THE FOURTH INDUSTRIAL REVOLUTION „INDUSTRY 4.0”

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Abstract: The many observers estimate that in the world is at the beginning of a new industrial revolution, which it is considered the fourth revolution and it is called "Industry 4.0". The connecting many products to the internet, presence of sensors, wireless communications expansion, robot and intelligent machine development, real-time data analysis have the potential to turn the way the production is done. Connecting the physical world to the virtual world in cyber-physical systems it will have a disruptive impact on technologies, manufacturing processes and people.

Keywords: revolution, industry, internet, cloud computing

1.Introduction.

The industrial companies in all sectors globally are going through a fourth industrial revolution that could be called "Industry 4.0". The transition to this new reality of the digital industry is in full swing all over the world: approximately one third of companies are already measures the digitization as high, and this level is expected to rise on average from 33% to 72% in the next 5 years.

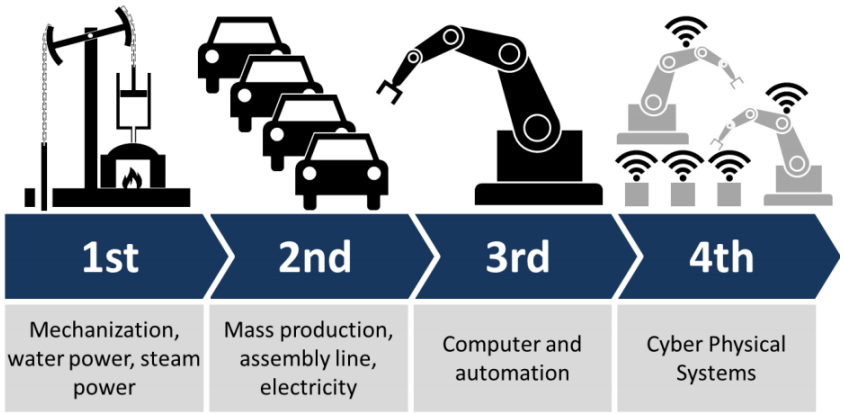

Fig. 1 *The industry evolution*

2. What it is Industry 4.0

It is a significant transformation of the entire industrial production by merging digital and internet technologies to conventional industry. Opinions are divided on the use of terms of revolution or evolution. In Europe, the concept was launched and it is supported by Germany government programs and leading companies like Siemens or Bosch. In America, the approach is often called "Smart Manufacturing" in China discusses the "Made in China 2025" and Japan "Innovation 25".

All aim the development of an industry to launch products faster to increase flexibility and increase resource efficiency through digitization. In intelligent factories created by Industry 4.0, modularly structured, cyber-physical systems monitor physical processes, create a virtual copy of the physical world, and make decentralized decisions. They communicate using the Internet of Things, cooperating in real time with each other and with human resources.The information storage and processing takes place using Cloud computing.

The Cyber-physical systems

The Cyber-physical systems SC-F mechanisms monitored or controlled by algorithms (software) integrated with users via the Internet.Physical and software components interpenetrate on different spatial and temporal scales, having multiple and distinct behaviors and interacting in ways that change the context of the whole system. Example of SC-F: intelligent vehicle systems, medical monitoring, process control systems, robotic systems, autopilots in avionics, smart homes, intelligent transportation, smart cities, etc. Multidisciplinary approach involving SC-F have the same basic architecture as the IoT, but greater with filler and coordination between physical and computational components.

Internet of Things

IoT (also called the infrastructure of the information society) describes interconnection of intelligent components (uniquely identifiable and interoperable), whether physical devices, vehicles have buildings elements have electronics, software, sensors, actuators and components for connecting to a network that allows collecting and exchanging information. The intelligent items can thus be remotely monitored and controlled, allowing integration between the physical world and computerized systems. Estimate of 50 billion intelligent items in 2020. Sensors and actuators make from IoT an instance of SC-F.

IoT uses machine learning capacity and technology for Big Data for retrieve, interpret, and use data from the automation sensors and systems
industry.

Cloud computing

Using shared (common) on request by computers or other devices of sets of data and computing resources (processing) on the Internet.

3.The Industry Technologies 4.0

The large industrial revolution depends on small technological revolutions in the various fields:

- Applying information and communication technology to digitize and integrate information systems in design, development, manufacture and use.
- New software technologies for modeling, simulation, virtualization and the digital manufacturing.
- Development of cyber-physical systems to monitor and control physical processes.
- The evolution of 3D printers and additive manufacturing to simplify manufacturing.
- Support for the decision to human operators, smart appearance and support tools using augmented reality. New forms of human-machine interaction. Many of these technologies have been available for a few years, and others are not yet ready for use on a large scale

4.The benefits of Industry 4.0

TIME: Every employee becomes more efficient when working in an optimized process. Engineers spend 31% of working time searching for information, time that can be used for activities that produce value.

COST: Presents accurate data in the right context and format needed to make informed decisions. Incorrect information and erroneous decisions taken on them cost 25% of the company's income.

FLEXIBILITY: They create flexible systems ready for change and ready for new opportunities. Only 36% of companies are ready to optimize processes based on data analysis.

INTEGRATION: The digital manufacturing involves the simultaneous development of the product and the production process. The companies reduce 80% time with production interruptions if they use digital validation.

The digital factory

The Digital Factory will allow optimization of all phases in the product life cycle. The virtual simulations of design and functionality developed in parallel with manufacturing planning lead to a much faster market launch, significant cost reduction and the higher quality. Everything will be driven by data analysis. Digital Factory integrates Product Lifecycle Management solutions, Digital Manufacturing, Manufacturing Execution System and IoT components that communicate feedback from you manufacture with ongoing processes or products in use.

The workplaces in the Industry 4.0

The future of blue dressing gown will be seriously influenced by the Industry 4.0. The surely the skills required in the factories of the future will be other than the present ones. Many of today's activities, serving production machines, precision positioning, assembly, quality inspection will be done by robots. Not only are they more effective, they also communicate perfectly with decision and control systems.

The labor market will change, but it is hard to predict if there will be more or fewer jobs overall. Robots are still at the beginning and can not replace people in all activities. On the other hand, the rate of return on investment in a fully automated factory is not attractive now. All forecasts are based on historical data, but exponential technologies are completely new, so the effect of large-scale evolution and use is hard to predict. The risk is to have massive unemployment for certain categories and the lack of digital skills.

5. The Romania's advantages in terms of Industry 4.0

There are many factors that place our country in a very favorable position in the prospect of moving to Industry 4.0. Even though there are voices claiming that we can not make the jump from 2.0 to 4.0, Romania will benefit of significant and will attract numerous investments.

I mention below 7 advantages that Romania has:

5.1. Industry Strategy 4.0 aims to bring production back to Europe, focusing on personalized production, high quality and manufacturing near the consumer market. Eastern European countries are the best destinations for investing in new production facilities.

5.2. The automotive industry will be the one to engage most resources and make the most investments.In fortunately in the last 10 years, this industry has developed strongly in us. The number of automotive suppliers in Romania is steadily increasing. Even if we have only two car makers, Dacia and Ford, the supplier network is well developed. Of the top 20 global automotive suppliers, 13 are present in Romania with production facilities. According to ACAROM, the turnover of suppliers is twice as high as the builder's.

5.3. The speed of the internet connection in Romania is one of the highest in Europe. The Internet of Things will generate a huge amount of data and will require very high transfer and processing speeds.

5.4. IT companies will have an increased involvement, Industry 4.0 will attract new cyber-physical systems (CPS) services or services: IT security, Big Data analysis, M2M solutions, and Artificial Intelligence. The IT sector is well developed in Romania and can support investors' efforts in digital factories.

5.5. The skills required for the digital factory can be found in Romania. There is a good manufacturing tradition and good technical universities, as evidenced by the numerous investments in Automotive R & D.

5.6. In the period 2016-2020 are numerous grant programs for R & D Technologies Industry 4.0. They will support the development of Romanian companies and it will attract investors.

5.7. Germany is the main supporter of Industry 4.0 strategy and is one of the largest investors in Romania.The many German companies already have the latest technology in production facilities from us.

6.Conclusions:

There are significant opportunities for development for Romania in the context of Industry 4.0. The direction in which the industry goes is very clear. Data management and security will be key issues to solve. To achieve the true Industry 4.0 potential, companies need to plan digital transformation.

Although worldwide companies are advancing in Industry 4.0, the study reveals some regional features at the level of objectives: Japan and Germany are implementing digitization primarily to increase their efficiency and product quality. In the US, the trend is to develop new business models using digital offers and services, and to provide these products and services digitally as quickly as possible. China's manufacturing companies focus on ways to cope with international competitors by cutting costs. "Our study shows that the level of digital integration will be broadly comparable between regions over the next five years, led by countries like Japan, Germany and the US. We do not expect Industry 4.0 to divide regions, but to create a strong link between companies and countries, and thus even promote globalization.

Data analysis tools enable product development and also allows companies to expand services and better align their offerings with the needs of their clients

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