# THE USE OF STATISTICAL PARAMETRIC TESTS IN ORDER TO ANALYZE ECONOMIC DATA

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**ABSTRACT:** *The paper deals with the issue of establishing the most adequate statistical parametric test in order analyze economic sets of data. A sample comprising 35 large corporations from Romania was selected in order to analyze the volume and the quality of occupational health & safety (OHS) disclosures. On the grounds that one dependent variable was defined – the global reporting index - and a number of independent numerical variables were also considered, such as the turnover, the number of employees, the return on capital, the market share and so on, we have performed the appropriate statistical tests in order to verify some hypotheses and to establish the appropriate procedure to be followed in order to analyze the correlations between the variables.*

**KEY WORDS:** *Occupational Health & Safety (OHS), t - test, paired t - test, paired samples correlations, the global reporting index.*

**JEL CLASSIFICATION**: *C12, C46, C88, J28.*

## 1. INTRODUCTION

Selecting the appropriate statistical test which can be used under certian circumstances in order solve a specific economic problem, can be, sometimes, a rather difficult task. This kind of analysis requires the definition of variables involved in the study, which may be expressed according to the peculiarities of associated data groups (i.e. numerical, cathegorical, ordinal).

Another important prerequisite for choosing a statistical test lies in the process of determining the hypotesis of the study. Thus, establishing by nature wich hypotesis belongs to the *confirmatory* set (meaning that a few assumed associations are put to the proof) and which belongs to the *exploratory* gruop (in which case the hypotesis are simply put forward by the data) represents an operation of great significance.

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Using a prudent approach will imply that the amount of confirmatory hypotesis sould be strictly restrained. Despite the fact that employing statistical tests based on hypotesys indicated by the data appears as a credible statistical procedure, the standard P values must be adopted merely as frames of references.

Another question to be answered in the context of this study concerns the use of independent samples or paired samples. The paired *t* test fits whith the objective of confornting means which are determined form paired samples. Estimations are assumed to be paired in cases they are extracted form the same entity of study (e.g. the same corporation, the same individual, the same household etc.).

Under various circumstances, when two classes of individuals are very sharply replicated, it is tolerable to consider the two classes as "paired". Once the pairing is established, the paired *t* test is normally considered to be more robust than the classical approach which would use two independent data series in order to perform the *t* – test or the *Welch test*. Hence, if pairing is manifested, it is recommended to carry out a paired t-test.

## 2. RESEARCH METHODOLOGY

The database in Appendix 1 was developed whith the purpose of highlighting whether the reporting phenomenon of occupational health &safety issues by the Romanian companies meets, from the qualitative point of view, the specific requirements of reporting standards generally accepted in the international practice.

A sample comprising 35 large corporations from Romania was selected and its representativity has been substantiated both by the fact that the total number of reporting corporations (that is the size of the total population) cannot be accurately known and by the fact that various empirical studies conducted between 2013 and 2017 have shown that very few auchthonous corporations were engaged in the process.

Using the data provided by *RisCo Business Intelligence*, the *Trade Register Office*, as well as the websites of corporations selected in the sample, we have collected the statistical data series from 2016 and 2017, describing the following variables to be analyzed: the turnover; the number of employees; the return on capital; the degree of indebtedness and the market share.

On the other hand, we have substantiated the dependent variable – *the global reporting index* – whose values were within the range [0,100] - by considering as a starting point the content analysis of sustainability reports disclosed by 35 corporations from the sample. For this purpose, we gave differentiated scores for each corporation, by taking into consideration the volume and the quality of its disclosure in the following areas:

- $A_1$ – ***The quality of drawing up and communicating the OHS Policy*** – the maximum score which could be obtained by this criterion: ***30***;
- $A_2$ – ***Employees' participation and representation in OHS comittees*** – the maximum score possible to be achieved by this criterion: ***15***;
- $A_3$ – ***OHS topics and programmes disclosed*** – the maximum score which was assigned for this criterion: ***20***;
- $A_4$ – ***The level of disclosing relevant information regarding the trainings carried out with the purpose of raising the awareness of***

***employees on the OHS issue*** – the value of maximum score in this case: ***15***;

- $A_5$ – ***The level of disclosing OHS performance indicators*** – the maximum score possible to be aquired for this criterion: ***20***.

The values of the global reporting index deducted from the content analysis performed on the 35 sustainability/non-financial reports disclosed by the selected corporations from the sample, are displayed in the third column of Appendix 1.

Within the content of the next paragraph, we shall continue our analysis both by performing the *t* – test in order to verify the hypotheses on a parameter and by carrying out the paired *t* – test for two sets of observations.

## 3. APPLICATION OF PARAMETRIC TESTS

### 3.1. Testing the Hypothesis Regarding the Significance of The Mean Value for the Global Reporting Index Variable

For this purpose, the statistical test *t* which is generally used in the case of small size samples, will be employed. It is considered that the average of the global reporting index is equal to the score of ***55***, taking into account the scores given by the content analysis, depending on the consistency of OHS reports for each company. Therefore, the null hypothesis could be formulated as follows:

- $H_0$: "*The average distribution of the global reporting index is equal to 55*".

SPSS software tests the statistical hypotheses regarding the average of a distribution based on the *t-Student* distribution [Cristinel, 2012].

Tables 1 and 2 show the output generated by the application of the *t* test with the help of the SPSS software.

**Table 1. Desprciptive Statistics for OHS Global Reporting Index: One-Sample Statistics**

| | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| OHS Global Reporting Index | 35 | 67.86 | 20.375 | 3.444 |

Table 1 shows some of the descriptive statistical indicators for the variable *global reporting index*: the average of the scores awarded (equal to 67.86), the standard deviation (with the value of 20.375) and the standard deviation from the average of the samples. Therefore, for the 35 corporations, an average of 67.86 for the scores awarded for reporting OHS issues was obtained, with a standard deviation of 20.375.

Therefore, the average obtained at the sample level is higher than the default value established through the statistical hypothesis $H_0$ (67.86> 55). By applying this test, we will have to determine to what extent this difference is high enough not to be due solely to the selection of a sample of several reporting corporations. If the difference is classified as sufficiently high, then it will be called a *statistically significant difference*.

This decision related to the significance of the difference between the two mean values, will be adopted on the basis of the statistical test *t*, whose implementation is accompanied by the establishment of a guaranteed probability of the obtained result considered by the researcher to be sufficiently high.

We chose this probability as equal to 95%, considering that this value is considered reasonable by most statistical researches targeting similar objectives in the literature. We shall use the SPSS program to generate the results of the *t-Student* test in order to verify the significance of the difference between the averages and we shall obtain the output from table 2.

On the first line of table 2, the mean value established by the null hypothesis is displayed, against which we test the existence of a difference ("Test Value = 55"). The software applies this test by using the critical ratio method, which means to generate an observed value of the *t* coefficient based on the following relationship:

$$t_{obs} = \frac{m - \mu}{s / \sqrt{n}},$$

which is to be compared with a theoretical value, extracted from the table of the Student's *t* distribution law, depending on the chosen guaranteed probability of the result and the number of degrees of freedom calculated.

**Table 2. Data obtained from the application of the t-Student test**

| One-Sample Test | | | | | | |
|---|---|---|---|---|---|---|
| | Test Value = 55 | | | | | |
| | T | df | Sig. (2-tailed) | Mean Difference | 95% Confidence Interval of the Difference | |
| | | | | | Lower | Upper |
| Global OHS Reporting Index | 3.733 | 34 | .001 | 12.857 | 5.86 | 19.86 |

In the context of the previous relation, *m* represents the effective average of the analyzed variable (67.86), and $\mu$ designates the reference value of the mean value established on the basis of the null hypothesis (55). The denominator of the fraction, $s/\sqrt{n}$ reflects the dispersion of the analyzed characteristic, $\sigma = \frac{s}{\sqrt{n}}$.

This observed value of the coefficient *t* is compared with the theoretical value, taken from the tables of the Student's *t* distribution. In our case, t (34) = 3.733, which represents the value of the critical $t_{obs}$ ratio, with a number of 34 degrees of freedom (df = n - 1). Also, p <0.001; in other words, there is a probability less than 1/1000 to obtain a value of t greater than 3.73.

Therefore, the test is statistically significant and the mean value of the global OHS reporting index of the sample is different from 55. This difference is 12.857 and lies with a 95% probability in the range [5.86 - 19.86].

The size of the effect is calculated by the relation proposed by the statistician Cohen:

$$d = \frac{m - \mu}{\sigma} = \frac{12{,}857}{20{,}375} = 0{,}631.$$

The result obtained reflects a very strong effect, according to Cohen's grid, which means a significant statistical difference between the two mean values.

In other words, it can be stated that the average of the *global OHS reporting index* for the companies which draw up sustainability reports in Romania is about 68 (on a scale from 0 to 100), which reflects a high degree of concern of the Romanian managers regarding the issue of occupational health and safety.

In table 3, we display the extreme values (outliers) of the global OHS reporting index, highlighted with the help of the SPSS program. The extreme minimum value belongs to the corporation S.I.E.P.C.O.F.A.R., with a global reporting index equal to 15.

If we give up this extreme value, we can determine the quartiles that allow the division of the statistical data series into four equal parts. These are:

- *The lower quarter* ($Q_1$ = 60), represents that value of the statistical data series that delimits a percentage of 25% of the small values from the rest of 75% of the values. In this category, we will retain corporations with low OHS performance, highlighted by a global reporting index inferior to 60;
- *The second quarter* ($Q_1$ = 67), divides the series of statistical data into two equal parts, being identical to its median. This quartile will include corporations that have a global reporting index in the range [60-85], which reflects a satisfactory performance in the field of OHS;
- *The third quarter* (Q3 = 85), is the value that separates the first 75% of the values of the statistical data series, from the rest of 25% of the large values of the analyzed variable. In this class, there will be highlighted the corporations with OHS high performances.

**Table 3. Extreme values of the variable OHS Global Reporting Index**

| | | | Corporation | Value |
|---|---|---|---|---|
| **OHS Global Reporting Index** | Highest | 1 | OMV Petrom | 100 |
| | | 2 | ALRO SA Slatina | 100 |
| | | 3 | Holcim | 95 |
| | | 4 | Zentiva | 95 |
| | | 5 | Transeletrica | 90[a] |
| | Lowest | 1 | S.I.E.P.C.O.F.A.R. | 15 |
| | | 2 | Holzindustrie Schweighofer | 30 |
| | | 3 | Patria Bank | 30 |
| | | 4 | Ursus Breweries | 40 |
| | | 5 | KPMG | 45 |
| a. Only a partial list of cases with the value 90 are shown in the table of upper extremes. | | | | |

**Table 4. Quartiles of the data series related to the OHS Global Reporting Index**

| Statistics | | |
|---|---|---|
| N | Valid | 35 |
| | Missing | 0 |
| Mean | | 67.86 |
| Percentiles | 25 | 60.00 |
| | 50 | 70.00 |
| | 75 | 85.00 |

The classification which results is represented in the figure 1.

### 3.2. Application of the Parametric *t* Test for Paired Samples

The database contiaining 35 reporting corporations (which is presented in Appendix 1) includes a series of statistical data on the following indicators: the turnover, the number of employees, the return on capital, the degree of indebtedness and the market share, measured for two consecutive years (2016, 2017).

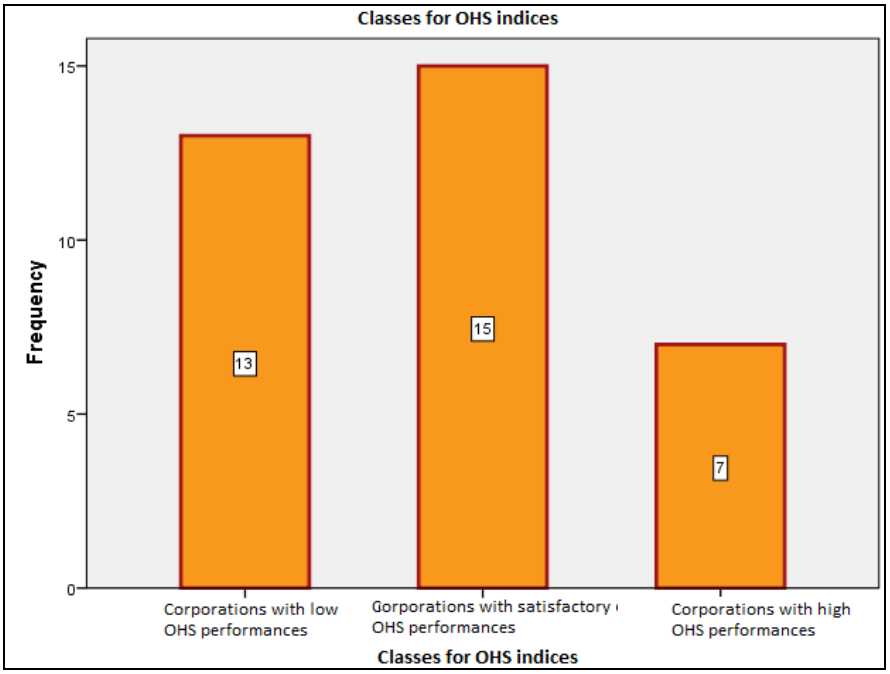


**Figure 1. Quartile classification of the data series related to the variable "OHS Global Reporting Index"**

This was done considering that the reporting practices of the sample companies were not unitary: thus, there were companies that reported sustainability and OHS issues in 2016 while others prepared reports for 2016-2017 or 2017-2018.

Because the dependent variable - *the OHS global reporting index* - is characterized by a single set of data resulting from the content analysis of the sustainability reports prepared by the companies in the aforementioned periods, we will proceed in the following paragraph by applying the statistical *t* test for pairs samples, in order to investigate whether there are any statistically significant differences between the values collected in consecutive years (between 2016-2017) and assigned to the same variable.

**1.** We will apply the *t* test for dependent samples for the couple of observations: *Turnover 2016* - *Turnover 2017*. Through this test, we want to investigate if there are statistically significant differences between the turnover for the corporations selected in the sample at the level of the years 2016 and 2017 respectively. The null hypothesis $H_0$ will be stated as follows: "*There are no statistically relevant differences between the mean values of turnovers for those two years*."

Using the SPSS software, we have provided with the statistical data regarding the turnover in 2016 and 2017 (see Appendix 1) and we have obtained the following results (tables 5, 6 and 7).

For 34 companies, the turnover values for the years 2016 and 2017 remain valid, as two numeric variables with the mean values made available: $m_1$=2,19 billion lei and $m_2$=2.43 billion lei. The correlation between the two values of the Turnover indicator is 0.993, with a value of p (2-tailed bidirectional significance) less than 0.001. The correlation is significant between the two averages of the turnover [Bucea-Manea Țoniș et al., 2010].

We have applied for the pair consisting of the Turnover 2016 and the Turnover 2017 variables the *t* test for the dependent variables, obtaining t = 2.801, df = 33, p <0.05. These values lead to the rejection of the null hypothesis and the effect size $d = \frac{245.423.954,294}{510.931.441,597} = 0,4903$ shows that there is a small to moderate difference between the two mean values.

**Table 5. Descriptive statistics for the Turnover - Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Pair 1** | Turnover (lei) 2016 | 2192475124.29 | 34 | 2824308849.344 | 484364971.668 |
| | Turnover (lei) 2017 | 2437899078.59 | 34 | 3202678682.157 | 549254862.656 |

**Table 6. Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| **Pair 1** | Turnover (lei) 2016 & Turnover (lei) 2017 | 34 | .993 | .000 |

**Table 7. Paired Samples t Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| **Pair 1** | Turnover (lei) 2016 - Turnover (lei) 2017 | -245423954.294 | 510931441.597 | 87624019.339 | -423696362.063 | -67151546.525 | -2.801 | 33 | .008 |

The limits of the confidence interval of the difference of the mean values for the 95% guaranteed probability for the result have the values: for the lower limit -423,696,362.063, and for the upper limit -67,151,546.525. This shows a high probability that the difference will remain within the same limits when researching another sample from the same population.

**2.** We shall apply the *t* test for dependent samples, by the same procedure, customized this time for the pair of variables *Number of employees 2016* - *Number of employees 2017*.

The null hypothesis $H_0$ will be stated as follows: "*There are no statistically significant differences between the number of employees of the sample corporations in the two consecutive years*". We entered the statistical data regarding the number of employees (see Appendix 1), within the SPSS software and we obtained the following results (tables 8, 9 and 10).

For 34 companies we have considered the values of the *Number of employees* 2016 and 2017, being registered as two numerical variables with the averages: $m_1$ = 2.949 and $m_2$ = 2.929. The correlation between the two pairs of values related to the indicator *Number of employees* has the value 0.995, with a value of *p* (of 2-tailed bidirectional significance) less than 0.01. The correlation is significant between the two mean values of the number of employees.

**Table 8. Descriptive statistics for the Number of employees - Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Pair 1** | Number of employees 2016 | 2948.94 | 34 | 3626.227 | 621.893 |
| | Number of employees 2017 | 2928.71 | 34 | 3497.151 | 599.756 |

**Table 9. Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| **Pair 1** | Number of employees 2016 - Number of employees 2017 | 34 | .995 | .000 |

**Table 10. Paired Samples t Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| **Pair 1** | Number of employees 2016 - Number of employees 2017 | 20235 | 387075 | 66383 | -114821 | 155292 | .305 | 33 | .762 |

We have applied the *t* test for the dependent variables, for the pair formed by the variables *Number of employees 2016* and *Number of employees 2017* and we have obtained the values t = 0.305, df = 33, p> 0.05. This shows that there is no significant difference between the two mean values and thus confirms the null hypothesis $H_0$. The limits of the confidence interval of the average difference for the 95% guaranteed probability have the values: for the lower limit of -114,821, and for the upper limit of 155,292.

**3.** We use the same *t* test for dependent samples in the case of the pair ***Return on capital 2016 - Return on capital 2017***. The null hypothesis $H_0$ is formulated as follows: "*There are no statistically significant differences between the return on capital recorded by the companies selected in the sample in the two consecutive years*". We have entered the statistical data regarding the return on capital for the two reference years (Appendix 2), in the SPSS program and we have obtained the following output (tables 11, 12 and 13).

For 34 companies, the values of the *Return on capital* for 2016 and 2017 were considered, being registered as two numerical variables with the average values: $m_1$ = 9.62 and $m_2$ = 11.43. The correlation between 34 pairs of values related to the *Return on capital* indicator is of medium intensity and has the value 0.504, with a value of *p* (of 2-tailed bidirectional significance) of 0.002.

**Table 11. Descriptive statistics for the return on capital - Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Pair 1** | Return on capital (%) 2016 | 9.6203 | 34 | 9.62195 | 1.65015 |
| | Return on capital (%) 2017 | 11.4303 | 34 | 10.94734 | 1.87745 |

**Table 12. Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| **Pair 1** | Return on capital (%) 2016 & Return on capital (%) 2017 | 34 | .504 | .002 |

**Table 13. Paired Samples t Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| **Pair 1** | Return on capital (%) 2016 - Return on capital (%) 2017 | -1.81000 | 10.30806 | 1.76782 | -5.40665 | 1.78665 | -1.024 | 33 | .313 |

A value t = 1.024 was obtained, for a number of degrees of freedom df = 33 and p> 0.05. These elements confirm the null hypothesis stipulated previously. The confidence limits of the difference of the mean values for the 95% guaranteed probability have the values: for the lower limit -5.40, and for the upper limit 1.78.

**4.** The t test for dependent samples is still used for the pair ***The Degree of indebtedness 2016 - The Degree of indebtedness 2017*** for the companies included in the sample. In this situation, the statement of the null hypothesis is as follows: *There are no statistically significant differences between the degree of indebtedness recorded by the sample companies in the two consecutive years*". We shall introduce statistical data regarding the indebteness degree of the selected corporations in 2016 and 2017 (Appendix 1), in the SPSS software and the following results are generated (tables 14, 15 and 16).

For 33 companies, the values of the *The Degree of indebtedness* for 2016 and 2017 were considered, being registered as two numerical variables with the mean values: $m_1 = 36.35$ and $m_2 = 40.46$.

The correlation between 33 pairs of values related to *The Degree of indebtedness* indicator has a value of 0.888, with *p* (of 2-tailed bidirectional significance) less than 0.01.

We have applied the *t* test for the dependent variables for the pair consisting of the variables *The Degree of indebtedness* 2016 and *The Degree of indebtedness* 2017, obtaining the value t = 1.798, the number of degrees of freedom being df = 32 and p> 0.05.

**Table 14. Descriptive statistics for the Degree of indebtedness - Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Pair 1** | Total debt degree (%) 2016 | 36.3588 | 33 | 28.55935 | 4.97155 |
| | Total debt degree (%) 2017 | 40.4645 | 33 | 25.66066 | 4.46695 |

**Table 15. Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| **Pair 1** | Total debt degree (%) 2016 & Total debt degree (%) 2017 | 33 | .888 | .000 |

**Table 16. Paired Samples t Test**

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| **Pair 1** | Total debt degree (%) 2016 - Total debt degree (%) 2017 | -4.10576 | 13.11504 | 2.28303 | -8.75615 | .54463 | -1.798 | 32 | .082 |

These calculations confirm the null hypothesis formulated above, showing that there is a very small difference, statistically insignificant, between the two mean values. The limits of the confidence interval of the difference of means for the 95% guaranteed probability for the result have the values: for the lower limit of -8.75, and for the upper limit of 0.54.

**5.** Finally, we shall apply the same statistical procedure of the *t* test for the sample pair ***Market share 2016 - Market share 2017***.

The null hypothesis $H_0$ will have, in this case, the following statement: *There are no statistically significant differences between the market shares registered by the companies in sample in the two consecutive years*". We will use the statistical data regarding the market shares of the sample corporations in 2016 and 2017 (Appendix 1), we will introduce them in the SPSS program and we will obtain the following outputs (tables 17, 18 and 19).

For 34 companies, the values of the 2016 and 2017 *Market shares* were considered, being registered as two numerical variables with the averages: $m_1 = 34.73$ and $m_2 = 34.94$.

The correlation between 34 pairs of values related to the *Market share* indicator has the value 0.991, with *p* (of 2-tailed bidirectional significance) less than 0.01. We have applied for the pair constituted from the variables *Market share 2016* and *Market share 2017*, the *t* test for the dependent variables and we have obtained the results: the t = 0.288 value, the number of degrees of freedom df = 33, respectively p> 0.05.

**Table 17. Descriptive statistics for market shares - Paired Samples Statistics**

| | | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Pair 1** | Market share (%) 2016 | 34.7344 | 34 | 32.55445 | 5.58304 |
| | Market share (%) 2017 | 34.9485 | 34 | 32.22428 | 5.52642 |

**Table 18. Paired Samples Correlations**

| | | N | Correlation | Sig. |
|---|---|---|---|---|
| **Pair 1** | Market share (%) 2016 & Market share (%) 2017 | 34 | .991 | .000 |

**Table 19. Paired Samples t Test**

| | | Paired Differences | | | | | T | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | | Lower | Upper | | | |
| **Pair 1** | Market share (%) 2016 - Market share (%) 2017 | -.21412 | 4.33638 | .74368 | -1.72715 | 1.29892 | -.288 | 33 | .775 |

These results confirm the research hypothesis, i.e. there is no significant difference between the two mean values. The confidence limits of the difference of the averages for the chosen 95% probability are the following: the lower limit -1.72 and the upper limit 1.29.

## 4. CONCLUSIONS

The *t*-test performed in order to verify the hypothesis regarding the significance of the average for the global reporting index variable revealed that the average of the OHS reporting index of the sample is different from 55. Thus, it is noted that *13 corporations in the sample* (i.e. 34.1%) *have a low performance* in the field of OHS reporting, *15 corporations* are characterized by a *satisfactory performance* in the area (42.9%), and *7 corporations* (20% of the sample) show *high performances in the field of OHS disclosure*. In other words, almost 63% of the corporations included in the sample address the OHS aspects of sustainability disclosures at a satisfactory or very good level.

Regarding the paired *t* – test for two groups of observations, for most of the analyzed variables, differences between the pairs of samples were characterized as insignificant. We have encountered a single exception, i.e. the company's Turnover, for which the difference calculated between the pairs of samples was classified as small to moderate. Therefore, it wil be possible for us simplify our future analysis on the databasis, by carrying out correlational and association studies considering only the 2017 values for the chosen independent numerical variables.

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**Appendix 1. The Database for the 35 corporations included in the selected sample**

| No. | Company | Global Reporting Index | Turnover | | No. of employees | | Return on capital employed (ROCE) % | | Degree of indebtedness (%) | | Market share (%) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 | 2016 | 2017 |
| 1 | Antibiotice Iași | 90 | 334990734 | 337629448 | 1449 | 1420 | 7.42 | 8.05 | 21.46 | 25.94 | 16.95 | 15.65 |
| 2 | Coca Cola HBC România | 60 | 2224228133 | 2218998534 | 1427 | 1476 | 33.31 | 33.9 | 25.74 | 25.59 | 38.38 | 37.39 |
| 3 | Heineken România | 50 | 1214365597 | 1160229860 | 1123 | 1157 | 19.78 | 15.92 | 29.20 | 28.28 | 31.05 | 29.20 |
| 4 | Ursus Breweries | 40 | 1638808749 | 1705841267 | 1409 | 1443 | 22.05 | 19.64 | 31.22 | 33.66 | 41.91 | 42.93 |
| 5 | Zentiva | 95 | 420004308 | 458377044 | 513 | 548 | N.a. | 24.24 | N.a. | 20.23 | 17.37 | 18.04 |
| 6 | Auchan | 65 | 4895591739 | 5223286301 | 9337 | 9290 | 0 | 5.8 | 57.71 | 56.56 | 4.00 | 3.93 |
| 7 | GSK România | 70 | 463758735 | 423560799 | 142 | 142 | 0 | 1.93 | 0 | 12.42 | 1.43 | 1.81 |
| 8 | Kaufland România | 70 | 9691424899 | 10086636311 | 14070 | 13519 | 15.52 | 13.5 | 33.15 | 32.57 | 7.92 | 7.58 |
| 9 | Lidl România | 65 | 5577887360 | 6510008485 | 4265 | 4815 | 0 | 32.54 | 0 | 62.25 | 46.13 | 46,79 |
| 10 | ROMSTAL | 50 | 612368064 | 659217381 | 112 | 1132 | 8.77 | 6.84 | 32.35 | 32.19 | 14.19 | 14.19 |
| 11 | SIEPCOFAR | 15 | 902695038 | 880528121 | 2043 | 1946 | 6.46 | 12.15 | 77.11 | 76.49 | 5.41 | 5.15 |
| 12 | ADREM Invest | 75 | 118510435 | 115799922 | 776 | 770 | 0.69 | 10.89 | 89.57 | 92.96 | 1.48 | 1.48 |
| 13 | Antalis România | 60 | 86095573 | 84896838 | 86 | 86 | 5.66 | 3.16 | 27.17 | 26.31 | 5.66 | 5.15 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | KPMG | 45 | 89188061 | 95777079 | 541 | 519 | 3.03 | 24.31 | 45.28 | 38.33 | 3.29 | 3.21 |
| 15 | Patria Bank | 30 | 241618000 | 187722000 | 698 | 1018 | -13.53 | -18.37 | 92.20 | 93.64 | 0.66 | 0.85 |
| 16 | Raiffeisen Bank | 60 | 2129000000 | 2603000000 | 5826 | 5314 | 13.99 | 16.07 | 90.35 | 90.23 | 8.40 | 8.42 |
| 17 | Telekom | 55 | 2572957146 | 2714820946 | 5291 | 5078 | 0 | 0 | 0 | 27.84 | 31.48 | 46.74 |
| 18 | Vodafone | 70 | 3495231400 | 4545439472 | 2787 | 2508 | 26.19 | 9.53 | 59.92 | 58.26 | 30.01 | 36.26 |
| 19 | KMG Rompetrol Grup | 70 | 178403862 | 190171762 | 350 | 224 | 0 | 0 | 97.53 | 92.50 | 1.97 | 2.06 |
| 20 | OMV Petrom | 100 | 12523026161 | 14764836448 | 14769 | 13790 | 3.49 | 8.71 | 9.68 | 11.00 | 99.42 | 99.07 |
| 21 | Romgaz | 80 | 3411867658 | 4585189388 | 6102 | 6046 | 10.59 | 19.92 | 11.45 | 11.54 | 89.17 | 93.19 |
| 22 | Societatea Națională a Sării | 70 | 297,132,742 | 317,180,887 | 1697 | 1660 | 10.13 | 24.43 | 12.80 | 13.08 | 96.2 | 95.70 |
| 23 | ALRO Slatina | 100 | 2,139,862,434 | 2,480,775,721 | 2449 | 2501 | 5.94 | 23.03 | 51.91 | 44.51 | 57.72 | 59.99 |
| 24 | AMEROPA România /Azomureş | 75 | 1,465,151,802 | 1,447,333,215 | 1308 | 1252 | 13.88 | 0.24 | 48.38 | 46.26 | 100 | 86.74 |
| 25 | ArcelorMittal Galaţi | 85 | 3,466,867,877 | 4,661,907,896 | 6006 | 5682 | 0 | 0 | 52.39 | 63.67 | 52.28 | 52.37 |
| 26 | Ciech Soda România | 70 | 367,095,868 | 389,511,192 | 590 | 587 | 13.01 | 5.37 | 20.14 | 21.94 | 53.00 | 48.80 |
| 27 | Heidelberg Cement România | 90 | 824,947,076 | 890,530,183 | 946 | 955 | 11.56 | 12.21 | 10.53 | 12.72 | 31.06 | 30.87 |
| 28 | Holcim | 95 | 1,015,648,887 | 1,051,272,937 | 745 | 755 | 18.31 | 22.73 | 49.05 | 50.13 | 28.24 | 36.44 |
| 29 | Holzindustrie Schweighofer | 30 | 1,948,747,614 | 1,769,381,279 | 2170 | 1945 | 0 | 0 | 0 | 29.44 | 26.60 | 25.07 |
| 30 | CEZ România | 70 | 148,267,402 | 147,570,316 | 472 | 465 | 17.13 | 14.15 | 92.38 | 92.75 | 1.64 | 1.60 |
| 31 | Electrica Group | 80 | 6,552,504,440 | 6,295,732,084 | 4970 | 6601 | 16.68 | 5.07 | 22.31 | 26.32 | 15.82 | 14.59 |
| 32 | Transelectrica | 90 | 2,680,536,934 | 3,015,023,896 | 2180 | 2063 | 8.76 | 1.04 | 29.95 | 27.63 | 99.36 | 99.71 |
| 33 | Aerostar Bacău | 60 | 356,219,105 | 340,172,330 | 1719 | 1834 | 26.40 | 21.02 | 14.09 | 9.65 | 30.68 | 23.40 |
| 34 | Rombat Metair | 60 | 350,461,426 | 386,005,630 | 724 | 733 | 10.40 | 9.91 | 20.11 | 20.89 | 84.76 | 86.15 |
| 35 | Vrancart | 85 | 227,199,402 | 260,003,622 | 939 | 1072 | 12.16 | 11.59 | 34.28 | 40.74 | 8.81 | 9.21 |