Industry 4.0 in the South-West Oltenia Region: The Challenges of Emerging Technologies

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Abstract. *Without any doubt, the industry, a concept with variable geometry, has undergone profound transformations, especially through what we now call revolutions. The last of these, the fourth, known as 'Industry 4.0', involves a disruption of production processes, induced by the Internet and information processing, transmission and processing technologies. More significant of the effects expected by those[1] who follow his gait we can mention: more flexibility and adaptability; transformation of rigid structures into network-type structures; vertical integration of flexible and reconfigurable production systems; modularization and autonomy of production systems; use of production systems with fractal structure; resource optimization by connecting equipment to the network; the use of artificial intelligence in the control of production systems, in order to make quick optimal decisions; developing and using new business models; the use of 'ap-store' and 'cloud' applications as new concepts in knowledge management. The conclusion of those who promote the new era of industrial evolution is that all these aspects will generate an increase in manufacturing efficiency by optimizing the technological process, reducing waste in the process chain, greater adaptability to customer needs, increasing product quality, and finally reducing manufacturing costs and waiting times for final consumers. These huge challenges posed by the emergence and expansion of the new evolutionary period of the industry by digitizing the entire process for the manufacture of a product, justify the effort of the contemporary world to implement the Industry 4.0 agenda. And, finally, I come back with the natural dilemma: can Romania and, naturally, the South-West Oltenia region be an active part in this qualitative leap of the industry and not only?*

Keywords: industry 4.0, emerging technologies, connections, technological revolution

JEL classification: L71, O14

1. Introduction

Concept with variable geometry industry 4.0, like all the essential branches of contemporary economies, assimilates in its evolution revolutionary technologies, which it integrates rapidly, the spectrum of major crises in vital areas such as energy, food or military being dissipated. “It can be appreciated that, of all the contemporary world developments, the most spectacular in depth and broadest in terms of consequences is the explosion of the so-called emerging technologies. Although quite recent, these technologies are being applied more and more intensely in all spheres of human activity with particularly favorable consequences on the general quality of work and life,

[1] Dorel Banabic - The fourth industrial revolution has begun. Is Romania ready to face the challenges of this new revolution ?, Journal of Science Policy and Scientonometry - new series, vol.5, no. 3, September 2016, pp. 194-201

but also non-negligible threats to traditional jobs."[2] For a more accurate estimate of the impact of emerging technologies on the performance of Industry 4.0, we believe that it is necessary to decode the concept of 'emerging technology' and, in particular, the main forms of its manifestation.

2. Emerging technologies: controversial concepts

Being a concept that has prevailed in the literature in recent years, it is natural that it is controversial. A synthesis, in our opinion more than complete, we find in the study made by C. Fota[3] according to which emerging technology is a "new, relatively fast-growing technology, correctly targeted by a certain degree of persistence over time, with the potential to have a considerable impact on the socio-economic field observed, in terms of the composition of actors, institutions and interaction partners, together with the associated knowledge and production processes. But the prominent impact is in the future, so in the beginning it is somewhat uncertain and ambiguous." According to the author, from this elaborate, complex, meticulously elaborated definition, results the criteria that a technology must meet to be considered emerging: radical novelty, relatively rapid growth, coherence, prominent impact, some uncertainty and ambiguity at first. Based on this definition, most experts consider that at least five technologies meet the mentioned eligibility criteria: artificial intelligence; robotic automation process; the internet of things; enterprise resource planning; distributed registry technology.

ARTIFICIAL INTELLIGENCE (AI), like other related technologies, is experiencing rapid and widespread development and has an unsuspected impact on all components of economic and social life. Being in full swing and widely diversified as forms and fields of application, it does not benefit, at least so far, from a consensual definition. Of particular interest in our approach is the definition given to artificial intelligence by the European Parliament Resolution, namely: others the collection and processing of data, the analysis and interpretation of the environment or also by undertaking actions with a certain degree of autonomy, in order to achieve specific objectives. Autonomous means an AI system that operates by interpreting a certain input and using a predetermined set of instructions, without being limited by such instructions, although behaviorally it is constrained but aimed at achieving the set goal and other relevant objectives designed by their developer.[4]

The ROBOTIC AUTOMATION PROCESS (RPA) includes in its architecture, in the opinion of those concerned with its progress, three distinct elements: automation; automatic control; robotics. Automation (A) is defined as the technology by which a process or procedure is performed with minimal human assistance. Automatic control (AC), in turn, integrates the multitude of control systems used for machine operation in factories, telephone interconnections, vessel and aircraft control, and for other applications with minimal or reduced human intervention. Robotics (R) is an interdisciplinary field that integrates computer science with engineering, in order to design machines to help, assist or replace people, replicating their activities. Robotics in partnership with artificial intelligence will perform complex actions, able to learn from humans and lead the phenomenon of intelligent automation[5].

INTERNET OF THINGS (IOT). There is no universally established definition yet. However, two visions of technical and socio-technical conceptualization are conveyed.

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[2] C. Fota, Emerging technologies and their impact in Oltenia, working information material, 2020

[3] Citat din C Fota, studiul citat

[4] European Parlament, Rezolution of 20 Juanuary 2021 on artificial inteligence, Definition of artificial inteligence, punct 1, Bruxelles.

[5] L. Pagliarini, H. Hautoplung, The future of Robotic technology, Journal of Robotics, Networking on Artificial Life, Vol. 3, Nr. 4, Martie 2017, pag. 270-273.

In the context of the first vision, the latest conceptualization states that IoT is a "paradigm in which every object can be equipped with capabilities for identification, sensory, networking and processing, allowing them to communicate with each other and with other devices and services via the Internet, in order to achieve certain objectives"[6]. The socio-technical vision takes into account not only the technical ingredients, but also the associated actors and the processes in which IoT interacts. According to this approach, IOT has been defined as "part of broader socio-technical systems, encompassing people, human activities, spaces, artifacts, devices and technologies"[7]. Finally, we note that the most complete definition, recently published, looks like this: the Internet of Things is a system of interconnected computer devices, mechanical and digital machines, animals or people that are equipped with unique identifiers and the ability to transfer without networking. to request human-to-human interaction, or human-to-computer interaction.[8]

ENTERPRISE RESOURCE PLANNING (ERP). Note that even in the case of this technology, a consensual definition is not yet established. However, the evaluation of the definitions used allows us to state that the planning of business processes is a new and naturally advanced model of business management, based on the integration of work departments (supply, production, sales, accounting, finance, etc.) through a set of specific software and a common digitized database, in order to reduce costs and increase the quality and efficiency of the whole business.[9] In the current architecture, ERP has been operating since the 1990s, when information flows could be centralized in a common platform, and its functionalities have been integrated. Today, ERP is taking a new step forward by using the Internet to streamline functionality. Customers can access the status of their order or the stocks of the supplier company, by integrating ERP functionalities with WEB applications.[10]

DISTRIBUTED REGISTER TECHNOLOGY (DLT). It is defined as a decentralized database that exists between multiple locations or between multiple participants, in contrast to a centralized database that operates in a fixed location. While the centralized base has a single point of failure, the distributed registry being decentralized eliminates the need for a central authority or intermediary to process, validate or authenticate transactions. Businesses use distributed registry technology to process, validate, or authenticate their transactions for transparency, efficiency, and more security. Usually these records are stored in the register only after obtaining the consent of the partners involved. It is also worth noting that this fundamental technology is par excellence a creative one, not a disruptive one, in the sense that it does not replace an old technology and does not contribute to the disappearance of some jobs but, on the contrary, to their creation.[11]

3. Connections between emerging technologies and industry 4.0

Decoding the complex and naturally controversial concept of 'emerging technology' and its manifestation formulas allows us to establish its connections with Industry 4.0, respectively the degree to which they have been assimilated by the

[6] W. Uitmore Andrew, Anurag Agraval, Li Da Hu, IOT, A Survey of Topics and Trends, Information Systems Frontiers, 17 (2): 261-274
[7] Sin Donghee, A Socio-Technical Framework of internet of Things Design, A. Human Centre Design for Internet of Things, Telematics and Informatics 31 (4): 519-531.
[8] Callum Mc. Clelland, IOT For All, Introduction to the Internet of Things, IOT 101, e Book, 3 februarie 2021
[9] Maxton Stuart, scriitor Seatle, SUA. Benefits of Enterprise System in the Organisation, blog, 5 may 2020.
[10] Wikipedia, Planificarea resurselor întreprinderii
[11] Mark Walport, Distributed Ledger Tehnology: Beyong blockchain, pdf, December 2015.

Fourth Industrial Revolution. In our opinion, the scientific approach involves two steps: assessing the economic and financial situation of the industry in the south of the South-West Oltenia Region; quantifying the intensity of the connections between the course of industrial activities and the integration of emerging technologies.

■The importance and major role of industry in the sustainable recovery of economic growth and job creation in the post-crisis periods are findings validated by prestigious researchers and developments in contemporary economies. In this context, for the formulation of new coordinates of the regional industrial policy, with priority objectives and actions to be taken, we present in annexes 1-6 the most significant indicators of the branch in the South-West Oltenia region. The rigorous evaluation of their evolution as well as other investigations create the premises to notice the strong points, the weak ones that corrected, can be a viable support for the assimilation of the emerging technologies and finally of the industry 4.0. Thus, among the strengths mentioned in the mentioned study and which are still obvious, we mention:

- the existence of a highly qualified workforce in the IT field, offered by the faculties of Automation, Computers and Electronics, Science and Economics and Business Administration;
- development of a high-performance IT sector, with skills in areas essential for Industry 4.0;
- the existence of high-performance centers in important fields for industry 4.0: computers, computer science, robotics, automation;
- the existence of research nuclei in specific technologies for industry 4.0;
- involvement of university teams in European projects in the field of 4.0;
- the existence of a very active Oltenian diaspora in the field;
- development of industrial sectors that make it attractive to attract investment in new production facilities;
- the existence of collaborations in the automotive field with US companies, promoters of Industry 4.0.

Among the most significant weaknesses we believe could be recalled:

- lack of significant employment in national and international fora promoting industry 4.0;
- fragile beginnings in shaping a regional program in the field of 4.0;
- modest visibility of Oltenian researchers in the field of processing technologies;
- lack of organizational culture and financial resources in promoting Industry 4.0;
- the modest interest of banks, almost all with foreign capital, in financing the activities specific to the field;
- lack of qualification of the interdisciplinary workforce.

A brief look at the strengths and weaknesses suggests that the multitude of strengths is predominant. Consequently, we believe that the South-West Oltenia region will integrate in an acceptable time horizon in the area of the regions that will face the challenges of the fourth industrial revolution by assimilating emerging technologies. In such a vision, the architecture of industrial activities will undergo profound changes. Those who manage the destinies of Romania as a whole, in particular of Oltenia, must be aware and start rigorous approaches and strategies for adapting to the European and world trends generated by Industry 4.0.

Major changes will occur in the configuration of the extractive and energy industries. The transition from the fossil fuel-based energy system to the renewable energy-based energy system will significantly affect the extraction of lignite and oil. The realization of a new energy mix will be possible by: capitalizing on the energy potential of the Danube, Olt, Jiu and other lower rivers; stimulating and developing research and production activities in the fields of solar, wind, thermal and bioenergy.

A sector with a tradition and a high share in the industry of the South-West Oltenia region, the manufacturing industry has known a sinuous evolution in the last decades. The expectations generated by the assimilation of emerging technologies will materialize in the evolution of top fields such as: non-ferrous metallurgy, automotive industry, agricultural machinery and equipment industry, railway equipment industry, electrical industry, naval industry, aeronautical industry, chemical industry, materials industry construction, light industry.

In conclusion, we consider that from the architecture of industrial activities many activities frequently encountered today will disappear. Others, by assimilating the emerging technologies, will survive, prosper and constitute together with the entities that will appear in the future industrial landscape of Oltenia new essential alternatives of the industry. Without underestimating the importance and functions assigned to small and medium-sized enterprises, we consider that vital sectors such as aeronautics, shipbuilding, automotive industry, in general those incorporating emerging technologies, can only develop within complex structures specific to large industrial conglomerates.

■The rigorous evaluation of the economic-financial state of the industry is the background that offers sufficient possibilities to quantify the intensity of the connections between the evolution of this branch as a whole but also of the different sectors and the degree of assimilation of emerging technologies.

In order to provide a vision on the evolution of the degree of assimilation of emerging technologies by industrial enterprises in the South-West Oltenia Region, we used the conclusions of the study undertaken by the expert group set up and coordinated by Professor Constantin Fota, using the DELFI method to quantify the impact induced by the mentioned technologies on the labor market. According to the study mentioned in the extractive and processing industries, the most assimilated technologies are: robotic automation process (RPA), artificial intelligence (AI) and enterprise resource planning (ERP). By counties, the distributions of emerging technologies are presented, in order of intensity and on the whole of the activities carried out, as follows: Dolj (RPA, AI, IOT, ERP, DLT); Gorj (RPA, AI, ERP, IOT, DLT); Mehedinți (AI, RPA, IOT, ERP, DLT); Olt (RPA, AI, IOT, DLT, ERP); Vâlcea (RPA, ERP, AI, IOT, DLT).

According to the cited study, from the combination of answers and giving a win-win to the largest group of residents (the one in the industry area), the most significant assimilated technologies are: FORD (RPA, IOT, AI); POPECI (RPA, AI, ERP); SOFTRONIC (RPA, IOT, ERP); CE OLTENIA (RPA, AI, ERP), SEVERNAV (RPA, ERP, AI); ALRO (RPA, ERP, IOT). Naturally, the mentioned companies should be in the top of the most representative creators of added value, a truth verified only partially. The manufacturing industry of the region includes, in the order of turnover from 2020, FORD Craiova, ALRO Slatina, PIRELLI TIRES Slatina, TCM ARTROM Slatina, CUMINS Craiova, VEL PITAR Rm. Vâlcea, DIANA Rm. Vâlcea, BEKARAT Slatina, VIMETCCO SRL etc.

Significant, we believe, is to deepen the approach taken to reveal the contribution of industry, in general, that of the SV-OLTENIA region, in particular, to the formation of gross domestic product. Industry participates with 32.2% in the national GDP, agriculture with 4.2%, services with 62.6%. The SOUTH-WEST OLTENIA region contributes 7.3% to the national GDP. Industry contributes 29.8% to Oltenia's GDP (GVA), agriculture by 6.8%, services by 63.4% (2016). In the structure of the Oltenian

industry, the extractive industry holds 4.2%, the energy industry 17.1%, the manufacturing industry 78.7% (2011)[12].

It is worth mentioning the conclusions drawn, both from the assessment of the degree of assimilation of emerging technologies and from the industry's contribution to creating added value, the still more dependent dependence of the branch, taken as a whole . Without sufficient, rigorously reasoned assessments, we point to the inadequacy of sectors that have an internal base of raw materials (agricultural in nature), benefit from local demand and more, as well as labor (more or less skilled) , such as the agri-food, textile, craft industries. In the same sense, we mention the big discrepancies between the “flagship” enterprises of Oltenia and most of the others and, consequently, the weaker connections with the emerging technologies.

4. Conclusions

Finally, we believe that it is necessary, "In the vision of Oltenia 2050", the realization of a new industrial structure, viable and efficient, supported by emerging technologies, able to integrate green, clean energy sectors and those branches of manufacturing, designed to ensure both supplying the internal market and promoting exports as well as the use of rich sources of raw materials.

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Trends in the evolution of the number of active enterprises - South-West Oltenia Region

Annex 1

Activities of the national economy	Development regions and counties	Years				
		2015	2016	2017	2018	2019
		UM: Number				
		Number	Number	Number	Number	Number
EXTRACTIVE INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**1107**	**1076**	**1014**	**1033**	**992**
	SOUTH-WEST OLTENIA REGION	**84**	**74**	**74**	**73**	**70**
	DOLJ	19	12	13	13	16
	GORJ	27	27	28	27	26
	MEHEDINŢI	13	12	10	9	9
	OLT	10	9	10	11	8
	VÂLCEA	15	14	13	13	11
MANUFACTURING INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**48404**	**48347**	**49837**	**52451**	**53802**
	SOUTH-WEST OLTENIA REGION	**3504**	**3430**	**3581**	**3729**	**3976**
	DOLJ	1361	1309	1390	1440	1509
	GORJ	513	515	542	554	609
	MEHEDINŢI	286	264	279	288	318
	OLT	657	658	682	714	781
	VÂLCEA	687	684	688	733	759
PRODUCTION AND SUPPLY OF ELECTRIC AND THERMAL ENERGY, GASES, HOT WATER AND AIR CONDITIONING	**TOTAL NATIONAL INDUSTRY**	**1460**	**1350**	**1206**	**1200**	**1069**
	SOUTH-WEST OLTENIA REGION	**46**	**42**	**37**	**41**	**37**
	DOLJ	22	19	14	15	16
	GORJ	4	6	4	8	8
	MEHEDINŢI	7	5	5	5	4
	OLT	5	6	8	8	6
	VÂLCEA	8	6	6	5	3
TOTAL	**TOTAL INDUSTRY SOUTH-WEST OLTENIA REGION**	**3634**	**3546**	**3692**	**3843**	**4083**
	DOLJ	**1402**	**1340**	**1417**	**1468**	**1541**
	GORJ	**544**	**548**	**574**	**589**	**643**
	MEHEDINŢI	**306**	**281**	**294**	**302**	**331**
	OLT	**672**	**673**	**700**	**733**	**795**
	VÂLCEA	**710**	**704**	**707**	**751**	**773**

Source: processing according to INS data

Trends in turnover evolution - South-West Oltenia Region

Annex 2

Activities of the national economy	Development regions and counties	Years				
		2015	2016	2017	2018	2019
		UM: million Lei RON				
		Million RON	Million RON	Million RON	Million RON	Million RON
EXTRACTIVE INDUSTRY	TOTAL NATIONAL INDUSTRY	13409	10799	11365	14097	15800
	SOUTH-WEST OLTENIA REGION	1044	1626	1605	1430	1148
	DOLJ	359	490	457	392	463
	GORJ	350	725	720	528	207
	MEHEDINŢI	66	20	2	6	20
	OLT	146	289	120	152	132
	VÂLCEA	122	101	306	351	325
MANUFACTURING INDUSTRY	TOTAL NATIONAL INDUSTRY	326279	338740	380896	422916	442725
	SOUTH-WEST OLTENIA REGION	20842	20429	24516	32851	34513
	DOLJ	7696	7328	9394	15289	16017
	GORJ	978	1033	931	1528	1641
	MEHEDINŢI	900	1096	1240	1432	1648
	OLT	7655	7406	9027	10102	10396
	VÂLCEA	3613	3567	3923	4500	4811
PRODUCTION AND SUPPLY OF ELECTRICITY AND THERMAL, GAS, HOT WATER AND AIR CONDITIONING	TOTAL NATIONAL INDUSTRY	58747	57977	58057	62540	69104
	SOUTH-WEST OLTENIA REGION	5548	7268	7702	8786	9228
	DOLJ	3192	2943	2979	3052	3816
	GORJ	1805	1680	2168	2297	2369
	MEHEDINŢI	80	1473	1425	1930	1811
	OLT	2	1	1	113	29
	VÂLCEA	469	1171	1130	1394	1201
TOTAL	TOTAL INDUSTRY SOUTH-WEST OLTENIA REGION	27434	29323	33823	43067	44889
	DOLJ	11247	10761	12830	18733	20296
	GORJ	3133	3438	3819	4353	4217
	MEHEDINŢI	1046	2589	2667	3368	3479
	OLT	7803	7696	9148	10367	10557
	VÂLCEA	4204	4839	5359	6245	6337

Source: processing according to INS data

Trends in the evolution of staff in local units - South-West Oltenia Region

Annex 3

Activities of the national economy	Development regions and counties	Years				
		2015	2016	2017	2018	2019
		UM: Number				
		Number	Number	Number	Number	Number
EXTRACTIVE INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**58085**	**51782**	**45171**	**43600**	**46017**
	SOUTH-WEST OLTENIA REGION	**15699**	**12991**	**13666**	**12038**	**11974**
	DOLJ	968	816	773	781	878
	GORJ	11813	10010	10000	8806	8622
	MEHEDINŢI	696	613	498	39	104
	OLT	919	625	585	601	604
	VÂLCEA	1303	927	1810	1811	1766
MANUFACTURING INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**1194271**	**1201739**	**1209214**	**1201412**	**1166330**
	SOUTH-WEST OLTENIA REGION	**79710**	**78350**	**80725**	**84579**	**85350**
	DOLJ	26356	25646	26139	26722	27942
	GORJ	8730	8396	8500	9465	9653
	MEHEDINŢI	8867	8648	9167	9804	9401
	OLT	20326	20696	22482	23671	23287
	VÂLCEA	15431	14964	14437	14917	15067
PRODUCTION AND SUPPLY OF ELECTRICITY AND THERMAL, GAS, HOT WATER AND AIR CONDITIONING	**TOTAL NATIONAL INDUSTRY**	**58636**	**57941**	**57030**	**57398**	**54273**
	SOUTH-WEST OLTENIA REGION	**11929**	**10967**	**9389**	**9674**	**9775**
	DOLJ	3177	2971	2983	2916	3060
	GORJ	4205	4020	3857	4267	4235
	MEHEDINŢI	1572	948	645	624	707
	OLT	141	139	188	187	180
	VÂLCEA	2834	2889	1716	1680	1593
TOTAL	**TOTAL INDUSTRY SOUTH-WEST OLTENIA REGION**	**107338**	**102308**	**103780**	**106291**	**107099**
	DOLJ	**30501**	**29433**	**29895**	**30419**	**31880**
	GORJ	**24748**	**22426**	**22357**	**22538**	**22510**
	MEHEDINŢI	**11135**	**10209**	**10310**	**10467**	**10212**
	OLT	**21386**	**21460**	**23255**	**24459**	**24071**
	VÂLCEA	**19568**	**18780**	**17963**	**18408**	**18426**

Source: processing according to INS data

Trends in the evolution of gross investments - South-West Oltenia Region

Annex 4

Activities of the national economy	Development regions and counties	Years				
		2015	2016	2017	2018	2019
		UM: million Lei RON				
		Million Lei RON	Million Lei RON	Million Lei RON	Million Lei RON	Million Lei RON
EXTRACTIVE INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**6693**	**4120**	**3891**	**4043**	**6080**
	SOUTH-WEST OLTENIA REGION	**1022**	**520**	**491**	**573**	**830**
	DOLJ	175	83	105	114	170
	GORJ	433	251	235	264	406
	MEHEDINŢI	14	9	0	2	4
	OLT	266	129	104	121	177
	VÂLCEA	135	48	47	71	73
MANUFACTURING INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**25780**	**25912**	**31687**	**34097**	**36563**
	SOUTH-WEST OLTENIA REGION	**2207**	**1900**	**3430**	**2854**	**3721**
	DOLJ	627	518	1480	1231	1762
	GORJ	42	35	57	101	106
	MEHEDINŢI	130	45	189	180	207
	OLT	1094	973	1379	961	1085
	VÂLCEA	314	329	326	381	561
PRODUCTION AND SUPPLY OF ELECTRICITY AND THERMAL, GAS, HOT WATER AND AIR CONDITIONING	**TOTAL NATIONAL INDUSTRY**	**6794**	**4332**	**5672**	**6358**	**5923**
	SOUTH-WEST OLTENIA REGION	**916**	**418**	**865**	**658**	**499**
	DOLJ	212	203	571	196	289
	GORJ	508	71	108	259	131
	MEHEDINŢI	19	99	158	51	30
	OLT	19	12	3	31	1
	VÂLCEA	158	33	24	121	47
TOTAL	**TOTAL INDUSTRY SOUTH-WEST**	**4145**	**2838**	**4786**	**4085**	**5050**
	DOLJ	**1014**	**804**	**2156**	**1541**	**2221**
	GORJ	**983**	**357**	**400**	**624**	**643**
	MEHEDINŢI	**163**	**153**	**347**	**233**	**241**
	OLT	**1379**	**1114**	**1486**	**1113**	**1263**
	VÂLCEA	**607**	**410**	**397**	**573**	**681**

Source: processing according to INS data

Trends in the evolution of the actual number of employees - South-West Oltenia Region

Annex 5

Activities of the national economy	Development regions and counties	Years				
		2015	2016	2017	2018	2019
		UM: Number				
		Number	Number	Number	Number	Number
EXTRACTIVE INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**57429**	**54203**	**51883**	**50103**	**50293**
	SOUTH-WEST OLTENIA REGION	**15150**	**14143**	**13250**	**12800**	**12867**
	DOLJ	873	774	899	874	1005
	GORJ	10751	10178	9421	9062	8915
	MEHEDINŢI	678	610	504	496	560
	OLT	791	744	622	561	624
	VÂLCEA	2057	1837	1804	1807	1763
MANUFACTURING INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**1216176**	**1244739**	**1284129**	**1272836**	**1242184**
	SOUTH-WEST OLTENIA REGION	**80995**	**83275**	**89667**	**93312**	**90256**
	DOLJ	23420	24151	26623	26750	27413
	GORJ	8633	8283	9696	10859	10105
	MEHEDINŢI	9739	10720	10737	12026	10304
	OLT	21233	21739	23653	24590	23678
	VÂLCEA	17970	18382	18958	19087	18756
PRODUCTION AND SUPPLY OF ELECTRICITY AND THERMAL, GAS, HOT WATER AND AIR CONDITIONING	**TOTAL NATIONAL INDUSTRY**	**55111**	**54383**	**54537**	**54283**	**54905**
	SOUTH-WEST OLTENIA REGION	**11018**	**9795**	**9530**	**9456**	**9584**
	DOLJ	2839	2719	2651	2621	2747
	GORJ	4317	3997	3835	3822	3795
	MEHEDINŢI	1248	776	764	764	943
	OLT	368	370	391	390	396
	VÂLCEA	2246	1933	1889	1859	1703
TOTAL	**TOTAL INDUSTRY SOUTH-WEST OLTENIA REGION**	**107163**	**107213**	**112447**	**115568**	**112707**
	DOLJ	**27132**	**27644**	**30173**	**30245**	**31165**
	GORJ	**23701**	**22458**	**22952**	**23743**	**22815**
	MEHEDINŢI	**11665**	**12106**	**12005**	**13286**	**11807**
	OLT	**22392**	**22853**	**24666**	**25541**	**24698**
	VÂLCEA	**22273**	**22152**	**22651**	**22753**	**22222**

Source: processing according to INS data

Trends in the evolution of the average gross monthly nominal earnings - South-West Oltenia Region

Annex 6

Activities of the national economy	Development regions and counties	Years				
		2015	2016	2017	2018	2019
		UM: Lei RON (since 2005)				
		Lei	Lei	Lei	Lei	Lei
EXTRACTIVE INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**4829**	**4777**	**5144**	**6298**	**6957**
	SOUTH-WEST OLTENIA REGION	**3990**	**3959**	**4310**	**5485**	**6076**
	DOLJ	5261	5510	5496	6748	6267
	GORJ	3897	3884	4268	5522	6353
	MEHEDINŢI	3626	3544	3558	4153	4511
	OLT	4599	4392	5109	6359	6442
	VÂLCEA	3812	3687	3880	4775	4965
MANUFACTURING INDUSTRY	**TOTAL NATIONAL INDUSTRY**	**2340**	**2585**	**2906**	**3843**	**4211**
	SOUTH-WEST OLTENIA REGION	**2163**	**2289**	**2607**	**3501**	**3775**
	DOLJ	2279	2285	2664	3593	3882
	GORJ	1780	1939	2148	2833	3170
	MEHEDINŢI	1881	1927	2224	3015	3128
	OLT	2490	2697	3036	4077	4507
	VÂLCEA	1966	2182	2444	3292	3411
PRODUCTION AND SUPPLY OF ELECTRICITY AND THERMAL, GAS, HOT WATER AND AIR CONDITIONING	**TOTAL NATIONAL INDUSTRY**	**4302**	**4506**	**4784**	**6326**	**7240**
	SOUTH-WEST OLTENIA REGION	**3947**	**4109**	**4477**	**5738**	**6373**
	DOLJ	3985	4109	4408	5001	7381
	GORJ	4002	4080	4582	6068	5557
	MEHEDINŢI	3754	4266	4797	6920	7001
	OLT	4612	4922	5204	6982	7745
	VÂLCEA	3826	3943	4072	5358	5937
TOTAL	**TOTAL INDUSTRY SOUTH-WEST**	**10100**	**10357**	**11394**	**14724**	**16224**
	DOLJ	**11525**	**11904**	**12568**	**15342**	**17530**
	GORJ	**9679**	**9903**	**10998**	**14423**	**15080**
	MEHEDINŢI	**9261**	**9737**	**10579**	**14088**	**14640**
	OLT	**11701**	**12011**	**13349**	**17418**	**18694**
	VÂLCEA	**9604**	**9812**	**10396**	**13425**	**14313**

Source: processing according to INS data