

THE TRANSFORMER EFFECT OF INDUSTRY 4.0 CONCEPT ON HUMAN RESOURCES: HR 4.0

Endüstri 4.0'ın İnsan Kaynaklarını Dönüştürücü Etkisi: İK 4.0

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Reference: Nalçacigil, E. (2020). "The Transformer Effect Of Industry 4.0 Concept On Human Resources: HR 4.0", *International Journal of Disciplines Economics & Administrative Sciences Studies*, Vol:6, Issue:17; pp:261-270.

ABSTRACT

The concept of "Industry 4.0", which first announced its name at the Hannover Fair in Germany in 2011, has been a subject that has been constantly taken into consideration by academics, practitioners, politicians and government officials worldwide. The concept of Industry 4.0 is expressed as a new trend in automation and data transfer in production technologies. Its adaptation to the Industry 4.0 system is important to maintain the current positions of the employees. Workers included in the system must learn the new process information required for the business process systems. If it is considered in terms of employment policies, it can easily be said that the need for skilled workers will increase and the need for unskilled workers will decrease with the spread of Industry 4.0 applications. Therefore, it is necessary to harmonize the existing human resources policies with this new generation business approach, which can be expressed as Human Resources 4.0. In the study, firstly, the concept and development of Industry 4.0 was defined. In the second section, the transformation of human resources management is examined in parallel with this issue, and human resources 4.0, which name is relatively rare in the literature, is explained. In the last chapters, this term has been compared with Traditional Human Resources Management and the current labor force market. As a result of the study, the main purpose of HR 4.0 is to provide employment, training, motivation, orientation, etc. and it can be stated that the focus is on the skills those are more advanced than the Classical Human Resources Management concerned with the processes.

Keywords: Industry 4.0, Human Resources Management, Human Resources 4.0

ÖZET

Adını ilk kez 2011 yılında Almanya'daki Hannover Fuarı'nda duyuran "Endüstri 4.0" kavramı, bu tarihten itibaren dünya çapında akademisyenler, uygulayıcılar, politikacılar ve hükümet yetkilileri tarafından sürekli dikkate alınan bir konu olmuştur. Endüstri 4.0 kavramı, üretim teknolojilerinde otomasyon ve veri transferine yönelik yeni bir trend olarak ifade edilmektedir. İş görenlerin mevcut pozisyonlarını korumak için Endüstri 4.0 sistemine adaptasyonu önemlidir. Sisteme dahil olan işçiler sistem için gerekli yeni süreç bilgilerini öğrenmeleri gerekmektedir. İstihdam politikaları açısından düşünülürse Endüstri 4.0 uygulamalarının yaygınlaşmasıyla, vasıflı iş görene olan ihtiyacın artacağı, vasıfsız iş görene olan ihtiyacın gittikçe azalacağı rahatlıkla söylenebilmektedir. Dolayısıyla mevcut insan kaynakları politikalarının bu yeni nesil işletmecilik anlayışıyla uyumlaştırılması gerekmektedir ki bunu İnsan Kaynakları 4.0 olarak ifade etmek mümkündür. Çalışmada öncelikle Endüstri 4.0 kavramı ve gelişimi tanımlanmıştır. İkinci bölümde, bu paralelde insan kaynakları yönetiminin dönüşümü irdelenmiş ve literatürde ismi görece az geçen insan kaynakları 4.0 açıklanmıştır. Son bölümlerde ise bu terimin geleneksel insan kaynakları yönetimi ve mevcut iş piyasasıyla kıyaslanması yapılmıştır. Sonuç olarak İK 4.0'ın temel amacının, bilinen hali ile işe yerleştirme, iş gören temin etme, eğitim, motivasyon, oryantasyon vb. süreçlerle ilgilenen insan kaynakları yönetiminden daha ileri düzeyde yeteneklere odaklanmak olduğu ifade edilebilir.

Anahtar Kelimeler: Endüstri 4.0, İnsan Kaynakları Yönetimi, İnsan Kaynakları 4.0

1. CONCEPT OF INDUSTRY 4.0; DEVELOPMENT AND DEFINITION

Industry 4.0, which is one of the popular concepts of recent years, is also used in the literature with expressions such as "Industry 4.0" and "Smart Industry". Although many authors and academicians offer different opinions about the concept, it does not have a fully agreed definition. Production is among the main elements of the economic growth of developed countries. For example, 75% of exports in developed European countries and 80% of all innovations are industry-based (Soylu, 2018: 44; Hofmann and Rüşch, acted from 2017. Kamber, 2019: 10). Production factors vary in technology and human resources. Shifting investments to countries that offer cost advantage in order to reduce production costs has accelerated the spread of technical and knowledge (Yazıcı &

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Düzükaya, 2016: 56-57). On the other hand, developed countries are looking for solutions in order to use more advanced technology and smart systems from production processes in order to maintain their industrialization for themselves and to eliminate the deficiencies caused by the aging population structure. This search was the driving force in the emergence of the concept of Industry 4.0 (Gabaçlı and Uzunöz, 2017: 151; Özkurt, 2018: 21-22).

The concept of "Industry 4.0", which first announced its name at the Hannover Fair in Germany in 2011, has been a subject that has been constantly taken into consideration by academics, practitioners, politicians and government officials worldwide. The concept of Industry 4.0 is expressed as a new trend in automation and data transfer in production technologies. Cyber Physical Systems (CPS), Internet of Things (IoT), cloud systems and smart factory concepts are mentioned as components that form the concept of Industry 4.0. To summarize the system briefly; The digital copy of real objects is created in the virtual world with the support of cyber physical systems created in the smart factories established. With the internet of things, products are in communication and coordinated with each other and with people. Thus, production and process monitoring will be done using the internet in the created cyber physical system (Yıldız, 2018: 547; Kayar, Ayvaz and Öztürk, 2018: 1652). At the fair in Hannover, "Why should not the machines and systems in the factory be in contact with each other and the products they produce, while all computers can be in close contact with each other today?" This question also revealed the basic logic of Industry 4.0 (Dutzler, et al. 2016: 2-3; Alçın, 2016: 23; Kağnicioğlu and Özdemir, 2017: 903).

In the fourth phase of industrialization, the structures were divided within themselves, outsourcing, supply chain operations and talent management in HR came to the fore. Machine-machine, machine-human, human-machine relationship has started, and the whole system has begun to be connected with artificial intelligence with the whole system Block Chains. The period of smart and dark factories has been interrupted, and the understanding of minimizing the human factor has been strengthened in auditing, monitoring, sustainability and supply processes and even in customer relations (Davies, 2015; Bösl, 2016). It is also possible to accept Industry 4.0 as the "Hannover Process" and it is accepted that the three industrialization periods that have been left behind have been completed and a new period has started, especially in the HR dimension. While the common characteristic of the three periods left behind was development through production, in the fourth period, the environment, social, human and economic development was restarted through Industry 4.0, the role of HR factor started to be discussed in this process (Frederick, 2016: 9-10; Toroa, Barandiarana and Posadaa, 2015 : 364-367; Yazıcı and Düzükaya, 2016: 56-57; Stentoft, 2019: 5155).

The "Industry 4.0 Manifesto" was published in 2011 by the German National Academy of Science and Engineering (Acatech) on Industry 4.0. According to this manifesto, the general characteristic of Industry 4.0 is to establish simultaneous virtual and real communication and communication between digital and smart production systems, human, machine, and products in order to respond quickly to variable customer demands. Industry 4.0 can also be defined as the creation of smart products and processes with the use of smart devices, thereby ensuring the conversion from traditional production systems to smart factories. Acatech for Industry 4.0 in 2013 "In industrial processes, production and logistics are technically integrated with the use of cyber-physical systems and the Internet of things and services." (Kağnicioğlu and Özdemir, 2017: 903-905; Kamber, 2019: 17).

Those targeted with Industry 4.0 are to develop products or services, to integrate human, machine, information systems in the processes from the raw material to production and to the end consumer in the supply chain logic, to ensure that the machines make autonomous production processes, to solve its additional requests systematically with the flexibility of the machines in production. It is thought that the implementation of Industry 4.0 in enterprises will radically change HRM policies. Those who work unskilled in production will be replaced by highly skilled workers who can use

high technology and work systematically. The new information and production technologies brought by the fourth industrial revolution may increase the need for a more skilled workforce. In order to create a skilled workforce, universities should renew their education programs in accordance with new technological infrastructures, and increase information technologies, innovation and entrepreneurship programs. In addition, universities should specialize in R&D and establish new technology strategies in cooperation with the private sector (Yazıcı and Düzkaaya, 2016: 59).

Its adaptation to the Industry 4.0 system is important to maintain the current positions of the employees. Workers included in the system must learn the new process information required for the system. In some routine or simple work groups, it is thought that unemployment will increase in the following process as the need for workers will decrease with the new system. But since there will be new business groups to be created by the new system, it is earlier to comment on whether unemployment will increase or decrease. If it is considered in terms of employment policies, it can be easily said that the need for skilled workers will increase and the need for unskilled workers will decrease with the spread of Industry 4.0 applications (Yazıcı & Düzkaaya, 2016: 57-59).

2. TRANSFORMATION OF HUMAN RESOURCES MANAGEMENT

Human resources, which have evolved with Industry 4.0, have transformed into an understanding of competing with human resources and talent management to meet the expectations needed today. The reasons such as the dominance of global and economies of scale that can be evaluated as one of the results of Industry 4.0 in the business world, the presence of business volume exceeding the capacities in many sectors, the development of internet, network and information technologies day by day, and the presence of information economy are some of the forces that force businesses to change their structures. Vertical integration, managerial control, stagnation, mutual loyalty between business and employee are now replaced by more mobile, competitive, continuously developing and self-managing business features. Enterprises have started to decrease, unite, and form joint ventures in the number of employees to develop their basic competencies and skills (Güler, 2006: 18; Yüksel, 2007: 22; Dolgun, 2007: 7). Therefore, it is necessary to harmonize the existing human resources policies with this new generation business approach, which can be expressed as Human Resources 4.0.

The philosophy of Industry 4.0 is to draw the human factor from the production process and to obtain accurate and cheap outputs (Ünlü & Atik, 2018: 438). Therefore, although it is thought that there are industrial facilities in the center of Industry 4.0, there is essentially qualified and expert human resources. It can be said that the human factor has become more important than ever before as the architect of transformation. However, it can be said that the importance in question is not because of the “working” quality of the person, but rather because of its “value adding” quality.

It can be stated that radical changes have started in human resources policies with Industry 4.0. Because strategic HRM and talent-based human resources management due to the lack of personnel management, and a shift towards talent-based human resources management due to the deficiencies of human resources management. The driving factor of these changes was the development of models and technologies developed in production processes. It is expected that there will be people who can work flexibly, knowledgeable, talented and add value to these businesses as the center of the new generation human resource understanding.

While the need for qualified labor force is expected to increase with Industry 4.0, the demand for unqualified labor will decrease. According to Türkel and Bozağaç (2018: 436), the integration of technological systems, information systems, production processes will reveal new requirements in terms of working style, job descriptions and the content of the work. It will be important that the employees are qualified, with different skills and competencies, and the value of quality in education will come to the fore. Increasing the density of information and the pressure of the technology to cope with this will reveal another very important movement of change.

Industry 4.0 will have pressure on human resources management. Because the constant change of the business world and production styles in recent years, qualified employees are seen as the most important source in creating competitive advantage, and the need to review the human resources strategies and contribution of the human resources departments to the business. Enterprises have to increase their competencies, constantly compare themselves with the best, and apply new methods. Considering these situations, the reasons for the human resources management's acceptance as a means of creating competitive advantage are also revealed. Today, businesses are trying to offer the same products, more or less similar technologies, to the same market. Everything that enterprises will use to gain competitive advantage must have a structure that will create a privileged advantage (Güler, 2006: 18; Yüksel, 2007: 22; Dolgun, 2007: 7).

It can be said that the perspective of human resources has changed radically with Industry 4.0, and importance is given to the management of talents in the new generation human resources processes rather than the management of routine processes. Because it can be thought that a correct orientation has started in HR 4.0 in order to leave routine works to smart systems to compete with human resources.

2.1. Human Resources 4.0

When we look at the story of industrialization, it can be stated that the first steps were taken with arm / muscle power, walked with steam machines, accelerated with internal combustion engines, and reached unstoppable power with internet and information technologies. In the age of Industry 4.0, it is seen that smart systems challenge "human". However, the "human" who are challenged are those with average qualifications. Because "human", a resource that is specialized and can produce value, will always maintain its place at the top. In this regard, Bayram (2018: 69) uses the phrase "Industry 4.0 will be the age of engineers".

In the literature, it is seen that a full definition about HR 4.0 has not been made, and those working in this field have not yet agreed. In addition, it is difficult to study enough about HR 4.0 and to mention a built-in literature. However, the definition of HR 4.0 as a concept; moving all HR processes to digital platforms by deploying systems based on talent management in human resources processes, minimizing operational processes with smart systems, operating competence and expertise-based processes, offering employees the opportunity to prove themselves at the highest level, using tools that are more advanced than monetary and material motivation tools, it is possible to achieve digital transformation (Asiltürk, 2018: 537).

HR 4.0 is a smart system based on participation, rather than managerial processes, based on techno-human model, improvement and development centered, challenging hierarchical organizational structures, value and result oriented, business skills and expertise (Filizöz and Orhan, 2018: 113-114). According to Demirel, (2018: 435), "Industry 4.0 process stands out as a journey beyond efficiency increase, creating a higher value added, creating its own economy, changing the established value chains fundamentally and most importantly, reaching a much more important point in the need for qualified manpower. The revolution-change in industrial production with Industry 4.0 means not only the use of smart machines more and more efficiently in production, but also the task of planning and managing the works-production of the machines, and making decisions about this, thanks to technologies such as big data and analysis and virtual reality. "

2.2. Human Resources Management with Human Resources 4.0

The technological development, growth and structural changes that come with Industry 4.0 depend on the qualified human resource as the most important input of the production as well as the physical capital increases. On the other hand, along with the capital instruments, human will continue to be seen as a source of resource in the production process. Because it will always maintain its importance and value, provided that it is human qualified as a human resource. Therefore, when the growth processes of the developed countries that have taken the industry 4.0 to the agenda and invest in it are analyzed, it is seen that the main development is the importance

given to the human resource. In other words, when establishing smart and unmanned factories, it can be stated that priority is given to highly qualified people. The traditional business approach and structures change in this process.

There are a number of results that the Industry 4.0 period will produce in the context of HR 4.0, and it is possible to summarize them as follows (Koçak, 2017; Asiltürk, 2018: 537-538):

- Working styles and career perception will change. Under severe conditions, the way they work by pushing the limits of body strength or closed hours in the office environment will change, and instead, those who work will follow their own practices in organized processes and develop production strategies. Due to cloud technology and similar services, the concept of overtime will disappear, offices will not be needed to work, and the system of working from home will gain importance as remote access will be high. Private life - work life balance will be established, gains for income increase will be achieved, decision processes will be accelerated, expertise will be a very important strategic advantage, and because people are able to access information, they will constantly learn and update themselves. The career plan will move away from its traditional functional structure, it will mean continuous learning regardless of age, the person-centered learning and the differentiation of education methods from traditional education methods.

- Competence in information technologies will gain importance. Since the level of competence will increase especially in the fields of software and hardware, issues such as computing, informatics and software will become competencies expected from all employees. Regardless of the white and blue collar, it will be desired to be knowledgeable and competent in the use of digital technology for every level of employees, new business lines, new occupational groups and new titles related to information technologies will emerge.

- Employment will increase due to the emergence of new professions. Due to the new professions, the need for labor related to that profession will arise and the employment will increase naturally. These new professions will be at the level of qualified intermediate staff or white collar. To list some of the professions that Industry 4.0 will bring with it and that will assign a task to HR 4.0 as Industrial Data Science, Robot Coordinator, IT / IoT Solution Architecture, Industrial Computer Engineering / Programming, Cloud Computing Expert, Data Security Expertise, Network Development Engineering and etc. will be possible professions. The amount of manual work required in production will decrease by opening new job opportunities to those who are experts in the field of robotics. For example, according to the 'Future of Jobs' report of the World Economic Forum, approximately 5 million jobs will disappear with Industry 4.0 as of 2020; however, 2.1 million new jobs / professions will be needed.

- New professions and jobs will lead to unemployment by reducing the need for some occupations. Along with smart factories, the blue-collar workforce will be replaced by robots and blue-collar workers will encounter unemployment. While the blue-collar employment decreases, white collar employment will become more important, the increase in layoffs may cause some departments to be emptied in some businesses and not to be needed. The number of 'dark factories' that are equipped with fully automated systems and that do not need any human existence or incorporate very few human elements into production will increase. The need for countries such as China for cheap labor will be reduced, as the work of robotic workers in factories will reduce the role of the human factor in production. As a result of executing processes such as smart systems, the number of white-collar people may decrease, and white-collar people, just like blue-collar ones, may be unemployed. Businesses' adaptation to larger data will allow industrial data scientists to increase demand while reducing the number of workers involved in quality control processes. By the means of artificial intelligence, logistics vehicles that can operate independently and an automated transportation system will develop and the need for logistics personnel will decrease.

- Human resources management practices will be different and HR 4.0 will become widespread. In Human Resources practices, motivation studies will gain importance and many popular HR

concepts such as teamwork, creating team spirit, building effective teams can be eliminated. Instead, the use of artificial intelligence in HR processes and HRM processes and practices based on talent management can be expected. As efficiency will be related to new ideas and inventions, trainings will increase in innovation and innovation.

According to all these explanations, it is possible to consider industry 4.0 as a threat for low and average employees in general, but it is also an opportunity for employees in HR 4.0 standards. This situation can be used as a factor that can be turned into an advantage for countries to develop and compete. Because if qualified human resources will be one of the basic inputs of the new industrial process, this situation can be turned into an opportunity with good education. Because the qualified human element increases the amount and quality of the physical capital, leading to the development level. Besides, physical capital and human resources are among the important indicators of development in determining the development levels of countries. The fact that human resources are well-directed, trained and motivated will directly affect productivity and achieve the expected development. However, on the role and importance of the human factor in development, the contribution of the human as a value, not numerically, is important. In this regard, the provision of qualified manpower and its impact on development are of special importance, which can provide HR 4.0. In summary, it can be said that the companies and national economies that have achieved competitive advantage at the international level today come from traditional interpretation of competitive advantage, different interpretations of the human element, as well as their ability to train qualified people according to the understanding of management and production.

2.3. Human Resources 4.0 and Labor Market

It is a natural consequence that Industry 4.0 has a broad and in-depth impact on the labor market. At the beginning of these effects, along with the change in the production processes, the way of doing business and the qualifications of the employees needed. Although the qualifications of those who work according to the development levels of the countries will differ in meeting the requirements of Industry 4.0, it is possible to overcome this difference with globalization, in part. For example, highly qualified and talented engineers, who have expertise, will be able to show employment roaming between countries (Yüksekbilgili and Çevik, 2018: 423-424).

There is a misconception about the effects of Industry 4.0 on the labor market. This misconception is that machines will replace humans. Although it is true to some extent, the expression that human-machine cooperation will be advanced to the next level from the substitution of robotic systems instead of human will be a more accurate determination. Robots will begin to be positioned as people's coworkers. Therefore, it can be said that one of the fields of HR 4.0, which is a new generation of human resources, will concentrate at this point. Another area of interest of HR 4.0 will be to manage the substitution effect that will occur with the use of machinery between labor and capital, as Ricordo stated (Ardor and Varlık, 2009: 16-18).

Another impact of Industry 4.0 on the labor market can be seen in the quality of employment as well as in employment rates. As routine work processes, morning-evening working hours, classical operative tasks will change, the quality of the human resource of the new period will also change. In this context, primarily flexible working hours and multi-dimensional job descriptions will emerge. This will determine the general characteristics of the new generation of human resources. Of course, Industry 4.0 will change the quality of employment as well as its quantitative nature. For example, Apple's plans to build more than a million robots and associated facilities in the medium term mean that the company will work with fewer people. The fact that many developed countries and big companies show such a trend may cause unemployment risk on blue collar and white collar. Smart machines error, production amount, cost, working time, etc. comparative advantage over human labor increases more with developing technology (OECD, 2015).

Examining at the business lines that Industry 4.0 will affect, it is suggested that the number of employees in the fields such as chemical industry, mechanical engineering, logistics industry,

supply chain cycle, agricultural industry, transportation and storage will decrease while the qualifications of the current employees will increase. Occupational groups that are expected to rise with Industry 4.0 will be able to create opportunities for those working in areas such as programming, software, big data processing, cyber security, and blockchain (Buhr, 2017).

According to Çakır (2018: 100), "Industry 4.0 is expected to provide new investment opportunities and create employment through increased profitability and efficiency, and this cycle is expected to move towards the customer and community-oriented services ecosystem. According to a study conducted in line with these developments, it is expected that Industry 4.0 will generate 28% capital return in Western Europe and 6.7 billion new jobs in the services sector by 2035." On the other hand, with Industry 4.0, the effects of possible crises can be managed in different ways for businesses. Because the unemployment problem that emerged as a result of the crises may be lighter in the new period by the means of machine-intensive production. For example, as a result of a research made based on technological unemployment, it was determined that 47% of the total employment in the USA is in the high risk category due to technological developments and that these jobs tend to disappear in the next 10 years, similarly, 57% of jobs in OECD countries is proven to be automation sensitive, this rate is 69% in India and 77% in China, and future projections include creating 9.5 million new jobs in the EU from 2013 to 2025." (Citigroup, 2016 from Cakir, 2018: 101).

Increasing use of automation in production with Industry 4.0 enables many jobs to be produced faster, more error-free and cheaper. However, it can either eliminate or minimize certain occupational groups while highlighting some of the occupational groups given above. This may lead to negative indicators on unemployment. With the effect of robotization and digitalization in the economy in the coming years, Digital Age Professions will be able to improve (Table 1).

Table 1: Occupations in Industry 4.0 Age

Professions in High Risk Group with Automation and Digitalization	Professions in The Middle Risk Group with Automation and Digitalization	New Professions That Can Emerge Through Automation and Digitalization
Clerical and Office Jobs	Education, Art, Media	Data Miner, Data Engineer, Data Analyst
Scanty Sale and Individual Trade	Management, Human Resource Management, Business Administration	Software and Application Developer
Transport and Logistics	Some Financial Services	Network Expert, Artificial Intelligence Expert
Manufacturing Industry	Medical Service Providers	Smart Machine and Robot Manufacturer, 3d Printer Designer and Manufacturer
Construction Industry	Computer Technician, Engineering, Laboratory Technician	Digital Marketing and E-Commerce Specialist
Some Financial Services	Some Service Sectors (Hairdressing, Beauty Expertise Etc.)	
Some Service Sectors (Translator, Tax Consultancy Etc.)		

Source: (Degryse, 2016).

According to Yüceol (2019: 19), "new forms of employment can differ from a traditional employee-employer relationship. For example, in employee sharing, an individual worker can be hired by more than one employer. While in the job sharing, an employer can hire two or more workers for a specific job. In the third document, document-based work, the employment relationship and related payment can be made based on any document, unlike an employment contract." From this point of view, it will be possible to see new generation or new types of employment in working life with Industry 4.0.

In the new working order, which will be the subject of HR 4.0, information technology management based collaborative, flexible and mobile work will manifest itself. In addition to this, the working procedures in the office environment will change, and contracted working styles and service offerings will come to the fore instead of long-term staff. With Industry 4.0, there will be

developments in processes such as part-time work, freelance work, and partial business service (Kayar, Ayvaz & Öztürk, 2018: 1655; Yüceol, 2019: 21).

3. CONCLUSION

Industry 4.0, which is one of the important changes in the time of business, radically changes the way of doing business, production systems and management. One of the important points of these changes in business life is in the field of human resources. Industry 4.0, which can be described as the current state of the stages since the beginning of industrialization, continues its development with solutions that will realize the concept of unmanned work.

Development and transformation to life has also had impacts on human resources, and it has become inevitable to form new generation HR policies for blue-collar and then white-collar. The main feature of the new HR policies is the recruitment and training of qualified employees and a transition to talent management is observed. It is seen that the term HR 4.0 is used for these new HR policies.

The main purpose of HR 4.0 is to place the known state into work, to provide employees, training, motivation, orientation, etc. It can be stated that the focus is on the skills that are more advanced than the human resources management concerned with the processes. Because, although the number of employees will decrease in the operation of smart and labor-based factories, there is a need for human resources. In this new process, innovative and flexible working styles come to the fore instead of routine job descriptions and standardized working hours. Therefore, it can be said that "talent" concept will be replaced by "job" concept for businesses.

considering the comments at Industry 4.0, it is seen that the final target is unmanned production. Therefore, some criticism has been put forward, as unemployment will increase. This criticism can be evaluated from two aspects; First, Industry 4.0 attaches importance to robotic production in order to minimize human based error and maximize efficiency. This situation may be effective in increasing unemployment. Second, human resources are always needed for systems to be installed, operated and sustainable. These two approaches, which seem to be opposite with each other, have a reality share. Because in the new situation, while high quality human resources are compulsory for Industry 4.0, those with relatively low qualifications are likely to face the risk of unemployment. However, it can be argued that there will be an increase in the employment of those who have the qualifications required in the context of talent and an improvement in working conditions. In this case, it is possible to state that Industry 4.0 does not ignore human resources, but it improves HR 4.0 by supporting qualified human resources concept. Based on this proposition, it can be suggested that developments in the education system and working life in Industry 4.0 age will be encouraged in the context of HR 4.0.

Subject to the terms of Turkey's HR 4.0, in order to be sustainable, there is need for qualified employees for HR 4.0. Therefore, the system will be able to give the expected result by combining the elements that complement each other and which cannot be considered separate. It is necessary to train specialist-based, qualified, broad-vision white and blue collar human capital. As stated, in order not to be left behind the "age of engineers", it is necessary to develop solutions based on quality rather than quantity. It can be stated that universities that play a major role in training human resources in order to meet the needs of the society and the business world should be supported with the infrastructure and superstructure that can produce integrated solutions with the modern world, the capacities should be increased based on quality and the emphasis should be given to the talent factor.

As emphasized in the study, although there is a very wide literature about Industry 4.0, it has been observed that very few studies have been conducted on HR 4.0, which can be seen as one of the results of Industry 4.0. For this reason, it may be recommended to conduct more extensive research and measure by a scale the function of HR 4.0 for subsequent researchers.

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