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# THE IMPACT OF TECHNOLOGY ON HUMAN RESOURCES

**Denisa DOBAI**[1]

***Abstract:*** *The jobs' evolution and the employees' ability to adapt to technological change are important for the future of human resources. This paper presents a qualitative study that aims to identify the influence of technology on human resources. The participants in the study are people who hold key positions in private and public organizations in Oradea. Modern technologies adopted by organizations and mentioned by respondents refer to: financial software for human resources activity, for communication and for the transfer of data and documents, as well as robotic systems for replacing human operators. Automation is described in terms of efficiency and productivity.*

***Key words:*** *technology, automation, Industry 4.0, labor market, human resource*

## 1. Introduction

The concepts of technology or automation are being discussed more and more, but many employees do not currently feel their presence in their professional environment, which is why they do not give much importance to them. Modern technology is a phenomenon booming even in Romania. Awareness of the importance of introducing modern technology among employees and understanding the effects are absolutely necessary for an optimal route for performant human resources.

The world of work has undergone several changes in recent decades, so we can talk about the process of machines' optimization, creating new work, and planning programs. It is also estimated that the intellectual workforce has become more important and more numerous, and factory operators are becoming fewer and fewer and replaced by robots (Schrenk, 2010).

New technologies have a multitude of innovations, so employees are allowed remote work, innovative workspaces, and teleconferencing. It is also estimated that organizations will evolve into small structures, in which employees will form a small group, employed full-time for fixed positions, and joined by colleagues from different

[1] University of Oradea, denisa_dobai@yahoo.com , corresponding author

countries, external consultants, or specialized people for certain projects (Schwab and Samans, 2016).

This paper has two fundamental parts, the first describing the theoretical framework of technologies and their impact on the labor market, while the second presents the results of a qualitative study that aimed to identify the degree of automation and the presence of modern technologies in organizations, among which the effects felt by employees as a result of this change.

## 2. Technological Change Produced on the Labor Market

Human resources, according to experts, are crucial regarding the organization's trajectory, along with other resources, so that they have a major role in the harmonious development of any organization, even more, being considered among the most important resources necessary for the creation and operation of an enterprise (Cindrea 2008, Moldovan-Scholz, 2000).

The specialized literature concretely states that the world is in a process of change, called *the Fourth Industrial Revolution,* described by the development and use of the robot and the intelligent machine, connecting more and more products to the Internet, developing the wireless communication systems, having the role of changing the current state of the production process and the application of new forms of human-machine interaction. Named *Industry 4.0,* it has come to take over to some extent the industrial companies from all sectors worldwide, the pace of change being fast so that approximately one-third of the companies are digitized, estimating that in five years digitization will raise from 33% to 72% (Banabic, 2018; Schwab and Samans, 2016; Stăncioiu, 2017).

There are some estimates regarding the onset of the next industrial revolution. This could occur when the machines/robots have the ability to reproduce or at least create different tools to help them in the creative process. At present, a small part of the evolution of technology is highlighted, because computer programs have been made that make new programs with the help of programming languages. The speed with which this technology evolves is downright impressive, but the moment when *The Fifth Industrial Revolution* is necessary cannot be estimated precisely (Banabic, 2018).

Benefits that are attracted by *4.0 Industry* could be summed up to a few aspects such as: time, cost, flexibility, and integration. The employee is more effective when working in an optimized process while routine and too demanding activities could be replaced with those that bring added value to the company. Cost reduction is another extremely important benefit because precise data is exposed, especially when it is necessary to decide on the organization since wrong information weighs heavily when important decisions are taken. *Industry 4.0* creates flexible systems, always ready for changes and orientation. Finally, the ability of integration refers to development in a harmony of products and production processes to maximize results (Gillich and Mocan, 2017; Stăncioiu, 2017).

When discussing technology and its involvement in the field of labor, both hardware and software systems are considered. It is considered that nowadays, more and more

technologies are used in industry, specifically talking about robotics, with the advantages and disadvantages of its use in the organizational environment.

Among the advantages of using robots, we find: increased productivity and profits, increased efficiency and speed of execution due to the way robots work, they do not get tired as quickly as the human operator, and reduced maintenance costs (Iliescu, 2016, Niku, 2010).

The disadvantages of using these robotic systems in the institutional environment could be summed up to those concerning emergency problem-solving capacity, because the robot does not have it, except for those who are hardwired to solve various problems. Another disadvantage is explained by the limitation of action because robots are used for repetitive, monotone work, not for creative or stimulating work. The additional costs of training processes, their programming, putting them into service, or even equipping them with various elements should not be overlooked (Iliescu, 2016; Niku, 2010; Pham et al, 2018).

Stăncioiu (2017) considers that the labor market will undergo changes in the coming years in terms of the volume of jobs or trades, but without knowing exactly whether there will be more or fewer jobs. Robots are just getting started and are unable to replace the human agent in all activities. Another aspect would be the rate of return on investment in an automated factory, which is currently not attractive enough.

Futurologist Thomas Frey tried in 2011 to imagine new forms of work, finding 55 potential jobs, predicting that they could appear in the next three decades. Among the future jobs described by him, we can find: waste data manager, responsible for organizing data stores, avatar maker and privacy manager. Handy believes that these can be created and filled by people on their own, without having to work in a company (Frey and Osborne, 2013).

## 3. Study on the Impact of Technology on Employees of Private Companies and Public Institutions in Oradea

### 3.1. Objectives of the Study

The present study is qualitative, aimed at identifying the influence of technology on the human resource of private and public organizations in Oradea.

*The overall objective of the research is to identify and describe changes in the local labor market, and especially among employees, arising from current technological progress. Three specific objectives have also been stated:*

1. Exposing the characteristics of the current and future labor market in the context of the acceleration of technology and the development of the phenomenon of automation;
2. Identifying and describing the phenomenon of labor automation, as well as new technologies on the local labor market;
3. Identifying the skills required of the employees in the labor market, taking into account the technological progress.

### 3.2. Research Methods and Techniques

The method used in this study is the interview-based survey, building a tool consisting of an online interview guide with the help of the Google forms platform.

The technique chosen for data collection is that of the structured interview and seeks to identify the influence of technology on employees. The survey guide has 15 questions based on three relevant key dimensions: general information about the labor market, information about modern technology and automation of work, and employees' skills at work. In the end, the socio-demographic data were defined.

The first dimension includes the following questions concerning the opinion of respondents on changes in the labor market. Thus, the following questions are raised that contribute to creating an image of the current and future labor market: *What do you consider to be the main changes in the labor market in the last 5 years?; In your opinion, are there imbalances in the labor market?; If the answer to the previous question is yes, then what do they consist of?; How do you see the labor market in the next 5 years?; Which do you think will be the important new jobs in 5 years?; In your opinion, does the current situation caused by Covid-19 change the context of the work environment? Explain the answer.*

The second dimension is considering the description of the importance of technologies in the labor market and automation phenomenon. The questions asked were: *What do you understand through new technologies?; To what extent have you adopted new technologies in your company/institution and for what positions?; What is your opinion about work automation?; Do you think that labor automation can create imbalances in the labor market? Motivate the answer.*

The last dimension aims, on the one hand, to identify the skills required of employees that have changed recently: *Are there changes in the last 5 years in terms of the type of* skills required of employees *by employers?; If the answer to the previous question is yes, then what are these skills?; In what skills should individuals invest in order to increase their chances of employment?*, and on the other hand, it refers to the adoption of strategies for the development of human resources skills: *What is the strategy of your company/institution in terms of developing employee skills?; What types of training do you focus on?.*

### 3.3. Study Participants

The participants in this study generally hold management positions or at least know well enough the mechanism of the companies they belong to and can provide specific answers to the questions asked. So, they work in different areas (construction, agriculture, electrical, IT, beauty services and the medical field), these are 7 Administrators, 2 Technical Executives, 1 Spokesman, 1 I.T. engineer, 1 HR Manager, and 1 Assistant Manager. Their total seniority is between 4 and 46 years old, of which they spent between 3 to 32 years in their current job. 9 of the 13 respondents are male, and 4 are female, aged between 23 and 63 years.

The sampling was theoretical and the number of participants in this research was established after the theoretical saturation.

## 4. Data Analysis and Interpretation

Being a qualitative research, we opted for thematic analysis to interpret the data. Each question in the research tool was grouped around three dimensions (general information about the labor market, information about modern technology and work automation, and the skills of employees in the workplace) that correspond to the theoretical framework of the paper. Reasons for choosing this method are to facilitate the data analysis process, but also to provide a clear view of the research.

### 4.1. Changes in the Labor Market

The first dimension is built around the labor market, more precisely, the **description of the current and future labor market**. Thus, regarding the first item (*What do you consider to be the main changes on the labor market in the last 5 years?),* It provides an interesting overview of the local labor market. So, the main changes in the labor market over the last five years come down to "wage increase" (5 respondents), "insufficient qualified personnel" (4 respondents), "technologization" (3 respondents) "lower unemployment rate" (1 respondent), change of work itself, “related to the number of working hours, workload and employee-employer relationship” (1 respondent), “the valorization of the human resource and legislative changes in labor regulations” (1 respondent), “the appearance of numerous companies” (1 respondent).

"I believe that the demand for qualified personnel in the field of the industry has increased, many companies have increased the level of automation and more recently, there is talk of certain investors who want to develop new businesses in the field of IT, robotics" (1 respondent).

To the next question, *How do you see the labor market in the next 5 years?, the* answers given capture the idea of change, and among the most unanimous answers are “labor market development”, mainly due to technological influence (5 respondents), recalling changes such as work from home, increased number of working hours, deadlines that change the perception of work, efficient and motivated staff, but still, the "shortage of qualified staff" will be maintained, the areas affected being construction, food, textile and clothing industries (3 respondents), when others consider that the future labor market will be “fluctuating” (1 respondent), “competitive” (1 respondent), “low professional level” (1 respondent), but also “alignment of the monthly gross minimum income to the level of the European Union” (1 respondent).

Taking into account the current situation caused by the COVID-19 pandemic respondents' views on local labor market rates should also be identified in the current global context by asking the following question: *In your opinion, does the current situation caused by Covid-19 change the context of work? Explain the answer.*

To that question, almost all respondents (12 respondents) believe that the pandemic causes changes in work, with both negative and positive consequences (there are 8

answers with negative influences on the situation, 3 positive consequences, and 2 answers that include both types of influences/changes), while one respondent considers that it is not possible to discuss a too great influence of this situation: “everything starts to return to normal, companies are starting to work” (1 respondent, 23 years, construction company administrator), noting the short-term impact of this unpleasant situation.

### 4.2. The Importance of Technologies in the Labor Market and of the Automation Phenomenon

The second dimension of the research tool aims to outline the idea of **modern technology** and **work automation**.

According to the question: *What do you mean by new technologies?*, from the answers obtained, we can emphasize the idea of progress in carrying out professional activities. New technologies mean the use of "hardware and software components" (3 respondents) to perform tasks efficiently and much simplified, to increase productivity and quality of work, "use of software, robotics, automation", with emphasis on automation work (3 respondents), "the easing of provision of work" (2 respondents), "work from home, from the computer without going to the office" (1 respondent) "a better conduct of business" (1 respondent), “modernization and efficiency” (1 respondent), “meeting customer requirements” (1 respondent).

According to the question: *What is your opinion on work automation?, the* data obtained highlight the idea of progress and efficiency, most participants considering automation as beneficial in organizations (12 respondents).

Thus, through the answers of the participants quite similar characteristics of automation were formulated, the emphasis being placed on the results of the implementation of the process. On the one hand, the characteristics of automation and its consequences are formulated, some considering automation a process of “evolution, productivity” (3 respondents), a process “beneficial, efficient, ensuring quality” (3 respondents), but it is necessary “to improve the staff training process”, aiming at “reducing or even eliminating human error” (1 respondent), “increasing business, because those poorly paid or high-risk jobs can be replaced” (1 respondent). On the other hand, it is considered to be “50% favorable” (1 respondent, 33 years old, a state institution with an energy profile) and can survive with the help of “technical support” provided by the employee (1 respondent, 39 years, private automotive organization);

To the next question, *To what extent have you adopted new technologies in your company/institution, and for what positions?*, the respondents referred to the technologies specific to the fields in which they operate, except for one respondent who states that within the organization it is not possible to adopt technologies because they are of no use: “I have not adopted measures, because in my company it is not possible" (1 respondent, private institution in the field of constructions). Also, there are still organizations that have not had the opportunity to take too many technological measures "we have not really managed to take them, but we want" (1 respondent, economic profile company), "to a rather small extent, we have not yet had the

opportunity to introduce too many technologies in the parlour" (1 respondent, beauty services).

Instead, other technologies introduced are: "obtaining authorization online" (1 respondent, public institution agricultural profile) and "acquisition of new equipment and apparatus in the energy construction" (1 respondent energy profile organization) "technologies only partially, for operators" (1 respondent, in the automotive industry), "robots for reducing the number of employees" (1 respondent, automotive industry), "medical programs, monitoring systems, access systems" (1 respondent , private hospital care), especially those that facilitate "communication between team members and the transfer of data and documents in real time" (1 respondent, public institution), "some technological equipment - computers, laptops, and special software for accounting, HR " (1 respondent, food industry company), "being an IT company, we operate with a lot of hard and soft equipment (around 90%)" (1 respondent, IT company), "all tasks are performed with the help of hard/soft equipment" (1 respondent, IT company), "in proportion of 50%, here I refer to special programs for operators "(1 respondent, outsourcing services company).

### 4.3. Skills Required from Employees

The third dimension outlines the **skills required of employees at work**, and by asking the question *Are there any changes in the last 5 years in terms of the type of skills required of employees by employers?*, the idea of change is emphasized because all respondents believe that - there were changes in the demand for employment skills (13 respondents), the requirements being more and more numerous.

Next, to the link question, *If the answer to the previous question is yes, then what are these competencies?*, respondents list the competencies they consider important and subject to the change process of the last 5 years, focusing on "professional/technical skills" (7 respondents), "digital skills/computer use" (6 respondents), "language skills" (6 respondents), but also on "professional experience" (2 respondents). It can be seen that the study participants offered multiple answers, considering that more skills are important and required in the labor market.

In the direction of developing skills needed to access jobs in the current context of the labor market, the following question needs to be asked: *What are the skills that individuals should invest in to increase their employment opportunities?.* The question attracts the following answers: "digital skills" (6 respondents), "professional skills" (5 respondents), "language skills" (5 respondents), and those related to "communication management" (3 respondents).

In relation to the organizations to which the respondents belong, the aim is to identify strategies through which the skills of employees are developed. In this regard, the question: *What is the strategy of your company/institution in terms of developing employee skills?* offers quite similar answers, focusing on organizing "periodical development courses" (6 respondents), "on-the-job training" (4 respondents), "job integration/job training" (2 respondents), "promotion" (1 respondent), "workshops" (1 respondent).

## 5. Discussions and Conclusions

This study aims to identify and describe changes produced among employees in the context of current technological progress.

The labor market has undergone several changes and it's expected that they will be more visible and numerous, and, according to respondents, **labor market characteristics present** are described by reference to revenues: despite the higher gross minimum wages, salary differences remain (skilled vs. unskilled staff), an imbalance between labor supply and demand (migration continues to affect the labor market through vacancies that cannot be filled by existing staff), accelerating technology in companies, capitalizing on human resources, lowering the unemployment rate at the national level.

Given the events that occurred in the context of the Covid-19 pandemic, the labor market undergoes several changes, so it can be described by: an increased number of unemployed people in various fields of activity, an increased number of unemployed, reduced or stopped activities, poor socialization, and an even stronger imbalance between supply and demand for labor, this time with employees unable to access jobs due to their small number. However, there are also positive consequences: increasing online activities (online commerce is growing), working from home (the possibility of working remotely, with the benefits it brings: lowering the risk of injury on the way to work, avoiding congestion, etc.).

**The characteristics of the future labor market** envisage a development by introducing technology more and more, facilitating work at home or telework, but the number of working hours will increase, establishing numerous deadlines, all with the help of the motivated human resource. (although the shortage of qualified staff in areas such as construction, food, textiles, and clothing will be maintained). The labor market will also be subject to successive changes and increasing competition and changes in the minimum gross monthly wage so that there is alignment between the EU Member States in granting the minimum wage.

Concerning the **new technologies on the labor market,** they refer to efficiency, better organization, improved quality of services/products, productivity, better fulfilment of customer needs. Modern technologies provide software and hardware systems (software, special programs, and equipment for work efficiency), automation of activities (purchase of robots for product production) and remote work. These have been introduced in some companies, but not in a proportion of 100%, except for the IT field which operates exclusively with the help of specialized programs for all activities.

**Work automation** takes into account the idea of progress and efficiency, which is considered beneficial in companies. With the mention that automation needs human support to function optimally. Not in line with the idea of progress, the imbalances caused by the introduction of automation are highlighted, the most important being the replacement of staff. Optimistic concepts are considering the creation of other jobs, but they will not be so demanding physically or the possibility of retraining replaced employees.

Regarding the **skills required of employees in the workplace** in the context of technology acceleration, they are changing as technical skills, digital skills and language

skills become more important. The latter is becoming increasingly important, complementing professional skills. Employee *skills development strategies made* by employers are: professional development courses, on-the-job training (technical, specialized, communication skills development training), on-the-job learning, promotion, and workshops.

Employees notify the transformation of the labor field and acknowledge the importance that technology has for them and for the direction the labor market is heading for. Thus, skills development strategies are necessary and beneficial for each company, and the fact that employers are involved in this project only describes a healthy working environment.

The Fourth Industrial Revolution describes the current situation in the labor field, explaining the technology elements that are placed on the labor market. So, this revolution is notable for the development and use of robots, artificial intelligence machines, the connection of many devices to the Internet, the development of wireless communications, making it possible to perform tasks without too much physical effort. Technology refers to both the software part (logical component) and the hardware part (physical component) which aims to make the work of employees easier and increase the pace of business. Local companies are aware of the presence of those systems and employees are aware of their future evolution, even if we still cannot talk about very performant technological advancements in all organizations.

The inclusion of technologies in the labor market implies both positive and negative consequences. The positive ones refer to the increase in productivity and profit, the increase in efficiency, the speed of execution, and the quality of the products. The negative effects are explained by the huge costs (it is necessary to carry out employee training for the use of those technologies, programming the hard components - robots, equipping with various elements), the emergence of concern about the future, the feeling of uselessness and inability.

Among the limitations of the study are the aspects related to the data collection environment as this paper is only about the urban environment.

Future research directions will provide a quantitative study, extending the study to the national level. It would also be advisable for directly productive employees to participate in the study, to express their opinions on the introduction of technology and automation to the labor market. In the end, we might outline comparative conclusions between employers and employees, according to their views on the key concepts mentioned.

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