovinos, I.A., Szymanski, M. & Grabowska, K. (2019). Revisiting corruption and culture – are there really cultures more prone to corruption, *Forum Scientiae Oeconomia, 7*(1), 103-120. DOI: 10.23762/FSO%20_VOL%207_NO%201_7.

Valdovinos-Hernandez, I., Szymanski, M. & Grabowska, K. (2019). Mea culpa – the role of religion in corruption perception. *Forum Scientiae Oeconomia, 7*(3), 49-62. DOI: 10.23762/FSO_VOL7_NO3_4.

Williams, C.C. and Horodnic, I.A. (2015). Evaluating the prevalence of the undeclared economy in Central and Eastern Europe: An institutional asymmetry perspective. *European Journal of Industrial Relations, 21*(4), 389-406. doi.org/10.1177/0143831X14568835.

Williams, C.C., Nadin, S.J. & Windebank, J. (2011). Undeclared work in the European construction industry: Evidence from a 2007 Eurobarometer survey. *Construction Management and Economics, 29*(8), 853-867. DOI: 10.1080/01446193.2011.610331.

The impact of agreement on government procurement use on the competition in Slovak healthcare sector

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Abstract: *The efficiency of the public finance system is conditioned also by the efficiency of public procurement processes. The Slovak healthcare system has been under pressure to increase long-term efficiency. With respect to achieve the efficiency in healthcare system, the efficient public procurement is necessary condition. It is important to examine the factors influencing the public procurement system in the health sector as well as the causal relationships that would provide a valuable platform for the evaluation mechanisms aimed at the effectiveness of the planned purchases. The healthcare sector is specific because it is difficult to consider the effectiveness of the medical equipment in public procurement as well as its long-term effects, the total cost of the treatment and the individual requirements of the patient. The aim of the study is to clarify, whether the use of GPA impact the occurrence of savings within the public procurement process and if application of GPA induces the competition among tenders, thus whether the use of GPA increase number of offers. We use data on public procurement in healthcare sector in Slovak republic in 2019. The focus of analysis is on the Agreement on Government Procurement use by Slovak public procurement bodies and its impact on competition and creation of savings in public procurement process. Our findings suggest that the use of Agreement on Government Procurement induce emergence of savings in public procurement and increases the level of competition. Analysis also indicates that there exists relatively tight correspondence between competition and emergence of savings within public procurement process. It holds that higher the number of offers is, the higher savings are.*

Keywords: Agreement on Government Procurement, public procurement, public contract, savings, sector efficiency, healthcare system efficiency, sustainability of public finances.

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Introduction

The main goal of public procurement in healthcare is to ensure innovative and high-quality treatment for patients at a reasonable price. Public procurement represents an important tool of the state and the public authorities (Mori, 2017). In the healthcare sector, quality should be a priority, not lowest price in procurement process. Most of the medicines and the medical equipment are procured through an electronic auction with the lowest price being the criterion for evaluation of the offered bids. In public procurement, it is very problematic to consider the effectiveness of the medical equipment as well as their long-term effects, the total cost of treatment and the individual requirements of the patient (Decarolis and Giorgiantonio, 2015). This requires an application of the sophisticated methodologies and access to deeper structured data too (Beaulieu et al. 2018; Bustinza et al. 2010; Marco-Simó and Pastor-Collado, 2020). Public procurement is not just about using all public resources economically, but it is important for all the contracting authorities and tenderers to behave responsibly, ethically and not to use a variety of the corruption activities (Fazekas et al. 2016; Hunsaker, 2009; Olken and Pande, 2012). The application of the competitive procedures, such as public tendering, restricted competition and negotiated procedures, which are regulated by the Public Procurement Act, represents a tool for ensuring the economy and the ethical behaviour of all the participants (Šumpíková and Ďurčeková, 2019; Nemec et al., 2014, 2016).

One of the biggest problems in the field of public procurement in the Slovak healthcare system is the low long-term competitiveness. In practice, there are quite often public procurement contracts, where only one tenderer is involved in, what result to no real competition between tenderers in such public procurement (Plaček et al. 2019).

In the scientific literature, public procurement processes are analyzed from a microeconomic as well as macroeconomic point of view and the interconnection of these aspects is important for the creation of relevant policies (Padhi and Mohapatra, 2011). The absence of public procurement policies is highlighted by many research studies. For this reason, multidimensional analyses are necessary to examine the causal relationships between variables in the public procurement system and to identify new factors as well as critical points in public procurement (Pollitt and Bouckaert, 2011; Racca, 2010). This is also the motivation to carry out our research that is aimed to examine whether the use of GPA has an impact on the occurrence of savings within the public procurement process and if the application of GPA induces the competition among tenders, thus whether the use of GPA increases the number of offers. The results of the analyses represent valuable findings for policymakers as well as for the creation of national and international benchmarking indicators enabling comparative analyses.

Public procurement processes and its barriers in the various health systems are the subject of the numerous international and national research studies (Skipworth et al. 2020; Sullivan and Ngwenyama, 2005; Uyarra et al. 2014).

Although their comparison is problematic due to the considerable heterogeneity of the research studies, they provide valuable input for follow-up research and for evaluation of the effectiveness of the policies linked to the public procurement processes in the individual countries.

Siegfried Schnitzer (2010) analyses the degree of fragmentation of the system of international agreements related to public procurement in the European Union. The author validates the importance of this fragmentation because the categorization and stylization of agreements on public procurement law is very important from a point of view of the legislation of a specific agreement. Turrell (2013) examines the potential application of public value management theory to the practice of healthcare procurement in the United Kingdom. Study also tries to examine the mechanisms that can be applied to healthcare procurement and are identified together with the mechanisms that can be used in procurement to protect public values and to enhance the creation of public value. Rothery (2003) states that the Chinese government has also developed the regulations, laws, and implementation procedures necessary for public procurement to have a comprehensive administrative as well as legal framework since a half of the 90s of the twentieth century. The study analyses the history of the development of the legal framework and thus, it justifies the motivation for its modification – improving the quality of public projects, increasing transparency, the relationship with trade and the development of the national standards. The study benefits from an evaluation of the unique aspects of Chinese procurement and their impact on social and economic policy as well as the use of public procurement agents. Arrowsmith (2010) also highlights the significant macroeconomic effects of public procurement. Author sees its importance primarily in supporting economic, environmental, and social policies related to disadvantaged social groups. The study examines the policy implications of the different approaches as well as the development of regulatory frameworks to support the public procurement processes. In their study, Ahsan and Rahman (2017) address the issue of green public procurement in public health in Australia. The data set of analysis was formed by the data from the structured interviews of the managers from the health departments, while a multicriteria decision-making model as an instance of the analytical hierarchical process was applied. The outcome of the analyses declares the fact that the key challenges of green public procurement are mainly related to governmental, non-governmental and public issues, as well as to the environmental issues of the institution. Authors emphasize that the most critical problems are embodied by the lack of public procurement legislation, top management support for green public procurement, government incentives to promote green purchasing and the lack of financial support. The most critical challenges are strategic, but the least critical are of operational characteristics – environmental purchasing preferences, understanding of environmental policy, and so forth. Miller and Lehoux (2020) explore the innovative aspects of healthcare procurement. They underscore the importance of the public procurement authorities that are considered to be the professional intermediaries and the important initiators of innovative

development in public procurement. Therefore, they have a systemic impact on innovation. The implication trajectories of the study are aimed at emphasizing the social purpose of innovation in public procurement. The importance of innovation in the health sector will continue to grow and thus, the importance and a role of the actors in the public procurement system become more considerable. Rolfstam (2013) also appeals to the need to examine innovations in the public procurement system in his monograph. His view on the study of the system areas is based on trajectory–theory–policy–practice. Public procurement has been established on the three platforms over the last years – academic research, innovative policy making and practice. Each of these components is more or less preferable at the various times. In conclusion, the author emphasizes that the cooperation of several actors will still be important for the further development of public procurement – the coordination activities of researchers, policymakers and practitioners. Hence, the study implicitly highlights the importance of science for practice and its necessary connections in the economic system. Kastanioti et al. (2013) assess the development of policies affecting the public procurement system in Greece. The authors evaluate the retrospective development of the public procurement policies and the procedures that have been criticized for distorting competition. The study describes the implementation of reforms and legislative processes aimed at reducing expenditure in the sector. They consider the transfer of public tenders to regional health systems to be beneficial. Kautsch et al. (2014) examine the issues with innovation in public procurement processes in the healthcare sector in Poland. They apply the case studies from the Polish hospitals that use an innovative approach in public procurement. The results of the analyses show that innovative development in public procurement in Poland is still at an early stage, but the interest of the health institutions in innovation processes is high. There are several obstacles to the introduction of the innovative methods in the hospital procurement processes – a conservative organizational culture of the hospitals, a lack of knowledge and know-how, a lack of trust and understanding for an introduction of the new approaches to public procurement processes. Askfors and Fornstedt (2018) explore the impact of the legislative changes on innovation development in public procurement processes. They apply a case study of public procurement of a low-tech medical equipment innovation in the Swedish healthcare system. The research method is constructed of the interviews that examine the various perspectives of the different professions involved in the complex task of setting the requirement specification for the tender. The results of the study call for a deeper examination of the social aspects in public procurement.

The effectiveness of public procurement in Slovakia is also investigated by Grega et al. (2019) through an implementation of primary research. The authors found that there is a significant agreement between the suppliers and the contractors. The two main factors causing inefficiency include excessive bureaucracy and corruption or ethical shortcomings. If competition is insufficient and the criterion of the lowest price is overused to select a winning bid, the efficiency of public procurement will not increase. Savings are highest when there

are six to eight bidders in the tender. Electronic auctions generally produce greater savings than more traditional methods and Slovak procurement procedures are costly compared to a majority of the other European Union member countries. These results are followed by the research study by Nemec et al. (2020), who examine the degree of competitiveness of public procurement in the Czech and Slovak healthcare systems and its impact on the final price of a contract. The results of the analyses confirm the conclusions of the previous studies carried out in the countries involved – the higher the number of tenderers, the lower the final price. The average number of bidders was two and in the Czech Republic for more than half of the tenders only one a single bid was submitted. Plaček et al. (2019) carried out the interesting comparative analysis aimed at a comparison of the length of the public procurement procedures in the Czech Republic and in the United Kingdom and the reasons for the delay. They consider the involvement and commitment of all the actors in this process – politicians, the public and officials – to be a basic precondition for improving public procurement results. The results of the presented research studies are beneficial for the detection and investigation of the other factors in the public procurement systems as well as for the investigation of the causal relationships and the implementation of the comparative analyses.

2. Research section

Analysed cross sectional dataset consists of contract award notices which took place in healthcare sector during 2019 in Slovak Republic. We use data coming from EU Open Data Portal and in total we use 1231 observations on the level of submitted orders. In this analysis we will look closer on the use of Agreement on Government Procurement (GPA) in Slovak republic. GPA should ensure open, fair, and transparent conditions of competition in the government procurements. Agreement on Government Procurement is framework of rights and obligations among countries with aim to ensure international fair, and transparent competition without favouritism of domestic tenderers. Countries that signed Agreement on Government Procurement consent that suppliers of goods and services from other signatory countries will be treated at the same manner, as domestic suppliers. Out of 1231 procurements, 40% were done under the plurilateral Agreement on Government Procurement. However, majority, thus 60% were not done under Agreement on Government Procurement. If we look closer on the type of contract, see Table 1, we can note that Government Procurement Agreement is mostly used in case of works, followed by supplies, and least often used in case of services.

Table 1. Use of Agreement on Government Procurement

		Services	Supplies	Works
Government Procurement Agreement	No	53.5%	58.0%	71.4%
	Yes	46.5%	39.6%	28.6%

(*Source:* own data processing)

If we look closer on the average value of the contract in connection to Government Procurement Agreement, see Table 2, we note that when Government Procurement Agreement is not used in case of Services, average procurement value is much higher than in cases when Government Procurement Agreement is used. In case of Supplies and Works we observe inverse patters, thus when Government Procurement Agreement is not used, an average estimated price of the contract is lower.

Table 2. Estimated value of the contracts

		Average estimated value of the contract (EUR)		
		Services	Supplies	Works
Government Procurement Agreement	No	1 502 535	231 524	6 305 723
	Yes	679 631	580 795	6 949 098

(*Source:* own data processing)

Further analysis will be focused on achievement of savings in public procurement process with regard to use of GPA. Savings are understood as difference between estimated value/price of the contract and the final value/price of the contract. We are aware of the limitation of this approach of saving calculation, but due to the size of the dataset, we are not able to estimate market price for each item within dataset. Savings are calculated as a percentage difference between estimated price and final price, in following manner:

$$Saving = \left[\left(\frac{Final\ price}{Estimated\ price} \right) \times 100 \right]$$

Figure 1 propose the average savings with respect to Common Procurement Vocabulary (CPV) items in procurements that took place in the healthcare sector in Slovakia in 2019. First evident anomaly can be seen in case of Architectural, construction, engineering, and inspection services. We notice here highly negative savings and the fact, that GPA was not at all used within Architectural, construction, engineering, and inspection services. In case of Chemical products, we observe the savings creation in both cases, when GPA is used, but also in cases where it is not. However, when GPA is not used saving are on the level 5%, and on the level 9% when GPA is used. In CPV chapter Construction work, we detect negative savings. The interesting fact in this chapter of CPV is, that negative savings are more substantial in cases when GPA is used, -7% as compared to cases when GPA were not used, -4%. In subchapter of CPV Electrical machinery, apparatus, equipment, and consumables, lighting we declare use of GPA in all public procurements and the presence of positive savings on the level of 12%. The pattern of positive saving is also observed in procurement of Food, beverages, tobacco, and related products where we observe savings on the level 14% when GPA is not used and even savings on the level 16% in cases, when GPA were present. In CPV chapter Furniture (incl. office furniture), furnishings,

domestic appliances (excl. lighting) and cleaning products we observe complete absence of GPA use, but we notice relatively high creation of savings on the level of 12%. Complete absence of GPA use is visible also in CPV chapter Hotel, restaurant, and retail trade services where savings are on the level of 2%; and chapter IT services: consulting, software development, Internet, and support, where the savings close to 0% are present.

Figure 1. Savings and Agreement on Government Procurement
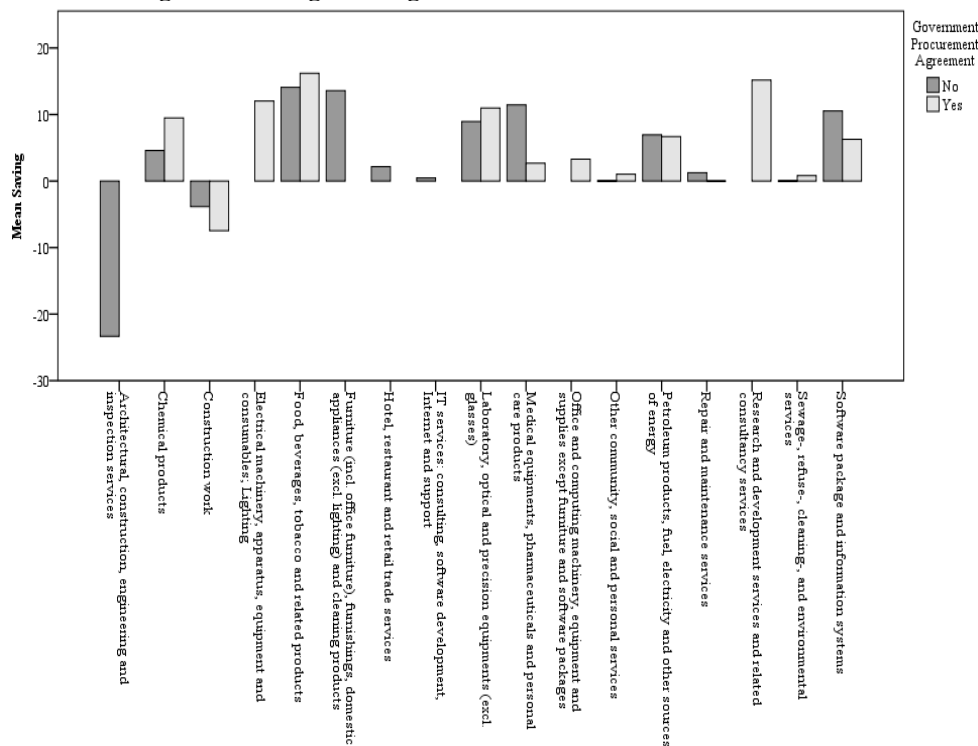
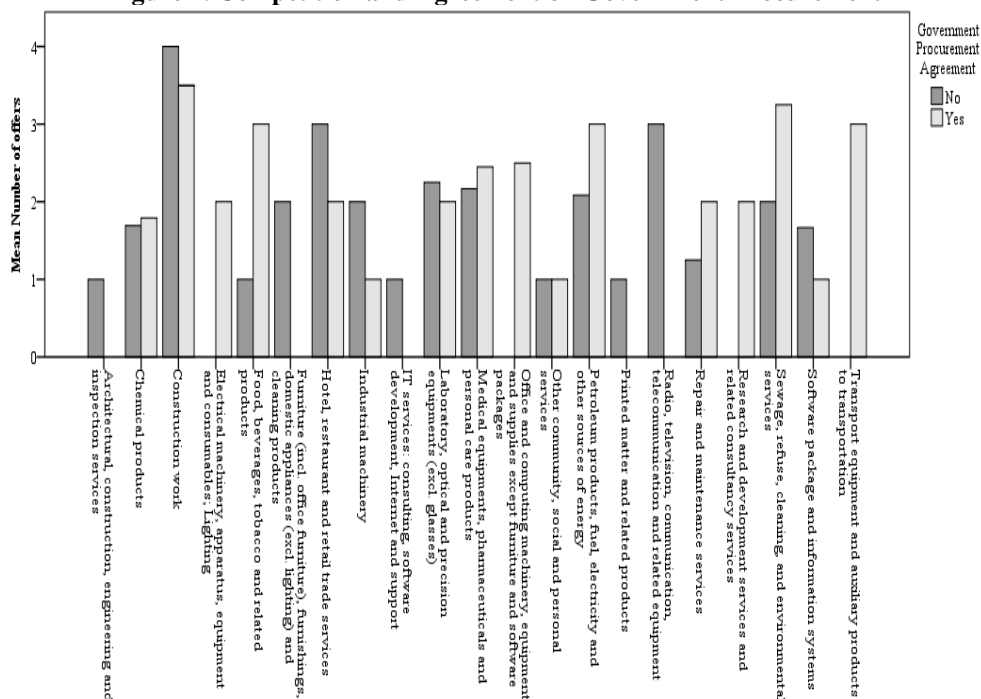

(*Source:* own data processing)

In case of Laboratory, optical and precision equipment (excl. glasses) the positive, relatively high savings are present if both cases, when GPA were used, and when GPA were not used. When GPA occurred withing chapter of Laboratory, optical and precision equipment (excl. glasses) savings were at the level 11%, when GPA did not occur, savings were at the level 9%. In our opinion, interesting pattern can be seen within CPV chapter of Medical equipment, pharmaceuticals, and personal care products. We observe in this chapter relatively high difference between GPA and non-GPA public procurements in terms of savings. We document here biggest difference between observed phenomenon, but also its

direction is opposite. By that we mean that saving is higher, on the level off 11% when GPA is not used and only on the level 3% when GPA is present. In CPV chapter Office and computing machinery, equipment and supplies except furniture and software packages we find only public procurements that used of Agreement on Government Procurement and we document positive savings on the level 3%. In CPV chapter Other community, social and personal services savings are relatively low, close to 0% in cases when GPA were not present and 1% in cases when GPA took place. In procurements of Petroleum products, fuel, electricity, and other sources of energy within healthcare sector, no difference between savings creation within procurements are observed, and in both cases, thus when GPA took place and did not, savings are on the level of 7%. Small differences, and also small magnitude of savings are reached also in CPV chapter Repair and maintenance services, where we notice savings on the level 1% in the procurements where GPA is applied and 0% savings in cases, when GPA was not applied. Second highest savings, on the level of 15% are reached in case of procurements in CPV chapter Research and development services and related consultancy services in cases when GPA were applied. Moreover, in this CPV chapter we notice only procurements, which were run in GPA mode. In CPV chapter Sewage, refuse, cleaning, and environmental services, relatively low savings are detected. We notice here zero savings in cases of non-GPA procurements and 1% saving in cases when GPA was applied. Finally, in CPV chapter Software package and information systems we document same opposite pattern as in case of Medical equipment, pharmaceuticals, and personal care products, where the difference between GPA and non-GPA procurements was relatively high and its direction was opposite compared to the rest of the database. Software package and information systems were procured with saving on the level 11% when GPA were not applied and 6% in cases, when GPA were applied. In next part of analysis, we will look closer on the competition in terms of number of bids in relation to GPA application. The mean number of bids in respective chapter of the Common Procurement Vocabulary is presented on the Figure 2.

It is needless to say that public procurement in Slovak republic suffers in long term from low competition. We document the mentioned fact in Figure 2. The toughest competition in terms of number of bids can be observed in CPV chapter Construction work, where in cases when GPA were applied, we observe 4 bids per contract award and 3.5 bids in cases, when GPA were not applied. Second most competitive CPV chapter is the chapter of Sewage, refuse, cleaning, and environmental services, where we document 3 bids per contract in cases when GPA were applied and 2 bids in cases, when not. On the third place in terms of competition within CPV chapter is chapter of Food, beverages, tobacco, and related products where 3 bids were on average observed in procurement process when GPA were applied and 1 bid when not. Similar competition can be seen in Transport equipment and auxiliary products to transportation chapter, where all procurements were done under GPA and average number of bids is equal to 3.

**Figure 2. Competition and Agreement on Government Procurement**

(*Source:* own data processing)

We document here 3 bids per procurement when GPA were applied and 2 bids per procurement when GPA were not applied. In chapters Hotel, restaurant, and retail trade services, Industrial machinery and Laboratory, optical and precision equipment (excl. glasses), we observe opposite pattern, meaning that non-GPA procurements contained more competition, than GPA procurements. In chapter Hotel, restaurant and retail trade services we find 3 bids per procurement when GPA were not applied and 2 bids per procurement, when GPA were applied. In Laboratory, optical and precision equipment we find weakly more bids in non-GPA procurements, than in GPA procurements. In industrial machinery chapter we notice 2 bids on average when GPA are not applied and 1 bid on average, when GPA is applied. Poorest competition is within chapters of Administration, defence and social security services; IT services: consulting, software development, Internet and support; Other community, social and personal services; Printed matter and related products where we find on average only 1 bid per contract, while it does not matter whether procurement was done with GPA, or not. In final part of analysis, we run correspondence analysis to verify whether number of bids influence the savings that occur during procurement process. We do not split dataset on GPA and non-GPA procurements, because differences between results were minimal, when we tried to do so. Figure 3 propose the output of correspondence analysis. Correspondence analysis is a data visualisation method,

where data are displayed to correspondence map. The position of the points indicates the similarity between the line categories and column categories of the pivot table and reveal some possible relationships and associations between analysed variables. We consider two categorical variables in presented correspondence analysis. Number of offers is categorical variable indicating the total number of offers submitted by potential contractors during procurement process. Saving is derived categorical variable from continuous variable Savings. By data binning we created 4 intervals of savings, which are less than 0%, (1;2), (3;12) and more than 13%. Bins were created by using optimal scaling of intervals, where we consider quartiles.

Figure 3. Correspondence analysis Number of offers and Savings
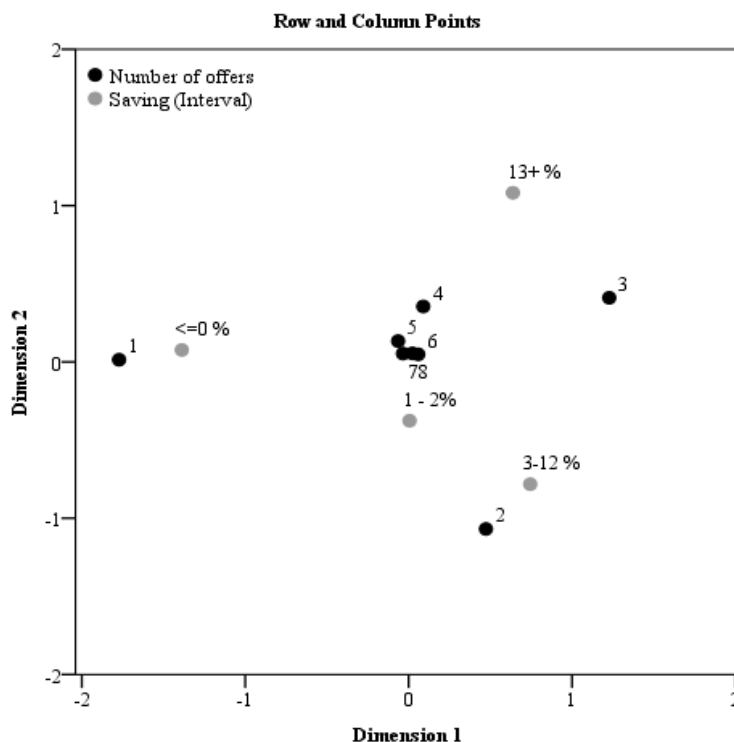
(*Source:* own data processing)

Correspondence analysis firstly reveals that negative savings, less than 0% are associated with 1 offer, thus lowest level of competition. Second conclusion that can be drown is that relatively high savings are associated with duopolistic competition, thus with two offers per contract. Interesting is also fact that relatively small positive savings, 1-2% are associated to 4-8 number of offers per procurement. Finally, high savings are weakly associated with 3 and 4 offers per procurement.

3. Conclusions

The aim of our study is to examine whether the use of GPA has an impact on the occurrence of savings within the public procurement process and if the application of GPA induces the competition among tenders, thus whether the use of GPA increases the number of offers. The outcome of the analyses brings up the interesting findings. The use of the Government Procurement Agreement – GPA stimulates the creation of savings in the selected items of the common procurement vocabulary, for the selected CPV codes, respectively. Higher savings in GPA use are achieved within the following CPV chapters: Chemical products; Food, beverages, tobacco and related products; Laboratory, optical and precision equipment (excl. Glasses); Sewage, refuse, cleaning, and environmental services, and Other community, social and personal services. When examining the competition within the CPV chapters, it was found that the use of GPA increases competition, resp., the number of offers from competing companies in the following subchapters of the CPV: Chemical products; Food, beverages, tobacco and related products; Medical equipment, pharmaceuticals, and personal care products; Fuel, electricity, and other sources of energy; Repair and maintenance services and Sewage, refuse, cleaning, and environmental services. The results of the correspondence analysis declare that the negative savings are associated with one offer and thus, the lowest level of competition. Relatively high savings were associated with duopolistic competition, where two bids per procurement are present. Also, there is the interesting fact that relatively small positive savings, 1 % to 2 % are related to 4 to 8 offers. The high savings correspond slightly to 3 and 4 bids in per procurement. To ensure the efficiency of public procurement, it is necessary to eliminate non-transparent procurements that is related to the inefficient use of public finances as well as corruption. Attention must also be paid to the legislative system within the Slovak Republic along with the timely implementation of the legal norms in practice.

Authors Contributions

The authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

system in order to measure and to manage performance in healthcare facilities in the Czech Republic".

References

Ahsan, K. and Rahman, S. (2017). Green public procurement implementation challenges in Australian public healthcare sector. *Journal of Cleaner Production*, 152, 181-197. https://doi.org/10.1016/j.jclepro.2017.03.055

Arrowsmith, S. (2010). Horizontal policies in public procurement: a taxonomy. *Journal of Public Procurement*, *10*(2), 149-186. https://doi.org/10.1108/JOPP-10-02-2010-B001

Askfors, Y. and Fornstedt, H. (2018). The clash of managerial and professional logics in public procurement: Implications for innovation in the health-care sector. *Scandinavian Journal of Management*, *34*(1), 78-90. https://doi.org/10.1016/j.scaman.2018.01.001

Beaulieu, M., Roy, J. & Landry, S. (2018). Logistics outsourcing in the healthcare sector: Lessons from a Canadian experience. *Canadian Journal of Administrative Sciences*, 35, 635-648. https://doi.org/10.1002/cjas.1469

Bustinza, O. F., Arias-Aranda, D. & Gutierrez-Gutierrez, L. (2010). Outsourcing, competitive capabilities and performance: An empirical study in service firms *International Journal of Production Economics*, *126* (1), 276-288.

Decarolis, F. and Giorgiantonio, C. (2015). Public Procurement of Healthcare in Europe: The Case of Medical Devices (April 1, 2015). *Rivista di Politica Economica, 104* (4/4), 7-36. http://dx.doi.org/10.2139/ssrn.3476523

Fazekas, M., Toth, I. J. & King, P. L. (2016). An objective corruption risk index using public procurement data. *European Journal on Criminal Policy and Research*, *22*(3), 369-397. https://doi.org/10.1007/s10610-016-9308-z

Grega, M., Orviska, M., Nemec, J. & Lawson, C. (2019). Factors Determining the Efficiency of Slovak Public Procurement. *NISPAcee Journal of Public Administration and Policy*, *12*(1). https://doi.org/10.2478/nispa-2019-0002

Hunsaker, K. (2009). Ethics in public procurement: buying public trust. *Journal of Public Procurement*, *9*(3/4), 411-418. https://doi.org/10.1108/JOPP-09-03-04-2009-B004

Kastanioti, C., Kontodimopoulos, N., Stasinopoulos, D., Kapetaneas, N. & Polyzos, N. (2013). Public procurement of health technologies in Greece in an era of economic crisis. *Health Policy*, *109*(1), 7-13. https://doi.org/10.1016/j.healthpol.2012.03.015

Kautsch, M., Lichoń, M. & Whyles, G. (2015). Tools of innovative public procurement in health care in Poland. *Innovation: The European Journal of Social Science Research*, *28*(3). https://doi.org/10.1080/13511610.2015.1043243

Marco-Simó, J. M. and Pastor-Collado, J. A. (2020). IT outsourcing in the public sector: A descriptive framework from a literature review. *Journal of Global Information Technology Management*, 23, 25-52. https://doi.org/10.1080/1097198x.2019.1701357

Miller, F. A. and Lehoux, P. (2020). The innovation impacts of public procurement offices: The case of healthcare procurement. *Research Policy*, *49*(7), 104075. https://doi.org/10.1016/j.respol.2020.104075

Mori, A. (2017). The impact of public services outsourcing on work and employment conditions in different national regimes. *European Journal of Industrial Relations*, *23*(4), 347-364. https://doi.org/10.1177/0959680117694272

Nemec, J., Kubak, M., Krapek, M. & Horehajova, M. (2020). Competition in Public Procurement in the Czech and Slovak Public Health Care Sectors. *Healthcare*, 8, 201. https://doi.org/10.3390/healthcare8030201

Nemec, J., Šumpíková, M., Orviská, M., Bušina, F. & Grega, M. (2016). Transaction costs in the public procurement: Selected findings in czech and lovak conditions. In T. Loster, & T. Pavelka (Eds.), Proceedings of the 10th international days of statistics and economics, 1749-1758. Melandrium: Praha.

Nemec, J., Šumpíková, M., Klazar, S. & Grega, M. (2014). Efficiency versus economy in public procurement. In T. Löster, & T. Pavelka (Eds.), Conference proceedings: The 8th international days of statistics and economics, 1054-1063. Praha: Melandrium.

Olken, B. A. and Pande, R. (2012). Corruption in developing countries. *Annual Review of Economics*, *4*(1), 479-509. https://doi.org/10.3386/w17398

Padhi, S. S. and Mohapatra, P. K. (2011). Detection of collusion in government procurement auctions. *Journal of Purchasing and Supply Management*, *17*(4), 207-221.

Plaček, M., Ochrana, F., Schmidt, M., Nemec, J. & Půček, M. (2019). The factors causing delays in public procurement: the Czech Republic versus the UK. *Public Money & Management, 40*(2), 131-139. https://doi.org/10.1080/09540962.2019.1651034

Pollitt, C. and Bouckaert, G. (2011). Public management reform: A comparative analysis – new public management, governance, and the Neo-Weberian state Oxford University Press, Oxford (2011)

Racca, G. M. (2010). Collaborative Procurement and Contract Performance in the Italian Healthcare Sector: Illustration of a Common Problem in European Procurement. *Public Procurement Law Review*, 3, 119. https://ssrn.com/abstract=1714278

Relakis, J. and Maniadakis, M. (2011). Developing HTA frameworks in emerging markets: the road ahead. The case of Greece. *Eurohealth,* 16, 11–4.

Rolfstam, M. (2013). Public procurement of innovation theory. The Role of Institutions. Monograph Chapter, 23-51. https://doi.org/10.4337/9780857930521.00007

Rothery, R. (2003). China´s Legal Framework for Public Procurement. *Journal of Public Procurement*, 3(3), 370-388.

Siegfried Schnitzer, O. (2010). Regulating public procurement law at supranational level: The example of eu agreements on public procurement. *Journal of Public Procurement*, *10*(3), 301-334. https://doi.org/10.1108/JOPP-10-03-2010-B001

Skipworth, H., Delbufalo, E. & Mena, C. (2020). Logistics and procurement outsourcing in the healthcare sector: A comparative analysis. European Management Journal. *European Management Journal*, *38*(3), 518-532. https://doi.org/10.1016/j.emj.2020.04.002

Sullivan, E. W. and Ngwenyama, O. K. (2005). How are public sector organizations managing IS outsourcing risks? An analysis of outsourcing guidelines from three jurisdictions. *Journal of Computer Information Systems*, *45*(3), 73-87.

Turrell, A. (2013). Developing a public value healthcare procurement framework. *Journal of Public Procurement*, *13*(4), 476-515. https://doi.org/10.1108/JOPP-13-04-2013-B003

Uyarra, E., Edler, J., Garcia-Estevez, J., Georghiou, L. & Yeow, J. (2014). Barriers to innovation through public procurement: A supplier perspective. *Technovation*, *34*(10), 631-645. https://doi.org/10.1016/j.technovation.2014.04.003Get rights and content

Šumpíková, M. and Ďurčeková, I. (2019). Transaction Costs, Outsourcing, and the Public Procurement Review Process in the Czech Republic and Slovakia. *NISPAcee Journal of Public Administration and Policy*, *12*(2), 233-250. https://doi.org/10.2478/nispa-2019-0021

EU Open Data Portal. https://data.europa.eu/euodp/sk/data/dataset/ted-csv

Corporate social responsibility in public administration. Case of Polish central administrative institutions

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Abstract: *The article aims to show that, currently, the concept of Corporate Social Responsibility (CSR) shall not be associated solely with business, but has been successfully absorbed in public administration. Theoreticians' views as to the possibility (or even necessity) of applying the concept of social responsibility in public administration are confirmed by the activities of public administration institutions at the central level in Poland. The subjects of the study were manifestations of the implementation of the CSR concept on two levels: 1) policy planning (based on the example of selected key strategic documents in the field of development policy from the last decade) and 2) operational activities of public administration. The article analyses the database on Good CSR Practices of Public Administration, gathered at the forum of the Working Group on Corporate Social Responsibility of Public Administration, operating at the Ministry of Funds and Regional Policy since 2018. The article also presents pioneering CSR reports published by three central public administrative institutions, whose representatives participated in the work of the group. The results of the analysis of the database and reports lead to the conclusion that, in Poland, the concept of CSR at the central administration level is implemented by institutions, although only occasionally reported. CSR should be considered an inherent part of modern public governance models constituting the paradigm of public administration activity.*

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Introduction

Corporate Social Responsibility (CSR) has become a well-established concept in business. The idea of CSR assumes that an enterprise functions in a broader social context and within a particular time frame. The modern concept of CSR and its principles result from research and practice originating in the 1950s (Bowen, 1953). Nowadays, CSR is widely recognized at the global, regional, national, and even local level, mostly as a "voluntary contribution to sustainable development" (Steurer, 2012). Key international organisations are involved in debating about and promoting CSR: the World Bank, European Union, OECD and UN. In the recent decade, a few practical tools oriented for the implementation of CSR have been worked out - these are: ISO26000, AA1000, ISO14000, ISO900, ISO18000, GRI, LBG23 SA8000. According to Frederick (1994), four stages of development of the CSR concept can be recognized: the first stage focuses on defining areas of responsibility, the second stage concerns the preparation and implementation of strategies and specific activities within areas previously defined, the third stage emphasizes values, and the fourth stage concentrates on a broadened understanding of responsibility, also concerning religion and ethics. The four stages reflect the constant development of the CSR concept. Socially responsible behaviour of companies is expected nowadays by a wide scope of entities: mainly consumers, but also trading partners, contractors and public authorities (Haseeb et al., 2019) Challenges of sustainable development as well as economic and social crises in recent years resulted in a reality where ethics turned out to be essential, mainly because the global community is experiencing a shortage of ethical approaches and reflections. Under these circumstances, CSR is no longer voluntary, but is becoming a strong moral or even legal duty (some groups of companies are legally obliged to report their non-financial activities in publicly available documents). The conviction of entities to undertake the special responsibility - responsibility that goes beyond legal requirements - seems to get attention also in the public sector. Public administration can implement CSR goals while performing its main roles: as a policy planner and policy maker, as a supervisor of other entities' activities, as an organizer of a market, as a purchaser of services and goods, as a supplier of (public) services, and as an employer. Public administrative bodies surely fulfil tasks of high importance for the state and society, however, they can be regarded as "corporates" from the perspective of management: administrative bodies have their specific internal structures, decision-making and supervisory procedures, they have areas of specialization and are attributed with specific tasks. The famous CSR standard - ISO 26000 norm - applies to corporations (not strictly business), so public administrative bodies can be also covered by this term.

This paper aims to verify the thesis that the concept of Corporate Social Responsibility can be successfully implemented in activities of public administration in a manner that so far has been attributed to companies (Androniceanu, 2019). The functioning of the central (governmental) public administration in Poland proves that the concept of CSR has been absorbed either in policy planning and legislation or in

the operational day-to-day activities of public institutions (which is confirmed in CSR reports), although the practical dimension of CSR in public institutions needs further popularization.

1. Literature review

It is extremely difficult to formulate a clear and unbiased definition of CSR. Most frequently, definitions of CSR relate to the overall relationship of a corporation with all its stakeholders (Khoury et al., 1999). CSR is perceived as an obligation to constituent groups in a society other than stockholders and beyond that prescribed by law or union contract (Jones, 1980). In addition, important functions of CSR concept implementation in social relations are provided by NGOs (Carvalho et al,. 2019). Nicolaides (2018) sees CSR as a "vital strategic tool for corporations and smaller enterprises". The notion of CSR also refers to the ethical treatment of stakeholders (Hopkins, 1998; Hopkins, 2003) and goes beyond what is required by law and the direct interests of a corporation (McWilliams & Siegel, 2003). Some of these studies provide evidence of higher financial outcomes for enterprises with a responsible approach to entrepreneurship (Myšková & Hájek, 2019). The European Commission sees CSR as "the responsibility of enterprises for their impacts on society" (EC, 2011), and for public administration, it only provides a supporting role for CSR activities undertaken by enterprises. In the ISO 26000 norm, the International Organization for Standardization defines CSR as an organization's responsibility for the impact of its decisions and activities on society and the environment through transparent and ethical behaviour that contributes to sustainable development. These include the health and welfare of society, taking into account the expectations of stakeholders, remaining in compliance with applicable law and consistent with international norms of behaviour, integrated throughout the organization and implemented in its relations.

In the last two decades, CSR practices have been identified with sustainable development more frequently (Moon, 2007; Kolk & van Tulder, 2010; Kolk, 2016; Akdoğu, 2016). This is particularly evident in the UN reports and documents concerning Agenda 2030 (UN, 2016). Despite their multitude, "definitions of CSR are predominantly congruent, making the lack of one universally accepted definition less problematic than it might seem at first glance" (Dahlshrud, 2008). Even if the definitions of CSR do not relate directly to public administration, the view that corporate responsibility can be attributed to public administration has been rooted in a scholar debate on administration since the 1930s, e.g. in the works of Carl Friedrich (Plant, 2018). In the 1970s, the context of critical social theory, social equity, and democratic governance appeared in the academic discourse on the responsibility of public administration (Plant, 2008). The possibility of implementing the CSR concept in public administration requires an understanding that the operation of the administration is not limited to administrative law, even if the regulatory impact of the law in public administration is decisive, and, generally, public administration is largely a state-legal category, although it is not limited to this (Ospanova et al.,

2018). The gate for CSR in public administration was opened by the New Public Management rules, which postulate bringing the methods of operation of public administration closer to business methods. With such a vision of the public sector's activities, there is already room for the implementation of CSR activities by public institutions that cannot and should not function in isolation from the environment and the social challenges that arise in it. Modern public governance requires a holistic approach, assuming the participation of many stakeholders in decision-making processes. Tomaževič's research (2019) shows that, among public governance models (post-NPM), the greatest openness to the implementation of the CSR concept is shown by alternative models, network governance and the New Weberian State.

Another drive for boosting CSR in public administration is the tendency to focus on and strengthen public values, such as the need for accountability, fairness, impartiality, or ending discrimination based on race, gender, or sexual orientation, equality (Plant, 2018), fair income distribution within public distributive policy (Mishchuk et al., 2019), support for the implementation of responsible practices in the employment sphere based on their objective estimation (Olinyk, 2020). The value-based approach within modern public governance results in the rules applied in contemporary public governance, such as consensus orientation, participation, equity, and inclusiveness, to directly refer to CSR (Tomaževič, 2019).

In the last decade, numerous authors have emphasised the need for responsible administration in terms known from the business application of CSR (Di Bitetto, Chymis, & D'Anselmi, 2014; Chymis, D'Anselmi & Triantopoluos, 2017; Formánková, Hrdličková & Grabec, 2017). Publications presenting case studies of CSR in public sector and their social reception have been rather seldom (Štreimikienė & Pušinaitė, 2009; Broniewska, 2012; Pauzuoliene & Mauriciene, 2013; Di Bitetto, Chymis, D'Anselmi, 2014; Wieteska-Rosiak, 2014; Vázquez, Aza & Lanero, 2016; UN, 2016).

Summing up, the literature sees social responsibility as a paradigm of public administration activity, usually strictly associated with sustainable development. However, empirical research on CSR in public administration remains sparse, hence this article, presenting this issue based on an example from the central Polish public administration, has a chance to partially fill in this gap.

2. Methods

In order to achieve the goal of the paper, which is proving that CSR can be successfully implemented as a paradigm of public governance, Both quantitative and qualitative research methods were applied, using mainly secondary data. Regarding the policy-planning dimension, the content analysis of governmental strategic documents of development policy in Poland was introduced - in this area research focused on identification of exemplary signs of CSR approach in public administration's activities designed in the selected documents: *Report Poland 2030*, the long-term *National Development Strategy Poland 2030. The Third Wave of*

Modernity, the mid-term *National Development Strategy 2020* and the *Strategy on Sustainable Development*, as well as the sectoral *Efficient State Strategy*.

Furthermore, identification of the CSR approach in operations of central public administrative bodies required the analysis of the content of the database that gathered information on CSR activities from members of the Working Group on Corporate Social Responsibility of Public Administration, established by the Polish Ministry of Investment and Development (currently, the Ministry of Funds and Regional Development). The records of the database were filled in on the basis of a survey conducted among members of the group in 2019; the test version of the database was made available in February 2020. In this regard, the research was supplemented by a questionnaire submitted to 132 organizational units of the central public administration in Poland, conducted in October 2020. The final part of the research presented in the paper was the examination of the mixed analysis of content of non-financial reports of the central institutions supplementing the research.

3. Analysis

3.1 Policy-planning level

The first policy paper incorporating the CSR concept into the public administration's functioning was a planning document entitled *Report Poland 2030* (2009) that strongly refers to the inclusion of citizens in decision-making processes to the highest possible extent. *Report Poland 2030* insists on recognizing the knowledge, practice, and experience of non-state-owned entities in making diagnosis and solving current problems (p. 300). The spirit of CSR can be also seen in: raising the effectiveness of new public management and gradually introducing citizens' participation in the creation of public services (p. 329) as well as a participation of stakeholders as a method to obtain additional analysis, arguments or opinions useful for optimizing the undertaken activities (p. 330). Following *Report Poland 2030* is the long term *Strategy for Country Development Poland 2030.* The *Third Wave of Modernity* (2013) indicated necessary directions of interventions: treating citizens as sources of knowledge and solutions (p. 59), introducing mechanisms of modern social debate and communication between a state and citizens (p. 119), promoting a social and citizens' participation (p. 125). The middle-term *Strategy for Country Development 2020* focused on a shift from "administering" to "managing development" (p. 39) and on strengthening conditions for implementing individual needs and activities of citizens (p. 54*). Strategy on Efficient State* (2013) introduces the CSR concept through organizational and managerial solutions, such as responsive management, partnership, transparency, participation, co-creation of solutions (p. 5 and 8), by providing access to the resources of the public sector (Open Government) and making the consultation process more efficient, and introducing more methods for including citizens in governance (p. 27 and 36). The strategy also emphasizes creating a program for developing, testing, and popularizing innovative techniques of participatory management (e.g. participatory budget, citizens' panels)

and a regular monitoring of the quality of social consultation and participation (p. 36-38). It also introduces a technique of planning and making decisions based on real data and full knowledge of the needs and preferences of citizens, who should be engaged in improving governance by using participatory tools offered by public administration and by creating their own solutions (p. 59). The process of exchange of knowledge should go beyond traditional citizens' participation, based on public consultation as an element of the lawmaking process (p. 59).

Strategy on Sustainable Development until 2020 (with a perspective to 2030) (2017) relates directly to social responsibility. It presents a responsible development model based on building a competitive strength with the use of new development factors in order to ensure participation and benefits to all social groups in Poland. The strategy highlights that the new development model focuses on the quality of development and the perception of development processes in the context of their importance for citizens (p. 7). The three goals of Strategy for Sustainable Development also underpin social responsibility of a public administration: (1) constant economic growth based increasingly on knowledge, data, and organizational excellence (Androniceanu et al., 2021); (2) socially sensitive and territorially sustainable development; (3) efficient state and institutions oriented for growth, and social and economic inclusion.

Recommendations from national strategies are partly implemented by normative acts. Elements of social responsibility can be identified mainly in: (1) mandatory public consultations in cases on legislation (e.g. in the Revitalization Act, Act on Self-Government in Communes, Act on Self-Government in Poviats, Act on Self-Government in Voivodeships), (2) setting up representative bodies for stakeholders (e.g. Revitalization Act, Act on Self-Government in Communes), (3) collaboration based on the social participation guaranteeing active participation in preparing particular solution (e.g. Revitalization Act, Act on Public Benefit Activity and Volunteering), (4) initiatives in performing public tasks (Act on Self-Government in Communes, Act on Self-Government in Poviats, Act on Self-Government in Voivodeships). The transparency of public administration's activities shall be protected by the Act on Access to Public Information (2001).

3.2 Operational level

This part of the research addresses the problem of recognizing the CSR approach in regular activities of central administrative bodies. Considering that policy-planning documents and legislative acts acknowledge the CSR approach, there was a need to verify if these formal frameworks have any impact on practices of public administration. The most evident sign of CSR in practice was the establishment (in September 2018) of the Working Group on Social Responsibility of Public Administration (hereafter, the Group) at the Ministry of Investment and Development (currently (2020), the Ministry of Funds and Regional Policy), operating under the auspices of the Team for Sustainable Development and Corporate Social Responsibility. The Group is composed of ca. 50 representatives

of central administration authorities, representatives of non-governmental organizations and academia. Its first task was to gather good CSR practices implemented in central public administrative bodies (ministries, central offices, agencies). The results of the survey were collected in the test version of the database of Good CSR Practices in Public Administration. It is based on a scheme of ISO 26000, and the activities are identified in all 7 subjects recognized in Table 1 by this norm (6 specific subjects plus organizational governance).

Table 1. CSR practices reported by central administrative institutions by subject

ISO 26000 area	Number of practices reported	Examples
Organisational Governance	13	Implementation of process approach in the Ministry of State Assets
Labour Practices	35	Using anti-discrimination clause in job offers announced by the Ministry of Digital Affairs
Human rights	16	Establishing a Coordinator for Equal Treatment in the Ministry of Sport
Environment	17	„Green chancellery": implementation of environment-friendly actions in the Chancellery of the Prime Minister
Fair Operating Practices	17	Establishing an independent position of a counsellor of ethics in the Ministry of Funds and Regional Policy
Consumer Issues	14	Opening a historic building of the Ministry of National Education for external visitors
Community Involvement and Development	32	"Little Heart" campaign: support of employees of the Ministry of Foreign Affairs for kids in the child care home
Total number of reported practices	**127**	

(Source: Processed by authors from https://prezentacja.www.gov.pl/web/baza-wiedzy/baza-dobrych-praktyk, accessed: 30 September 2020)

The most frequent areas where public administrative bodies communicate their CSR practices are: Labour practices and Community Involvement and Development. What may be surprising is the low number of practices classified as Organizational Governance and Consumer Issues. Regarding the first issue: public administration is strongly hierarchized and structured from bottom to top. It operates on the basis and within the limits of law - one can say that organizational governance is just natural for public administrative bodies and that is why they probably do not identify this category of practices as socially responsible activities (that *ex definitione* are

not required by law). The low number of practices related to Consumer Issues shown in the database with high probability results from the nature of the institutions that reported practices; they were central governmental institutions that are in charge of planning and implementing policies, and normally do not enter into direct contact with clients. Simultaneously, public administration institutions indicated a high number of practices in the area of Community Involvement and Development - this is probably linked to the long-lasting efforts of Polish public administration to build its positive image among Polish society - a number of actions undertaken in this regard in recent years had to be reflected in the database (Table 2).

Table 2. Central administrative institutions that reported CSR practices

Institution	Total number of practices reported in the database of Good CSR Practices in Public Administration	Number of practices reported simultaneously by other institutions (out of total number of reported practices)
Ministries		
Ministry of Funds and Regional Policy	25	15
Ministry of Digital Affairs	15	6
Ministry of National Education	14	5
Ministry of Sport	13	3
Ministry of Foreign Affairs	12	4
Ministry of Family, Labour and Social Policy	10	6
Ministry of State Assets	6	2
Ministry of Maritime Economy and Inland Shipping	1	-
Ministry of Agriculture and Development of Rural Areas	1	1
Ministry of National Defense	1	1
Other central administrative institutions		
Office of Rail Transport	36	5
Chancellery of the Prime Minister	23	11
Chief of Civil Service	11	-
Polish Statistical Office	17	1
Energy Regulatory Office	1	-
	186	**61**

(Source: Processed by authors from https://prezentacja.www.gov.pl/web/baza-wiedzy/baza-dobrych-praktyk, accessed: 30 September 2020).

The participants of the Working Group reported 127 activities that are attributed to only 15 institutions: 10 ministries, Chancellery of Prime Minister, two regulatory authorities (in energy and rail transport), and the Polish Statistical Office. Out of 127 practices in total, 20 were reported by more than 1 institution (one of these "shared" practices was voluntary blood donation), so the real number of practices undertaken by central public administrative bodies amounts to 186.

A low number of institutions reporting CSR practices to the database provoked a question on the level of recognition of the CSR concept by public administration. In order to determine that, all Polish public administration bodies operating at a central level were surveyed in this regard. The survey covered 132 organizational units performing tasks in the field of public administration: constitutional bodies (7), supreme bodies (14), central bodies (42), executive agencies (6), state legal entities (30), state budgetary units (23), state organizational units (10). The units covered by the survey were asked whether they knew about operations of the Working Group on Corporate Social Responsibility of Public Administration and whether the management of the unit has already implemented / or plans to implement CSR practices in the near future (up to 6 months) or in a longer time perspective (within 1-5 years). Furthermore, mainly because of the poor response to the short questionnaire (12.87%), the content of the websites and the Bulletin of Public Information were analyzed to finalize the research (verification of whether CSR practices are mentioned in the main sources of information available to the public), as can be seen in Table 3.

Table 3. Recognition of CSR concept by central administrative bodies in Poland

Source of information	Number of units selected for analysis /survey	Number of units analyzed/that responded	Number of units recognizing CSR in their activities
Institution's website	132	132	14
Bulletin of Public Information	122	122	4
Survey (by email)	132	17	8

(Source: Authors' own research and compilation)

The above research found that, on websites and in the Bulletin of Public Information, descriptions of CSR activities are rare. A low number of responses to the survey show that CSR issues are not highly ranked by central administrative bodies. However, 8 units that answered the short survey confirmed their CSR practices and 12 of them declared that they would implement CSR activities within 1-5 years.

The most evident sign of an advanced CSR approach is reporting CSR activities and announcing it to the wider public. Three institutions from central public administration headed this process: Rail Transport Office (hereafter, UTK), Social Insurance Institution (hereafter, ZUS) and the Polish Statistical Office (hereafter, GUS).

The pioneer of CSR in Polish public administration of the central level was the Rail Transport Office, which published its first CSR report in 2016. The first and the second (2017) CSR reports issued by the UTK did not result from the implementation of CSR strategy (as it was non-existent), but they were summaries of various CSR activities, not necessarily classified according to the ISO 26000 norm. However, since 2018, reports have shown how UTK managed to achieve the goals defined in the policy paper "Strategic goals of UTK 2018-2021". The quality of reports has been continuously improving: the 2018 CSR Report for the first time reflected a holistic approach to ISO 26000 and UTK reports increasingly socially responsible activities every year (Table 4).

Table 4. CSR practices in 2018 and 2019 reported by UTK (examples)

Areas according to UTK CSR Reports	Relevant ISO 26000 area	2018	2019
Dialogue and relations	Organizational Governance	Implementation of 360° assessment Examination of clients' training demands	Establishing ERTMS' Users' Group (to coordinate the implementation of ERTMS in PL)
Social involvement	Labour Practices	Cooperation agreements with a number of NGOs and public institutions	New Intranet services for employees Taking care of employees' kids in days off the school
Safety	Human rights	Initiative on Declaration on Development of Safety in rail transport adopted by 127 signatories	Training for UTK's employees "How to understand disability"
Education	Consumer Issues	Rail ABC – information campaign for kids	Rail Passengers' Spokesman dealing with passengers' claims
Accessibility	Fair Operating Practices	Eliminating physical barriers in accessing the site of UTK	Active participation of UTK in implementing the project "Single rail ticket"
Environment	Environment	Turning the roofs of the site into city apiaries	Organizing a debate on using hydrogen in rail transport
Ambitious team	Community Involvement and Development	Idea box for employees to present their ideas anonymously	Preserving historic vehicles, important for a development of rail transport in PL

(Source: Processed by authors on the basis of UTK, 2019 & UTK, 2020).

The scope of CSR-related activities performed by UTK is impressive regarding the relatively small size of the institution as well as a modest field of competence (rail transport issues). UTK uses its involvement in CSR to make this institution recognizable to the wider public. Since 2017, this public institution put its CSR reports in direct competition with non-financial reports of the biggest Polish commercial companies in the contest annually organized by Forum of Responsible Business (the oldest and the most influential organization dealing with CSR in Poland).

ZUS is a large public institution in charge of the social insurance system, employing ca. 45,000 people in 341 units across the country. Each year, ZUS enters into contact with ca. 26,000,000 citizens. The vision of ZUS is defined as "reaching the status of an innovative institution of social trust". In its 2017 and 2018 CSR reports (those available while this paper was completed - October 2020) ZUS presented itself as a smart, proactive, stakeholder-oriented organisation. Each annual report gathered ca. 100 activities categorised according to the ISO 26000 norms (Table 5). The CSR report of ZUS for 2019 was not available when this paper was finished (October 2020).

Table 5. CSR practices in 2017 and 2018 reported by ZUS (examples)

ISO 26000 area	2017	2018
Organizational Governance	Implementing procedures for whistle-blowing	e-ZLA (introduction of sick leave in electronic forms)
Labour Practices	Organizing tourist trips and package tours for employees, their families and pensioners	Updating a system for employee assessment
Human rights	Providing assistance of a video interpreter of sign language	Improving procedures for making appeals by ZUS' clients
Environment	Thermo-modernization of buildings belonging to ZUS	Eliminating paper usage by introducing electronic communication in ZUS and with clients
Fair Operating Practices	Including social clauses in contracts with external deliverers	Being a strategic partner to the social campaign „I work legally" organized by PIP
Consumer Issues	Special certificates for pensioners over 100 years old	Simplifying the language used by ZUS in communication with its clients
Community Involvement and Development	Co-operation with Polish diaspora - meetings and trainings concerning social insurance system in Europe, USA and Canada	Blood donation: 27 liters gathered by ZUS officials in 2018

(Source: Processed by authors on the basis of ZUS, 2018 & ZUS, 2019)

Analysis of CSR reports from 2017 and 2018 shows that ZUS is determined to present their achievements in CSR area, even if some activities described in the reports can be regarded rather as public relations activities, whereas others can be considered as simple fulfillment of basic duties of a public institution in charge of a state's pension scheme. In 2018, ZUS copied the approach of UTK and participated in the national contest for the best non-financial reports.

In 2019, the Polish Statistical Office (GUS), for the first time reported its CSR activities from 2018 (the 2019 report was not available when this paper was finished). The slogan of the report: "Statistics without barriers, because everybody matters" and it refers to GUS' commitment to the 8th goal of Agenda 2030. GUS is a public institution in charge of gathering, processing, and reporting official public data.

Due to the competences of GUS, this institution has a very wide range of stakeholders from other public institutions (European Commission, Eurostat, national governmental agencies) through international organizations (e.g. UN) to respondents (GUS, 2019). The GUS CSR Report 2018 reflects the areas of social responsibility recognized by the ISO 26000 norms, however, a large part of the report is dedicated to the significance of public statistics for monitoring the sustainable development and organizational structure of CSR activities in GUS (Table 6). The institution declares that it merged 7 areas of ISO 26000 norms into 4 key areas: corporate governance, natural environment, employees, and community (GUS, 2019).

Particular chapters of the report refer also to SDGs; they present CSR practices implemented either by the central office of GUS or by its regional departments.

Table 6. CSR practices in 2018 reported by GUS (examples)

ISO 26000 area	2018
Organisational Governance	Establishment of group on statistics of disabilities in GUS
Labour Practices	Providing interviewers working for GUS with personal alarm appliances in order to enhance their security
Human rights	Introducing health prevention programs for employees and the public (e.g. information campaigns promoting prevention of cancer and diabetes)
Environment	Using environmental clauses in public procurements
Fair Operating Practices	Purchasing ink, toner and other consumables considering intellectual property rights
Consumer Issues	Trainings on personal data protection

ISO 26000 area	2018
Community Involvement and Development	Charity actions (e.g. collection of glasses for people in Africa)

(Source: Processed by authors on the basis of GUS, 2019).

4. Discussion

For more than a decade, development strategies have been the basis for decision-making processes and day-to-day operation of public institutions. They constitute a sufficient formal framework for the development of "CSR culture" in public administrative bodies. Examples of the normative acts prove that the social responsibility of public administration is primarily implemented by the inclusivity, materiality and impact principles in the meaning provided by Accountability Principles Standard (AA1000APS, 2008), a set of standards dedicated to developing an accountable and strategic response to sustainability (Waistell, 2008).

Even if a formal framework for the CSR approach in public administration exists, institutions whose representatives already participate in the work of the Group show a very different level of awareness and involvement in CSR activities. Several institutions have already published reports on their own initiatives in the field of corporate social responsibility. Some of them are at the very early stage of implementing CSR, however, as the database shows, all of them are able to point at least one CSR practice undertaken in their offices. The contents of the database cannot be treated as exhaustive (it certainly does not cover all CSR-related activities undertaken by public administration) as public institutions reported these practices only voluntarily. Nevertheless, this incompleteness of the database does not deprive it of its utilitarian character - the results were used to create a publicly available platform that can serve as a model for other administration bodies to base their activities in various dimensions and areas on the CSR concept.

The number of central public administrative institutions that declare an implementation of CSR practices is not impressive – only 10.6% of (132) institutions mention CSR practices on their websites and only 50% out of (20) Polish ministries admitted to implementing CSR practices. The content of the database of Good CSR Practices in Public Administration shows that not all participants of the Group reported their good practices in CSR. The question is whether they have not implemented any practices so far or if public institutions are unaware of the fact that what they do can be considered CSR. If the latter is true, it only confirms the necessity to develop and popularize the platform of good practices in organizations. The third option is that some institutions do not want to admit their contribution to social responsibility of public administration. So far, only a few central administrative institutions have decided to report their CSR activities, and these are all public administration institutions outside the government. The reports presented in this paper are professionally constructed, usually carried out by communication

departments, education, or HR departments - interviews with government employees reporting CSR showed that often people who transferred to public administration from business institutions are behind these activities. All reports directly refer to ISO 26000 areas, and – to a lesser or greater extent - to the UN SDGs. CSR reports of public administrative institutions do not differ much from similar reports produced by business entities. Submitting reports for a contest and opening for competition with companies' reports only proves that public institutions treat CSR as seriously as private businesses do. ZUS could be seen as the most significant recipient of CSR in public administration. The size of the institution, its common recognition as well as the broad network of stakeholders ZUS deals with predetermines this public body to transfer the CSR concept to other sectors of public administration. But, even if the 2017 and 2018 reports showed that ZUS was heading toward this goal, however the tendency seemed to stop in 2019. ZUS must report its CSR activities to build and to strengthen the good image of the institution. As a monopolist on the market for social insurance, ZUS has been strongly fighting for social trust - this task is extremely difficult regarding the rather poor state of the Polish system of pensions and the problems arising from the growing number of pensioners. The picture of ZUS in the media is also quite negative - the institution used to be described as inefficiently managed. Surely, ZUS as an organization is not responsible for the amount of an average pension or other social insurance bond, but the association of a poor pensioner with ZUS is deeply rooted in the Polish society and public opinion. Nevertheless, the public attitude towards ZUS has started to change. In 2012, ZUS was positively assessed only by 32% of respondents (CBOS, 2012), but in April 2019, ZUS achieved the best result in the history of the survey (since 2009) - 47% of respondents expressed a positive opinion of ZUS. CSR activities as such are not the only factor that contributed to this shift, but regarding CSR as a part of a broader strategy of management of the institution, stakeholder-oriented activities shall be seen as important components of improving the image and social reception of ZUS. Other institutions having reported CSR face much fewer problems in their social receptions, mainly because they are not oriented for direct servicing of citizens.

5. Conclusions

Reference to policy papers (development strategies) and selected legislative acts confirms that the CSR concept is widely recognized in policy planning and legislation. The Polish central administration seems to be strongly oriented toward achieving CSR goals that are strongly represented in the UN Agenda 2030, currently being implemented in Poland by the Strategy on Sustainable Development. Establishment of CSR Working Groups, among them the Working Group on Corporate Social Responsibility of Public Administration, at a ministerial level confirms the significance of this issue. The database of Good CSR Practices created on the basis of information gathered from members of the Group showed that a significant number of central governmental institutions have undertaken socially responsible activities addressed to many categories of stakeholders. Case studies

based on CSR reports of three sector-specific institutions (rail transport, social insurance, and public statistics) confirm that social responsible initiatives are, nowadays, a coherent part of the performance of public bodies. These reports, referring to ISO 26000 norms and SDGs, make evident that the CSR concept can be applicable to public administration in the same manner and as successfully as it is in business. Even if the number of CSR reports from central public administrative institutions is not remarkable, this number does not reflect the magnitude of CSR activities undertaken by governmental administration – activities that are not reported in a professional manner. The paper confirms that central public administration is oriented toward a value-based approach, highlighted in the literature on contemporary, post-NPM, governance and CSR has become one of the most important tools in facing global challenges. The examples of CSR activities presented in the paper may be of use for practitioners: public officers and decision makers and in this regard. The paper fills the gap in the literature on administrative sciences that stipulates CSR in public governance, but hardly provides any examples from the practice that public officers could benefit from. So far, the research has focused solely on central public administration. In the future, it should cover self-governmental (regional and local administration) institutions in order to assess the impact of the concept of CSR on the sector of public administration as a whole.

Authors Contributions

The author/authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Akdoğu, S.K. (2016). The Link Between CSR and Sustainable Development in a Global Economy. In: Vertigans, S. & Idowu, S. (eds.). Corporate Social Responsibility. CSR, Sustainability, Ethics & Governance. Springer, Cham, 223-240.

Androniceanu, A., Kinnunen, J. & Georgescu, I. (2021). Circular economy as a strategic option to promote sustainable economic growth and effective human development. *Journal of International Studies, 14*(1), 60-73. doi:10.14254/2071- 8330.2021/14-1/4

Androniceanu A. (2019). Using automated digital systems to thoroughly regulate social governance: monitoring and behavior modification through data-driven algorithmic decision-making. *Contemporary Readings in Law and Social Justice*, 11(1), 63-68.

Bowen, H.R .(1953). *Social Responsibilities of the Businessman*. Harper and Row: New York.

Broniewska, M.J. (2012). Społeczna odpowiedzialność w administracji publicznej, *Acta Universitatis Lodziensis Folia Oeconomica*, *265*, 115-123.

Carvalho, A. O., Ferreira, M. R., & Silva, P. A. (2019). Partners in a caring society – a nonprofit organization case study. *Economics and Sociology, 12*(2*),* 129-146. doi:10.14254/2071-789X.2019/12-2/8

CBOS (2012). Społeczny wizerunek ZUS. Komunikat z badań: BS/129/2012, Warszawa. Retrieved from: https://www.cbos.pl/SPISKOM.POL/2012/K_129_12.PDF

Chymis, A., D'Anselmi, P. & Triantopoluos, Ch. (2017). The Need for a Responsible Public Administration. In: Chymis, A., D'Anselmi, P. & Triantopoluos, Ch. (eds.). *Corporate Social Responsibility in the Post-Financial Crisis Era. Palgrave Studies in Governance, Leadership and Responsibility*. Palgrave Macmillan, Cham, 155-173.

Dahlsrud, A. (2008). How Corporate Social Responsibility is Defined: an Analysis of 37 Definitions. *Corporate Social Responsibility and Environmental Management*, 15, 1-13.

Di Bitetto, M., Chymis, A. & D'Anselmi, P. (2014). *Public Management as Corporate Social Responsibility: The Economic Bottom Line of Government*, Springer.

European Commission (2011). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A renewed EU Strategy 2011-14 for Corporate Social Responsibility, COM/2011/0681 final. Retrieved from: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011DC0681

Formánková, S., Hrdličková, A. & Grabec, T. (2017). Corporate social responsibility of public administration through eyes of enterprises, *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *65*(6), 1901-1909.

Frederick, W.C. (1994). From CSR1 to CSR2: The Maturing of Business-and-Society Thought, *Business & Society*, *33*(2), 150-164.

GUS (2019). Społeczna odpowiedzialność GUS. Raport 2018, Warszawa. Retrieved from: https://stat.gov.pl/obszary-tematyczne/inne-opracowania/inne-opracowania-zbiorcze/spoleczna-odpowiedzialnosc-statystyki-publicznej-raport-2018,36,1.html

Haseeb, M., Hussai, H. I., Kot, S., Androniceanu, A. & Jermsittiparsert, K. (2019). Role of Social and Technological Challenges in Achieving a Sustainable Competitive Advantage and Sustainable Business Performance. *Sustainability*, 11(14), Article Number: 3811

Hopkins, M. (1998). *The Planetary Bargain: Corporate Social Responsibility Comes of Age.* Macmillan: London.

Hopkins, M. (2003). *The Planetary Bargain – CSR Matters*. Earthscan: London.

Jones, T.M. (1980). Corporate social responsibility revisited, redefined. *California Management Review, 22*(2), 59–67.

Khoury, G., Rostami, J. & Turnbull, JP. (1999). *Corporate Social Responsibility: Turning Words into Action*. Conference Board of Canada: Ottawa.

Kolk, A. (2016). The social responsibility of international business: From ethics and the environment to CSR and sustainable development, Journal of World Business, 51, 23-34.

Kolk, A. and van Tulder, R. (2010). International business, corporate social responsibility and sustainable development, *International Business Review*, *19*(2), 119-125.

McWilliams, A. and Siegel, D. (2001). Corporate social responsibility: a theory of the firm perspective. *The Academy of Management Review, 26*(1), 117-127.

Mishchuk, H., Samoliuk, N., & Bilan, Y. (2019). Measuring social justice in the light of effectiveness of public distributive policy. *Administration & Public Management Review*, (32). 63-76. DOI: 10.24818/amp/2019.32-05

Moon, J. (2007). The contribution of corporate social responsibility to sustainable development, *Sustainable Development*, *15*(5), 275-327.

Myšková, R. and Hájek, P. (2019). Relationship between corporate social responsibility in corporate annual reports and financial performance of the US companies. *Journal of International Studies, 12(1)*, 269-282. doi:10.14254/2071-8330.2019/12-1/18

Nicolaides, A. (2018). Corporate social responsibility as an ethical imperative, *Athens Journal of Law*, *4*(4), 285-300.

Olinyk O.O. (2020). Social responsibility assessment in the field of employment (case study of manufacturing). *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu, 3,* 131-136. DOI: 10.33271/nvngu/2020-3/131

Ospanova, D., Kussainov, D., Suleimanov, A., Kussainov, A. & Abilsheyeva, R. (2018). Problems of administrative law in the system of public administration, *International Journal of Law and Management*, *60*(6), 1255-1271.

Pauzuoliene, J. and Mauriciene, I. (2013). Implementation of Social Responsibility in Public Institutions. *Socialiniai tyrimai / Social Research, 4* (33), 141-151.

Plant, J.F. (2018). Responsibility in Public Administration Ethics. *Public Integrity*, 20, 33-45.

Štreimikienė, D. and Pušinaitė, R. (2009). The role of public sector in corporate social responsibility development in Lithuania, *Ekonomika*, *86*, 55-67.

Steurer, R. (2010). The role of governments in corporate social responsibility: characterising public policies on CSR in Europe, *Policy Science*, 43, 49-72.

Tomaževič, N. (2019). Social Responsibility and Consensus Orientation in Public Governance: a Content Analysis, *Central European Public Administration Review*, *17*(2), 189-204.

United Nations (2016). Compendium of Innovative Practices in Public Governance and Administration for Sustainable Development. Retrieved from: https://publicadministration.un.org/publications/cont ent/PDFs/Compendium%20Public%20Governance%20and%20Administration%20f or%20Sustainable%20Development.pdf

UTK (2020). Raport CSR 2019. Urząd Transportu Kolejowego. Warszawa. Retrieved from: https://utk.gov.pl/pl/dokumenty-i-formularze/opracowania-urzedu-tran/16218,Raport-Spolecznej-Odpowiedzialnosci-2019.html

UTK (2019). Raport CSR 2018. Urząd Transportu Kolejowego. Warszawa. Retrieved from: https://utk.gov.pl/pl/dokumenty-i-formularze/opracowania-urzedu-tran/15220,Raport-Spolecznej-Odpowiedzialnosci-2018.html

UTK (2018). Raport Społecznej Odpowiedzialności 2017. Urząd Transportu Kolejowego. Warszawa. Retrieved from: https://utk.gov.pl/pl/dokumenty-i-formularze/ opracowania-urzedu-tran/14385,Raport-Spolecznej-Odpowiedzialnosci-2017.html?search=570501791687

UTK (2017). Raport Społecznej Odpowiedzialności 2016. Urząd Transportu Kolejowego. Warszawa. Retrieved from: https://utk.gov.pl/pl/dokumenty-i-formularze/ opracowania-urzedu-tran/12837,Raport-spolecznej-odpowiedzialnosci-Urzedu-Transportu-Kolejowego.html

Vázquez, J.L, Aza, C. & Lanero, A. (2016). Citizens' perceptions on social responsibility in public administration organizations: a case study on Spain, *Transylvanian Review of Administrative Sciences*, 48 E, 166-183.

Waistell, D. (2008). Principles for Accountable Leadership - The AA1000 Series, *The Journal of Value-Based Leadership*, *1*(2), 61-69.

Wieteska-Rosiak, B. (2014). Odpowiedzialne praktyki w urzędach gmin i starostwach powiatowych na przykładzie regionu łódzkiego, *Samorząd Terytorialny*, *1-2*, 122-129.

Wodecka-Hyjek, A. (2008). Odpowiedzialność społeczna w administracji publicznej. In: Błaszczyk, W. (ed.), *Nurt metodologiczny w naukach o zarządzaniu – w drodze ku doskonałości,* Łódź.

ZUS, (2018). Społeczna odpowiedzialność ZUS. Raport 2017, Warszawa. Retrieved from: https://www.zus.pl/documents/10182/167526/ZUS_CSR_2017.pdf/1d4555d1-4031-66fc-af92-6512636846df

ZUS, (2019). Społeczna odpowiedzialność ZUS. Raport 2018, Warszawa. Retrieved from: https://www.zus.pl/documents/10182/0/ZUS_CSR _2018.pdf/ecb12b7d-c30b-5dd4-30e8-95db74c07756

Job satisfaction of public social workers

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Abstract: *The profession of a social worker is one of the most important professions for the functioning of a household and society as a whole. A key feature of this type of activity is that an employer does not have economic benefits associated with the tasks that a social worker performs. The study aims to determine the components of job satisfaction of public social workers and to conduct a quantitative analysis of the dependence of these components on factors of the external (professional) environment. The research methodology is focused on considering the object as a system. To achieve a goal, other studies were analyzed with the allocation of categorical data of satisfaction components and external (professional) environment factors. Using the statistical method, categorical data are presented in the form of frequencies to conduct a quantitative analysis of the dependence of satisfaction components on external (professional) environment factors, using the correlation coefficient. The study focused on two categories - job satisfaction and the external (professional) environment. The most significant components of job satisfaction are interpersonal relationships and commitment to an organization; the most significant factors of the external (professional) environment are the interaction of social workers with different population groups and compliance with the law and regulations. On the other hand, the least significant components of job satisfaction are social connections and wages, and the least significant factors of the external environment are professional burnout and personal life. A positive relationship was established between the components of job satisfaction and factors of the external (professional) environment. This indicates that job satisfaction components have an inverse relationship with external environment factors such as rules and norms. The research results are applicable in the field of public policy development, as well as for managers of public institutions, in particular, human resource management.*

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Introduction

In the context of globalization, the organizational environment has undergone significant changes. Digital technologies, the global market, the economic crisis require organizations to be flexible, less costly, and more efficient to provide quality services. This is especially true for public social services during the financial crisis caused by the COVID-19 pandemic (Androniceanu and Marton, 2021). To cope with the challenges of today and remain competitive in the domestic market, institutions need to go beyond traditional management and reorient towards the use of joint management, namely teamwork, as a single coherent system in which institution's employees are the most valuable asset (Qing, Asif, Hussain, & Jameel, 2019). An increase in employees' productivity leads to an increase in the quality of services provided to the population by state institutions. The satisfaction and commitment of government workers to their work is a precondition for achieving this goal (Cantarelli, Belardinelli, & Belle, 2016). This is the main reason why almost all institutions want to increase employee satisfaction with their job duties, which as a result will improve the productivity of activities and strengthen the competitiveness of an institution in society. Cantarelli et al. (2016) conducted an in-depth analysis of job satisfaction in public administration, analyzing a total of 249 case studies. Scientists found that initially job satisfaction in management and psychology was characterized as a positive emotion that arises as a result of job evaluation, but later this concept expanded and began to correlate both with feelings (emotional reaction) of a person and with various aspects of the performed activity, such as:

- individual characteristics (education, motivation, career growth, gender);
- the complexity of the work performed (skill set, variety of tasks, autonomy);
- job characteristics (interpersonal communication, reward system);
- professional environment (payment, job security).

Jung (2018) argues that if an employee of an institution works diligently within their competencies, the productivity and efficiency of this institution do not increase. For the development and functioning of an institution, it is necessary that its employees show initiative in their work. The scientist believes that the effectiveness of an institution depends on the behavior of the participants and their interpersonal relationships (a sense of trust and loyalty among team members), especially among social workers. It is these specialists who provide state guarantees in the form of services for different groups of the population, with whom they interact in the workplace. From a human resources (HR) management perspective, institutions need to find ways to ensure employee satisfaction with their work, because the higher the employee satisfaction, the higher the performance. Job satisfaction among specialists working in the social protection service increases when their activities are focused on results (Stepenko, Dreval, Chernov, and Shestak,

2021; Jung, 2018; Androniceanu et al., 2020). Qing et al. (2019) have proven that employees with a higher perception of their work are more satisfied than employees who consider their work less valuable. This theory shows that employees with high confidence in their success are much more autonomous than employees with low confidence. The autonomy and decision making give employees a sense of control over their activities and lead to greater satisfaction since employees are highly motivated to do more work on their own. Jiang, Wang, Chui, and Xu (2019) state that social workers constantly have to maintain a positive public image. Consequently, professional identity and job satisfaction are significant factors for social workers compared to other professions. Therefore, if a social worker is proud of his/her status in society and identifies him/herself as a social worker, he/she will be satisfied with his/her work.

The profession of a social worker in different countries of the world has shown different satisfaction and recognition at the level of society. In the United States, the sphere of social protection of the population (Roh, Moon, Yang, & Jung, 2016) is one of the fastest-growing professions that have career growth. In China, the profession of a social worker (Jiang et al., 2019) is new, so the public image of social work has not yet developed, and the professional identity of a social worker has an unfavorable status, which affects the low rating of this profession in China and low efficiency in social institutions. Important factors of the undeveloped social sphere in China are low wages and a low level of management to create a positive professional environment, which negatively affects job satisfaction. The United Arab Emirates (UAE), like China, is a country that has a new specialist - a social worker, but the status of a social worker in the social security service is considered prestigious in the Emirate society. A social worker in the UAE (Department of Community Development, 2020c) is understood as a specialist with educational qualifications - a bachelor's degree in social work and 2 years of work experience in related areas. The license is issued by the Department of Community Development (DCD) for 24 months and then it may be renewed for an unlimited period. A social specialist (Department of Community Development, 2020b) supports individuals, families, or groups of people (children, retirees, persons with special needs) with social problems by assessing their needs and interacting with them/or their guardians to explore methods and solutions that can help them adapt to society or integrate into a labor market. Social workers of UAE government institutions contribute to the professional development, social or personal well-being of a beneficiary. Thus, social services in the Emirates are provided by competent professionals with the necessary qualifications and experience.

The primary focus of previous studies was to examine the direct impact of job satisfaction on institutional performance. Job satisfaction components that have a connection with the external (professional) environment and the activities of public social workers, in particular in the UAE (Department of Community Development, 2019), have been little studied. Therefore, this study combines theoretical and empirical mechanisms for studying this effect.

The study aims to determine the components of job satisfaction using the example of social workers in public institutions and to conduct a quantitative

analysis of these components' dependence on external (professional) environment factors.

The study aims to:
1) update the concept of job satisfaction of public social workers and highlight the components;
2) identify the factors of the external (professional) environment;
3) conduct a quantitative analysis of the dependence of job satisfaction components on external (professional) environment factors.

1. Materials and methods

To quantify the dependence of job satisfaction components on external environment factors, the study used the following methods: analysis, systems approach, and statistical method. The studies were reviewed for the period 2016-2020 using the official website of DCD in Abu Dhabi (Department of Community Development, 2019). The research includes three stages that meet the study tasks:

- at the first stage, studies were analyzed, with the help of which the concept of job satisfaction was updated, with the subsequent allocation of its components, taking into account the professional activities of public social workers. Thematic analysis was based on the following studies (Al-Buainain et al., 2019; Al-Zoubi & Al-Tkhayneh, 2019; Alshehhi, Abuelhassan, & Nusari, 2019; Bond, 2020; Cantarelli et al., 2016; Jabeen, Friesen, & Ghoudi, 2018; Jiang et al., 2019; Jung, 2018; Pereselkova, & Korennaya, 2016) and conducted with the aim of understanding the management of the professional environment and highlighting job satisfaction components - tab. 2. The average value ($\Sigma x \geq 3$) in Table 2 was selected to determine the significance of job satisfaction components; the threshold value ($\Sigma x_i \geq 3$) was used to measure various components of job satisfaction;

- at the second stage, through a thematic review of previous studies (Al-Buainain et al., 2019; Alshehhi et al., 2019; Bond, 2020; Cantarelli et al., 2016; Jiang et al., 2019; Jung, 2018), external (professional) environment factors were identified (Table 3); these factors correlate with the concept of job satisfaction (Table 1) and its components (Table 2). The average value in Table 3 ($\Sigma y \geq 3$) was chosen to determine the significance of the external (professional) environment factors; the threshold ($\Sigma y_i \geq 3$) was used to measure various factors of the external (professional) environment;

- at the third stage, the correlation coefficient was used to determine the dependence of job satisfaction components ($\Sigma x_i \geq 3$) on external (professional) environment factors ($\Sigma y_i \geq 3$) (Table 4). The correlation coefficient R reveals the presence/absence of a relationship between the variables x and y. R-values are in the range - 1.0 to + 1.0. If R is positive, the relationship between x and y is positive. If R is negative, the relationship between x and y is negative. If the R-value is close to zero, this indicates that there is no connection between the x and y variables. To calculate the correlation coefficient, an Excel program was used with the following characteristics of the CORREL function (range 1; range 2): data range 1 represents job satisfaction components (Σx_1; Σx_2; Σx_4; Σx_5; Σx_6; Σx_7; Σx_8; Σx_{10}, excluding Σx_3 and Σx_9 values since they are less than the set threshold $\Sigma x_i \leq 3$); data range

2 represents environmental factors (Σy1; Σy2; Σy3; Σy4, excluding Σy5 and Σy6, respectively). The correlation coefficient equation has the following form:

$$R = \frac{n \sum xy - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

(1)

Demonstration of the theoretical model in practice is carried out using the Visio program - Fig. 2. The algorithm for calculating the added value (on the example of a social service state institution in the UAE) for a year is based on the ratio of external (professional) environment factors and job satisfaction components:

- factors of the external (professional) environment are considered through the indicators: the number of families that received financial assistance (FAF) and the number of families that joined the society and gained financial independence (FFI);

- components of job satisfaction are considered through indicators: the number of corporate events held in the institution (CE) and work experience in the institution (WE).

Value added is equal to the difference between the actual result obtained from the activities of a social worker and job satisfaction components.

The actual result obtained from social workers' activities (ARO):

•ARO=FAF*FFI.   (2)

Calculation of value added (VA) of a state social service institution:

•VA=ARO-CE-WE.   (3)

Research limitations. The study explored and updated the concept of job satisfaction in public sector, but this issue was not considered for a particular country.

The research object is the process of adapting the phenomenon of satisfaction to the conditions of the professional environment.

The research subject is the dependence of job satisfaction components on the external (professional) environment.

2. Results

As the external environment and the needs of the employed people in the field of social protection change, institutions need new approaches in the development and retention of personnel, as well as the creation of a professional image of an institution; this can increase the status of employees in society and contribute to the quality of services provided. In this context, job satisfaction is both an economic and a social category and is one of the key objectives of institutional management. Currently, there is no uniform concept of job satisfaction. Scientists use different interpretations of this concept, depending on the indicators and criteria used (Pereselkova & Korennaya, 2016). To actualize this concept, it is necessary to have an objective understanding of the existing terminology in world practice (Table 1).

Table 1. Basic concepts of job satisfaction in the field of public social protection institutions

Author/s	Concept definition
Cantarelli et al. (2016)	Job satisfaction is seen as a category that determines the professionalism of an institution through the services it provides to the public.
Jung (2018); Andjarwati et al., (2019)	Job satisfaction is a positive emotional response that an employee experiences when performing their job duties or during working hours.
Jiang et al. (2019); Patterson et al., (2020)	Job satisfaction is associated with working conditions, organizational commitment, and community acceptance.
Al-Zoubi and Al-Tkhayneh (2019)	Job satisfaction is the link between personal expectations and outcomes.
Pereselkova and Korennaya (2016)	Job satisfaction is defined as a positive attitude towards professional activity, a repeatedly experienced pleasure from the work performed, and employee's expectations of receiving this pleasure in the future.

(*Source*: Authors*)*

In general, a thematic review of the basic concepts of job satisfaction (Table 1) shows that the category of job satisfaction consists of different aspects that are associated with the emotional component, the assessment of a specific job, and organizational conditions. Summarizing the considered basic concepts, it can be stated that job satisfaction is a relationship between actual, desirable, and expected results.

The activities of social workers of public institutions in the UAE are based on providing assistance to the community aimed at implementing social security policies and improving the living standards of citizens who cannot provide adequate income for a decent life (Department of Community Development, 2019). In this regard, the allocation of job satisfaction components (Table 2) was based largely on studies conducted in this country.

Table 2. Job satisfaction components of public social workers

Components / Authors	Potential for future growth	Recognition	Forming connections in the outside world	Organizational commitment	Duties performed	Interpersonal relationships	Working conditions	Public image of the profession	Salary	Healthy professional environment
Cantarelli et al. (2016)				1	1	1		1		1
Jung (2018)				1	1					1

Components / Authors	Potential for future growth	Recognition	Forming connections in the outside world	Organizational commitment	Duties performed	Interpersonal relationships	Working conditions	Public image of the profession	Salary	Healthy professional environment
Jiang et al. (2019)	1			1		1	1	1	1	
Roh et al. (2016)				1		1				1
Al-Zoubi and Al-Tkhayneh (2019)	1	1				1	1			1
Pereselkova and Korennaya (2016)	1				1	1	1		1	1
Jabeen et al. (2018)	1			1		1		1		
Alshehhi et al. (2019)		1			1	1	1			
Bond (2020)	1	1	1	1						
Al-Buainain et al. (2019)		1			1			1		
Σx=10	Σx1=5	Σx2=4	Σx3=1	Σx4=6	Σx5=5	Σx6=7	Σx7=4	Σx8=4	Σx9=2	Σx10=5

Note. The average value for job satisfaction components is Σxi≥3.

(*Source*: Own determination)

As shown in Table 2, job satisfaction components, such as interpersonal relationships and organizational commitment, are of greatest importance. Other significant components that have a positive effect on work are potential for future growth, duties performed, a healthy professional environment, as well as recognition, working conditions, and the public image of the profession. The least significant satisfaction components include the economic aspects of work, namely, connections and wages. The average level of job satisfaction is 5.1 at Σx=10, which indicates that public social workers in the Emirates are satisfied with their professional activities.

Based on the results of the above studies and the DCD data (Department of Community Development, 2020b), the following external environment factors were identified (Table 3), which correlate with the concept of job satisfaction and its identified components, taking into account the principles of public policy in the UAE.

Table 3. External (professional) environment factors

Author/s	Interaction with different population groups	State policy in relation to human resources	Compliance with laws and regulations	Labor legislation	Professional burnout	Personal life
Cantarelli et al. (2016)]	1	1				
Jung (2018)	1		1			
Jiang et al. (2019)	1	1	1	1		
Roh et al. (2016)	1		1		1	
Al-Zoubi and Al-Tkhayneh (2019)	1		1			
Pereselkova and Korennaya (2016)	1			1		
Jabeen et al. (2018)				1		1
Alshehhi et al. (2019)				1		
Al-Buainain et al. (2019)	1					
$\Sigma y=10$	$\Sigma y1=8$	$\Sigma y2=3$	$\Sigma y3=5$	$\Sigma y4=4$	$\Sigma y5=1$	$\Sigma y6=1$
Note. The average value for external environment factors is $\Sigma yi \geq 3$						

(*Source*: Own determination)

As one can see from Table 3, the most significant factors of the external (professional) environment are:

- interaction with different population groups - social worker's correct behavior under all circumstances;

- compliance with laws and regulations - social specialist shall communicate and perform professional duties within national jurisdiction. The average value of external (professional) environment factors is 5.6 at $\Sigma y=10$, which indicates the importance of the selected factors for a public social worker's professional activity. In addition, among the considered factors related to the professional activities of public social workers, it can be seen that the least significant factors of the external (professional) environment ($\Sigma yi \leq 3$) include professional burnout and personal life.

This study tests the dependence of job satisfaction components ($\Sigma xi \geq 3$) on external environment factors ($\Sigma yi \geq 3$) using the correlation coefficient. Table 4 visualizes the initial data for the presence/absence of a relationship between variables (x and y).

Table 4. Initial data

Job satisfaction components at Σxi≥3	Values (X)	External environment factors at Σyi≥3	Values (У)
Interpersonal relationships	7	Interaction with different population groups	8
Organizational commitment	6	Compliance with laws and regulations	5
Potential for future growth, duties performed, a healthy professional environment	5	Labor legislation	4
Recognition, working conditions, public image of the profession	4	State policy in relation to human resources	3

(*Source*: Own determination)

The calculation of the correlation coefficient is carried out using Excel, which is the most reliable method of quantitative assessment. Figure 1 shows the correlation function using the data in Table 4, where data range 1 represents variables x and data range 2 represents variables y. The graph of the correlation function shows a positive relationship between the variables x and y, with R=0.9143.

Figure 1. The graph of correlation function between variables x and y
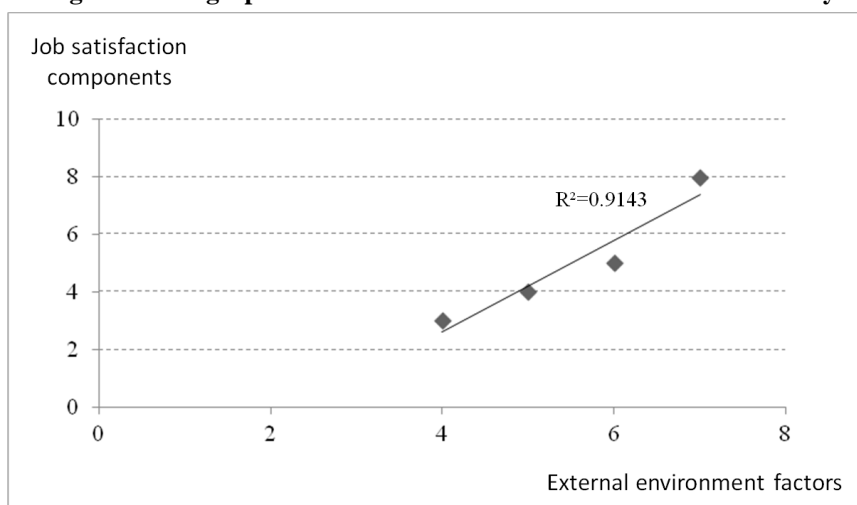
(*Source*: Own determination)

Summing up, it can be stated that a state institution that ensures a healthy working environment for its social workers receives committed employees who are motivated to achieve results. In this context, it is important to outline the following advantages: employee satisfaction reflects positively on interaction with beneficiaries and reduces the risk of violations of national legislation.

Demonstration of the theoretical model in practice is carried out using the algorithm for calculating the added value of a state social institution based on the correlation of external (professional) environment factors and job satisfaction components (Figure 2). Indicators of external (professional) environment factors, taking into account the activities of social workers of public institutions in the UAE, include:

- the amount of allocated financial assistance to families (FAF);
- the number of families who joined the society and gained financial independence (FFI).

The indicators of job satisfaction components are as follows:

- the number of corporate events held per year (CE);
- work experience of an employee in an institution (WE).

The amount of value added by a public institution for the reporting year is calculated using the formula:

The added value is equal to the difference between the actual results of a social worker's performance in terms of the factors of the external (professional) environment (FAF, FFI) and the indicators that make up job satisfaction (CE and WE).
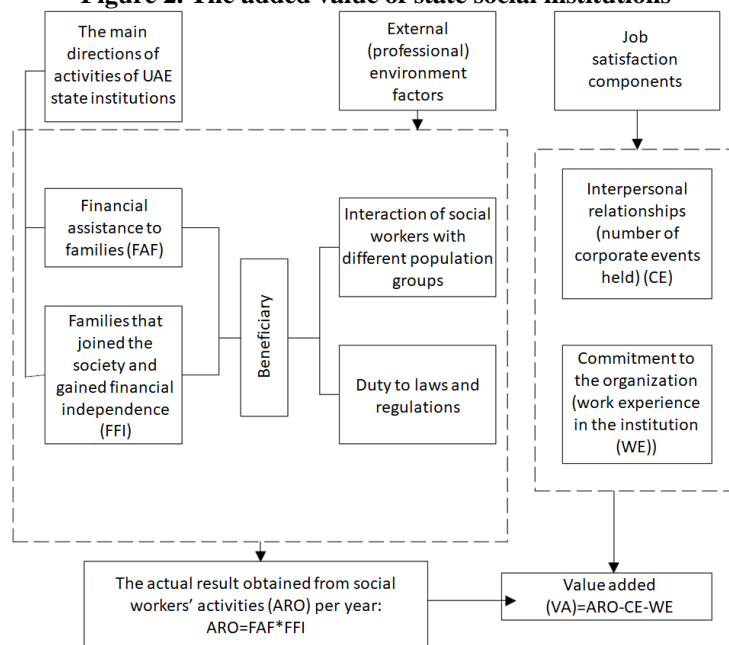
Determination of the actual result of a state institution:

•ARO=FAF*FFI;   (4)

Calculation of value added (VA):

•VA=ARO-CE-WE.   (5)

Figure 2. The added value of state social institutions

(*Source:* Authors)

The calculation of the added value of a state social institution was due to the need to understand an institution's activities in the context of the relationship between social workers' job satisfaction and their external professional environment (a country's social sphere). The basis of the proposed theoretical approach in the study is the assessment of value added in the practice of state social institutions. In this context, it is advisable to emphasize that the social services of different countries have a certain specificity associated with the organization of labor and professional problems, as well as with the state of economic development. Therefore, these facts must be taken into account when calculating the value added of a state social institution. In terms of value added calculations, this issue is the subject of further research.

3. Discussion

In this study, the concept of job satisfaction of public social workers in the UAE is updated and its components are highlighted. With the help of quantitative analysis, the dependence of these components on external (professional) environment factors was verified. A review of studies on job satisfaction concept showed that all the definitions indicated an emotional component in relation to personality and professional activity. Salsberg, Quigley, Acquaviva, Wyche, and Sliwa (2018) characterize the social profession as one of the large-scale professions in the field of social services, which implies performing different roles in management, community organization, assessment, training, and policy. In this context, Allas and Schaninger (2020) highlight two aspects that characterize the quality of a workplace: 1) working conditions; 2) lack of interpersonal fear. In the present study, public social workers in the Emirates (Department of Community Development, 2019; U.ae, 2021) focus on three main aspirations to achieve government-mandated social outcomes: a decent life for all UAE citizens; a close-knit family as the foundation of a tolerant and inclusive community; an active and responsible community. The level of satisfaction with the work of social workers in the UAE is 5.1, which indicates a positive result regarding the individual qualities of an employee. Geisler, Berthelsen, and Muhonen (2019) confirm the present study results on job satisfaction components and state that commitment to work and interpersonal relationships force public social workers to stay in this profession and contribute to a positive attitude towards this profession. Judge, Weiss, Kammeyer-Mueller, and Hulin (2017) characterize organizational commitment as an affective state that is based on the conformity between personal values and institution's values. Tokareva, Kovalenko, Gafurova, and Tokarev (2016) found that trusting relationships in a team form a free and positive opinion about colleagues, which contributes to internal cohesion and ensures a healthy professional environment in an institution. It can be assumed that organizational commitment and interpersonal relationships have a significant impact on the professional performance of social workers. A thematic review of studies on job satisfaction components and their dependence on external (professional) environment factors was carried out. It was

revealed that public social workers interact with different population groups and are obligated to do it within the framework of laws and regulations. It is important to note that previous studies (Department of Community Development, 2020a; Jackson, 2020; van Hulsen, Rohde, & van Exel, 2020) considered external (professional) environment factors - ecology (climate change, air pollution), occupational burnout, interaction with vulnerable population groups, the COVID-19 pandemic, while the present study considered external (professional) environment factors at the individual level of a social employee. The present research results showed that significant external environment factors in the context of job satisfaction of social workers are interaction with vulnerable population groups and obligations to comply with laws and regulations. At the same time, professional burnout and personal life are the least significant external (professional) environment factors. Vydrová and Bejtkovský (2018) argue that the management of a public institution directly affects workers' social maturity and intelligence, shaping the professional environment in the workplace. Belas, Belas, Cepel, and Rozsa (2019) confirm the importance of a healthy professional environment in a public institution, applying the following research algorithm: defining the concept of a professional environment and assessing significant factors in the public sector that affect the quality of the professional environment. The study results showed what factors need to be improved to achieve a perfect system of social factors affecting the professional environment.

In the current study, a quantitative analysis was carried out to check the dependence of job satisfaction components on external (professional) environment factors. The quantitative analysis was carried out using the correlation coefficient between the job satisfaction variables and variables of external (professional) environment.

Based on the above theoretical and empirical data, a positive relationship between job satisfaction components and external (professional) environment factors was revealed. To understand the theoretical approach of the study, the calculation of value added was applied in practice on the example of a state social institution in the UAE.

4. Conclusions

The study revealed a statistical relationship between job satisfaction components of public social workers and external (professional) environment factors. It has been established that job satisfaction is an indicator of an institution's performance, which includes a relationship between actual, desired, and expected results. In general, it can be stated that a social worker provides state-guaranteed services to society and state social institutions contribute to ensuring decent life for all citizens and residents of a given country. It was found that public social workers in the UAE pay the greatest attention to interpersonal relationships and commitment to an organization, while the influencing external (professional) environment factors

are communication with different population groups and compliance with laws and regulations.

The practical results can be applied by advising managers of public sector institutions, in particular those located in the UAE, on what strategies should be used to increase job satisfaction among social workers.

Further work could be focused on calculating value added in the practice of public social institutions, followed by an analysis of the relationship between job satisfaction and job outcomes.

Authors Contributions

All authors contributed equally to the experimentation, read and approved the final manuscript.

Conflict of Interest Statement

Authors declare that they have no conflict of interests.

References

Andjarwati, T., Susilo, K.E. & Audah, A.K. (2019). Predictors of job satisfaction in non-profit organizations. *Polish Journal of Management Studies*, 20(1), 19-28.

Al-Buainain, F., Alzarouni, A., Alshamsi, H., Arab, A., Bader, F. & Awad, M. (2019). Job Satisfaction of U.A.E. Dental Practitioners. *European Journal of Dentistry, 13*(3), 354-360.

Allas, T. and Schaninger, B. (2020). *The boss factor: making the world a better place through workplace relationships.* McKinsey Quarterly.

Alshehhi, S., Abuelhassan, A. E. & Nusari, M. (2019). Effect of Transformational Leadership on Employees' Performances through Job Satisfaction within Public Sectors in UAE. *International Journal of Innovative Technology and Exploring Engineering, 8,* 588-597.

Al-Zoubi, M. and Al-Tkhayneh, K. (2019). Employees' Perception of Corporate Social Responsibility (CSR) and its Effect on Job Satisfaction. *Journal of Social Research & Policy, 10*(1), 67-81

Androniceanu, A. and Marton, D.-M., (2021). The psychosocial impact of the Romanian government measures on the population during the COVID-19 pandemic. *Central European Public Administration Review*, *19*(1), 7-32.

Androniceanu A., Sabie O. M. & Pegulescu A. (2020). An integrated approach of the human resources motivation and the quality of health services. *Theoretical and Empirical Research in Urban Management*, *15*(1), February, 42-53.

Belas, J., Belas, L., Cepel, M. & Rozsa, Z. (2019). The impact of the public sector on the quality of the business environment in the SME segment. *Administratie si Management Public, 32,* 18-31.

Bond, S. (2020). Poll: Job Satisfaction Climbs to Highest Level in Over Two Decades. The Conference Board, USA. Retrieved from https://www.prnewswire.com/news-releases/poll-job-satisfaction-climbs-to-highest-level-in-over-two-decades-300909167.html

Cantarelli, P., Belardinelli, P. & Belle, N. (2016). A meta-analysis of job satisfaction correlates in the public administration literature. *Review of Public Personnel Administration, 36*(2), 115-144.

Department of Community Development (2019). *Annual Report 2019.* Abu Dhabi.

Department of Community Development (2020a). Life during Coronavirus Survey 2020. Report., Abu Dhabi.

Department of Community Development (2020b). *DCD Social Care Professionals Code of Conduct & Ethics in the Emirate of Abu Dhabi. Licensing of Social Care Professionals.* Abu Dhabi.

Department of Community Development (2020c). *DCD Standards for Education & Practical Experience. Licensing of Social Care Professionals*. Abu Dhabi.

Geisler, M., Berthelsen, H. & Muhonen, T. (2019). Retaining Social Workers: The Role of Quality of Work and Psychosocial Safety Climate for Work Engagement, Job Satisfaction, and Organizational Commitment. *Human Service Organizations: Management, Leadership & Governance, 43*(1), 1-15.

Jabeen, F., Friesen, H. & Ghoudi, K. (2018). Quality of work life of Emirati women and its influence on job satisfaction and turnover intention. *Journal of Organizational Change Management, 31*(2), 352-370.

Jackson, K. (2020). Climate Change and Public Health: How Social Workers Can Advocate for Environmental Justice. *Social Work Today, 17*(6), 1-10.

Jiang, H., Wang, Y., Chui, E. & Xu, Y. (2019). Professional identity and turnover intentions of social workers in Beijing, China: The roles of job satisfaction and agency type. *International Social Work, 62*(1), 146-160.

Judge, T., Weiss, H., Kammeyer-Mueller, J. & Hulin, C. (2017). Job attitudes, job satisfaction, and job affect – A century of continuity and of change. *Journal of applied psychology, 102*(3), 356-374.

Jung, M. H. (2018). Effects of organizational and interpersonal relations on job satisfaction of social workers. *The Journal of Industrial Distribution & Business, 9*(6), 25-35.

Patterson, L., Pandya, B. & Cho, B. (2020). Exploring the motivators to satisfy uae employees. *Polish Journal of Management Studies*, 22 (2), 402-413.

Pereselkova, Z. and Korennaya, A. (2016). *Job satisfaction and its understanding in terms of the sociology of labor and employment.* Orenburg: Orenburg State University.

Qing, M., Asif, M., Hussain, A. & Jameel, A. (2019). Exploring the impact of ethical leadership on job satisfaction and organizational commitment in public sector organizations: the mediating role of psychological empowerment. *Review of Managerial Science, 14,* 1405-1432.

Roh, C. Y., Moon, M. J., Yang, S. B. & Jung, K. (2016). Linking emotional labor, public service motivation, and job satisfaction: Social workers in health care settings. *Social work in public health, 31*(2), 43-57.

Salsberg, E., Quigley, L., Acquaviva, K., Wyche, K. & Sliwa, S. (2018). New social workers. Results of the nationwide survey 2017 social work graduates. The national social workforce study. The George Washington University, Health Workforce Institute.

Stepenko, V., Dreval, L., Chernov, S. & Shestak, V. (2021). EU Personal Data Protection Standards and Regulatory Framework. *Journal of Applied Security Research*, 1-14.

Tokareva, Y., Kovalenko, T., Gafurova, T. & Tokarev, A. (2016). Interpersonal relationships as conditions for the formation of a positive socio-psychological climate in an organization. A New Look. *International Scientific Bulletin, 15,* 40-49.

U.AE (2021). Social welfare programmers. Retrieved from https://u.ae/en/information-and-services/social-affairs/social-welfare/social-welfare-programmes

Van Hulsen, M. A. J., Rohde, K. I. & van Exel, N. J. A. (2020). *Intertemporal and Social Preferences predict cooperation in a Social Dilemma: An application in the context of COVID-19* (No. TI 2020-047/I). Tinbergen Institute Discussion Paper.

Vydrová, J. and Bejtkovský, J. (2018). The importance of the individual pillars of social maturity of workers in healthcare organizations in the hierarchy of pillars of competence in management. *Revista Administratie si Management Public, 31*, 21-35.

Transparency in public administration as a challenge for a good democratic governance

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Abstract: In democratic societies, the transparency of public institutions is essential. Increasingly, developed or developing countries recognize that free access to information is fundamental to democracy. Whether we are talking about the government or the private companies that manage public services, access to the data held by these organizations means increasing accountability and allows citizens to know what these organizations do and what they use public money for. Access to information develops citizens' trust in public institutions, enabling citizens to understand public policy decisions and monitor their implementation. The purpose of our research is to identify the degree of transparency of the ministries in the Romanian Government. The research was based on public data and information identified on the websites of 18 ministries in the current structure of the Romanian Government, but also on data collected using online questionnaires answered by 45 officials from the Information and Documentation Departments of the ministries. The data and information obtained were processed in excel and SPSS. The database was completed with the evaluation reports on the implementation of Law 52/2003 on decisional transparency in the Romanian public administration, from 2017-2020. The results of our research show that ministries have made progress in ensuring administrative transparency. However, administrative transparency remains a challenge for Romanian government ministries. The results obtained are useful and interesting for both the field of knowledge and for ministries to help them identify ways to increase transparency for better democratic governance**.**

Introduction

Transparency is a necessity in the fight against corruption. Access to information develops citizens' trust in their own government, enabling citizens to understand public policy decisions and monitor their implementation (Jaeger and Bertot, 2010)

The lack of decisional transparency, together with other deficiencies of the regulatory activity, leads to the low confidence of the citizens in the importance of the normative acts. The absence of consultations means that the norms are frequently modified or replaced, which determines an accentuated legislative

instability and does not offer the necessary security to the existing legal framework in Romania. The real application of the principle of transparency would lead to a greater trust in laws and regulations, since they were adopted in consultation with stakeholders.

The right to information is the basis for achieving other principles, such as transparency, accountability, public participation, environmental protection and other individual freedoms (Kim and Lee, 2012). The right to information contributes to democratic consolidation and economic growth (Szeiner et al., 2020).

The involvement of citizens in public affairs in a democratic society is not limited to the right to vote. Democratic citizenship involves obtaining information about issues that affect the lives of citizens and the activity of the business environment, but also collaborating with others to influence how society will solve those problems. Effective participation in public debate requires good public information on issues on the public agenda and on the mechanism by which the citizen can be involved in the public policy process (Androniceanu, A.-M., 2020c; Machyniak, 2017). The lack of decisional transparency leads to the low confidence of citizens in the strength and importance of normative acts. The absence of consultations can lead to frequent changes or replacements, which leads to increased legislative instability and does not provide the necessary security for the existing legal framework. The real application of the principle of transparency would lead to greater trust in regulations, since they were adopted in consultation with stakeholders. Confidence in the legal framework will result in a higher degree of compliance with the law, with positive consequences on economic development and the maintenance of cooperative relations between the public administration and citizens. The real application of the principle of transparency would lead to a greater confidence in laws and regulations, since they would be adopted in consultation with stakeholders (Glotko et al., 2020). Trust in the legal framework will result in a greater degree of acceptance and observance of the law, with positive consequences on economic development and the maintenance of cooperative relations between the government apparatus and society. No wonder then that governments and companies take actions on integration of ethical issues into the training of business administration professionals (Stonkute et al., 2018).

A law on transparency must ensure that the public administration is "open" to its stakeholders through their participation in the regulatory process and through their participation in decision-making. Decision-making transparency does not introduce rules into a democratic government but only ensures dialogue and collaboration between the public sector and the beneficiaries of the regulations developed by it, respectively, citizens, non-governmental organizations, and business associations. It is about a consultation process, and not about a change in the roles between the public administration and the civil society regarding the elaboration of normative acts (Peracek et al., 2018). This conclusion is necessary and can be deduced from the fact that the responsibility for adopting deficient normative acts undoubtedly belongs to the public governance (Barabashev, 2016). Citizens, non-governmental organizations and other stakeholders must be able to find out about the legislative intentions of public authorities, to actively participate

in the decision-making process through suggestions and comments on normative acts.

The decision-making transparency is based on the following principles: informing people in advance about issues of public interest and draft normative acts that will be debated; consulting them, as well as the legally constituted associations, in the process of elaborating the normative acts; active participation of citizens in administrative decision-making and in the process of drafting normative acts. Accordingly, the objectives of a public institution in order to respect decision-making transparency must be to encourage citizen participation through a public consultation process, to comply with minimum procedures and standards in order to systematize the consultation process, to build a coherent and sufficiently consultative framework, flexible to take into account the specific requirements of stakeholders and to have consultation strategies adapted to each situation, and to promote the exchange of good practices.

1. Literature Review

In a democracy, government is just one component that coexists in a social network of many and varied institutions, with citizens as the main stakeholders. The essence of any democracy lies in the active participation of citizens in the governmental decision-making process. This means the real possibility to consult or obtain detailed information online, in a timely manner, without the existence of barriers represented by a too complex system. It is the right of citizens to be informed. In other words, the right to know what the government knows. An informed society is essential for a viable democracy. Transparency aims to ensure a wider access of citizens to information and documents in the possession of state institutions. Transparency ensures the participation of citizens in the decision-making process and implicitly the legitimacy, effectiveness and responsibility of the administration towards the citizen. Transparency aims to prevent actions that threaten public integrity (acts of corruption) and to assess the performance of a public administration (Meyer, 2018; Mircica, 2020; Peracek, 2020).

Some authors analyze transparency according to society's tendencies regarding legitimacy, trust and receptivity. They argue that transparency - defined as lack of secrecy and openness to the public - is traditionally seen as a means of reducing uncertainty and increasing citizens' trust about how the public budget is administrated (Ott et al., 2019; Klun et al., 2019). However, they say that computer-mediated transparency has several features that can actually threaten trust (Shevyakova et al., 2021; Russell, 2020; Zabolotniaia et al., 2019).

Political science, public administration and scientific research have brought to light new challenges regarding government transparency, based on access to information. These studies explore some of the basic concepts and address some of the shortcomings of the efforts planned to promote transparency through the electronic information environment.

Transparency promotes accountability and provides citizens with information about what the administration is doing for them (Dubnick, 2005). Administration information is a national good. During election campaign periods,

many politicians promise to take steps to make access to information of public interest faster and in forms that citizens can quickly find and use. Each department needs to find the latest technologies to put information about their online activity to be used by the public (Nica et al., 2020). Departments will need to seek feedback from citizens to find the most useful type of information for citizens.

Public administration is transparent when most information about its activities, policies and decisions is accessible to the public. Transparency is the result of available information. Being transparent has advantages for participation, because it encourages the involvement of citizens in the decision-making process, for accountability, because, in a democracy, citizens have the right to hold public officials accountable for their actions and for the efficiency of public administration, because only through access to information, be it reactive or proactive, do citizens find out what the administration does for them and can appreciate the quality of services and provide feedback on them to the administration.

Transparency mainly targets access to information of public interest and decision-making transparency in public policy making. One claims that issues of trust and quality assurance in terms of the civil service are relevant (Shpak et al., 2019). The literature makes the connection between transparency and public trust, as a constitutive value of the functioning of democracy and implicitly of public administration in democratic systems. From our point of view, it becomes clear that transparency has an ethical value derived from that of public trust, which it operationalizes at the level of administrative practice as a social practice. In turn, public trust is based as a constitutive value for public administration practices, on that of public participation, in turn a constitutive value for systems based on participatory democracy. It emphasizes the value of the moral actor having the capacity to make autonomous and responsible decisions within the limits of his communicative competence and interests of social action (Androniceanu, A.-M., 2020b). Transparency becomes a fundamental value with a constitutive role for a series of institutions particular to the public administration, whose mission is to implement the ethics policy established at various levels of administration (Mura and Machyniak, 2014). It has also an impact on the employees' well-being (Vveinhardt and Sroka, 2020).

The origin of transparency as a democratic principle lies in the continuous public pressure, meant to increase the social control over the public administration bodies and in general in its functioning. If initially transparency was mainly aimed at spending public money and recognizing the taxpayer's right to be informed about it, gradually the concept of transparency increasingly concerns the sphere of public decision (Larsson, 1998; Lincényi and Čársky, 2021). These decisions are extremely important to strengthen the efficiency of public expenditures governance especially in terms of severe informal economy spread in a country (Androniceanu, A.-M et al, 2020a; ben-Aaron et al., 2017).

Tax transparency (transparency in the use of public money) evolves from the simple obligation to inform citizens about spending public money, to the obligation to ensure fair access to public funds of all suppliers interested and qualified for the field in which public procurement is to take place. Therefore,

ensuring transparency guarantees equity in access to public resources, but also maximum efficiency in their allocation. Equity, transparency and efficiency become regulatory principles for the functioning of public services in the administration.

Our research focuses on the issue of government transparency. According to specialists, government transparency is achieved through one of the following four primary ways: (1) proactive dissemination of information by the government; (2) the release by the government of the requested data and information; (3) organization of public meetings; (4) informing the public by the specialized offices of the ministries. A study conducted in 2006 in 14 countries found that countries with transparency laws were 3 times more willing to respond to requests for information, compared to countries that did not have transparency laws and responded to less than half of the requests. Countries that have respected transparency tend to have more information and are more willing to share it. More than 30 countries have institutions at the central administration level that monitor the transparency of the administration.

Transparency ultimately serves to maintain an honest government. The communication and information opportunities offered by the internet have significantly contributed to the transparency of governance in many states. Thus, e-government not only ensures wide access to information, but also contributes to increasing transparency, accountability and achieving the anti-corruption objectives of each administration (Wakuła, 2020; Mempel-Śnieżyk et al. 2020). However, efforts to promote government openness and reduce corruption are strongly influenced by a nation's cultural and educational environment. Many countries that have transparency laws have directly linked the implementation of these laws to the implementation of ICT-based initiatives, often through e-government. ICT can reduce corruption by promoting good governance, by strengthening targeted reform initiatives, by strengthening relations between government employees and citizens, by pursuing activities by citizens, and by monitoring and controlling the behavior of government officials. Many governments consider the use of ICT as a means of promoting efficiency and transparency. America, Asia and Europe have been very successful in reducing corruption through e-government (Jeretina, 2018). Administrative taxes and government contracts are areas where e-government has been seen as a successful solution to the problem of corruption in many countries. For example, the United States has created sites that provide access to data on government spending general funding and technology development funding which are intended to promote and monitor government public spending and, at the same time, to identify and eliminate more quickly the projects through which public money is spent inefficiently. A number of governments in the United States have similar sites made available to citizens for the purpose of monitoring government spending.

Based on experience and research to date, it is not known whether the use of ICT to promote transparency can create a sustainable culture of transparency (Horick, 2020). Given the access to information in general, the results are shared. The publication of content on the Internet by the government is an example in which the amount of accessible information available has changed significantly in

some countries, with different reactions from the public (Bennett et al., 2020). More than 30 nations, mainly from East Asia, North Africa, the Middle East and Central Africa have restricted access to the Internet. Malaysia and Saudi Arabia began censoring Internet access as an official government policy in 1990. Saudi Arabia even announced the implementation of a strategy to monitor and censor Internet use within the country through The King Abdulaziz City for Science & Technology (KACST). In the same year, China began arresting citizens for what they posted online. In the United States, federally funded public libraries and schools have had to restrict Internet access since 2001, creating differences in the levels of access available between government-funded libraries and schools and richer schools and libraries that can give up. to the funds received from the government, and, implicitly, to the requirements regarding the restrictions. These nations have blocked, with a number of social, political and security reasons, materials related to free speech, health, human rights, economic development, environmental issues, religion. In some countries that have implemented filters, citizens have lost access to information they previously held, resulting in controversy in some countries, and almost no response in others. These situations significantly affect the fundamental right of citizens to benefit from public information.

There has been strong controversy in the United States, a nation with a tradition of openness and transparency (Berliner, 2014). Similarly, in the European Union, new EU conventions restricting access to government documents have been challenged by activists, scientists, citizens and organizations.

Transparency in the decision-making process is achieved by simultaneously ensuring participatory and deliberative democracy within the framework determined by the norms of representative democracy. We believe that there is a democratic deficit even in contexts where the deliberative process is inconsistent, including due to lack of transparency and limited public participation (Christensen & Cornelissen, 2015). We extend the meaning of the term democratic deficit to any public decision system that has diminished either the representative or the participatory component. We consider the term democratic deficit to be applicable to bureaucratic situations that do not respect the conditions of transparency: participation, deliberation and representation (Da Cruz et al., 2015). In our opinion, transparency exceeds simple public control, it being conditioned by the simultaneous existence of representativeness in collective decisions, ensuring participation and deliberation (Erkkilä, 2012; Erkkilä, 2016). A decision taken in the context of a democratic deficit, namely a deficit of transparency and public participation, is susceptible to a lack of legitimacy (Grayson, 2020, Grimmelikhuijsen et al. 2018). For these reasons in the EU public administration tends to be more transparent in the field of safety and quality food governance (Komínková et al., 2020; Blakemore and Craglia, 2006), income distribution which is constantly debatable sphere of public relations (Mishchuk et al., 2018; Mishchuk et al., 2020).

Romanian legislation on transparency in public administration reflects the European policy in the field, initiated by the White Paper on European Government adopted by the European Commission in 2001, and which concerns the implementation of principles such as: openness, participation, responsibility, efficiency and coherence. The main reference points are the internal legislation: Law no. 544/2001 regarding the free access to information of public interest; Law no. 215/2001 completed and modified of the local public administration; Law no. 52/2003 regarding the decisional transparency in the exercise of public dignities, of public functions, prevention and sanctioning of corruption. These laws aim at establishing a set of minimum procedural rules for ensuring decisional transparency in the functioning of public-administrative authorities in Romania, both at central and local level, as well as other institutions that use public financial resources. The purpose of regulating decision-making transparency in public administration is to increase its responsibility towards citizens and the active participation of citizens in the decision-making process (Johnson, 2020).

The legislator formulates a series of principles, among which: informing people in advance and ex officio on issues of public interest, consulting citizens and civil society in the process of drafting acts, and active participation of citizens in the administrative decision-making process. The obligation of transparency, which falls under this law to the public administration authorities, is to inform and submit to public debate the draft nominative acts, to allow access to administrative decisions and minutes of public meetings. As we have seen, this is a minimum obligation that should be complemented by good practices, established at the level of public institutions through their own codes of ethics. In terms of procedures, the law describes how to implement the transparency obligations, by publishing the draft normative acts and sending them to the representatives of the civil society for consultation. The purpose of regulating decision-making transparency in public administration is to increase its responsibility towards citizens and the active participation of citizens in the decision-making process. The obligation of transparency is to inform and submit to public debate the draft nominative acts.

According to Romanian legislation, transparency in public administration means the obligation of public communication of the administrative decision, through easy access to information to the interested public, but also facilitating the participation of all potential stakeholders in the decision-making act, including inclusive measures where necessary to ensure participation.

In our opinion, maximizing the transparency of public administration is a necessity in any democratic state. In our research we aimed to know the degree of transparency of the ministries in the structure of the Romanian Government. The question that our research answers is: Are the ministries of the Romanian Government sufficiently transparent in the governance process? In order to answer this question, we carried out a research in which all the ministries from the current structure of the Romanian Government were included. For this we analyzed their activity from the perspective of the main national regulations regarding transparency in public administration.

2. Research methods

The research included the 18 ministries from the current structure of the Romanian Government. The number of subjects included in the research are part of the ministerial departments that have attributions for information and documentation. The size of the sample is 45 civil servants, from the Information and Public Relations Department of each ministry.

To determine the sample size we used the following calculation formula:

$$n = \frac{N Z^{2} * 0.25}{[d^{2} * (N - 1)] + (Z^{2} * 0.25)} = 45$$

n = the dimension of the sample (number of respondents);

N = total number of civil servants within the Directorate of Information and Public Relations, which is 350 civil servants

d = accuracy level is 0.03

Z = 1.96 corresponds to a 95% confidence level

The main methods used for data collection and processing were: the questionnaire and applications offered by excel for processing and representing the frequencies of the analyzed aspects regarding transparency. The main variables considered are: (1) the degree of training of the officials from the specialized departments for the implementation of the regulations regarding the transparency; (2) the usefulness of the legislative framework regarding transparency for increasing the degree of administrative transparency in the governance process (3) the frequency of delivery of public data and information to those who requested it; (4) the modalities used by ministries for the delivery of information of public interest; (5) monitoring the transparency of ministries.
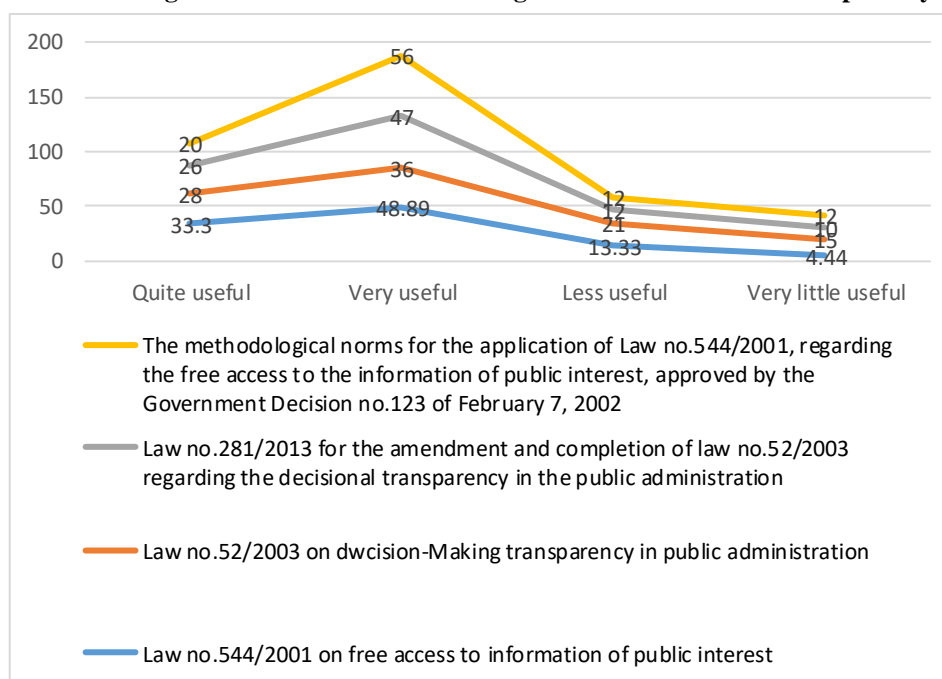
3. Results and discussion

Most of the civil servants within the Communication and Public Relations Department, in percentage of 82.22%, did not participate in trainings on the topic of transparency and free access to public information. Only 17.78% of the respondents stated that they participated in trainings on this topic. For the identification of public information, a percentage of 51.1% of civil servants is based on the text of Law 544/2001 (Parliament of Romania, 2001). Equally, namely 24.4% of the respondents stated that they use only the decisions issued by the ministry, respectively 24.4% of the respondents use both the text of Law 544/2001 and the decisions issued by the ministry.

The study confirms that it is necessary to prepare human resources from the specialized departments of the ministries not only to be able to correctly understand the legislative framework in force, but also to delimit public information from the other categories. This aspect is important, as most say they do not respond to requests because they are not sure that it falls into the category of public interest. The same cause determines the small share of information of public

interest posted on the ministry's website. Most documents can be posted on the ministry's website only if they have an approval from the ministry board.

From the research results we find out that most officials consider that the 2 laws, Law no. 544/32003 and Law no. 52/2003 together with other subsequent regulations are particularly useful due to their content, but not specific enough, which creates problems of understanding and different interpretations. Figure 1 reflects the opinions of the respondents regarding the usefulness of the main normative acts that regulate administrative transparency in Romania.

Figure 1. The usefulness of the legislative framework on transparency

The methodological norms for the application of Law no.544/2001, regarding the free access to the information of public interest, approved by the Government Decision no.123 of February 7, 2002

Law no.281/2013 for the amendment and completion of law no.52/2003 regarding the decisional transparency in the public administration

Law no.52/2003 on dwcision-Making transparency in public administration

Law no.544/2001 on free access to information of public interest

(*Source*: Author, 2021)

These normative acts have intensified the preoccupations of the ministries to be more transparent in their activity. In the process of drafting normative acts, public authorities and institutions have the obligation to inform and submit to public consultation and debate the draft normative acts and to allow citizens access to the administrative decision-making process, as well as to the data and information of public interest, within the limits of the law.

Beneficiaries of public administration activities have the right to obtain information from public administration authorities and institutions, and they have a correlative obligation to make information available to beneficiaries ex officio or upon request, within the limits of the law.

Regarding the frequency with which the information of public interest is requested and delivered to the beneficiaries, the obtained results can be grouped,

depending on the frequency in five groups: (1) weekly; (b) monthly (3) half-yearly; (4) cancel; (5) as needed. The main results are prezented in figure 2.

Figure 2. The frequency with which information of public interest is provided
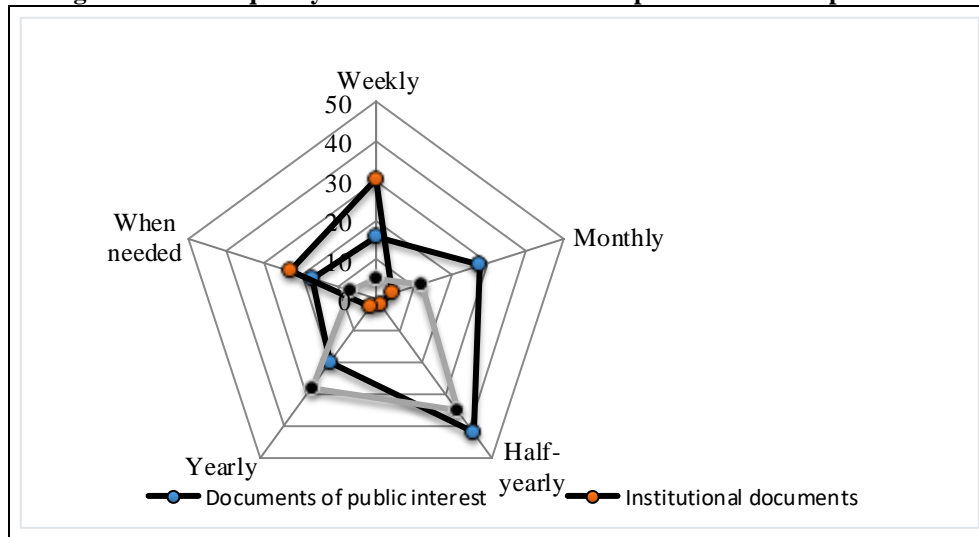
(*Source*: Author, 2021)

Our research highlights large differences in the frequency with which information of public interest is delivered.

Two categories of public information are delimited, some contained in documents of public interest and others related to documents about the activity within the ministries.

We note that there is no mechanism for cooperation and communication of public information, most of them are provided upon request.

Only 37% of public information is disseminated through various means of communication and information.

These results show that in these ministries the process of managing public information is not a coordinated and transparent one, most of the public information is communicated several times in different time intervals in a year, which means time and resources. large consumed.

The lack of internal regulations to help officials delimit the different categories of information from those of public interest, creates uncertainty and often errors.

The respondents were asked if there was a decision of the ministry regarding the information exempted from free access.

The results show that 64.44% of respondents say that it was established within the ministry what information is exempt from free access, while 35.56% of civil servants said that it was not established what this information is exempt.

However, in ministries, 60% of respondents consider that the list of information exempt from free access is known, while 40% say it is not known.

For example, when they establish that requested information is exempt from free access, 60% are based only on the provisions of Law 544/2001 when they establish what information is exempt from free access of citizens, while 22.2% of respondents are based both on the provisions of Law 544/2001, and on the decisions at the level of the ministry.

A lower percentage, of 17.8%, states that it is based only on the decisions from the ministry level in establishing the information exempted from publication.

These results show the lack of a clear and unified approach to transparency and public information that falls into this category.

Another variable involved in our research refers to the ways used by ministries to ensure administrative transparency and the act of governing.

Figure 3 shows the following ways:
(1) posting in the ministry building;
(2) mass media;
(3) ministry website;
(4) official gazette;
(5) the Information and Communication department of the ministry.

During the research, we took into account in each ministry two components of the activity:
(1) the one of public information and
(2) the transparent one of the regulatory process in the ministry.

Figure 3. Ways used to provide information to beneficiaries
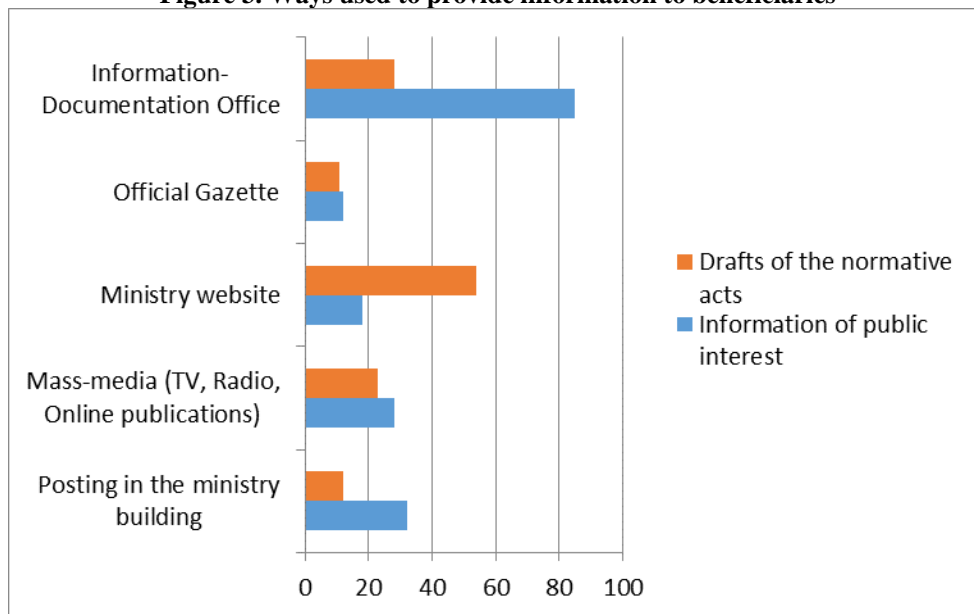
(*Source*: Author)

The results show that there are a variety of means used for both activities. However, most data and information of public interest are provided by the

departments of the ministries specializing in information and communication, when it comes to information of public interest. Regarding the regulatory process in the ministry, most draft normative acts are published on the ministry's website where they can be accessed by all interested parties. From the obtained results we notice that an important part of the public information is found posted in the ministries and others are subjects of analysis and debate in the media space. From these results it is observed that within the ministries there is no systematic approach and a coherent strategy regarding the internal and external means of communication for the increase of administrative transparency. A high percentage, 44.4% of respondents, consider it quite necessary to allocate financial and logistical resources to ensure access to information, in general and for people with special needs in particular, while 28.9% of respondents consider it very necessary.

Another variable investigated is the monitoring of administrative transparency through indicators. The main indicators considered by us in this research are: the number of draft normative acts publicly announced on the ministry's website, by posting at the ministry's headquarters or in the media. The results show that a small number of draft normative acts are communicated on the ministries' website. This indicator shows that in 2017 there were 3 projects, in 2018 12 projects were communicated, in 2019 only 7 projects and in 2020 6 projects.

These results show a low level of transparency, given that several hundred normative acts have been adopted by the government each year. Another indicator followed in our analysis is the number of research received for providing information on draft regulations.

Thus, we discovered that, in 2020, there were 4 requests from business associations or other legally constituted associations and only 1 request made by a citizen. Instead, in 2020, 23 projects were sent by ministries to associations and 266 recommendations were received from them. Furthermore, these indicators show a weak cooperation between the ministries that have legislative initiatives and their stakeholders and implicitly the need to motivate the dialogue and to increase the transparency in the governance process.

The research results show that most of the respondents, 77.78% stated that they made the report on decision-making transparency, while 22.22% of them did not make the report. In this regard, 71.1% of respondents stated that they published the report on decision-making transparency on the ministry's website, while 15.6% said that they published it in the Official Gazette and 13.3% gave it to the press for publication.

Most respondents stated that they did not face complaints (80%), while 20% of officials faced such a thing. Complaints regarding the lack of transparency according to the normative acts in force were, in proportion of 66.7% of the press, and 33.3% were employers '/ trade unions' associations.

The results of the research show that administrative transparency in the ministries of the Romanian Government is still a challenge and that major changes are needed in the implementation of the regulations on administrative transparency.

These refer to: the training of civil servants; communication strategies, coordination and monitoring of administrative transparency; investments in logistics necessary for a modern, democratic, transparent and efficient participatory governance act.

4. Conclusions

Transparency and the right to access government information are considered essential in a real democracy (Hollyer et al., 2014). They are based on democratic participation and clearly contribute to increasing trust in government, preventing corruption, informing about decision-making, accurate government information and providing information to the public, companies and journalists (Hood and Heald, 2006). Our study confirms that administrative transparency in the ministries of the Romanian Government needs a significant improvement. Administrative transparency is essential for increasing the quality of governance (Barabashev et al., 2019). As the results of our research show, after the adoption of law no. 544/2001 of the free access to the information of public interest and respectively of the law no. 52/2003 regarding the decisional transparency, there is an increase of the degree of transparency of the ministries from the Romanian Government. However, as it resulted from our research, major changes are needed to significantly improve transparency in the central administration in Romania in general and in the ministries analyzed, in particular.

Authors Contributions
The author/authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of Interest Statement
The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Androniceanu, A.-M., Georgescu, I., Dobrin, C. & Dragulanescu I.V. (2020a). Multifactorial components analysis of the renewable energy sector in the OECD countries and managerial implications. *Polish Journal of Management Studies*, *22* (2), 36-49. DOI: 10.17512/pjms.2020.22.2.03

Androniceanu, A.-M., Kinnunen, J., Georgescu, I. & Androniceanu, A. (2020b). A Multidimensional Approach to Competitiveness, Innovation and Well-Being in the EU Using Canonical Correlation Analysis. *Journal of Competitiveness*, *12*(4), 5-21. https://doi.org/10.7441/joc.2020.04.01

Androniceanu, A.-M., Georgescu, I., Tvaronavičiene, M. & Androniceanu, A. (2020c). Canonical Correlation Analysis and a New Composite Index on Digitalization and

Labor Force in the Context of the Industrial Revolution 4.0. *Sustainability*, *12*(17), 6812; https://doi.org/10.3390/su12176812

Barabashev, A. (2016). Crisis of public governance and its influence on basic administrative paradigms of state and bureaucracy. *Public Administration Issues*, 3, 163-194.

Barabashev, A., Makarov, A. & Makarov, I. (2019). On improvement of the indicative evaluations of the quality of governance. *Public Administration Issues*, 2. 7-38.

ben-Aaron, J., Denny, M., Desmarais, B. & Wallach, H. (2017). Transparency by conformity: A field experiment evaluating openness in local governments. *Public Administration Review*, *77*(1), 68–77.

Bennett, S., Durana, P. & Konecny, V. (2020). Urban internet of things systems and interconnected sensor networks in sustainable smart city governance. *Geopolitics, History, and International Relations, 12*(2), 51-57. doi:10.22381/GHIR12220207

Berliner, D. (2014). The political origins of transparency. *Journal of Politics*, *76*(2), 479-491.

Blakemore, M. and Craglia, M. (2006). Access to public-sector information in Europe: Policy, rights, and obligations. *Information Society: An International Journal*, *22*(1), 13-24.

Christensen, L. T. and Cornelissen, J. P. (2015). Organizational transparency as myth and metaphor. *European Journal of Social Theory*, *18*(2), 132-149.

Da Cruz, N. F., Tavares, A. F., Marques, R. C., Jorge, S., & de Sousa, L. (2015). Measuring local government transparency. *Public Management Review*, *18*(6), 1-28.

Erkkilä, T. (2012). *Government transparency: Impacts and unintended consequences.* Houndmills: Palgrave Macmillan.

Erkkilä, T. (2016). Global governance indices as policy instruments: actionability, transparency and comparative policy analysis. *Journal of Comparative Policy Analysis: Research and Practice*, *18*(4), 382-402.

Glotko, A.V., Polyakova, A.G., Kuznetsova, M.Yu., Kovalenko, K.E., Shichiyakh, R.A. & Melnik, M.V. (2020). Main trends of government regulation of sectoral digitalization. *Entrepreneurship and Sustainability Issues,* 7(3), 2181-2195. http://doi.org/10.9770/jesi.2020.7.3(48)

Grayson, J. (2020). Big data analytics and sustainable urbanism in internet of things-enabled smart governance. *Geopolitics, History, and International Relations*, 12(2), 23-29. doi:10.22381/GHIR12220203

Grimmelikhuijsen, S., John, P., Meijer, A. & Worthy, B. (2018). Do freedom of information laws increase transparency of government? A replication of a field experiment. *Journal of Behavioral Public Administration*, *1*, 1-10.

Hollyer, J. R., Rosendorff, B. P. & Vreeland, J. R. (2014). Measuring transparency. *Political Analysis*, *22*(4), 413-434.

Hood, C. and Heald, D. (Eds.). (2006). *Transparency: The key to better governance?* Oxford, U.K.: Oxford University Press.

Horick, C. (2020). Industry 4.0 production networks: cyber-physical system-based smart factories, real-time big data analytics, and sustainable product lifecycle management. *Journal of Self-Governance and Management Economics*, 8(1), 107-113. doi:10.22381/JSME8120203

Jaeger, P. T. and Bertot, J. C. (2010). Transparency and technological change: Ensuring equal and sustained public access to government information. *Government Information Quarterly*, *27*(4), 371-376.

Jeretina, U. (2018). Consumer Online Dispute Resolution (ODR) – A Mechanism for Innovative E-governance in EU. *Central European Public Administration Review*, *16*(2), 45-67.

Johnson, A. (2020). The smart automation of urban governance: sustainable mobilities and data-driven decision support systems. *Contemporary Readings in Law and Social Justice,* 12(1), 51-57. doi:10.22381/CRLSJ12120207

Kim, S. and Lee, J. (2012). E-participation, transparency, and trust in local government. *Public Administration Review*, *72*(6), 819-828.

Klun, M., Benčina, J. & Umek, L. (2019). Online budget transparency index and its determinants in Slovenian municipalities. *Pénzügyi Szemle*, *64*(3), 393-413. doi: 10.35551/PFQ_2019_3_5.

Komínková, A., Vavřina, J. & Polák, J. (2020). Breaking food safety and quality standards in the EU: Financial aspects within poultry products manufacturers in Visegrad 4 countries. *Journal of International Studies, 13*(3), 195-215. doi:10.14254/2071-8330.2020/13-3/13

Larsson, T. (1998). How open can a government be? The Swedish experience. In V. Deckmyn & I. Thomas (Eds.), *Openness and transparency in European Union* (pp. 39-52). Maastricht: European Institute of Public Administration

Lincényi, M. and Čársky, J. (2021). Research of citizens' behavior in a political campaign in searching for and monitoring political advertising in The Slovak Republic. *Insights into Regional Development*, 3(1), 29-40. https://doi.org/10.9770/IRD.2021.3.1(2)

Machyniak, J. (2017). Direct Democracy and the Local Level (the Case Study of the Slovak Republic). *4th ACADEMOS Conference/International Political Science Conference*, 138-142.

Mempel-Śnieżyk, A., Derlukiewicz, N., Pilewicz, T. & Zdon-Korzeniowska, M. (2020). Can local government impact transaction costs of enterprises? *Entrepreneurship and Sustainability Issues,* 7(3), 1612-1631. https://doi.org/10.9770/jesi.2020.7.3(13)

Meyer, D.F. (2018). Predictors of good governance and effective government management: The case of Poland. *Polish Journal of Management Studies*, *18* (1), 206-217.

Mircica, N. (2020). Restoring public trust in digital platform operations: machine learning algorithmic structuring of social media content. *Review of Contemporary Philosophy*, 19, 85–91. doi:10.22381/RCP1920209

Mishchuk, H., Bilan, S., Yurchyk, H., Akimova, L. & Navickas, M. (2020). Impact of the shadow economy on social safety: The experience of Ukraine. *Economics and Sociology*, *13*(2), 284-298.doi:10.14254/2071-789X.2020/13-2/19

Mishchuk H., Samoliuk N., Bilan Y. & Streimikiene D. (2018). Income inequality and its consequences within the framework of social justice. *Problemy Ekorozwoju*, 13(2), 131-138.

Mura, L. and Machyniak, J. (2014). Ethical aspects of public administration. *Hradec Economic Days 2014: Economic Development and Management of Regions, PT V*, 59-65.

Nica, E., Kliestik, T., Sabie, O.-M. & Ioanei (Gatan), M.-L. (2020). Socio-affective technologies for psychological health: emotional artificial intelligence in empathetic robots. *American Journal of Medical Research*, *7*(2), 9–14. doi:10.22381/AJMR7220201

Ott, K., Bronić, M., Stanić, B., Klun, M. & Benčina, J. (2019). Determinants of online local budget transparency in Croatia and Slovenia. *Central European Public Administration Review*, *17*(2), 167-187. doi: doi.org/10.17573/cepar.2019.2.08.

Parliament of Romania (2001). *Law 544*. Bucharest. Retrieved January 27, 2021, from http://arf.gov.ro/web/wp-content/uploads/2018/02/Lege-544-2001_en.pdf

Parliament of Romania (2003). *Legea 52*. Bucharest. Retrieved February 24, 2021, from http://arf.gov.ro/web/wp-content/uploads/2018/02/Law-52-2003r1_en.pdf

Peracek, T., Vojtech, F., Srebalova, M., Pekar. B., Mikusova-Merickova, B. & Horvat, M. (2018). Restriction on the re-export of medicinal products and the supervision of compliance with it by public administration bodies. *European Pharmaceutical Journal*, *65* (1), 24-30. doi: 10.1515/afpuc-2017-0009

Peracek, T. (2020). The perspectives of european society and the european cooperative as a form of entrepreneuship in the context of the impact of european economic policy, *Online Journal Modelling the New Europe*, 34, 38-56. doi: 10.24193/OJMNE.2020.34.02

Russell, H. (2020). Sustainable urban governance networks: data-driven planning technologies and smart city software systems. *Geopolitics, History, and International Relations*, 12(2), 9-15. doi:10.22381/GHIR12220201

Shevyakova, A. Munsh, E., Arystan, M. & Petrenko, Y. (2021). Competence development for Industry 4.0: Qualification requirements and solutions. *Insights into Regional Development*, 3(1), 124-135. http://doi.org/10.9770/IRD.2021.3.1(7)

Shpak, N., Podolchak, N., Karkovska, V. & Sroka, W. (2019), The influence of age factors on the reform of the public service of Ukraine, *Central European Journal of Public Policy*, *13*(2), 1-13. DOI: 10.2478/cejpp-2019-0006

Stonkute E., Vveinhardt J. & Sroka W. (2018), Training the CSR sensitive mind-set: the integration of CSR into the training of business administration professionals, *Sustainability*, 10, 754; DOI:10.3390/su10030754

Szeiner, Z., Mura, L., Horbulák, Z., Roberson, M. & Poor, J. (2020). Management Consulting Trends in Slovakia in the Light of Global and Regional Tendencies. *Journal of Eastern European and Central Asian Research (JEECAR)*, *7*(2), 191-204. https://doi.org/10.15549/jeecar.v7i2.390

Vveinhardt, J. and Sroka, W. (2020), Mobbing and Corporate Social Responsibility: Does the status of the organisation guarantee employee wellbeing and intentions to stay in the job? *Oeconomia Copernicana*, *11*(4), 743-778. DOI: 10.24136/oc.2020.030

Wakuła, M. (2020). The importance of accounting and reporting in the process of finance management in a basic unit of the territorial government, *Entrepreneurship and Sustainability Issues* 7(3): 1996-2011. https://doi.org/10.9770/jesi.2020.7.3(37)

Zabolotniaia, M., Cheng, Z. & Dacko-Pikiewicz, Z. (2019). Influence of leadership style on employees' innovative activity. *Polish Journal of Management Studies, 20* (1), 478-496.

Efficiency of the functioning of public administration: regional empirical study

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Abstract: *This paper presents qualitative research findings and a comparative scale efficiency analysis of the units performing services in the building sector. The analysis is based on two unique regional datasets from two countries, the Slovak Republic (SR) and the Czech Republic (CZ). Performance of building competences in Slovakia is based on the principle of voluntary cooperation of municipalities. In case of the Czech building sector, the competences have been transferred to the newly created municipalities with delegated or extended competences. Both states introduced reforms in public administration with the aim to improve their efficiency, including the performance of building competences. Czech Republic is currently undergoing a recodification of Building Act with unification of building authorities into the system of state building offices. The results of our qualitative research in both states in the period 2014-2019 show insufficient personal management due to low financing of building competences. Using quantitative statistical methods, we came to the conclusion that in Slovakia, a return to the performance of competences by state administration (district offices) instead of building offices (as a part of self-government) would not be effective.*

Introduction

The management of public affairs is currently a highly treated issue, all the more so as the public pressure on public authorities is constantly increasing in order to manage public affairs more efficiently, quickly and closer to the citizen (Androniceanu, 2019). Today, modern public administration is understood mainly

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as a service to the citizen, as a form of satisfying citizens' needs arising mainly from legal requirements. Several post-communist countries have committed themselves to effective and modern governance, as it is the case in Slovakia and the Czech Republic. For several years, we have been following reform efforts, with one wave of measures being replaced by another. Following the political will, it is also necessary to apply modern management tools so that the whole process actually works.

In its Program Statement of 30 April 2020, the current Government of the Slovak Republic proposes the abolition of building offices and the transfer of their competences from self-governing units to district offices. This would mean that a municipality, as a self-governing unit, would lose its powers and supervision over the exercise of competence in the field of building regulations.

At the same time, an institutional change is being introduced in the Czech Republic, consisting of the creation of a state building administration, and the exercise of building competences will be left to the self-governments – municipalities of III. category.

Based on the text above, we consider important to address this current issue concerning the exercise of competence in the field of building regulations (in the Slovak Republic but also in the neighbouring Czech Republic). It is true that municipalities in Slovakia have considerable problems with the exercise of the competence, but after introduction of the suggested change, they would completely lose their powers, which they have acquired so far through various reform steps. In our research, we prioritize the performance of public administration competences in the building sector and we come to conclusions that could help their efficient performance.

By the presented paper we would like to draw attention to the fact that from the point of view of our quantitative analysis, specifically by applying DEA analysis, in the future, this step may not be as efficient as it seems. It is true that municipalities in Slovakia have considerable problems with the exercise of the competence in the field of building regulations, but with this step they would completely lose control over the exercise of this competence. Ultimately, the presented principle of the exercise of public administration in Slovakia "closer to the citizen" could be negated.

1. Theoretical background

The agreement on the division (dismembrance) of the Czech and Slovak Federal Republic as of 31 December 1992 ceased the then Czech and Slovak Federal Republic and created two separate state entities - the Slovak Republic (SR) and the Czech Republic (CR).

Overall taken, despite of both nations share common history, geographical and natural conditions, inclusion of the same geopolitical and economic structures, and similar economic background, perhaps due to act of sovereign policies and governmental institutions, they had taken different paths of their evolution (Maris, 2019; Georgescu et al., 2020).

Public administration reforms have already started in parallel in both already independent states (Peracek, 2019). Boetti - Piacenza - Turati (2010) state that these are aimed at gaining the autonomy of self-governing units and their further development.

In both mentioned states, there is a decentralization (transfer) of competences from state bodies to self-governing units.

In Slovakia, Act no. 416/2001 Coll. on the Transfer of Certain Competences from State Administration to Municipalities and Higher Territorial Units was adopted, through which, more than 300 competences were transferred to self-governing units (Leško, 2015). In the Czech Republic, more than 80% of the original competences, which in the past were supposed to be provided by district authorities, were transferred to municipalities (Henninges, 2006).

However, the difference between Slovakia and the Czech Republic is that the Czech Republic has gone through the so-called categorization of municipalities, which means that the competences were divided between the established municipalities of I., II. and III. category (Sedláček, 2015). This was achieved by the adoption of Act no. 313/2002 Coll., which amended the Act no. 128/2000 Coll. on Municipalities, specifically by the Act no. 314/2002 Coll. on the Appointment of Municipalities with a Delegated Municipal Office and on the Appointment of Municipalities with Extended Competence. Klimovský (2010) commented on the fact that the categorization of municipalities prevented every single municipality from having the same authority, especially for objective reasons.

Not every municipality is able to ensure the implementation of such diverse volume of competences operationally, materially, in terms of personnel, but especially financially. Slovak municipalities (mostly small ones) also find this rather problematic.

Horváth-Hollósy-Vadász (2019) argue that the motivation of staff is very important (Androniceanu et al., 2020). In society, there are often visible differences in the salary of private and public sector employees, to the detriment of the public sector. This is also reflected in the motivation of the population to exercise competence in the field of building regulations or other public services.

In this context, Fandel et al. (2019) state a critical opinion on the financing of transferred competences. They claim that the financial support by the Slovak state budget relating to the transferred competences of municipalities, which is regulated by §6 par. 2 of Act no. 523/2004 Coll. on Budgetary Rules of Public Administration, is not sufficient, which, in case of building competences, leads municipalities to merging into the joint building offices serving for numerous municipalities. In this context, several foreign (Sargent, 1997) and domestic authors such as Horváth, Cíbik, and Švikruha (2018) state that fiscal decentralization has also brought many problems to local self-governments, with which municipalities have to deal within their means. In solving some problems, the question of financing of the reform changes arises. Self-government is most often dependent on its own finances, but at the same time, it has the opportunity to use the financial programs of the European Union (Hájek et al., 2017).

Kováčová (2014) expresses the opinion that "the smaller the municipality, the greater the problems with securing the transferred competences". Problems with the provision of transferred competences are directly reflected in the satisfaction of the population with life and development of the region (Oláh et al., 2020; Mura and Kajzar, 2018; Raszkowski, Bartniczak, 2018). For this reason, it is important to pay attention to the best possible functioning of local self-governments, what is very actively linked to the development of a particular region.

In Slovakia, the situation is currently being addressed through the so-called inter-municipal cooperation, which is allowed to municipalities in accordance with §20 of Act no. 369/1990 Coll. on Municipalities. The law states that municipalities may "cooperate with each other on the basis of a contract concluded for the purpose of carrying out a specific task or activity".

The delegated competence in the area of building regulation is also exercised, when the municipalities conclude contracts between themselves for the exercise of building competences by joint building offices.

Pursuant to §117 of Act no. 50/1976 Coll. Building Act as amended: "The municipality is the building authority. The competence of the building authority is a delegated performance of state administration".

Every municipality in Slovakia becomes a building authority, but not all of these municipalities are able to fully exercise the delegated competence in the field of building regulations and therefore they cooperate with each other and create joint municipal offices and in the field of building regulations - joint building offices. In the Czech Republic, the reform changes secured that the provision of competence in the area of building regulations is performed only by municipal authorities designated by law (categories II. and III.) (Klimovsky, 2010).

Situation, however, has been gradually changing.

As we have already mentioned in the introductory part, the Government of the Slovak Republic in its Program Statement of 30 April 2020 proposes the abolition of building offices and the transfer of their competences from self-governing units to district offices. At the same time, however, in other parts, public administration is planned to be left to non-state entities, such as local governments in the field of spatial planning. This would lead to the fact that the municipality, as a self-governing unit, would lose supervision over the exercise of competence in the field of building regulations.

Despite the above-mentioned idea of the Government of the Slovak Republic, which was defined in its Program Statement, the presented paper proposes a different direction of the functioning of building offices in Slovakia. We agree with Weimer (2019), who states that, as experts working to promote good governance, administrators must be able to anticipate the consequences. It should also be added, as reported by Okanazu et al. (2019): "No institution, organization or establishment will work efficiently without having credible, sound and innovative personnel."

In our opinion, the exercise of competence in the area of building regulations in the current seats of district offices would not lead to the effective

exercise of competence in the area of building regulations. According to the presented situation, 72 seats of building offices would be established in Slovakia. At the same time, we must not forget another important problem associated with the building process, and that is waste. Waste management is another huge problem of local government (Adamisin et al., 2018; Infante, Smirnova, 2016; Mucha et al., 2019; Pavolová et al., 2020).

In the paper, but also based on the preliminary results of research conducted within the project VEGA 1/0190/17 and the dissertation thesis entitled: Evaluation of the performance of municipal competences in the field of building regulations, we propose to keep the exercise of competence in the area of building regulations in municipalities, but only in those that can handle it materially, technically, personnel and financially.

According to Sargeant (1997), many small local institutions combine and jointly form their resources into larger units in order to increase the efficiency of public service delivery. Hemminges (2006) takes a similar view, arguing that activities that are inefficient are on the verge of interest and are in the centre of local governments' issues.

Buleca - Mura (2014) state that the issue of monitoring efficiency in public administration conditions is gaining more and more prominence, within all eurozone countries. The public sector must look for opportunities to increase its efficiency. In their analysis, they apply quantitative evaluation through the data envelopment analysis (DEA).

Many authors have researched and evaluated the efficiency of public administration in the past, e.g. Narbón-Perpiñá and De Witte (2018), Afonso and Fernandes (2008) or from Slovak experts Lacko, Hurný, Rozkošová, 2017). These authors analysed the overall efficiency of self-governments at the state level, taking into account the activities and competences provided by municipalities. They used DEA analysis to evaluate efficiency.

Based on previous research, in order to verify it, we also apply selected quantitative methods (identical to the mentioned authors) in our research, which are described in more detail in the methodological part.

2. Objective, material and methodology

The main objective of the presented paper is to evaluate the current situation and the impact of the expected future functioning of public administration for the exercise of competence in the field of building regulations in the Slovak Republic and the Czech Republic. This objective can be achieved using the qualitative and quantitative methods, by which we can draw the conclusions on the efficient exercise of competence in the field of building regulations.

At present, in the Slovak Republic, building competences are performed by independent offices (IO) and joint building offices (JBO) in municipalities. According to the Program Statement of the Government of the Slovak Republic for the years 2020-2024, these competences should be transferred from the self-governments back to the state administration. The Government assumes that the exercise of competences by district offices will be more efficient.

We verify the validity of this hypothesis using the data envelopment analysis (DEA), but also by a qualitative method - guided interviews with representatives of building authorities. In the Czech Republic, institutional reform in the building sector is also being implemented and the state building administration is being introduced, but building competences are left to the self - government – municipalities of III. category.

The partial objectives of the paper are directly related to the main one and they are:
- evaluation of the efficiency of the exercise of building competences by joint and independent building offices in the Slovak Republic,
- evaluation of transfers of building competences in the Slovak Republic and the Czech Republic from the self-governing units to the state institutions.

As Slovakia and the Czech Republic have a large number of municipalities, we decided to analyse a sample of municipalities (building offices) of the Slovak Republic and the Czech Republic at the regional level.

Specifically, it was a sample of municipalities, which is for Slovakia represented by municipalities within the Nitra Region and Košice Region and for the Czech Republic - Pardubice Region and Liberec Region. The reason for choosing these regions was the relatively comparable number of municipalities falling under them. However, it must be stated that the decisive factor was also the willingness of employees of these municipalities to cooperate on the implemented qualitative research and also the available data for quantitative analysis.

The results, findings and conclusions of the research were derived through the use of qualitative and quantitative methods:
- methods of controlled interviews with representatives of building offices of a representative sample for the Nitra and Košice Region (Slovakia) and Pardubice and Liberec Region (Czech Republic),
- statistical methods, more precisely, the calculation of efficiency using DEA analysis of the performance of building competences in the examined period in the Slovak Republic (2014 - 2019).

To calculate the efficiency of the implementation of building competences by district offices according to the Program Statement of the Government of the Slovak Republic 2020, we use a method based on the application of mathematical programming, known as data envelopment analysis (DEA) - analysis presented in the original works of Charnes - Cooper - Rhodes (1978) or Banker - Charnes - Cooper (1984), which are also currently mentioned in Buleca - Mura (2014) or Fandel et al. (2019). The reason for choosing DEA analysis to evaluate the efficiency of the implementation of building competences is that it is a complex multidimensional method that can assess the performance of offices in terms of multiple inputs and multiple outputs.

It is also important to mention that given its non-parametric basis, it is possible to considerably vary the specification of inputs and outputs without need to assume a particular functional form. The principle of the calculation of technical efficiency (TE) measures is based on calculation of productivities of all units

relative to the best practice unit's productivity, what can be expressed in following way:

$$TE = \frac{Productivity\ of\ DMU_o}{\max_j(Productivity\ of\ DMU_j)} = \frac{\frac{Output\ of\ DMU_o}{Input\ of\ DMU_o}}{\max_j\left(\frac{Output\ of\ DMU_j}{Input\ of\ DMU_j}\right)}$$

(1)

where DMUo is an observed (analysed) decision making unit and DMUj is j-th decision making unit out of n decision making units creating a sample of units under evaluation.

As variables in the analysis, we used data on the performance of a sample of municipalities (building offices) for the analysed regions of the Slovak Republic and the Czech Republic, specifically the number of issued building permits, approval decisions and additional decisions in the period 2014-2019, which we processed using a spreadsheet in Microsoft Excel. The calculations were performed after the incorporation of input variables consisting of the amount of income taxes of physical persons in the MS Excel.

3. Results and findings

When evaluating the functioning of public administration bodies, several attributes that need to be kept in mind come to the fore. Individual authors point to the selected, in their opinion, the most important factor. However, we are of the opinion that there are several important attributes and we are in favour of a set of indicators that need to be monitored in order to perform an objective assessment. Charnes et al. (1978) in their work defined efficiency as a comparison between the inputs used in a particular activity and the outputs produced by that activity.

In our research, we analyse the implementation of the competence of building regulations in a sample of municipalities in the Nitra and Košice regions for the Slovak Republic and municipalities in the Pardubice and Liberec regions for the Czech Republic. These regions are similar, especially in terms of the number of municipalities located in them.

The Slovak Republic is a relatively small state, which as of 31.12. 2018 (Bačík, 2019) had 2 927 municipalities. Pursuant to §117 of Act no. 50/1976 Coll. Building Act as amended, each municipality of the Slovak Republic is a building authority. In our opinion, a large number of municipalities does not lead to the effective exercise of all competences that municipalities have in their competence. Municipalities often do not have sufficient qualified staff to be able to provide the competence. Whether a municipality exercises competence in the area of building regulations independently or through a joint building office is published on the website of the Ministry of the Interior of the Slovak Republic.

There are 354 municipalities located in the Nitra Region (NR), which represents 12.09% of municipalities out of the total number of municipalities in the

Slovak Republic. These municipalities are located in the cadastral areas of 7 districts. Of the total number of municipalities in the NR Region, 96.89% used the possibility of contractual cooperation in the field of building regulations and became a part of 26 joint building offices, while 3.11% of them exercise the competence independently.

The Košice Region (KE), has a total of 461 municipalities including 22 municipal districts, which represents 15.74% of the total number of municipalities in the Slovak Republic. They are located within 11 districts. The total number of municipalities without municipal districts in the KE Region is 439. Of the stated number of municipalities (439), 89.06% of municipalities used the possibility of voluntary contractual cooperation and became part of 28 joint building offices. The remaining number of municipalities (48), which represents 10.94% of the total number of municipalities (excluding municipal districts), has not yet used the possibility of contractual cooperation and performs the competence independently. Competence in the area of building regulations of 22 municipal districts of Košice is performed by professional employees at 4 workplaces of building offices of the city of Košice.

Using the guided interviews (personal and e-mail communication), we asked representatives of municipalities for their opinion on the exercise of competence in the field of building regulations. The overall success of the conducted interviews related to building regulations in the NR Region, of the total number of building offices (354 municipalities) was 89.19% and in the KE Region of the sample (461 municipalities) was 36.23%. Together for both regions, the success rate of controlled interviews (from a sample of 815 municipalities) was 54.72% (58 building offices out of 106 surveyed building offices).

As of 31 December 2018, the Czech Republic had 6 254 municipalities. The building competence in these municipalities, as we have already stated, is performed by municipalities which, in terms of categorization of municipalities, fall into II. and III. category.

As part of our research in the Czech Republic, we dealt with the exercise of competence in the field of building regulations on the example of municipalities in the Pardubice Region and Liberec Region. In the Pardubice Region (PR), 451 municipalities are located, which represents 7.21% of the total number of municipalities in the Czech Republic. These municipalities belong to 4 districts. There are 227 municipalities located in the Liberec Region (LK), which represents 3.63% of municipalities out of the total number of municipalities in the Czech Republic.

Competence in the area of the building regulation in these regions is performed only by municipalities that exercise this competence, which means by those to which this competence has been entrusted in terms of categorization of municipalities. For the Pardubice Region there are 42 municipalities and for the Liberec Region 37 municipalities exercising building competence.

In the municipalities that are "building offices" in the PR and LK regions, similarly to the regions for the Slovak Republic (NR and KE regions), we carried out qualitative research, which was attended by all 79 "building offices" (100%).

Within the qualitative research, the questions we asked the employees of building offices in Slovakia concerned the issue of securing and exercising the transferred competence in the field of building regulations, namely: 1) reason for concluding a contract for joint performing of building competences, 2) whether there are implemented investments associated with the construction of new buildings and civil engineering works in the territory of the municipality 3) issues of financing competence in the field of building regulations, 4) hiring a new employee of the building office 5) the suitability of the statutory obligation of municipalities to create joint building offices. Similar questions were asked to employees of building offices in the Czech Republic, naturally, without questions related to the legislation covering the exercise of competence in the field of building regulations.

From the obtained data, we can clearly express the dissatisfaction of the municipalities we examined in the Nitra and Košice regions. Municipalities are particularly dissatisfied with the financial base provided to them by the state to exercise the competence. The amount of funds is insufficient for municipalities, which leads them to the need to cooperate with each other in accordance with §20 of Act no. 369/1990 Coll. on Municipalities as amended. Funding for municipalities to exercise this delegated competence is also a limiting factor for the recruitment of new staff that would be suitable for the authorities, especially those with a legal education.

Investment activity within the NR Region is rather focused on industrial construction, but of course also the related construction of housing units and adjacent garages or parking lots (Bayar et al., 2020). Investment activity within the KE Region focuses more on building purely housing units, of course with exceptions.

The application of the current wording of Act no. 50/1976 Coll. Building Act as amended must be applied in case of any building activity. The employees of the building offices, as well as the investors themselves, would welcome its complete change or an amendment that would facilitate, in particular, activities in processing building permits and other related activities.

In the Czech Republic, municipalities have been categorized by new legislation, but some employees of building offices also consider this to be imperfect. Conducted interviews with representatives of building offices show that the financing of competence in the Czech Republic, as in Slovakia, is also not considered ideal and municipalities exercising building competence would certainly welcome a higher level of funding. The financing of competence in the area of building regulations in the Czech Republic is influenced by the amount of the state subsidy for competence, which is determined annually by the amount approved within the budget. There are not as many qualified employees as there should be in building offices, and those who perform this activity would welcome more training and more information in case of exercising competence in the field of building regulations.

Development projects are no exception for investment activities within the analysed area in the Czech Republic, but not to the extent as building private housing units or houses. Investments and innovations are very important for regions.

We combine qualitative research with theoretical knowledge from public administration and we agree with the opinion of Mayne et al. (2019), who state that governments around the world are increasingly recognizing the power of problem-oriented management as a way of addressing complex public issues and improving the efficiency of measures through feedback processes on intended effects.

In our opinion, the situation in Slovakia in the area of exercising competences in building regulations could be resolved by adopting new legislation on the creation of building offices in the seats of registry offices. By amending Act no. 369/1990 Coll. on Municipalities, Act no. 154/1994 Coll. on Registries, Act no. 416/2001 Coll. on the Transfer of Certain Competences from State Administration to Municipalities and Higher Territorial Units, Act no. 50/1976 Coll. Building Act the elimination of the contractual but chaotic creation of joint building offices would be dismissed. With the new legislative solution according to our proposal, the building offices would be clearly allocated to the currently functioning registry offices and consequently building-registry offices would be created.

The Czech Republic is currently undergoing a recodification of building law, which brings a reform of the building administration and proposes the unification of building offices into the system of state building offices.

Quantitative research, namely a comparative analysis of the efficiency of the exercise of competences in the field of building regulations within the project VEGA 1/0190/17, found that independent building offices in the Slovak Republic in NR Region and KE Region perform building competences more efficiently by 4.64% points than joint building offices, although this result was not statistically significant. This is evidenced by the resulting values of the DEA analysis, which is shown in the Table 1.

Table 1. Total efficiency of the building offices of the municipalities of NR Region and KE Region (JBO and IO)

Efficiency according to the number of municipalities – crste		
Result 2 – Z-ratio		
The Z-Score is 0.9133. The p-value is 0.36282. – The result is not significant at $p < 0.05$		Calculation
Average value crste – Every Building Office (BOs.)	0.374	(0.397 -
Average value crste – Non-joint building offices (NBOs.)	**0.397**	0.351)*100=
Average value crste – Joint building offices (JBOs.)	0.351	**4.64%**

(Source: own processing, 2020)

The overall efficiency of building offices in the sample of municipalities of the NR and KE regions for the years 2014 - 2019 was generally low (Table 1). The overall average efficiency of building offices was $p = 0.374$ (with the average overall efficiency of non-joint building offices $p = 0.397$ and join building offices $p = 0.351$). There are differences between the performance of building offices due

to the large variability of overall efficiency. We present the distribution of processed data using a Pareto chart (Figure 1).

Figure1. Pareto chart - Efficiency according to the number of municipalities
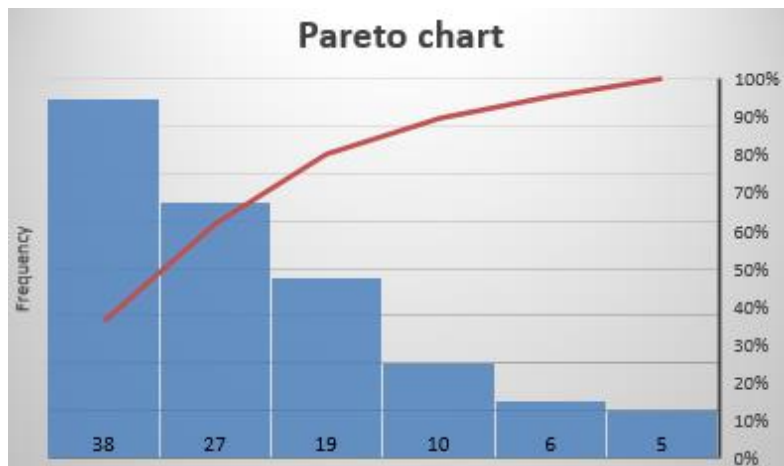
(Source: own processing, 2020)

On the other hand, the efficiency of the potential exercise of construction competences by district offices and the abolition of the current building offices according to the Program Statement of the Government of the Slovak Republic appears to be lower using the statistical methods we use. The overall efficiency of the exercise of building competences by district offices would be 6.4% points lower than the overall efficiency of the building competences performed by building offices, but the result is not statistically significant (Table 2).

Table 2. Total efficiency of the building offices determined by the Program Statement of the Government of SR

| Original Building Offices & (Simulated) County Building Offices - crste		
Result 1 - U-value		
The U-value is 671.		
Result 2 – Z-ratio		
The Z-Score is 0.52374. The p-value is 0.60306. the result **is not significant** at $p<0.05$		
Average value crste – Every Building Office (BOs.)	0.367	Calculation
Average value crste – Original Building Offices	0.374	(0.374 - 0.310)*100=
Averege value crste – (Simulated) County Building Offices	0.310	**6.4%**

(Source: own processing, 2020)

However, in terms of efficiency from the scope of the original building offices, we came to the conclusion that these are 29.5% more efficient than potential building offices in the district offices (see Table 3), which are to be established according to the Program Statement of the Slovak Government 2020, and this difference is statistically highly significant.

Table 3. Efficiency from the scope of the original building offices

Original Building Offices & (Simulated) County Building Offices - scale		
Result 1 – U-value		
The U-value is 91.5		
Result 2 – Z-ratio		
The Z-Score is 5.30337. The p-values is 0.00001. The result **is significant** at p<0.05.		
Average values scale te – Every Building Office	0.767	Calculation
Average values scale te – Original Building Offices	0.802	(0.802 - 0.507)*100%=
Average values scale te - Simulated County Building Offices	0.507	**29.5 %**

(Source: own processing, 2020)

Figure 2. Pareto chart - Original Building Offices & (Simulated) County Building Offices - scale
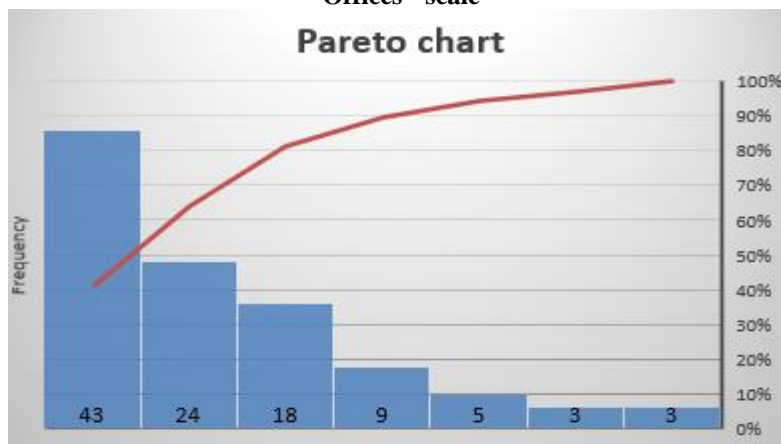
(Source: own processing, 2020)

For this reason, as well as based on the results of qualitative research on selected samples of building offices in NR and KE regions, we come to the conclusion that the government-declared step back in the building sector and the return of building competences to district offices as state administration bodies will not be effective. We present the distribution of processed data using a Pareto chart (Figure 2).

Mayors of municipalities which issue building decisions under Act no. 416/2001 Coll. on the Transfer of Certain Competences from State Administration to Municipalities and Higher Territorial Units, as amended, and the Building Act, would lose decision-making powers on building in their territory with the retroactive transfer of building competences to state administration bodies.

4. Conclusion

Qualitative research shows that representatives of building offices in the Slovak Republic are dissatisfied with the material, technical but also financial provision of the state for the transferred competences in the building sector. For the Slovak Republic, 80% of the surveyed building offices confirmed this, and for the Czech Republic, we detected a level of 72%.

The governments of both surveyed countries have adopted their strategies for structural and legislative solutions to the problems of building offices. In its Program Statement for 2020-2024, the Government of the Slovak Republic mentions the abolition of building offices and the Government of the Czech Republic is preparing to transfer the exercise of building competences to municipalities of III. category. The problem of exercising building competences was partially solved in the Czech Republic by the so-called categorization of municipalities, but in the conditions of the Slovak Republic it is still open.

The efficiency of the potential exercise of building competences by district offices and the abolition of the current building offices according to the Program Statement of the Government of the Slovak Republic appears to be lower based on the used statistical method. The overall efficiency of the exercise of building competences by district offices would be by 6.4% points lower than the overall efficiency of the building competences performed by building offices. This result, however, is not statistically significant.

In terms of efficiency from the scope of the original building offices, we came to the conclusion that these are 29.5% more efficient than potential building offices in the seats of district offices to be established according to the Program Statement of the Slovak Government. This result is statistically highly significant.

The final conclusion of our research is that there should be adopted new legislation in Slovakia, which would precisely determine the seats of joint building offices, which would be able to ensure the implementation of competence in the area of building regulations for the municipalities they would cover as it is n the case of registry offices. In practice, the situation would look like this: the current seats of the registry offices would also be the seats of the joint building offices covering the same municipalities (within both competences). However, the competences would be exercised by qualified staff separately (only the office would be common). This is already partly a question for the management of human resources in the field of public administration, which requires the acquisition of appropriate education.

Authors Contributions

The author/authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Adamisin, P., Kotulic, R., Mura, L., Kravcakova, Vozarova, I. & Vavrek, R. (2018). Managerial approaches of environmental projects: an empirical study. *Polish Journal of Management Studies*, *17* (1), 27-38.

Afonso, A. and Fernandes. S. (2008). Assessing and explaining the relative e ciency of local government. *Journal of Behavioral and Experimental Economic (Formerly the Journal of Socio-Economics)* 37, 1946-79.

Androniceanu, A. (2019). The social sustainability of smart cities: urban technological innovation, big data management, and the cognitive internet of things. *Geopolitics, History, and International Relations 11*(1), 110-115. doi:10.22381/GHIR11120197

Bačík, V. (2019). Slovenská republika – sumárne údaje. Zoznam obcí SR. Available at: http://www.sodbtn.sk/obce/index_kraje.php

Bayar, Y., Remeikiene, R., Androniceanu, A., Gaspareniene, L. & Jucevicius, R. (2020). The shadow economy, human development and foreign direct investment inflows. *Journal of Competitiveness*, *12*(1), 5–21. Doi: https://doi.org/10.7441/joc.2020.01.01

Banker, R.D., Charnes, A. & Cooper, W.W. (1984). Some models for estimating technical and scale efficiencies in data envelopment analysis. *Management Science*, *30* (9), 1078-1092.

Buleca, J. and Mura, L. (2014). Quantification of the efficiency of public administration by data envelopment analysis. *Procedia Economics and Finance*, 15, 162-168.

Boetti, L., Piacenza, M. & Turati, G. (2010). Decentralization and Local Governments Performance: How Does Fiscal Autonomy Affect Spending Efficiency? Torino: University of Torino. *Mohr Siebeck, Tübingen*, *68*(3), 269-302. DOI: 10.1628/001522108X653840

Charnes, A., Cooper, W. W. & Rhodes, E. (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, *2*(6), 429-444.

Fandel, P., Marišová, E., Malatinec, T. & Lichnerová, I. (2019). Decentralization policies in public administration in Slovakia and the Czech Republic, and their impact on building offices' scale efficiency. *Administrative Sciences*, *9* (4), 89.

Georgescu, I., Kinnunen, J., Androniceanu, A. & Androniceanu, A.-M. (2020). A Computational Approach to Economic Inequality, Happiness and Human Development. *Informatica economica*, *24*(4), December, 16-27.

Hájek, O., Novosák, J., Horváth, P. & Novosáková, J. (2017). Absorption capacity of structural funds (2007-2013): Typology of czech microregions. *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration*, *24*(39), 28-38

Hemminges, P. (2006). Improving Public-spending Efficiency in Czech Regions and Municipalities. No. 499, p. 30 [Online]. [Cited 2020-09-25] Avalaible at: https://doi.org/10.1787/884741503537

Horváth, P., Cíbik, L. & Švikruha, M. (2018). Financial dependency of territorial self-government in Slovakia. *Scientific Papers of the University of Pardubice, Series D: Faculty of Economics and Administration,* 25(42), pp. 67-79

Horváth, Zs. and Hollósy, V. G. (2019). The revision of Hungarian public service motivation (PSM) model. *Central European Journal of Labour Law and Personnel Management*, *2* (1), 17-28. http://doi.org/10.33382/cejllpm.2019.02.02

Infante, D. and Smirnova, J. (2016). Environmental technology choice in the presence of corruption and the rule of law enforcement. *Transformations in Business and Economics 15*(1), 214-227.

Klimovský, D. (2010). Samosprávy v EÚ Česká republika. In: Územná samospráva. s. 32-37. [online]. [cit. 2020-10-5] Avalaible at: https://archiv.vlada.gov.sk/krajina/data/att/24361_subor.pdf

Kováčová, E. (2014). Teória a prax verejnej správy v podmienkach Slovenskej republiky. Banská Bystrica: Univerzita Mateja Bela. 236 p. ISBN 978-80-557-0725-8.

Lacko, R., Hurný, F. & Rozkošová, A. (2017). Conceptual framework for evaluating the efficiency of public administration. *IDIMT 2017: Digitalization in Management, Society and Economy - 25th Interdisciplinary Information Management Talks*, 253-260

Leško, D. (2015). Formation of regional level of self-government int he process of transformation in Slovakia. *Journal for universal excellence*. September *4*(3), pp. A1-A11. Avalaible at: https://www.fos-unm.si/media/pdf/RUO/2015% 203/8.pdf

Mayne, Q., De Jong, J. & Fernandez-Monge, F. (2019). State Capabilities for Problem-Oriented Governance. *Perspectives on Public Management and Governance*, *3* (1), 33-44. https://doi.org/10.1093/ppmgov/gvz023

Mariš, M. (2019). Structural and productivity shift of industries in Slovakia and Czech republic: a Comparative study. *Journal of International Studies*, *10*(1), 277-288. DOI: 10.14254/2071-8330.2019/12-1/21

Mucha, B., Peráček, T. & Brestovanská, P. (2019). Strategy of environmental policy of the Slovak republic until 2030 - An effective tool for combating waste? *International Multidisciplinary Scientific GeoConference Surveying Geology and Mining Ecology Management, SGEM*, 19 (5.4), 541-548.

Mura, L. and Kajzar, P. (2018). Entrepreneurship in Tourism Sector In Central European Country: Hospitality Trends in the Czech Republic in 2007 - 2016. *Journal of Environmental Management and Tourism*, 96 (30), 1351 - 1360.

Narbón-Perpiñá, Isabel and De Witte, Kristof (2018). Local governments' e_ciency: A systematic literature review–part I. *International Transactions in Operational Research* 25, 431-68.

Nicolescu, L., Tudorache, F.G. & Androniceanu, A. (2020). Performance risk analysis on mutual funds versus stock exchanges in young financial markets *Journal of International Studies*, *13*(1), 279-294. Doi:10.14254/2071-8330.2020/13- 1/18

Okanazu, O.O., Madu, M.A. & Igboke, S. A. (2019). A recipe for efficient and corrupt free public sector. *Central European Journal of Labour Law and Personnel Management*, *2* (1), 29-46. http://doi.org/10.33382/cejllpm.2019.02.03

Oláh, J., Hajduová, Z., Lacko, R. & Andrejovský, P. (2020). Quality of life regional differences: Case of self-governing regions of Slovakia. *Sustainability*, *12*(7), 2924

Pavolová, H., Lacko, R., Hajduová, Z., Šimková, Z. & Rovňák, M. (2020). The circular model in disposal with municipal waste. *A case study of Slovakia. International Journal of Environmental Research and Public Health*, *17*(6), 1839

Peracek, T. (2019). Selected issues of electronic delivery in the Slovak public administration. *Proceedings of the 33rd International Business Information Management Association Conference, IBIMA 2019: Education Excellence and Innovation Management through Vision 2020*, pp. 3255-3263.

Raszkowski, A. and Bartniczak, B. (2018). Towards sustainable regional development: Economy, society, environment, good governance based on the example of Polish regions. *Transformations in Business and Economics 17*(2), 225-245.

Sargent, M. (1997). New Doubts about Transfers in the Public Administration. *Industrial Law Journal*, 26 (3), 265-269. https://academic.oup.com/ilj/article-abstract/26/3/265/664259?redirectedFrom=fulltext

Sedláček, J. (2015). Rozdělení obcí dle rozsahu přenesené působnosti. SMEČR. [Online]. [Cited 2020-10-02] Avalaible at: http://www.rokvobci.cz/zpravy-redaktoru/detail/692-rozdeleni-obci-dle-rozsahu-prenesene--pusobnosti/

Weimer, D. L. (2019). Public Administration Theory: Normative Necessity. *Perspectives on Public Management and Governance*, *3*(1), 7-11. https://doi.org/10.1093/ppmgov/gvy007

Perceiving of legal risk and the role of public sector in SMEs of V4 countries

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Abstract: *The public sector plays an important role in the process of creating a quality of business environment. The objective of the paper was to present new scientific knowledge in the field of legal risk in the SMEs sector of the V4 countries. For this purpose, weights of selected factors of legal risk were quantified and there were compared the trends of the Czech Republic with other V4 countries. Empirical research was conducted via questionnaire survey on a sample of 1.585 respondents. On the basis of the research conducted, it can be concluded that the level of legal risk in the V4 countries was relatively high; this risk negatively affects business activities in the SMEs of the V4 countries. A major part of enterprises in the V4 countries evaluate the legal risk as unacceptable. Entrepreneurs in the V4 countries negatively evaluated the fact that the dynamics of legislative changes is too intensive and has a negative impact on their business activities. SMEs in the V4 countries considered the business environment to be too strictly regulated. On the other hand, entrepreneurs showed a high level of self-confidence in the knowledge of basic legal norms in business. Legal risk is perceived differently in individual countries. The lowest intensity of legal risk is perceived by SMEs in Hungary; the highest level of perceiving legal risk was shown in Poland. Empirical research showed that the size of enterprise and education of entrepreneurs do not have a significant impact on the formation of entrepreneurs´ attitudes in terms of legal risk.*

Keywords: government, legal framework, small and medium-sized enterprises, legal risk, V4 countries

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Introduction

Small and medium-sized enterprises (SMEs) have an important position in the structure of the economy in the countries of the European Union. Supporting the sustainability of this sector is vital for economic development of countries (Hanggraeni *et al.*, 2019). The public sector plays a key role in the business environment, legal framework, and control of conditions. Therefore, the public administration cannot be overlooked either in terms of legal risk and its perception by SMEs.

SMEs do not apply risk management as often as large enterprises. Therefore, business risks can have a disastrous impact on their business. Nowadays, SMEs begin to make an effort to analyse the business risks and their impact on the future direction of SMEs (Lima *et al.*, 2020). However, they pay greater attention to the financial risks which can cause financial losses directly. Non-financial risks are not taken into account (Psárska *et al.*, 2019). These risks, including operational, security, legal, and other business risks can result in huge economic difficulties of enterprises as well (e.g. McNulty & Akhigbe, 2017; Petkovic *et al.*, 2016; Schulte *et al.*, 2018).

The study was motivated by the fact that SMEs do not pay appropriate attention to the legal risk which can lead to penalties. On the other side, the public administration should be aware of SMEs´ perception of the legal environment to support their sustainability more efficiently. The Visegrad countries (the Czech Republic, Slovakia, Poland, and Hungary) were chosen for their common characteristics such as history, economic development, and geographical similarity. This study fills in the knowledge gap in this area and brings new scientific findings valuable for both SMEs and the public sector.

The structure of the paper is as follows: the introductory chapter presents an overview of knowledge about business environment of SMEs, legal risk of SMEs and its factors, and the impact of the public sector on legal risk. In the methodology chapter, the main objective, data, and methodology are specified, and the hypotheses are formulated. The following chapter provides testing of the hypotheses formulated and the results are discussed and compared with the results of international analyses. The conclusions of the study summarize the main findings, their applicability for different readers, and the limitations of the study.

1. Literature review

Business environment is related with a number of various business risks, which can be divided into two large groups – financial and non-financial risks. Authors that analyse these risks are e.g. Ferreira de Araújo *et al.*, 2020; Kozubíková *et al.*, 2015 (financial risk), Carr *et al.*, 2017 (non-financial risk, such as market risk), McNulty & Akhigbe, 2017 (operational risk), Schulte *et al.*, 2018 (safety/security risk), Belás *et al.*, 2020; Kozlova *et al.*, 2016 (personnel risk), Kayes *et al.*, 2007 (reputation risk), Dvorský *et al.,* 2019; Li & Moosa, 2015,

Petkovic *et al.*, 2016 (legal risk), Taraba *et al.*, 2016 (project risk), and Zimon, 2017 (market risk). The concept of legal risk has not been clearly defined and is most often described as a category of operational risk in business activities (Kaszubski, 2006). In international literature, most authors focus on finding effective methods of minimizing and / or managing this type of risk in the activities of entrepreneurs, in particular in terms of using financial instruments for crediting their activities and in connection with contracts concluded with clients, rather than on specification of this phenomenon (McCornick, 2010). The analysis of studies on the scope of research on various risks in the activities of SMEs allows for the formulation of the following conclusions: firstly, they do not clearly specify how this risk is understood by the researchers and entrepreneurs participating in the research. Some of them consider this risk to be the result of the law-making activity of the state and its bodies; the others believe that this risk is the result of the application or refusal to apply these regulations and the related consequences in the form of decisions of judicial authorities and public administration bodies (Belás *et al.*, 2014); secondly, it can be assumed that within these studies, legal risk is seen mainly as an unpredictable change in the number and subject of enacted legal acts regulating the functioning of small and medium-sized enterprises in a given country (Dankiewicz *et al.*, 2020).

Petkovic *et al.* (2016) identified key risk sources in legal risk, such as complicated legal procedures and difficulties in the collection of receivables from debtors. Complicated legal environment also brings uncertainty into the decision-making process of the company management (Melnyk *et al.*, 2017). Legal process has huge consequences for business environment and business realities.

Many authors agree that managers should be educated to manage risks to avoid business failure (Brachert *et al.*, 2017). Crises also have a high impact on risk perception and risk management. SMEs perceive risks more intensively during crises and post-crises times, taking into account more closely the need to implement efficient risk management (Dvorský *et al.*, 2018). According to Brustbauer (2016), risk management processes of large enterprises are more developed than the processes of small enterprises, whose approach to risk management is rather passive. The risk management in enterprises depends on the characteristics of entrepreneurs (Gilmore et al., 2004; Nikolic *et al.*, 2019, Ključnikov *et al.*, 2019) and their knowledge (Rauch & Rijsdijk, 2013, Rostami *et al.,* 2015), on the size of the enterprise (Pagach & Warr, 2011, Paape & Speklé, 2012), on the length of doing business (Bottazzi *et al.*, 2014).

Political factors set up the legal framework and control the business environment (Dickson & Weaver, 2008). The legal regulation of business is perceived as the major obstacle for entry on the market (Lutz *et al.*, 2010). Stenholm *et al.* (2013) identify differences in the institutional organization and their impact on business activities. The authors consider the institutional methods and regulatory provisions to be connected with the level of business activities, and therefore, they suggest facilitating the entry of new enterprises on the market, which may have a positive effect on business activities. Establishing institutions

supporting entrepreneurials and entrepreneurship development is very important also in the transitional processes of SMEs (Hisrich *et al.*, 2016). Gaganis *et al.* (2019) warn that the European government should pay attention to the bureaucracy, which has a huge impact on the business environment. Not only national government, but the European regulation has a huge impact on business environment (Halasi *et al.*, 2019).

The government is responsible for business environment, including legislative conditions and their application in business practice and the overall economic environment (Kaplanová, 2016). Public administration should create favourable conditions for business, provide financial support for entrepreneurs, and reduce administrative burden of entrepreneurship (Dobeš *et al.*, 2017). The state is one of main actors in field of legal risk. Legal risks can be increased by frequent legislative changes or by a new administrative burden in business environment (Gavurova *et al.*, 2020). According to Dobeš *et al.* (2017), entrepreneurs are very critical to the role of the state in business environment. 60 % of the respondents from Czech SMEs disagree with the fact that the state creates favourable conditions for business in the Czech Republic. Hamplová & Provazniková (2015) focused their attention on the identification of non-market factors which influence entrepreneurship at the level of SMEs. They state that Czech entrepreneurs´ perception of business environment is very critical. The main reason are administrative barriers in business and the work of authorities representing the state administration and business regulation.

It should be emphasized that in the SMEs sector in Poland, the majority of entrepreneurs, i.e. 87.6 %, are natural persons running a business. Other organizational and legal forms, i.e. legal persons (e.g. limited liability companies) and organizational units without legal personality (e.g. general partnerships, limited partnerships, civil partnerships) account for 12.4 % of small and medium-sized enterprises (Skowrońska & Zakrzewski, 2020). According to Grzegorzewska-Mischka & Wyrzykowski (2017), Polish entrepreneurs constantly see the main barriers of the business in legal and administrative obstacles (including taxation). Kadocsa & Francsovics (2011) analysed the business environment in Hungary and concluded that SMEs do not capitalize on the opportunities of European Union and cannot perceive the political situation and its impact on business environment. Mallet *et al.* (2019) made a systematic literature review to present how the regulation affects SMEs. They conclude that the impact of regulations is not always direct, predictable, or constraining. There are differences among countries not only in specific regulations but also in the ways SMEs respond to them.

2. Objective, methodology and data

The objective of the paper is to present new scientific knowledge in the field of legal risks in the SME sector. Within achieving this objective, weights of selected legal risk factors are quantified and the trends in the Czech Republic are compared with other V4 countries. There is also examined the influence of the size

of enterprise and education of entrepreneurs on their approach to evaluating legal risk in individual V4 countries.

Empirical research in the SME sector was conducted between October 2019 and March 2020 in the Visegrad countries (the Czech Republic, Slovakia, Poland, and Hungary) through an online questionnaire survey. The method of random sampling was used to make the following selection: 8,250 enterprises in the Czech Republic, 10,100 enterprises in Slovakia, 7,680 enterprises in Poland, and 8,750 enterprises in Hungary. The enterprises in the Czech Republic and Slovakia were selected using the data from the Cribis database, in Poland, the Central Statistical Office of Poland database was used, and in Hungary, the enterprises were selected on the basis of the data from The Budapest Chamber of Commerce and Industry database. The average response rate was between 3.6 % (Slovakia) and 5.5% (the Czech Republic); with 4.6 % in Hungary and 4.7 % in Poland.

The structure of the SME sample from the Czech Republic was as follows: The overall number of respondents (correctly completed questionnaires) was 454, out of which 290 were micro-enterprises (0-9 employees), 107 small enterprises (10-49 employees), and 57 medium-sized enterprises (50-499 employees). Legal form: 135 self-employed persons, 266 limited liability companies, 34 joint-stock companies, 19 with other legal form (cooperative, partnership, public benefit corporation). Business sector: 29.3 % services, 20.1 % trade, 17.4 % manufacturing, 13.9 % construction, 2.4 % tourism, 2.4 % agriculture, 2.2 % transport, and 12.3 % in other business sectors. In the Czech Republic, the questionnaires were completed by 231 entrepreneurs with secondary education and 223 entrepreneurs with university education (out of which 34 with a Bachelor Degree, 168 with a Master Degree, and 21 entrepreneurs with Ph.D.

The overall number of respondents from Slovakia was 368, out of which 216 were micro-enterprises, 106 small enterprises, and 46 medium-sized enterprises. In terms of the legal form, 59 respondents were self-employed persons, 266 limited liability companies, 21 joint-stock companies, 22 had a different legal form (cooperative, partnership, public benefit corporation). Business sector: 30.1 % services, 20.7 % trade, 19.0 % manufacturing, 11.1 % construction, 4.1 % tourism, 2.2 % agriculture, 2.7 % transport, and 10.1 % in other business sectors. In terms of education, the attained education of the respondents was as follows: 77 % entrepreneurs with secondary education and 291 with university education (out of which 21 with a Bachelor Degree, 234 with a Master Degree, and 36 with Ph.D.

The SME sample from Poland included 364 respondents with the following structure: 202 micro-enterprises, 85 small enterprises, and 77 medium-sized enterprises. In terms of the legal form, 176 were self-employed persons, 126 limited liability companies, 22 joint-stock companies, 40 with other legal forms (cooperative, partnership, public-benefit corporation). Business sector: 51.4 % services, 12.6 % trade, 14.8 % manufacturing, 6.1 % construction, 1.1 % tourism, 0.8 % agriculture, 4.4 % transport, and 8.8 % in other business sectors.

The questionnaires in Poland were completed by 60 entrepreneurs with secondary education and 304 entrepreneurs with university education (out of which 38 had a Bachelor Degree, 244 a Master Degree, and 22 Ph.D.).

The sample of SMEs in Hungary included 399 respondents: 268 micro-enterprises, 73 small enterprises, and 58 medium-sized enterprises, out of which 109 were self-employed persons, 240 limited liability companies, 18 joint-stock companies, and 32 had a different legal form (cooperative, partnership, public-benefit corporation). The structure of the SMEs in terms of the business sector was as follows: 32.3 % of enterprises operated in services, 11.3 % in trade, 16.5 % in manufacturing, 7.3 % in construction, 3.5 % in tourism, 18.8 % in agriculture, 4.0 % in transport, 6.3 % in other business sectors.

The questionnaires in Hungary were completed by 78 entrepreneurs with secondary education and 321 with university education (out of which 134 attained a Bachelor Degree, 147 a Master Degree, and 40 Ph.D.

This paper examines the following statements in terms of their overall intensity, and the influence of enterprise size and education of entrepreneurs.

- ST1: I consider the legal risk-appropriate and not harmful to our (my) business.
- ST2: (My) business is affected by frequent legislative changes, but it has no negative impact on our (my) business.
- ST3: I understand the essential legal aspects of doing business.

The respondents selected one of the five following options: I strongly agree, I agree, I neither agree nor disagree, I disagree, I strongly disagree. Based on expert estimation method, the following scientific hypotheses were formulated:

- H1: The evaluation of the impact of legal risk on doing business in the V4 countries is not positive.
- H2: The intensity of the knowledge of the legal aspects of business environment is above average in the V4 countries.
- H3: There are significant differences in positive attitudes of entrepreneurs concerning legal risk in terms of comparing the Czech Republic with other V4 countries.
- H4: Enterprise size and education of entrepreneurs significantly influence their attitudes concerning legal risk.

To verify the formulated scientific hypotheses, the method of descriptive statistics (percentage), and the Z-score method were used. Statistically significant differences were compared at the significance level of 5 %. The calculations were made using free software available online.

3. Results

The following tables present the results of comparing the respondents´ attitudes with the selected statements concerning legal risk by country in total and

by enterprise size and education of entrepreneurs. Individual tables also present the results of statistical processing of the data.

Table 1. Evaluation of ST1

ST1	Czech Republic (CR)	Slovakia (SR)	Poland (PL)	Hungary (HU)	Z-score p-value CR/SR CR/PL CR/HU
Responses in total:	454	368	364	399	
1. I strongly agree	45	31	39	68	**0.0076**
2. I agree	166	106	85	162	**0.0003**
1+2 in total % / number	46.47/211	37.23/137	**34.06**/124	**57.64**/230	**0.0011**
Responses by enterprise size	Micro/SME 290/164	Micro/SME 216/152	Micro/SME 202/162	Micro/SME 268/131	
1+2 in total / %	118/40.70 93/**56.71**	79/36.57 58/38.16	76/37.62 48/29.63	144/53.73 86/**65.65**	
Z-score/p-value	**0.0010**	0.7566	0.1096	**0.0238**	
Responses by education of entrepreneurs	NUD/UD 231/223	NUD/UD 77/291	NUD/UD 60/304	NUD/UD 78/321	
1+2 in total / %	109/47.19 102/45.74	24/31.17 113/38.83	26/43.33 98/32.24	46/58.97 184/57.32	
Z-score/p-value	0.7566	0.2150	0.0969	0.7872	

(*Source:* Own contribution)

Legend: Micro – micro-enterprises, SME – small and medium-sized enterprises, UD – university education, NUD – secondary and primary education.

The level of agreement with ST1 ranges between 34.06 % (Poland: the lowest level of agreement with the statement) and 57.64 % (Hungary: the highest level of agreement). The average level of agreement with ST1 was 43.85 %.

The Z-score test values confirmed the existence of statistically significant differences in positive attitudes of SMEs between Czech entrepreneurs and entrepreneurs from Slovakia, Poland, and Hungary (p-value = 0.0076/0.0003/0.0011). Czech entrepreneurs appear to agree with ST1 significantly more often compared to Slovak and Polish entrepreneurs. On the other hand, they agree with ST1 significantly less often compared to Hungarian entrepreneurs.

P-value in the Czech Republic and Hungary confirmed the existence of statistically significant differences in entrepreneurs´ attitudes in terms of enterprise size. It has been found that micro-enterprises evaluate the level of legal risk significantly more negatively compared to larger enterprises.

When evaluating the entrepreneurs´ attitudes depending on their education, no significant differences were identified within the individual V4 countries.

Table 2. Evaluation of ST2

ST2	Czech Republic (CR)	Slovakia (SR)	Poland (PL)	Hungary (HU)	Z-score p-value CR/SR CR/PL CR/HU
Responses in total:	454	368	364	399	
1. I strongly agree	64	44	44	36	0.0969
2. I agree	117	82	86	127	0.2225
1+2 in total, % / number	39.87/181	**34.24**/126	35.71/130	**40.85**/163	0.7718
Responses by enterprise size	Micro/SME 290/164	Micro/SME 216/152	Micro/SME 202/162	Micro/SME 268/131	
1+2 in total / %	110/37.93 71/43.29	76/35.18 50/32.89	76/37.62 54/33.33	101/37.69 62/47.33	
Z-score/p-value	0.2627	0.6455	0.3953	0.0658	
Responses by education of entrepreneurs	NUD/UD 231/223	NUD/UD 77/291	NUD/UD 60/304	NUD/UD 78/321	
1+2 in total / %	93/40.26 88/39.46	22/28.57 104/35.74	26/43.33 104/34.21	33/42.31 130/40.50	
Z-score/p-value	0.8650	0.2380	0.1770	0.7718	

(*Source:* Own contribution)

The level of agreement with ST2 ranges between 34.24 % (Slovakia: the lowest level of agreement with the statement) and 40.85 % (Hungary: the highest level of agreement). The average level of agreement with ST2 was 37.67 %.

The Z-score test values confirmed that there are no statistically significant differences in positive attitudes of SMEs between Czech entrepreneurs and entrepreneurs from other V4 countries. There are no statistically significant differences in terms of comparing the entrepreneurs´ response by enterprise size and attained education of entrepreneurs.

Table 3. Evaluation of ST3

ST3	Czech Republic (CR)	Slovakia (SR)	Poland (PL)	Hungary (HU)	Z-score p-value CR/SR CR/PL CR/HU
Responses in total:	454	368	364	399	
1.I strongly agree	168	107	144	79	0.0719
2. I agree	195	205	150	221	0.7718
1+2 in total % / number	79.95/363	**84.78**/312	80.77/294	**75.19**/300	0.0949

ST3	Czech Republic (CR)	Slovakia (SR)	Poland (PL)	Hungary (HU)	Z-score p-value CR/SR CR/PL CR/HU
Responses by enterprise size	Micro/SME 290/164	Micro/SME 216/152	Micro/SME 202/162	Micro/SME 268/131	
1+2 in total /%	231/79.66 132/80.49	185/85.65 127/83.55	159/78.71 135/83.33	191/71.27 109/**83.21**	
Z-score/p-value	0.8337	0.5823	0.2670	**0.0096**	
Responses by education of entrepreneurs	NUD/UD 231/223	NUD/UD 77/291	NUD/UD 60/304	NUD/UD 78/321	
1+2 in total /%	171/74.03 192/**86.10**	66/85.71 246/84.54	46/76.67 248/81.58	55/70.51 245/76.32	
Z-score/p-value	**0.0013**	0.7949	0.3789	0.2846	

(*Source:* Own contribution)

The level of agreement with ST3 ranges between 75.19 % (Hungary: the lowest level of agreement with the statement) and 84.78 % (Slovakia: the highest level of agreement). The average level of agreement with ST4 was 80.17 %.

Z-score test values confirmed that there are no statistically significant differences in positive attitudes of SMEs between Czech entrepreneurs and entrepreneurs from Slovakia, Poland, and Hungary (p-value = 0.0719/0.7718/0.0949).

Based on the results, it could be stated that there are no statistically significant differences in entrepreneurs´ attitudes in terms of enterprise size within the V4 countries (except for Hungary, where larger enterprises tended to agree more with the statement). Czech entrepreneurs with university education agreed with ST4 significantly more often (p-value = 0.0013).

Evaluation of hypotheses:

H1 was confirmed. The impact of legal risk on business in the V4 countries was not evaluated positively. The average level of agreement with ST1 was 43.85 %, while the average level of agreement with ST2 achieved 37.67 %, and 29.41 % in the case of agreement with ST3.

H2 was confirmed. The intensity of knowledge of business environment legal determinants is above average in the V4 countries. The average level of agreement with ST4 was 80.17 %.

H3 was partially confirmed. The research confirmed the existence of significant differences in positive attitudes of entrepreneurs to legal risk when comparing the Czech Republic with other V4 countries in terms of ST1.

H4 was partially confirmed; however, it was not possible to clearly prove the scientific conclusion that enterprise size and education of entrepreneurs significantly influence their perception of legal risk.

4. Discussion

According to the results, Czech entrepreneurs agree with the statement that legal risk has no negative impact on the business much more than Slovak and Polish entrepreneurs; the highest level of agreement with this statement was identified in SMEs in Hungary. This result corresponds to the results achieved by Deligonul (2020), who confirms that the appropriate risk management in the case of legal risk has a negative impact on the whole system. Proper legal risk management means not paying penalties and the possibility to invest in the development of the enterprise. The cross-country research conducted by Chittenden *et al.* (2002) shows that regulations affect SMEs disproportionately and negatively. The results from Poland do not correspond with the research conducted by Dankiewicz *et al.* (2020) during the same period. The authors concluded that the most important risk for SMEs is personnel risk (62.3 %) followed by legal risk (52.1%). Furthermore, it was found out that legal risk is perceived more by Polish entrepreneurs operating on the market for more than 3 years (53.6 %) than by entrepreneurs operating for less than 3 years (41.5 %). The scale of new legal provisions in Poland is stable and similar to the situation in 2017 and 2018. The number of enacted regulations has significantly decreased since March 2020 due to the COVID-19 pandemic (Van Kędzierski, 2020). Legal risk was indicated by Polish SME entrepreneurs as the second most important risk in business activity; it was also identified as one of the significant types of risks SMEs will struggle with in the following 5 years. This gives grounds for the conclusion that although legislators in Poland try to reduce the risk in the activities of entrepreneurs by legal regulations, these efforts are not perceived by the SME sector, and the reduction of the risk for entrepreneurs is not the same as the reduction of legal risk concerning the quantitative and the qualitative aspects of the enacted law (Dankiewicz *et al.*, 2020). The public sector should see the perception of legal environment regularly to maintain healthy legislative conditions for business. The over-regulated environment can bring huge legal risk and can demotivate new entrepreneurs to enter the market.

More than 30 % of SMEs from the V4 countries agree that the legislative changes have a negative impact on their business. There are no statistical differences in responses among countries. Similar results were obtained by Belas *et al.* (2019), whose findings confirm that entrepreneurs in the Czech Republic and Slovakia evaluate the political factors of the business environment negatively. The result is opposite to the statement made by Bondareva & Zatrochová (2014), who concluded their research in Slovakia with findings that smooth operation of the legal risk framework can bring stability and success for SMEs.

On the other hand, it was found out that almost 80 % of entrepreneurs states that they have basic knowledge of legal aspects of entrepreneurship. This finding, however, can be caused by high confidence of entrepreneurs and can confirm the statement that entrepreneurs do not perceive the risks appropriately. This result was confirmed by conclusions made by Paape & Speklé (2012).

However, knowledge of regulations cannot be only theoretical, it must be transmitted through sources such as business support (Harris *et al.*, 2012; Kitching, 2016), public administration (Hirschsohn, 2008), and employees´ understanding of these regulations (Atkinson *et al.*, 2016).

5. Conclusions

The objective of the paper was to gain new scientific findings for the area of legal risk management in the SME sector of the V4 countries.

Based on the research, it can be stated that the level of legal risk in the V4 countries is relatively high and this risk has a negative impact on business activities of SMEs in the V4 countries. A considerable part of enterprises in the V4 countries evaluate legal risk as excessive. The entrepreneurs in the V4 countries negatively evaluated the fact that the dynamics of the legal changes is too intensive and affects negatively their business activities. The role of government and public administration is crucial in the legal environment. Often legal changes can lead to unwillingness to start a business or further develop the business. The SMEs in the V4 countries considered the business environment to be too strictly regulated. On the other hand, the entrepreneurs showed high level of confidence in terms of the knowledge of legislative norms in the business sector.

Legal risk was perceived differently in individual countries. The lowest intensity of perceiving legislative risk was shown by SMEs in Hungary; the highest level of intensity of negative perception of legislative risk was identified in Poland.

Empirical research showed that enterprise size and education of entrepreneurs do not have a significant influence on the formation of entrepreneur attitudes in the area of legal risk.

The research presented within the paper submitted has certain limitations that need to be pointed out. First of all, it is necessary to consider the methodological aspects of the given research in the context of possible interpretation of the empirical results obtained. Another important aspect is the period in which this empirical research was conducted. This period can be described as a favourable phase of the economic cycle. It can be assumed that the evaluation of legal risks will be more positive in this period than in the period of significant negative factors in the macroeconomic sphere.

Authors Contributions

The authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

References

Atkinson, C., Mallett, O. & Wapshott, R. (2016). 'You try to be a fair employer': regulation and employment relationships in medium-sized firms. *International Small Business Journal, 34*, 16-33. https://doi.org/10.1177/0266242614541992

Belás, J., Macháček, J., Bartoš, P., Hlawiczka, R. & Hudáková, M. (2014). Business risks and the level of entrepreneurial optimism among SME in the Czech and Slovakia. *Journal of Competitiveness*, *6*(2), 30-41. https://doi.org/10.7441/joc.2014.02.03

Belas, J., Belas, L., Cepel, M. & Rozsa, Z. (2019). The impact of the public sector on the quality of the business environment in the SME segment. *Administratie Si Management Public*, *32*, 18-31. https://doi.org/10.24818/amp/2019.32-02

Belas, J., Amoah, J., Petráková, Z., Kliuchnikava, Y. & Bilan, Y. (2020). Selected factors of SMEs management in the service sector. *Journal of Tourism and Services*, *21*(11), 129-146. https://doi.org/10.29036/jots.v11i21.215

Bondareva, I. and Zatrochová, M. (2014). Financial support for the development of SMEs in the Slovakia. *Procedia-Social and Behavioral Sciences*, *110*, 541-548. https://doi.org/10.1016/j.sbspro.2013.12.898

Bottazzi, G., Secchi, A. & Tamagni, F. (2014). Financial constraints and firm dynamics. *Small Business Economics*, *42*(1), 99-116. https://doi.org/10.1007/s11187-012-9465-5

Brachert, M., Hyll, W. & Titze, M. (2017). On the simultaneity bias in the relationship between risk attitudes, entry into entrepreneurship and entrepreneurial survival. *Applied Economics Letters*, *24*(7), 477-480. https://doi.org/10.1080/13504851.2016.1203056

Brustbauer, J. (2016). Enterprise risk management in SMEs: Towards a structural model. *International Small Business Journal*, *34*(1), 70-85. https://doi.org/10.1177/0266242614542853

Carr, J. B., Hawkins, C. V. & Westberg, D. E. (2017). An exploration of collaboration risk in joint ventures: perceptions of risk by local economic development officials. *Economic Development Quarterly*, *31*(3), 210-227. https://doi.org/10.1177/0891242417710325

Chittenden, F., Kauser, S. & Poutziouris, P. (2002). *Regulatory Burdens of Small Business: A Literature Review*. London: Small Business Service Research Directorate.

Dankiewicz, R., Ostrowska-Dankiewicz, A. & Bulut, C. (2020). The attitudes of entrepreneur of the small and medium-sized enterprises sector in Poland to key business risks. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *15*(3), 511-536. https://doi.org/10.24136/eq.2020.023

Deligonul, S. Z. (2020). Multinational country risk: Exposure to asset holding risk and operating risk in international business. *Journal of World Business*, *55*(2). https://doi.org/10.1016/j.jwb.2019.101041

Dickson, P. H. and Weaver, K. M. (2008). The role of the institutional environment in determining firm orientations towards entrepreneurial behavior. *International Entrepreneurship and Management Journal*, *4*(4), 467-483. https://doi.org/10.1007/s11365-008-0088-x

Dobeš, K., Kot S., Kramoliš, J. & Sopková, G. (2017). The perception of governmental support in the context of competitiveness of SMEs in the Czech Republic. *Journal of Competitiveness*, *9*(3), 34-50. https://doi.org/10.7441/joc.2017.03.03

Dvorský, J., Schönfeld, J., Kotásková, A. & Petráková, Z. (2018). Evaluation of important credit risk factors in the SME segment. *Journal of International Studies*, *11*(3), 204-216. https://doi.org/10.14254/2071-8330.2018/11-3/17

Dvorský, J., Petráková, Z., Zapletalíková, E. & Rózsa, Z. (2019). Entrepreneurial propensity index of university students. The case study from the Czech Republic, Slovakia and Poland. *Oeconomia Copernicana*, *10*(1), 173-192. https://doi.org/10.24136/oc.2019.009

Ferreira de Araújo Lima, P., Crema, M. & Verbano, C. (2020). Risk management in SMEs: A systematic literature review and future directions. *European Management Journal*, *38*(1), 78-94. https://doi.org/10.1016/j.emj.2019.06.005

Gaganis, Ch., Pasiouras, F. & Voulgari, F. (2019). Culture, business environment and SMEs' profitability: evidence from European countries. *Economic Modelling*, *78*(1), 275-292. https://doi.org/10.1016/j.econmod.2018.09.023

Gavurova, B., Belás, J., Bilan, Y. & Horák, J. (2020). Study of legislative and administrative obstacles to SMEs business in the Czech Republic and Slovakia. *Oeconomia Copernicana*, *11*(4), 689-719. https://doi.org/10.24136/oc.2020.028

Grzegorzewska-Mischka, E. and Wyrzykowski, W. (2017). *Barriers to entrepreneurship – retrospective analysis and comparison with other European countries*. Przedsiebiorczosc i zarzadzenie, Lodz-Warszawa.

Halasi, D., Schwarcz, P., Mura, L. & Roháčiková, O. (2019). The impact of EU support resources on business success of family-owned businesses. *Potravinarstvo Slovak Journal of Food Sciences*, *13*(1), 846-853. https://doi.org/10.5219/1167

Hanggraeni, D., Ślusarczyk, B., Sulung, L. A. K. & Subroto, A. (2019). The impact of internal, external and enterprise risk management on the performance of micro, small and medium enterprises. *Sustainability*, *11*(7), 1-17. https://doi.org/10.3390/su11072172

Harris, L., Tuckman, A. & Snook, J. (2012). Supporting workplace dispute resolution in smaller businesses: Policy perspectives and operational realities. *The International Journal of Human Resource Management*, *23*(3), 607-623. https://doi.org/10.1080/09585192.2012.641081

Hirschsohn, P. (2008). Regulating the 'Animal Spirits' of entrepreneurs? Skills development in South African small and medium enterprises. *International Small Business Journal*, *26*(2), 181-206. https://doi.org/10.1177/0266242607086573

Hisrich, R. D., Petković, S., Ramadani, V. & Dana, L. P. (2016). Venture capital funds in transition countries: Insights from Bosnia and Herzegovina and Macedonia. *Journal of Small Business and Enterprise Development*, *23*(2), 296-315. https://doi.org/10.1108/JSBED-06-2015-0078

Kadocsa, G. and Francsovics, A. (2011). Macro and micro economic factors of small enterprise competitiveness. *Acta Polytechnica Hungarica*, *8*(1), 23-40.

Kaplanová, P. (2016). Public goods as factors of a local economic development in Slovakia. *Administratie si Management Public*, 26, 6-24.

Kaszubski, R.W. (2006). *Funkcjonalne źródła prawa bankowego*. Kraków: Wolters Kluwer.

Kayes, D. C., Stirling, D. & Nielsen, T. M. (2007). Building organizational integrity. *Business Horizons*, *50*(1), 61-70. https://doi.org/10.1016/j.bushor.2006.06.001

Kitching, J. (2016). Between vulnerable compliance and confident ignorance: Small employers, regulatory discovery practices and external support networks.

International Small Business Journal, *34*(5), 601-617. https://doi.org/10.1177/0266242615569325

Ključnikov, A., Civelek, M., Čech, P. & Kloudová, J. (2019). Entrepreneurial orientation of SMEs' executives in the comparative perspective for Czechia and Turkey. *Oeconomia Copernicana*, *10*(4), 773–795. https://doi.org/10.24136/oc.2019.035

Kozlova, O., Makarova, M. & Mingaleva, Z. (2016). Corporative social responsibility as a factor of reducing the occupational health risk of personnel. *International Journal of Applied Business and Economic Research*, *14*(14), 683-693.

Kozubíková, L., Belás, J., Bilan, Y. & Bartoš, P. (2015). Personal characteristics of entrepreneurs in the context of perception and management of business risk in the SME segment. *Economics and Sociology*, *8*(1), 41-54. https://doi.org/10.14254/2071-789X.2015/8-1/4

Li, L. and Moosa, I. (2015). Operational risk, the legal system and governance indicators: a country-level analysis. *Applied Economics*, *47*(20), 519-530. https://doi.org/10.1016/j.ijpe.2016.09.018

Lima, P. F. D., Crema, M. & Verbano, C. (2020). Risk management in SMEs: A systematic literature review and future directions. *European Management Journal*, *38*(1), 78-94. https://doi.org/10.1016/j.emj.2019.06.005

Lutz, C. H. M. Kemp, R. G. M. & Dijkstra, S. G. (2010). Perceptions regarding strategic and structural entry barriers. *Small Business Economics*, *35*(1), 19-33. https://doi.org/10.1007/s11187-008-9159-1

Mallett, O., Wapshott, R. & Vorley, T. (2019). How do regulations affect SMEs? A review of the qualitative evidence and a research agenda. *International Journal of Management Reviews*, *21*(3), 294-316. https://doi.org/10.1111/ijmr.12191

McCornick, T. (2010). *Legal risk in the financial markets*. Oxford: Oxford University Press.

McNulty, J. E. and Akhigbe, A. (2017). What do a bank's legal expenses reveal about its internal controls and operational risk? *Journal of Financial Stability*, *30*(1), 181-191. https://doi.org/10.1016/j.jfs.2016.10.001

Melnyk, O., Sroka, W., Adamiv, M. & Shpak, Y. (2017). Information diagnostic support of enterprise under the conditions of uncertainty. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *65*(4), 1403-1414. https://doi.org/10.11118/actaun201765041403

Nikolic, N., Jovanovic, I., Nikolic, D., Mihajlovic, I. & Schulte, P. (2019). Investigation of the factors influencing SME failure as a function of its prevention and fast recovery after failure. *Entrepreneurship Research Journal*, *9*(3), 1-21. https://doi.org/10.1515/erj-2017-030

Paape, L. and Speklé, R. F. (2012). The adoption and design of enterprise risk management practices: An empirical study. *European Accounting Review*, *21*(3), 533-564. https://doi.org/10.1080/09638180.2012 .661937

Petkovic, S., Jager, C. & Sasic, B. (2016). Challenges of small and medium sized companies at early stage of development: insights from Bosnia and Herzegovina. *Management Journal of Contemporary Management Issues*, *21*(2), 45-76.

Psárska, M., Hašková, S. & Machová, V. (2019). Performance management in small and medium-sized manufacturing enterprises operating in automotive in the context of future changes and challenges in SR. *Ad Alta: Journal of Interdisciplinary Research*, *9*(2), 281-287.

Rauch, A. and Rijsdijk, S. A. (2013). The effects of general and specific human capital on long-term growth and failure of newly founded businesses. *Entrepreneurship Theory and Practice*, *37*(4), 923-941. https://doi.org/10.1111/j.1540-6520.2011.00487.x

Rostami, A., Sommerville, J., Wong, I. L. & Lee, C. (2015). Risk management implementation in small and medium enterprises in the UK construction industry. *Engineering, Construction and Architectural Management*, *22*(1), 91-107. https://doi.org/10.1108/ECAM-04-2014-0057

Schulte, P. A., Cunningham, T. R., Guerin, R. J., Hennigan, B. & Jacklitsch, B. (2018). Components of an occupational safety and health communication research strategy for small- and medium-sized enterprises. *Annals of Work Exposures and Health*, *62*(1), 12-24. https://doi.org/10.1093/annweh/wxy054

Skowrońska, A. and Zakrzewski, R. (2020). *Raport o stanie sektora małych i średnich przedsiębiorstw w Polsce*, Warszawa: PARP.

Stenholm, P., Acs, Z. J. & Wuebker, R. (2013). Exploring country-level institutional arrangements on the rate and type of entrepreneurial activity. *Journal of Business Venturing*, *28*(1), 176=193. doi:10.1016/j.jbusvent.2011.11.002

Taraba, P., Hart, M. & Pitrová, K. (2016). Risk management of projects in the Czech Republic [Zarządzanie ryzykiem projektów w Republice Czeskiej]. *Polish Journal of Management Studies*, *13*(1), 181=191. https://doi.org/10.17512/pjms.2016.13.1.17

Van Kędzierski, D. (2020). Koszty i bariery obciążające procesy gospodarowania. *Przegląd Prawa Publicznego*, *12*, 73–83.

Zimon, D. (2017). The influence of quality management systems for improvement of logistics supply in Poland. *Oeconomia Copernicana*, *8*(4), 643=655. https://doi.org/10.24136/oc.v8i4.39

Z-score Calculator (2021). URL: https://www.socscistatistics.com/tests/ztest/zscore calculator.aspx