

# A Dynamics Analysis of Labor Productivity in Economically Active Companies of Constanta City, Grouped into Categories of Activities

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## Abstract

*The structure of the economic activity undertaken by the companies in Constanta city is different from that of any other locality in Romania. This is due to the existence of the largest Romanian port by the Black Sea on the territory of Constanta city, which is also a port by the Danube, via the Danube-Black Sea Canal. Moreover, Mamaia, the largest tourist resort on the Romanian seaside, belongs to Constanta city. Furthermore, in Constanta city other important economic operators from other fields of activity are conducting their business.*

*The present study includes the analysis of the labor **productivity** evolution registered by the active companies in Constanta county in the years 2016-2017, based on the indicators from the financial accounting balance sheets.*

*For data processing, we have used the SPSS statistical software and quantitative statistical methods. The interpretation of the results obtained can be useful to current and potential entrepreneurs in carrying out economic activities in those areas of activity where a higher efficiency of the work done by workers is achieved.*

**Key words:** analysis, labor productivity, turnover, Constanța

**J.E.L. classification:** C10, C40, E240, M10, M20, M21, O11, O12

## 1. Introduction

In this study, we have dynamically analyzed the average level of labor productivity (calculated as a ratio between net turnover and number of employees) recorded in the companies of Constanța city in the years 2016 and 2017, by processing the information obtained from the financial accounting balance sheets submitted to tax authorities by these companies.

Within this analysis we used three indicators, namely: "Net turnover", "Average number of employees" and "Productivity of work", while the activity of the companies from Constanta was presented by fields of activity, grouped by CAEN codes.

## 2. Theoretical background

Productivity is generally defined "as a ratio between the volume of output and the volume of inputs", in other words, "it measures how efficiently production inputs, such as labour and capital, are being used in a economy to produce a given level of output" (OECD, 2018, p.9). Obviously, it should be pointed out that in the specialized literature "there is neither a unique purpose for, nor a single measure of, productivity" (OECD 2011, p.11). Productivity is, in fact, considered to be a key source of economic growth and competitiveness.

As specified in the Annex to the Order of the Ministry of Public Finance no. 1802/2014 for the approval of the Accounting Standards for Individual and Consolidated Financial Statements, net turnover "means the proceeds from the sale of goods and service provision after the deduction of trade discounts and of the value added tax and of other taxes linked to turnover" .

### 3. Research method

In order to achieve the pursued objective, we have chosen a quantitative approach, based on secondary data (Jugănar, 1998; Jugănar, 2000) represented by values of the indicators: "Net turnover", "Average number of employees" and "Workforce Productivity", indicators reported by the economically active companies in Constanța city.

The data have been selected from a large database of 26,978 companies that submitted their balance sheets in 2016 and 28,292 companies in 2017, including a series of economic indicators that companies are required to submit. (Accounting Law No. 82/1991 with subsequent amendments and additions; Official Gazette No. 902 of 11 December 2014, OMFP 1802/2014, Mătiș, Pop., 2007). Furthermore, in order to carry out the research, we have eliminated companies that reported zero turnover and declared a number of zero employees. Thus, 11,186 analyzed balance sheets about the year 2016 and 11,945 about 2017 have been kept in the study.

The data processing consisted in determining some absolute, relative statistical indicators and averages of the chronological data series. (Aivaz 2007, p. 329, Aivaz 2007, p. 99). Moreover, for data processing and graphics design, we have used the SPSS statistical software (Field 2009).

### 4. Data, results and discussions

The research has been conducted in three stages, related to the three indicators selected and analyzed.

✓ In the first stage, we have made the statistical description of the net turnover of Constanța city companies, by field of activity, in the years 2016 and 2017, using the following statistical indicators: average level (Mean), number of companies (N), the cumulative value of the financial indicators (Sum), the lowest value of the analyzed financial indicator (Minimum), respectively the highest (Maximum).

*Table no. 1 - Dynamics of the "Net turnover" indicator registered by Constanta county companies in the years 2016 and 2017, by field of activity*

Ac tiv.	Net turnover (RON)									
	2016					2017				
	Mean	N	Sum	Min	Max	Mean	N	Sum	Min	Max
1	3745032.1	194	726536228	200	155190165	3440062.2	205	705212751	117	182026465
2	3246462.3	23	74668633	4000	15639177	8088091.8	18	145585654	3816	58088740
3	2398942.0	797	1911956771	383	192835391	2573109.8	798	2053341679	14	229830865
4	61693587.8	23	1418952520	407	499393440	61477629.7	22	1352507854	103	481901551
5	9981606.0	54	539006729	750	270803067	11495457.3	46	528791036	2000	284206630
6	1332030.5	836	1113577534	6	57775593	1242802.5	860	1068810197	54	62939159
7	3195563.4	3277	10471861260	4	2647748817	3304663.9	3282	10845907168	17	2961385659
8	2237638.3	1451	3246813194	17	289799598	2427783.4	1474	3578552768	8	302472694
9	846355.6	727	615300589	10	39326641	904398.6	742	671063770	42	28134885
10	380467.3	350	133163574	118	8282850	361689.4	393	142143952	245	9033209
11	291292.9	191	55636958	500	6255477	296017.9	175	51803136	30	5788888
12	409437.1	457	187112797	42	17064062	409166.4	538	220131535	163	28349962
13	392782.6	1414	555394605	29	138744625	307639.3	1498	460843793	1	22407331
14	1027242.2	574	589637074	12	68663185	846908.3	597	505604263	12	39530076
15	10532.0	1	10532	10532	10532	623381.0	2	1246762	21094	1225668
16	538450.1	125	67306272	1187	45674623	149441.8	141	21071304	700	2038600

17	711857.9	314	223523387	2	21595537	727821.4	362	263471346	100	26331395
18	851772.4	265	225719701	309	77691513	580434.8	314	182256553	100	38380759
21	582288.67	113	65798620	121	14813415	269838.56	478	128982830	142	14377185
To -tal	1986588.32	1118 6	22221976978	2	264774881 7	1919407.9 8	1194 5	2292732835 1	1	296138565 9

Source: Data obtained by processing the information from the financial accounting balance sheets of active companies in Constanța city

The net turnover of the active companies in Constanța city (in this study we only refer to companies with a turnover higher than zero and with at least one employee) recorded a slight decrease of 0.89% in 2017 compared to 2016. In 2016, the average net turnover of the active companies (11,116) in Constanța city was 1,986,588.32 RON.

The fields of activity (grouped by CAEN codes) where the highest average net turnover was achieved were those belonging to the "Production and supply of electric and thermal energy, gas, hot water and air conditioning" (61.693.587, 83 RON), followed by "Water distribution, sanitation, waste management, decontamination activities" (9,981,606.09).

The largest share of net turnover achieved by Constanța city companies in 2016 was recorded in "Wholesale and retail trade, repair of motor vehicles and motorcycles" (47.1% of total net turnover), followed by companies in "Transport and storage" (14.6% of the total).

In 2017, the average net turnover of the active companies in Constanța city (11,945) was 1,919,407.98 RON, which shows an increase of more than 15% compared to 2016. The fields of activity where the highest average net turnover was registered were the same as in the previous year, namely "Production and supply of electric and thermal energy, gas, hot water and air conditioning" (61,477,629.73 RON), followed by "Water distribution, sanitation, waste management, decontamination activities" (11,495,457.30 RON).

The largest share of net turnover achieved by active companies in Constanța city in 2017 was held by those in the "Wholesale and retail trade, repair of motor vehicles and motorcycles" (21.5% of net turnover total), followed by companies in "Transport and storage" (14.8%).

✓ In the second stage, we have made a statistical description of the number of employees of the companies in Constanța city, by activity fields, in 2016 and 2017, using the following statistical indicators: the average level (Mean), the number of companies (N), the cumulative value of the financial indicators (Sum), the lowest value of the analyzed financial indicator (Minimum), respectively the highest (Maximum).

Table no. 2 - Dynamics of the "Average number of employees" indicator, registered by Constata county companies in the years 2016 and 2017, by field of activity

Average number of employees										
2016						2017				
Activ CAEN group	Mean	N	Sum	Min	Maxi mum	Mean	N	Sum	Min	Maxi mum
1.	6.23	194	1208	1	82	6.29	205	1290	1	82
2.	11.09	23	255	1	49	21.11	18	380	1	162
3.	15.13	797	12056	1	1033	14.60	799	11663	1	1038
4.	65.13	23	1498	1	660	64.82	22	1426	1	622
5.	75.56	54	4080	1	2091	85.89	46	3951	1	2161
6.	9.06	836	7575	1	351	8.63	861	7430	1	319
7.	5.47	3277	17915	1	565	5.18	3286	17037	1	565
8.	8.52	1451	12363	1	939	9.93	1475	14641	1	1940
9.	7.57	727	5505	1	280	7.87	742	5842	1	236
10.	3.52	350	1232	1	140	2.94	393	1157	1	62
11.	3.70	191	706	1	65	3.35	175	587	1	49

12.	2.78	457	1271	1	109	2.78	538	1496	1	132
13.	2.74	1414	3874	1	142	2.47	1499	3696	1	98
14.	16.86	574	9678	1	941	14.98	598	8958	1	967
15.	1.00	1	1	1	1	21.50	2	43	2	41
16.	6.20	125	775	1	306	3.37	141	475	1	29
17.	6.20	314	1948	1	105	5.77	362	2089	1	117
18.	3.91	265	1037	1	100	3.24	314	1018	1	104
21.	4.22	113	477	1	87	3.68	478	1760	1	86
Total	7.46	11186	83454	1	2091	7.11	11954	84939	1	2161

Source: Data obtained by processing the information from the financial accounting balance sheets of active companies in Constanța city

Analyzing the evolution of the number of employees of the active companies in Constanța city in 2017 compared to 2016, we note a slight decrease in the values of these indicators, from 7.46 to 7.11 employees. The main explanation for this phenomenon is the worsening situation on the Romanian labor market, respectively the increasing difficulty in finding labor force available for employment, especially skilled workers.

By category of activity, in 2016 most employees were registered in "Wholesale and retail trade, repair of motor vehicles and motorcycles" field (17,915 persons, representing 21.5% of the total number of employees of the active companies in Constanta city), followed by those in "Transport and storage" (12,363 persons, 14.8% of the total) and "Manufacturing" (12,056 persons, representing 14.45%) fields.

The highest average number of employees in Constanța city was registered in 2016 in the field of "Water distribution, sanitation, waste management, decontamination activities" (75.56 employees), followed by the fields "Production and supply of electric and thermal energy, gas, water and air conditioning" (65,13 employees) and "Administrative services and support service activities "(16,86 employees).

In 2017, most employees were registered in the fields "Wholesale and retail trade, repair of motor vehicles and motorcycles" (17,037 employees, representing 21.1% of the total number), followed by "Transport and storage" (with 14,642 employees and a share of 17.2%) and "Manufacturing" (with 11,663 employees and a share of 13.7%).

In the last stage, we have made a statistical description of the labor productivity registered by the companies in Constanța city, by field of activity, in the years 2016 and 2017, with the help of the following statistical indicators: absolute level, absolute and relative dynamics.

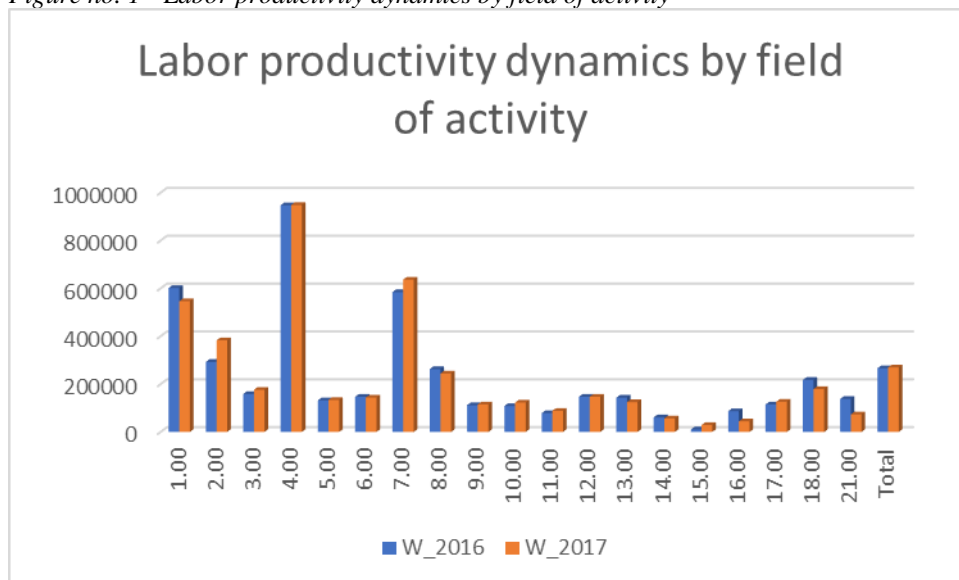
Table no. 3. Dynamics of the "Labor Productivity" Indicator registered by Constanța county companies in the years 2016 and 2017, by field of activity

Activities CAEN_Group	W <sub>-2016</sub>	W <sub>-2017</sub>	Dynamics w %
1. Agriculture, Forestry and Fisheries	601437.3	546676.5512	90.89502331
2. Extractive industry	292818.2	383120.1421	130.8389243
3. Manufacturing	158589.6	176054.4103	111.1526972
4. Production and supply of electric and thermal energy, gas, water and air conditioning	947231.3	948462.7307	100.1300009
5. Water distribution; sanitation, waste management, decontamination activities	132109.5	133837.2655	101.3078342
6. Construction	147006.9	143710.5202	97.96673889
7. Wholesale and retail trade; repair of motor vehicles and motorcycles	584530.4	636604.4017	109.0422175
8. Transport and storage	262623.4	244414.7402	93.13175539
9. Hotels and restaurants	111771.2	114868.8412	102.7713904

10. Information and communications	108087.3	122855.6197	113.6633082
11. Financial intermediation and insurance	78805.89	88250.65758	111.9848505
12. Real estate transactions	147217	147146.748	99.95228531
13. Professional, scientific and technical activities	143364.6	124579.9302	87.03011532
14. Administrative service activities and support service activities	60925.51	56441.60281	92.79559423
15. Public administration and defense	10532	28994.46512	275.2987573
16. Education	86846.8	44360.64	51.0791862
17. Health and social care	114745.1	126123.191	109.9160045
18. Entertainment, cultural and recreational activities	217666.1	179033.942	82.25165862
19. Other service activities	137942.6	73285.69886	53.12767708
Total	266278.2	269908.0156	101.446687

Source: Data obtained by processing the information from the financial accounting balance sheets of active companies in Constanța city

Figure no. 1 - Labor productivity dynamics by field of activity



Source: Data obtained by processing the information from the financial accounting balance sheets of active companies in Constanța city

From the comparative analysis of the "labor productivity" indicator, expressed in value, calculated in the years 2016 and 2017 (see Table 1), we note a slight increase in the value of this indicator (by 1.44%), as an average, at the level of active companies in Constanța city in 2017 compared to 2016.

Different, even contradictory evolutions of this indicator can be observed in 2017 compared to 2016 (see Figure 1), by field of activity. Thus, the most important increase was recorded in the "Public administration and defense" field, the increase being of 275% (but this field is not significant in the economy of Constanta city, in terms of number of companies and volume of activity), followed by the fields "Extractive industry" (+ 30,8%), "Information and communications" (+13,66%), "Financial intermediation and insurance" (+ 11.98%) and "Manufacturing" (+ 11, 5%). The most significant decreases in the "labor productivity" indicator were registered in "Education" (decrease of 48.93%), "Other service activities" (- 46.88%), "Entertainment, cultural, recreational activities" (-13%), "Agriculture and Forestry" (-9.11%) and other fields.

The highest values of labor productivity were recorded in the fields of "Production and supply of electric and thermal energy, gas, hot water and air conditioning", followed by "Wholesale and

retail trade, repair of motor vehicles and motorcycles" and "Agriculture, forestry and fishing" and the lowest values in the fields of "Public administration and defense", "Education" and "Other service activities".

#### 4. Conclusions

Analyzing the activity of the companies from the 21 fields of activity, grouped by CAEN codes, over the two years, using the three indicators, we note the following significant aspects:

✓ "Production and supply of electric and thermal energy, gas, hot water and air conditioning" and "Water distribution, sanitation, waste management, decontamination activities" were the fields of activity where the highest average net turnover was registered in both 2016 and 2017.

✓ Moreover, the largest net turnover was registered by a company in the "Wholesale and retail trade, repair of motor vehicles and motorcycles" field, both in 2016 and in 2017.

✓ Most employees were registered both in 2016 and in 2017 in the fields "Wholesale and retail trade, repair of motor vehicles and motorcycles", followed by "Transport and storage" and "Manufacturing".

✓ In 2016, according to the value of the indicator "labor productivity", the activity fields were ranked thus: "Production and supply of electric and thermal energy, gas, hot water and air conditioning", "Agriculture, Forestry and Fisheries", followed by "Wholesale and retail trade, repair of motor vehicles and motorcycles". In 2017, the field "Production and supply of electric and thermal energy, gas, hot water and air conditioning" was still ranked first, the second place was occupied by the field "Wholesale and retail trade, repair of motor vehicles and motorcycles" and "Agriculture, Forestry and Fishing" fell to third place.

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