ROMANIA AND INDUSTRY 4.0

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SUMMARY: I. *Introduction.* II. *Level of implementation of Industry 4.0.* III. *Digitalization of work.* IV. *Necessary reforms in the economic and legal field.* V. *Advantages and opportunities for Romania.* VI. *Conclusions.* VII. *Research sources.*

I. INTRODUCTION

At the end of the 18th Century, the First Industrial Revolution replaced manual labor with steam engines and railways, and a century later, the Second Industrial Revolution brought electrification and mass production. The Third Industrial Revolution brought computers (after 1970) and the Internet (after 1990), second-hand electronics, information technology and the first robots to automate certain industrial processes.[1]

With the effects of the First Industrial Revolution there were benefits for England, which managed to maintain the world's first industrial power in the 1900s, the Second Industrial Revolution, distinguished by mass production and the development of industries such as the electric, chemical or automotive industry, in the foreground of Germany's industry, and digitalization is considered the Third Industrial Revolution.

Currently, we are witnessing an unprecedented change in production patterns, business, government and social organization, a widespread use of the Internet and the digital technology gap that fully justify the announcement of the Fourth Industrial Revolution.

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[1] Vaida Paula, *Despre Industria 4.0 și implementarea conceptelor pe care le promovează în cadrul industriei românești de turnătorie*, https://ccicj.ro/.../despre-industria-4-0/pdf.

The emergence of the 3D printer, capable of producing even food, proceeds to what experts call "The Fourth Industrial Revolution."

While, in Europe, focus is on personalized production, the quality and production of the consumer market in Romania as a member state of the European Union are under an important transformation of industrial production through the fusion of digital technologies and the Internet with the conventional industry.

More and more industries are looking to replace[2] employees with robots,[3] which can work continuously and whose work is not subject to taxes by the State.

The automotive and metallurgical industries are the largest markets for co-workers and collaborative robots, followed by the processing of electronic, plastic, food and pharmaceutical products.

These robots work together with workers and are flexible, easy to program, safe and inexpensive. Romania had in 2016, according to the International Robotics Federation,[4] 11 robots per 10,000 industrial workers.

Whilst South Korea had 437 robots per 10,000 employees, Japan had 323 and Germany, 282.

A study carried out by the World Economic Forum, titled "Work in the future,"[5] predicts that by 2020 more than 5 million jobs will be lost in all sectors and all geographical regions, such losses would be partially compensated, through the creation of new jobs in highly qualified fields.

The notion of work through important changes caused by the development of technology and the development of supposedly sophisticated machines mark the existence of artificial intelligence work. However, the fear of the reduction in employment due to industrial robots is unjustified, since only less than 10 percent of jobs can be completely automated,[6] the rest will be occupied by more human workers.

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[2] Georgescu Laura, *Inteligența artificială și impactul ei în societate, mai ales în ce privește locurile de muncă,* Revista română de dreptul muncii, nr.2 de 2018, p. 25.

[3] Colgate E. James, Peshkin A. Michael, Wannasuphoprasit Witaya, *Operators,* Proceedings of the International Mechanical Engineering Congress and Exhibition, Atlanta, GA, DSC-Vol. 58,

Nov. 17-22, 1996, pp. 433-439.

[4] ------- Raport Mondial privind Robotica 2016, *Uniunea Europeană ocupă primul loc în cursa globală a automatizării* https ;// www.ttonline.ro/pdf, fecha de consulta: 19 June 2018

[5] -------- *The Future of Jobs*, *http://reports.weforum.org/future-of-jobs-2016/pdf.*

[6] Deacu Elena, *Coboţii viitorul muncii automatizate?* adevarul.ro › Economie › Afaceri, Date of consultation: 19 June 2018..

The Fourth Industrial Revolution, or Industry 4.0, which "erases the boundaries between physical, digital and biological areas",[7] based on the digital revolution, it is already present to advance the economy in new directions, advanced robotics, artificial intelligence, nanotechnology, biotechnology, the Internet and 3D printing of autonomous vehicles, so that industrial relations change as robotization progresses.[8]

The "Industry 4.0" concept, promoted for the first time by Germany's Ministry of Research and the Ministry of Economic Affairs ,[9] soon became a synonymous for the industry's future,by essentially referring to the factories that have digitized their technologies so that the facilities and the equipment can communicate with each other through the Internet, marked by a strong personalization of products under mass production and interconnectivity.[10]

Industry 4.0 focuses on the complete digitalization of all physical assets and processes, as well as on the integration of digital ecosystems with partners in the value chain. Data Management and Analysis (Data & Analytics) has a central capacity for Industry 4.0, since they are facilitated by specific technologies.[11]

It is announced that the Industry 4.0 impact will appear in several areas, with important effects at a socioeconomic level.

From an economic point of view, Industry 4.0 is an opportunity to relaunch, re-technologize production and develop commercial models for services and products.

Because the political and social objectives of reindustrialising[12] Europe for sustainable development after two decades in which production has moved to Asia and only one in 10 companies at the EU level have converted it into manufacturing, The European Commission has developed a plan for

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7 Schwab Klaus, *The Fourth Industrial Revolution*, Crown Business, New York, 2016.

8 Sebe Mihai, *O dezbatere necesară privind viitorul muncii. A Patra Revoluție Industrială - este posibilă o robo-apocalipsă a locurilor de muncă tradiționale? https://adevarul.ro/tech/stiinta/o-dezbatere-necesara-privind-viitorul.../index.htm*

9 -------- *Ce înseamnă Industry 4.0 pentru angajații și patronii din România – salarii mai mari și profituri crescute, www.zf.ro/.../p-ce-inseamna-industry-4-0-pentru-angajatii-si-patronii...romania...si-pr/.*

10 Luca Dan, *România și revoluția industrială 4.0, www.zf.ro/opinii/opinie-dan-luca-romania-si-revolutia-industriala-4-0-13780009/poze/,* Date of consultation: 20 June 2018.

11 ------- *O nouă revoluție industrială! Ce este "Industria 4.0", https://www.dcnews.ro/o-noua-revolutie-industriala-ce-este-industria-4-0_511383.html/.*

12 Nae Laurențiu, *Industry 4.0 în România 26.10.2016, https://www.ttonline.ro/revista/t-t-plus/industry-4-0-in-romania.*

"European industrial renaissance".[13] In 2014, the added value in production represented only 14.5 per cent at the EU level and the growth target was 20 per cent by 2020.

The Fourth Industrial Revolution has produced a turbulence in the processes of production and the technology for information processing, transmission and communication induced by the Internet. With new intelligent processing industries, smart and personalized products are offered to consumers.

Throughout a vast historical evolutionary space, a theory of industrialization has been imposed for the last two centuries, and after 1990 the term of deindustrialization has also emerged.[14] The last industrial revolution, and especially the deindustrialization, is under the impact of new materials and technologies of information and communication.[15]

The industry is preparing for a new era called Industry 4.0 or the Industrial Internet of Things.[16] It is a world in which processes are locally pre-designed in factories and will be interconnected globally.

II. Level of Implementation of Industry 4.0

There are opinions according to which Romania still could not make the leap from Industry 2.0 to Industry 4.0, although the current economic situation contradicts this claim.

It is shown that the job market will change, but it is difficult to predict if there will be more or fewer jobs in general. The lack of personal digital competence cannot be invoked because there is a necessary legal framework on tax incentives for such employees, who are exempt from payroll tax for several years.

On the other hand, the speed of the Internet connection in Romania is one of the highest in Europe, and digitalization skills can also be found. There is a tradition of production and good technical universities.

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13 ------- Industrial Renaissance, *https://www.ecepr.org/projects/industrial-renaissance/*.

14 Ciutacu Constantin, Chivu Luminița *Romania's deindustrialization, from the „Golden Age" to the „Iron Scrap Age"*, Elsevier Procedia Economics and Finance, Vol. 22, 2015, pp. 209-215.

15 Ciutacu Constantin, Chivu Luminița, Georgescu George , *Descompunerea și recompunerea structurilor industriale din România direcții de strategie,* Institutul național de cercetărieconomice „Costin C. Kiriţescu" septembrie 2016, *https://www.piarom.ro/descompunerea-si-recompunerea-structurilor-industriale-din-ro...*

16 Hângănuţ Radu, *Roboții sunt industria, www. revistasinteza.ro/robotii-sunt-industria*.

A study conducted by the Centre for European Economic Research (ZEW)[17] argues that two issues such as reducing unemployment and increasing robots are closely linked by the fact that robots create jobs and do not keep employees out of work, as many people would think.

The previous study confirms the events in Eastern Europe and Romania, where robotics has helped reduce unemployment and wage growth. In this context, the number of robots installed for every 10,000 employees in Slovakia and Slovenia is more than 130 units larger compared to the global average of 74 robots per 10,000 employees. Czech Republic has a density of 100 to 10,000 robots of workers, while Hungary has 60 and Poland has 30 units out of 10,000 workers.

Romania still has a low density of 15 robots per 10,000 employees and needs more than 10,000 robots in the coming years in order to maintain competitiveness in the region.[18]

In Romania, there is a national interest on these issues, leading to the adoption in 2015 of the National Digital Strategy for Romania 2020,[19] although it does not directly address the issue of robotics, modelling in the European Parliament has an important economic component in field of action 3 – e-commerce, research, development and innovation in ICT– it is estimated that for the implementation of measures in the field of action 3 will generate an estimated impact on the Romanian economy increase of approximately 3 percent to GDP and 2 per cent to jobs in 2020".[20]

The importance of this Strategy is once again reinforced by the 2017–2020 Governance Program, which has a different component than the Communication and Digital Convergence Policies.

> The considered objective is "fast and unlimited access to information tools and their facilities, communication and information technology, in order to take advantage of superior human energies, creatively shaping an equitable

[17] Abrihan Raluca, *Roboții și piața muncii: Mai puține joburi sau șomaj mai mic? – studiu,https://economie.hotnews.ro/stiri-it 22415572-robotii piață-muncii-mai-putine-joburi/*,

[18] Deacu Elena, *Robotizarea creează noi locuri de muncă și susține creșterea salariilor*, *https://adevarul.ro › Economie › Bani*,

[19] Government Decision no. 245 of April 7th, 2015, published in the Official Gazette of Romania no. 340 of May, 19th 2015.

[20] ------- *A Patra Revoluție Industriala - este posibila o robo-apocalipsa a locurilor de munca tradiționale?, https://www.antena.ro/.../a-patra-revolutie-industriala-este-posibila-o-robo- apocalipsa/*.

society and contributing to economic growth and the competitiveness of Romania.[21]

Logistics companies were among the first to use mobile devices as means to manage and monitor their processes.[22] Manual devices used by collectors or transporters have provided the first benefits in the automation of logistics processes.

One of the world's leading providers of technology and services is Bosch Group, which has announced that it is planning substantial investments from 2016 in Romania, especially to further develop the capabilities of producing mobility solutions.[23]

III. Digitalization of the Work

Digitalization is one of the fundamental concerns of the European Union. The Digital Single Market is part of the Europe 2020 strategy that is based on principles and ideas, such as "digital inclusion"[24] (related to social inclusion), ideas designed precisely to allow all categories of people to take part in technological changes that digitalization brings.[25]

In May 2015, the Commission presented the Digital Single Market Strategy[26] to address the challenges facing the digital economy.

In this strategy, the Commission is committed to adopting simpler and less burdensome rules for companies. This includes making digital solutions that they can use throughout their life cycle available , especially to record and archive their own documents and information.

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[21] Governance Program 2017-2020*www.cdep.ro/pdfs/gw201706/Program_de_Guvernare.pdf.*

[22] Biszok Bogdan, *Industria 4.0, o nouă revoluție digitală în transport și logistică, www.capital.ro/industria-40-o-noua-revolutie-digitala-in-transport.html*

[23] -------- Bosch implementează, in fabricile de la Cluj si Blaj, soluții ale „Industriei 4.0", *www.agir.roUnivers Ingineresc/ pdf.*

[24] European Commission, *Digital Inclusion for a better EU society, https://ec.europa.eu/digital-single-market/en/digital-inclusion.*

[25] Dimitriu Raluca, *Dreptul muncii. Anxietăți ale prezentului*, editura Rentrop & Straton, Bucureşti, 2016, p. 446.

[26] Comisia Europeană, *S*trategie privind piața unică digitală pentru Europa**,** *https://eur-lex.europa.eu/legal-content/RO/TXT/.*

We are witnessing a revolution that is supposed to generate mutations as important as the industrial one: digital upheaval.[27] The digitalization of work tends to structurally modify organization from a legal point of view.

First of all, we must admit that digitalization has remarkable effects on productivity or performance; it allows a general reduction in costs and especially in those with logistics. Digitalization has important positive effects on the worker–employer relationship and the personal life of those who work. It leads to the possibility of harmonizing professional and family life; A worker who is no longer required to be at work at a certain time enjoys a temporary flexibility that allows him to carry out the duties of the family, raise children, care for elderly relatives or respect personal biorhythm in their activities.

On the other hand, digitalization allows maintaining work contracts, even in conditions of relocation of the unit.

In some cases, workers who would normally have been laid off could be kept in the company; they continue doing the same activity as before, but when the employer is based in the territory of another country.

Many new jobs have been created thanks to digitalization; the flexibility this program allows and teleworking has made it possible for people who otherwise would not have had this opportunity, to enter the labor market .

Digitalization has the merit of allowing the labor inclusion of people with disabilities, whose journey to work in another way would be difficult or impossible. And even for people who have difficulty walking, it constitutes a work day relief by eliminating time spent in traffic, travelling to work.[28]

On the other hand, according to some estimates,[29] digitalization would make it possible to avoid large urban areas, the choice to live in rural areas, close to nature and therefore does not mean the termination of employment by the company.

Digitalization is professional training. Even if the idea of lifelong learning is not new, it has to be said that with the digital revolution it has become an indispensable requirement for continuous, automatic employment: software programs change, communication systems change, devices are always

[27] Dimitriu, Raluca *op. cit*, p. 445.

[28] *Ibidem*, p. 446.

[29] Smith Damien, *Future of work. Effects of the digital revolution on employment and civil society* Conferinta Eurofound "The impact of digitalization on work" (may 2016)„ *http://www.eurofound.europa.eu/sites/default/files/ef_even/field_ef_documents/smith_p.pdf*.

different – so the worker is subject to a process (often self-imposed) of continuous professional development.

There was a new indicator of this type in the analysis of the labor market: the number of contracts in which the worker carries out a job at least once per week outside the workplace; teleworkers are no longer a separate category, but represent the rule in certain systems (notably in the Netherlands).[30]

The reality of labor relations makes it harder to keep up with these enthusiastic estimates. In fact, it is not usually the worker who initiates these changes in the work schedule; it is not he who wants to work from home or be permanently connected to his employer's platform. But it is the employer himself who proposes or imposes such arrangements; and the savings they make are important.

Because, in fact, changes in terms of free time, privacy relations and collective work are – as we have previously had the opportunity to demonstrate – the most important ones.

As it expands in all spheres of professional life, digitalization can lead to an unexpected evolution of the relationship of subordination; the worker is in permanent contact with the employer, so he is practically under his permanent control.[31]

1) Subordinate over-autonomy
2) Subordination to exploitation

This has sometimes led to promoting the idea of the "right to cancel" that any employee aspires to be entitled, without fear of reprisal..

Of course, we cannot jump to the conclusion that digitalization automatically leads to exploitation, since workers on the computer would immediately have a harder life than the lives of workers on the construction site.

But one cannot ignore the fact that change in employment and the effects of this change imply something more unknown than we think. In fact, the effects of digitalization can be felt:

— In terms of collective labor relations, the reduction of the unionisation rate is often confronted with the fact that workers do not work

[30] European Commission, *Digital Single Market*, *https://ec.europa.eu/digital-single- market/en/digital-inclusion-better-eu-society*.

[31] Dimitriu Raluca, *op. cit*, p. 447

together in the company, so that each individual develops a personal relationship with the employer and is not mediated. Although we are still in the embryonic stage, the so-called online activism has appeared in response to these events: new forms of collective organization, forums and online communities, which tend to move collectivism in the plane of virtual reality.

— In the disciplinary and subordination report plan, through platforms, workers are directly connected to customers. The presence of the employer is almost unrecognizable: it is the clients who exercise control over the way they work; through the comments provided after having benefited from the service provided, they determine the immediate evaluation of professional performance. The Uber case is emblematic from this point of view.[32]

They are apparently self-created workers (because the management control that characterized the employer's position in a typical subordination relationship is no longer exercised by the same means). But, in reality, subordination is extended in this way: both in intensity and duration;

— In terms of work time. Time is no longer clear, as is its correlation with the duration of rest time. The number of hours actually worked can be difficult to quantify, and free time is not only less, but also more unpredictable – in relation to how Fordist work is performed. On the other hand, due to the open possibilities of digitalization, there are numerous companies that no longer control employees for arrival and departure times, only pursuing their results. The shorter the time of work, the paradoxical effect of the invasion takes place, so the work on free time can be anywhere, and the one who works - in the plastic expression of Patrice Adam - is considered a "nomadic worker".[33]

— In terms of contractual arrangements. Digitalization favours the conclusion of typical and atypical contracts. It is obvious that many

[32] Adam D., Bremermann M., J., Fonta-Narosa F., Kraemer B., Westphal H., Kunert A., Tonnes Lonnroos L., *Digitalization* Duran *and working life: lessons from the Uber cases around Europe, http://www.eurofound.europa.eu/observatories/ eurwork / articles / working-conditions-lawand-regulation / digitalization-and-working-life-lessons-from-the-uber-cases-around-europe*

[33] Adam Patrice, *L'individualisation du droit de travail*, Librarie Générale de Droit et de Jurisprudence, Paris, 2005, p. 364.

of the contractual arrangements that have emerged since the 2000s are fundamentally linked to the digital revolution;

— In terms of performance evaluation. Traditionally, the evaluation of employee performance is carried out by the employer, according to the evaluation criteria, in our country, (Article 17 para (3) e) of the labor Code) provided by the labor contract. Through direct relationships with customers, digitalization directly favours performance ratings through qualification and the comments that are made at the end of the collaboration with the company. This change is not without consequences in terms of the very concept of professional correspondence;
— In terms of health and safety at work. If industrial accidents and occupational diseases have arisen during the industrial revolution, new types of accidents also appear during the digital revolution, which can hardly be considered as accidents by common parameters of width, for example, accidents caused by wear and tear – a type of nervous overload that results from the state of tension and intensity of the activity for a long time, but it does not always correspond with the definition of the work accident. Studies in the field of occupational health attest to a multiplication of cases of exhaustion, anxiety and depression among workers who are in permanent contact with the work environment;
— In the level of professional training. Digitalization, technology and the rapid ageing of the means of production make it necessary to adapt to an unprecedented workforce. Accelerated technological progress leads to a rapid permeation of knowledge already accumulated by employees; "Survival" in an environment of such intense competition, an absolutely continuous intellectual effort is required;
— From the point of view of the right to privacy. The separation of privacy from private life is no longer very clear, and permanent contact with the employer through online platforms diminishes the worker's area of personal freedom. It is said that the latter is an almost continuous availability. Producing effects and the appearance of superior technological surveillance, means practically permanent surveillance over employees (video, GPS, etc.), both in the workplace and outside of it. This is what some authors call "modern slavery";
— In the field of human resources management and work organization. Monitoring is permanent; the employer does not always do it,

but the client does it directly. In fact, all elements of work organization tend to change as a result of digitalization;

— From the profile of the worker's point of view of technological changes have had a significant impact on the generation that graduated in the year 2000 (young people called "millennials"), whose differences exist with previous generations,[34] by values, attitudes and forms of social interaction that transform the labor relations, innovating in who these educated young people are, they show respect to the authorities– often with attention deficit, ambitious, anxious and aware of their value – millennials are generally determined by the many events that took place during its formation, but especially digitalization.

Companies in Japan and Germany are implementing digitalization mainly to increase their efficiency and product quality.

In the USA, the tendency is to develop new business models using digital services and offers and provide these products and services digitally, as quickly as possible.

China's manufacturing companies focus on ways to satisfy international customers by reducing costs.[35]

IV. Reforms Necessary in the Economic and Legal Field

The digitalization of work tends to structurally modify how this activity is legally organized. Digitalization produces remarkable effects in terms of productivity or performance; allows the reduction of general costs,especially those related to logistics.

Digitalization has important positive effects on the worker / employer relationship and the personal life of those who work. It leads to the possibility of harmonizing professional and family life; a worker who is no longer required to be at work a certain time enjoys a temporary flexibility that allows him to carry out family duties, raise children, care for elderly relatives or biorhythm; and develop their personal activities

34 Dimitriu Raluca, *op. cit*, p. 449.

35 *---------O nouă revoluție industrială! Ce este "Industria 4.0", https://www.dcnews.ro/o-noua-revolu-ie-industriala-ce-este-industria-4-0_511383.html*, Date of consultation: 24 June 2018.

After a legislative proposal,[36] Chapter IX, "Work at Home" of the Labor Code was amended and completed by adding four new articles (articles 1071 to 1074) that have defined rights and obligations for telework and *telesalariatului*; it was stated in Law no. 81/2018 on the regulation of teleworking activity.[37]

Teleworking[38] is defined by article 2

> as the organization of work by which the employees regularly and voluntarily perform their functions in the office, occupation or profession that has a place other than the work center, organized by the employer at least one day a month, using information and communication technology.

The application of the labor Law in aspects of teleworking, to verify whether its provisions respond to the interested employers and employees, interested in the flexible way of organizing work.

Its application, on the matter, seeks to establish in its provisions a more flexible way of working in the employees–employers relation.

According to the European Statistical Office (Eurostat), in Romania, only 0.3 per cent of the total number of employees, aged between 15 and 74 years, work from home.[39]

Europe must take into account rights and responsibilities related to providing robots with artificial intelligence, so, in 2017 the European Parliament adopted a resolution[40] that provides special legal status for "electronic persons" applicable to autonomous robots. "We are in an era where human intelligence supports artificial intelligence, "argues the report.

A new category of legal issues that could give birth to rights and obligations would be added to the traditional legal entities that could be ariseat a certain moment in the labor market.

Dobozi comments[41] that Sofia a

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36 Bill no. 109 of 10 February 2014, which modifies and completes the Labor Code, published in the Official Gazette of Romania, Part I, no. 173 of March 11th, 2014

37 Published in the Official Gazette of Romania, Part I, no. 296 of 2 April 2018.

38 Ţop Dan, *Regulatory of the teleworking activities in Romania*, Revue Européenne du droit social nr. 3 (40) 2018, pp. 26-33.

39 Database - Eurostat, *Statistics by theme, ec.europa.eu/eurostat/data/database*.

40 News European Parliament, *Robots: Legal Affairs Committee calls for EU-wide rules*, www.europarl.europa.eu/news/.../robots-legal-affairs-committee-calls-for-eu-wide-rules.

41 Partner Dobozi, Colţan Tudor, *Drepturi civile pentru roboţii umanoizi?*, www. HotNews.ro

> humanoid robot, is the first robot that acquired citizenship (Saudi Arabia has decided to do it in October 2017). It is considered a thing and not a person, and must be dismantled and taken luggage to be able to travel by plane, for example;granting civil rights to humanoid robots, although reduced at an early stage, would be a serious mistake from any legislator. It will only be a step towards the elimination of people...

Starting from the idea that a humanoid robot is something made by man, it is for it to be considered as a legal entity, even in a legal fiction, as it was done in 19th Century legal entities, which grouped physical persons and cannot exist independently of individuals.

Even if it could be supported, humanoid robots cannot function without the individual software they use, however, there is a concern that they will be able to update to the point where software is not needed and therefore generate the elimination of the mastery of human intelligence.

According to forecasts, professions that are believed to be disappearing include court officials and the tax office.[42]

A register of autonomous intelligent robots, as proposed by the European Commission, would not solve the problem of the patrimonial responsibility of intelligent robots, which would obviously become proprietaries and excludes the possibility of constituting a document of recognition for an "electronic person" to be a different subject.

In order for the European Union to maintain its competitiveness as a solid industrial base and manage the transition to an industrial economy and smart services, the digital transformation of all sectors is needed. 75 percent of the digital economy's added value comes from traditional industries, not from the IT & C market.

But the integration of digital technology done by these traditional companies is the weakest element.

Europe's digital development strategy is based on four lines of action:[43]

- Guaranteeing easy access to digital technologies for all industrial companies, especially SMEs. This action can also help complement national and regional digital innovation infrastructures;
- Guaranteeing the primacy of current European industrial platforms in the European digital industry, based on key areas of the

[42] Florea Magda, *Robotii umanoizi sunt printre noi,* www.manager.ro.

[43] *-------Industry 4.0 motorul producției digitale, https://cloudmania2013.com/2017/08/09/industry-4-0-motorul-productiei-digitale/*

manufacturing and engineering industries such as the automotive industry, aeronautics and energy;
- Preparing the work that digital transformation should count with - promoting digital literacy in Europe and its regions at all levels and stages of education and training;
- Identifying smart regulatory solutions for the smart industry - the search for the most appropriate way of politically approaching difficult issues, such as responsibility and security, or the ownership of autonomous systems and the use of industrial data.

The Opinion of the European Economic and Social Committee on the effects of digitalization in the service sector and employment in the context of industrial change[44] also establishes that the new industry of the industrial cycle 4.0 and digitalization have an impact on society. A constructive dialogue between social partners, Member States and the EU is needed to discuss the consequences for the labor market and the possible adaptations and necessary social and labor rights.

Romania's inauguration of the Presidency of the EU's Council in the first half of 2019 should locate Romania with clear options and actions to progress from 2017 to 2018, fulfilling a double conditionality given by national and European interests. Until then, a digitalization strategy of Romania, with priorities for each ministry, with a local public administration linked to the imperative of computerization as a basis to increase the quality of services to citizens, Digital Romania would be useful.

Part of these strategies could be assumed as a priority for Romania under the chairmanship of the Council (provided that it is a vehicle for growth for all Member States), for example, developing a European Cloud for all situations in which companies or people need all kinds of documents, in two or more Member States; or creating a European health card in which Romanian data are interoperable with foreign health systems. It is desirable to develop unique nomenclatures at European level (registration of private companies, and so on).[45]

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44 -------*Strategia Națională privind Agenda Digitală pentru România 2014 – 2020,https://www.juridice.ro/wp-content/uploads/2014/12/Strategia-Nationala-AD.pdf*.

45 Gaftea Viorel-Nicolae (coordonator) Ioniță Angela, Nițu Ionel, Popa Iulian-Florentin, *România și Piața Unică Digitală a Uniunii Europene. Oportunități și provocări*, Institutul European din România, Bucureşti, 2018, p. 69.

V. Advantages and Opportunities for Romania

Between 2016 and 2020, there have been numerous research and development programs in Romania, reimbursable in the 4.0 technology industry. They will support the development of Romanian companies and attract foreign investors.

Industry 4.0 announces important benefits that are worth considering at the beginning of the journey. The majority of the benefits are using IoT in manufacturing and optimizing its commercialization.

First, Industry 4.0 would increase productivity through optimization and automation; the main benefit when talking to a player in this market, when all that an entrepreneur wants is more from this sector, is to abandon the costs of downtime and the lack of constancy in the production process. Reducing costs, increasing profits, reducing waste, avoiding errors and delays, increasing production speed and the ability to intervene if necessary is easier.[46]

In the 2014–2020 programming period, Romania benefits from European funds amounting to some 42 billion euros, of which over € 22 billion are allocated to cohesion policy.[47]

Among these programs, we can mention the Regional Operational Program 2014–2020, which aims to increase economic competitiveness and improve the living conditions of local and regional communities. This objective will be achieved by supporting projects for the development of the business environment, the development of Romanian infrastructure and services;

The Competitiveness Operational Program (funded by the European Regional Development Fund)[48] supports smart growth, promoting the knowledge and innovation economy, investing in strengthening research, strategic development and innovation and improving the use, quality and access to information and communication technologies; The Operational Program for Human Capital aims to increase economic growth by investing in the promotion of employment and labor mobility, especially among young people and people outside the labor market; promoting social inclu-

[46] Hângănuţ Radu, *Roboţii sunt industria, www. revistasinteza.ro/robotii-sunt-industria*.

[47] Programe cu finanţare europeana nerambursabilă 2014-2020, *https://www.librabank.ro/programe_finantare_europeana_nerambursabila_2014-2020*.

[48] Fondul European de Dezvoltare Regională, *fondurile-euro.ro/fedr/fedr.php*.

sion and the fight against poverty, and supporting the education, the development of skills and encouraging lifelong learning, etc.

Even if 60 percent of jobs in Romania could be affected by the 4.0 digitalization of the economy, executives and leaders of government agencies rely on the Fourth Industrial Revolution.[49]

IT companies will have a greater participation; Industry 4.0 will attract new cyber-physical systems (CPS) or services: IT security, Big Data analysis, M2M solutions and Artificial Intelligence.

It is estimated that the automotive industry is the one that uses most of the resources and makes the greatest amount of investments. Even if there are only two car manufacturers, Dacia and Ford, the supply chain is well developed; of the 20 global suppliers, 13 are present in Romania through production facilities

One of the benefits of Romania in terms of Industry 4.0 is that it can become one of the best destinations to invest in new production facilities. Germany is the main sponsor of the Industry 4.0 strategy and one of the largest investors in Romania. The automotive industry will be the one that captures the greatest amount of resources and makes the biggest investment.

The Digital Agenda has evolved and has become a digital single market.[50] Adopted on May 6th, 2015, the Digital Single Market strategy aims to provide better access to the benefits of digital technologies to all citizens and businesses throughout Europe.

This will eliminate the essential differences between classical and modern economies and will break down barriers to the development of cross-border online activities.

In this new vision, citizens, governments and business environments can have the same access to the benefits of the digital age, favouring the unification of the 28 member states's markets. This could contribute more than € 415 billion to the EU economy and create thousands of new jobs.[51]

A single digital market would mean fewer barriers and more opportunities, that is, more opportunities to sell, buy and innovate safely, legally, at a cost or at an advantageous price.

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49 ----------60% din locurile de muncă din România ar putea fi afectate de digitalizarea economiei, *https://www.ziaruldevrancea.ro/*.

50 European Commission, Digital Single Market , *https://ec.europa.eu/digital-single-market/*.

51 ---------*Viitorul digital al Europei se bazează pe a 4-a revoluție industrială*, *https://cloudmania2013.com/.../viitorul-digital-al-europei-se-bazeaza-pe-a-4-a-revolut....*

Industry 4.0 is unleashing a revolution in the supply chain. Manufacturers who want to keep up with the evolution of the global industry are beginning to think things beyond the traditional pattern.

Logistic collaboration is a typical circular economy model in which maximum levels of efficiency and sustainability can be achieved in the supply chain.

In Romania, large consumer goods companies have already revolutionized their mode of operation and are working with suppliers and distributors to reduce the distances from factory to transport, costs and pollutant emissions. These companies are ready to take full advantage of Industry 4.0, because they can move and grow in tandem with consumer demand.[52]

The industrial revolution 4.0 opens a period of opportunity under the impact of new technologies.

It will stimulate the agility of the business, production and logistics chains through the convergence of new technologies.

Transportation, communications and logistics costs will decrease, which will represent a long-term gain in efficiency and productivity.

Increasing the speed of response to the dynamics of demand will increase the competitiveness of manufacturers and the global market. Romanians will spend more on personalized services than on manufactured products, a notable trend in annual growth of 3.7 per cent in March, 2018; compared to 1.4 per cent in the growth of the industry.[53]

In the context of the Fourth Industrial Revolution, in addition to investing in advanced digital technologies, the transformation into a "digital company" requires a much deeper change.

Companies will have to find new business models, fundamentally rethink how companies work and measure business success, reconsider how they attract, develop and promote digital talents.

Companies that will successfully complete this transformation process will truly become digital businesses with basic physical products, complemented by digital interfaces and innovative data services.

They will communicate in real time with customers and suppliers in interconnected digital ecosystems capable of generating important economic changes in developed and emerging markets, in the latter case, digitalization is a factor to accelerate the emergence process.

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[52] Industria 4.0: cum putem urmări procesul logistic pe smartphone, *www.roaliment.ro*.

[53] Revoluția industrială 4.0 – oportunități, sub impactul noilor tehnologii, *https://modernbuyer.ro › Retail & FMCG › Stiri*.

Very often, barriers in the single physical market also affect the online market. For example, online services are rarely marketed outside of a country.

Only 7 per cent of small and medium-sized enterprises in the EU carry out cross-border sales.[54] You can change the situation bringing the benefits of the single market to the online environment.

It was said in this context that

> Romania is not yet ready to join the 4.0 agenda of Europe 4.0 ... the delay in the rapid start of actions will lead to the elimination of Romania from the map of the European agenda in this field with long-term negative repercussions for Romanian companies: An active awareness and support campaign is needed to adapt them to European and global digitalization of manufacturing trends.[55]

The role of social partners in Romania in the formulation of industrial policies has a long tradition, but also faces many challenges.

According to a recent study by Eurofound,

> industrial policy initiatives are often taken unilaterally by the government, but other options can include social partners in different configurations, which include: bipartite initiatives (a common approach of social partners): tripartite initiatives together with public authorities), tripartite initiatives (the three factors involved in the combination sometimes with other civil society actors, such as NGOs, research centres or qualified public figures), initiatives such as public-private partnerships (a social partner and public authorities), and unilateral initiatives of a single social partner.[56]

It should be mentioned that Romania is struggling to keep up with the demand for specialists and the effects of the emigration of professionals, as a strategy[57] in order to develop and centralize, in the long term could grow into a market more bidding for investors in technology.

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[54] Priorităţi | Comisia Europeană - European Commission, *https://ec.europa.eu/commission/priorities_ro*.

[55] Banabic Dorel, *Industry 4.0 started. Is Romania ready for the challenges of this new revolution?*, in Revista de politică ştiinţei şi scientometrie, vol. 5, no. 3/ 2016, p. 201

[56] Vassil Kirov, *Industria României: situaţia actuală*, *www.effat.org/sites/default/files/events*.

[57] Dorobanţu Bianca, *A patra revoluţie industrială*, *https://www.forbes.ro/articles/patra-revolutie- industriala-100314*.

VI. Conclusions

Industrial Revolution 4.0 is a natural step in the evolution of humanity, a new challenge for civilization, which should not have reservations about the use of robots in the economic activity they cannot completely replace human intelligence, artificial intelligence can be even greater than human intelligence, but will always depend on the latter who will have the main role.

New technologies help companies become more productive and create better quality products in a safer work environment. In addition, it allows them to grow and be more competitive in the global market.

There are important development opportunities for Romania in the context of Industry 4.0. To fulfil the true potential of Industry 4.0, Romania needs to plan its digital transformation. One of the most important things is, of course, the creation of an adequate legal framework, such as the adoption of the digital single market telework strategy and the promotion of artificial intelligence. The future of industrial production is digital, and Romania cannot ignore it.

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