

THE

Gökçe | Yaralı

Fine PRINT

July 2017

58



Footsteps of Industry 4.0

FOOTSTEPS OF INDUSTRY 4.0

The world had been introduced to the industrial revolution, one of the most important milestones in the history of modernity, after the invention of the steam-operated machinery. The second industrial revolution came after the utilization of electricity and mass production (Ford type production). The usage of the calculation capacity of robots and computers brought us to the third wave in the 1970s. Although computers were used to do the calculation in these systems, they still were not entirely automatized, so, things were still under the control and supervision of mankind directly.. However, today, we hear the footsteps of a brand new system that would knock down all the mechanisms we know, push out manpower to a large extent and influence the economy deeply: **Industry 4.0**.

Industry 4.0, hence the name, is considered as the fourth industrial revolution. It basically means a combination of industry and sectors with information technologies. In other words, it means a system which is completely free of manpower, and is working, coordinating and processing on its own through utilization of cyber-physical systems in manufacturing in factories.

Although the human factor is not something that can be fully eliminated in the near future, by effectively using technologies such as Artificial Intelligence, Big Data, Cloud and IoT, Germany is leading a new industrial revolution. The system of this revolution works in three stages:

- **Hardware** (various devices with built-in systems and smart sensors)
- **Software** (software that stores the data received from sensors by processing it with artificial intelligence and that works with the cloud or server)
- **Applications** (Applications that connect smartphones, tablets and computers to the hardware and system, allowing smart devices to be in control)



Field Of Application

Even though the name has the word “industry” in it, the field of application is expected to be much broader, in numerous sectors from production to energy, retail, logistics and storage. In the aspects such as stock tracking, analysis of customer behavior, preventative maintenance and analysis of the fleet performances will be less expensive and more efficient at the same time.

Six pilot sectors specific to industry are as follows: automotive, machinery, white goods, food and drink, and textile and chemistry.

Adidas, as a global company, has already started the tests for Industry 4.0 and set up its first dark factory, named “Speed Factory” in Germany.

How is the industry converted?

According to the analysis of Boston Consulting Group (BCG), Germany, who applies Industry 4.0, has already achieved an increase at the industrial efficiency and a decrease at the cost of total production from five to eight percent. This decrease indicates that Germany will take 90-150billion euros advantage of total production costs within the next ten years. Excluding equipment expenses, operation expenses are also expected to decrease nearly twenty percent.

Changes which will be experienced with Industry 4.0 are not limited to effects in costs and efficiency. It is also important to consider how the companies which cannot adapt to Industry 4.0 will continue to compete in the market. For this reason, it is anticipated that under-developed and developing countries will no longer have the leverage of cheap labor; new definitions and professions such as data analyzing and also need for underqualified workforce will diminish.

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For instance, for Turkey within the next ten years, need for underqualified workers is expected to decrease by a number of five hundred thousand, while need for new and qualified employees is expected to be approximately a hundred thousand.

A factory in China produces mobile phone modules is being accepted as the very first example of the system. It is said that a robotic arm used in the factory has the capacity to do the work of 6-8 workers and as a result, the number of people working in the factory has decreased from 650 to 60. Another intriguing aspect is a distinguishable decrease in defective products from 25% to nearly 5% while actively using the system in the factory.

It is certain that Turkey will be affected with these changes. According to the researches, Turkish manufacturers have to invest nearly 10-15 billion TLs in order to adopt their technologies to Industry 4.0. This also indicates a brand new market concerning the integration of Industry 4.0.

It is expected that progress of Industry 4.0. together with analyze and processing of big data will result in improvements related to working processes, decision making mechanisms as well as in decrease of costs of companies. Nevertheless, this period of integration will not be smooth. In spite of need for qualified employees, this technology will also cause a significant increase in unemployment in general and lead a social transformation.. For the same reasons mentioned above, it is also anticipated that inequality between the social statutes of employers and employees will increase much more than ever before.

At the same time, digitalization of manufacturing process may cause locking of the system in case of cyber-attacks as well as stealing of trade secrets or even physical injuries of employees to be physically injured. It might sound utopic at the beginning; however, the risk seems really close, when remembered the factory in Bursa which was hacked by Russian hackers in order to demand a ransom.

What is the legal status?

Obviously, there will be legal consequences of all the afore-mentioned processes. In the simplest term, companies will discharge many of their employees after integrating their systems to Industry 4.0. However, being integrated to Industry 4.0 will be considered as a termination for default? There is no judgement by the High Court of Appeal for now; however, it is expected for the Court to have a policy which focuses on employment, steers employers to educate their employees as much as possible in order to keep them working and to consider termination as a last resort. At this point, extra taxation is also another predicted outcome for the companies which are integrated to Industry 4.0.

Another legal debate deals with the issue that who bears criminal and legal liabilities in case of an occupational accident, even though it is highly expected that Industry 4.0 will reduce such accidents. The employing company? The company who provides the integration services? The company who performs the tests on the systems or the software developer? The engineer or the shift manager?

Similarly, possible physical damages to employees, losses in manufacturing, losses caused by stolen data as a result of cyber-attacks are other legal aspects to be worked on.

At this point, it will be easier to find specific answers when all the persons who are potentially liable are located in one country; however, the problem becomes much more complicated when they are not. Also, there will be problems during the execution of contradicting court decisions from different countries; one holds that the software developer is liable and the other decides that the company should bear all the responsibility.

Answers. Not theories.

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