The Impact of IT on the Labour Market: The Impact of Technological Developments on Human Resources Today

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ABSTRACT

The research aims to examine the interactions between human resources and technological factors, with a particular focus on the advantages and disadvantages of change. In recent years, the rapid pace of technological development has brought radical changes to traditional forms of work, as the automation of monotonous, unskilled tasks has become a reality. Examples such as self-driving cars, robots, augmented reality and 3D printing illustrate how technological innovations are making everyday life and work processes easier. Artificial intelligence also has a prominent role to play, helping in a number of areas such as decision support and automated communication. However, this development also poses new challenges for the labour market, as new jobs requiring specific skills emerge while some positions disappear. The labour market has become dynamic and therefore turnover and demand can change significantly. Technological change can have negative as well as positive consequences, as many people fear uncertainty and redundant workers find it difficult to find their place in society. The research aims to raise awareness of these challenges and to present solutions that can help improve the relationship between technology and human resources. The interest in automation inspired the choice of topic, and the research will analyse trends and future opportunities in the modern labour market based on the experience gained through a questionnaire survey.

Keywords: Technology, Human resources, Labour market, Digitalisation, Artificial intelligence.

INTRODUCTION

Today, human resources and the technological factors surrounding them have undergone significant changes. What was commonplace even 5-20 years ago is now often considered an outdated methodology. Processes have accelerated and mankind tends to use machines for most processes, both in private life and at work.

When you think about it, automation not only affects our personal lives, but also our work. We can already simplify and automate many, many monotonous, easy-to-do, unskilled tasks. Just think of the people in the IT world who work every day to simplify work processes and change the world. Examples include self-driving cars, different types of robots, augmented reality, nanotechnology and 3D printing, which can even be used to build a house.

It is important to mention artificial intelligence, which is also used by businesses. Among other things, it can be used for decision support, faster solutions to creative tasks, automated responses, personal assistants and many other applications.

Processes are changing not only in everyday life but also in the world of work, new jobs are emerging, more specialised skills are needed, and this means that positions that are no longer needed are disappearing as robots

take their place. "*Stability and predictability in the labour market have been replaced by dynamic change and* unpredictability" , according to an article by FEOL. However, rather than positions being eliminated, there has been a much greater demand for people with specific skills and new positions have emerged.

There is also a certain hecticness in the labour market, as there are areas where there can be high turnover or demand for labour, the working environment can change very quickly, tasks and expectations can change from one day to the next, and this can be due to continuous innovation as industries evolve rapidly.

Let us not forget that technological progress can have negative as well as positive effects. Some people are afraid of change and find it difficult or impossible to integrate into society if they are made redundant, if their social circumstances do not allow them to keep up with the latest developments. It therefore also has an impact on our state of mind.

MATERIALS AND METHODS

The aim of my research is to examine these phenomena, highlight the advantages and disadvantages of these developments, and present solutions that can improve the interrelationship between technology and human resources. I want to pay attention to future threats and opportunities and the impact of recent trends on human resources.

My interest in automation inspired my choice of topic, because I want to understand how it affects human resources. The topic is not only relevant in the academic world but also in real life, so it is worth exploring in detail.

In my writing, I draw on reliable sources; my own knowledge, scientific readings, data analysis and books, as well as an online questionnaire completed by 100 people. The questionnaire method is advantageous because it allows for anonymous collection of subjective opinions and experiences, as well as quantitative data analysis.

In my research, I put forward five hypotheses that are closely related to the central theme.

Hypotheses

1. Technological innovations (automation and digitalisation) increase efficiency.
2. Thanks to digitalisation, manual and routine tasks are eliminated, there is less documentation and more time for more practical tasks during working hours.
3. The changes in the labour market caused by digitalisation need to be addressed not only at the company level, but also at the state level (e.g. providing training and further education).
4. Society welcomes innovative solutions in its work.
5. Technological changes are increasing employee satisfaction and commitment to the company.

RESULTS AND DEBATE

General Labour Market Overview

In my research, I consider it important to also review the current labour market and economic situation in Hungary, which I will discuss in detail in this chapter. The labour market can be described as "*The labour market is the market for labour as a factor of production in the economic sense, where there is an exchange of labour between sellers (workers or employees) and buyers (employers).*" So, the labour market is very similar to the commodity market, but here it is not a product but physical or intellectual knowledge, skills or abilities that are sold to the employer and its driving force is also the Marshall Cross, the so-called supply-demand function, i.e. if there is a high supply and many candidates in the market, the wages are lower, if there are few candidates in the market, the higher the wages available.

In 2022, the Hungarian Central Statistical Office (KSH) carried out a census which revealed that Hungary's population is 9 million 604 thousand. This research also showed that the population of the big cities has decreased, while the population of the surrounding agglomeration cities has increased, which, when projected onto the labour market, may lead to the conclusion that even if these people commute more to work, the economic reason may be that people in the suburbs have access to more affordable housing.

It is also important to note that Hungary's society is ageing, and immigration and emigration are also taken into account, with a 334,000 fewer population since the 2022 census and the previous 2011 census, which is also felt in the labour market.

It is interesting to note that Debrecen has the highest population among the big cities, but even here the population has decreased. As a complement to Debrecen, the city has been undergoing a lot of development recently and several new companies have opened up in the city, creating more job opportunities for the people there, especially in a manufacturing environment.

If we analyse the data further, we can see that the current employment rate, the number of people of working age, i.e. those aged 15-64, is currently 75.1%, but this is an increase compared to previous years, which means that

more and more people are getting jobs who are employable, i.e. who have both the skills and the willingness to work.

The unemployment rate is 3.9%, an indicator that tells us what percentage of the active population of the same age is unemployed. The percentage obtained is an indication that the economy is on a sound footing, as there are jobs where people can find work.

More general indicators were also researched during the census. The percentage of households with internet access is quite high, 91% to be precise. The percentage of people working remotely is 7.2%. The data suggest that the Internet and teleworking play a significant role in the modern economy and society, and that in the future, work will be done more through teleworking.

Above I have already mentioned the natural decrease and migration data due to population change, for which the Central Statistical Office has also produced a visual chart, which can be found in the **Error! Reference source not found.**Figure 1 shows that, with the exception of the years 1980-1989, the natural decrease was greater than the migration difference. This suggests that the proportion of older individuals, and hence deaths, is higher than those who migrate abroad.

In addition to this, the number of people employed in the labour market is also shown in the **Error! Reference source not found.**which shows the industries with the highest employment. Here we observe that the manufacturing sector employs the most people, followed by trade and public administration, which are the sectors in the top 10.

Characterising the industries by gender, it can still be seen that the share of men is higher in manufacturing, women in trade and even women in public administration. The most interesting data can be seen in the construction and education sectors, from which it can be deduced that construction is typically a male-dominated occupation, while education is much more likely to be dominated by women.

In terms of employment in Hungary, roughly 1.2 million people can be considered a potential labour reserve. They are those of working age and in public employment, possibly unemployed. Their number is estimated at 336 thousand. Roughly 860,000 people belong to the inactive segment, being over 60 years old, under-age or women. The latter can still be attracted to the labour market and employers have started to do so in an attempt to alleviate labour shortages.

People in the public works programme and the unemployed often only have a primary school education, making them difficult to integrate into shortage occupations, and training them to take on higher jobs could be a solution.

In Hungary, you can work from the age of 15 with the consent of a parent or legal guardian. Companies can also employ retired people, and many people take advantage of this opportunity, both to supplement their earnings and to make them feel less excluded from society from one day to the next, so that they can continue to feel useful. Recently, the employment of mothers with young children has become more and more popular, and companies can offer them more flexible working hours, possibly fewer hours, and they can return to the world of work part-time, thus supporting the labour market and their own financial situation.

In addition to the above, it is also important to mention the concept of structural unemployment, which means that although there may be unemployed people in a given area, the skills available are not always in line with what employers are looking for. A practical example of this is that a city may have a large number of graduates, but if the city only needs physical workers, the graduates may not be able to find a job at all, or may find it difficult to find a job, or may only find a job in another city with the right skills.

Further research by GVI shows that the majority of companies are not currently spending on automation, with 60% of companies spending little or nothing on innovation and development in the last 3 years, although there may be differences between industries. The proportion of their turnover spent on innovation in the last three years is estimated by **Error! Reference source not found.**Figure 3 shows that 36% of firms did not spend anything at all, 22% spent 1% on innovation and a rather good figure of more than 4% was spent by 14%, which I think is more likely to be firms in the engineering sector.

Technological Progress and the Labour Market

At first glance, one might think that the impact of technological developments on the labour market is very simple, as it is influenced by a number of market effects and macro-microeconomic factors. In this subsection, I argue that the drivers of the labour market are not so simple.

According to a 2016 study published by the Central Statistical Office, there are three possible outcomes of the impact of technological progress on the labour market:

1. inequalities will continue to grow in the market, with some people getting jobs and others not;
2. work loses its centrality in our lives;
3. the number of jobs available will fall, but looking back to previous industrial revolutions, we cannot reach a position where we run out of jobs.

In response to the three statements above, the third statement is perhaps the most realistic, since work will always be there, will never run out and will always play a central role in our lives, since it is through work that we get money, which will never disappear from our lives.

Interesting to see below **Error! Reference source not found.**. below, which was produced by the GVI (Institute for Economic and Business Research). Here you can see how many people are currently employed in the given occupation and how many of these jobs can be automated. Perhaps not worryingly, as you can see, the highest percentage, 28%, have a higher proportion of people working in partially automated jobs, and robots cannot fully replace human labour.

Digitalisation can have an impact on several segments of the labour market: data collection and processing, sales, but also smart homes, self-driving cars, the continuous development of logistics. According to a 2018 IFR (International Federation of Robotics) study, the number of robots sold increased by 30% in 2017 and is forecast to grow in the coming years. They can be used not only in manufacturing, but also in medicine, agriculture and tourism.

The barriers, as I mentioned above, are most commonly described as the fact that automation will reduce the demand for live labour. Job tasks can be divided into cognitive and manual tasks, or both non-routine and routine tasks. What can be clearly programmed, consisting of work processes (e.g. putting objects together, moving materials), can be done for us by computers and robots, and we only need to write and maintain the software and these robots, but cognitive tasks and data recording can also be easily automated. Machine learning and 3D printing can help a lot in these processes. We can create programs to help with payroll, but AI can also write articles, create music, take pictures and many other tasks.

However, there are some tasks that are not very automatable, for example, where very good manual dexterity is required, where perception is important, perhaps for tasks requiring special body positions. But also tasks requiring creativity, social skills. Practical examples include surgeons, who need a high level of manual dexterity, jewellery makers, photographers, and even actors. Also worth mentioning are areas where human decision-making and ethical considerations are needed, which a machine will never be able to do, such as empathy and personal counselling.

Overall, it can be seen that the labour market in Hungary has gone through a number of difficulties in the last few years, most notably the economic difficulties caused by the Crown virus, and then the upcoming Ukrainian-Russian war, culminating in the emigration of labour. It is true that, when the coronavirus first appeared, companies reacted to the economic difficulties mainly by mass redundancies, but today this has been reversed. There is much more demand for labour and even recruitment from abroad, mostly from third countries (Asia). However, in the current labour market, the sense of insecurity may have increased, as the management of companies knows exactly how difficult it is to recruit new workers, both in terms of high costs and the time needed to find new workers quickly. Although there are changes in the field of technological development, this is not where most companies are investing most of their energy.

Overview of Technology and Human Resources

In the last few decades, the world has evolved faster thanks to technology, but how and to what extent the world has changed is discussed in this chapter. There are countless innovations, technologies and tools that we can now use in our everyday lives and at work. One of these is artificial intelligence, which has emerged in the last year or two and is now being used in areas where we never thought it would be. For example, in many cases "it" writes the advertisements, but even new energy drinks have been launched, their flavour has been invented with the help of AI and even the design has been designed by it. Or think about the automation of processes, an excellent example of which could be the use of self-service checkouts, the construction of smart homes that can be remotely controlled, or let's not forget Vanda at Magyar Telekom, who works as an AI at the company's helpdesk and can take over the tasks from the operators, for example, she can record error messages, handle hundreds of customers at a time and understands the human voice. Or, the burning issue of today is a lot of data, which can be analysed and needs to be stored somewhere, which is why big data centres have been created.

Overall, the economic importance of the IT sector is growing, modern society and businesses find it unthinkable to exist without the IT sector, and if the internet were to collapse, we would probably not exist. This applies both to us as businesses and individuals, as we store a lot of data on the web.

With the changes have come new demands, both from the workforce and employers. By this we mean new skills, competences and working conditions. In addition to physical strength and the ability to memorise, there are now more important competences: we can easily store our notes in digital form on a computer or phone, it is easier to search these notes, and we do not need physical strength for each and every task, as robots take over the heavy work from us. What matters more is digital literacy, problem-solving skills and openness to innovation. In addition, education and training play an increasingly important role in both personal and professional development. Today,

the question "what do you know?" is becoming more important than "what should you know?" and with it the desire for continuous learning.

Continuous development and change brings further challenges and opportunities. A big challenge is how will the fate of the people who will be leaving their posts be shaped? Will they have to learn a completely new profession or will they be able to perform tasks in a similar field, requiring more complex competences? It is important to note that whatever the career path of these individuals, the challenges of change should not be seen as an obstacle, but as a necessary asset, as they are the cornerstone of their personal and professional development.

Technological progress is certainly making work more efficient. It speeds up and saves costs for the company, with a higher success rate in completing a task if the possibility of human error is eliminated. Which, of course, can also be a negative. It is often said that the machine does not make mistakes, but the human does, because the machine does what the human asks it to do. Therefore, if humans make mistakes when programming a machine, quite large errors can occur.

However, from a workplace perspective, there is also a convergence between IT and HR, and both industries are evolving dynamically. Think of how, in the past, all data had to be stored on paper, separately, but now we can use different software to store employee data, keep track of employees, account for holidays, create workplace chat groups and work online from virtually anywhere in the world. With these technological advances, the modern world has taken a significant administrative burden off the shoulders of HR colleagues. Just think of the outstanding work tools, the fast laptops, the various meeting rooms.

Overall, it is difficult to predict what the future will hold in the period ahead. One thing is certain: the future promises continuous progress and our destiny is in our hands.

Artificial Intelligence

Artificial intelligence is not as new as you might think, so I think it is important to clarify the concept. In fact, mathematicians started working on it, and more specifically on logic-based reasoning, as early as the 1950s. Then, about 10 years later, *Turing* investigated whether a machine can fool us, that is, whether we can tell from the machine's response that we are actually having a conversation with a machine and not with a human. The next stage was roughly until the 1970s, when games and programs were developed that could communicate with humans and even do language processing. Then, after a few years of stagnation, the idea gained momentum again until around the 1990s, when mathematicians made new algorithms possible. Then, in the years after 2000, with the spread of the internet and the availability of vast amounts of data, they reached deeper layers, where they even created programs for image recognition and speech recognition. Today, the sky is the limit. Artificial intelligence can be used, for example, to analyse medical records (interestingly, the US company *GE Healthcare* is doing just that, creating X-ray diagnostic applications to help detect cancer early, for example) and even offer future treatment options and warn us of risks.

After the historical overview, I think it is important to clarify the difference between machine learning and artificial intelligence, as very often these two concepts are confused. Artificial intelligence is designed to perform tasks that require human intelligence, it is a capability. However, machine learning is now actually literally understood as the ability of a machine to learn and improve its knowledge using data and algorithms.

Basically, there is a difference between the purpose of the two instruments. The goal of artificial intelligence is to be able to make decisions, plan and interpret, like humans, but machine learning has one goal: to learn by creating its own algorithms. (The meaning of an algorithm is: a predefined sequence of steps, a procedure, how to solve a problem, a task.)

Here are some more examples. Every day we can use *Google Assistant* or *Siri*, which are typically artificial intelligences. They can answer a specific question, but these are pre-written answers and not independent thoughts. In machine learning, we can get much friendlier, more personalised answers, where the machine learns from the human how to react in a given situation.

The terms M2M, IoT, V2V are also part of the concept of artificial intelligence. M2M means that machines are able to communicate with each other, i.e. share data, without human intervention, and the proliferation of smart homes is a perfect example. IoT is the term for the Internet of Things, which refers to devices that can detect information and communicate with another machine via the internet. The concept of V2V is not so well known today, it is not often used, and its meaning is not complicated either, it only means communication between vehicles, it means that vehicles can transmit information to each other and transport reform can be achieved.

So we can see that there are several areas of AI that have been successfully implemented in society and are even used on a daily basis. A perfect example could be the operation of factories where even collaborative robots are working, able to move without cells even next to humans without injuring us, or even robots working in cells, able to speed up the production process with their coordinated and precise movements.

Assessing the Impact of Technological Change

Technological progress not only affects the number of people in employment, but also the expectations placed on them. This is discussed in more detail in this chapter. Three different theories can be distinguished: the theory of de-skilling, according to which modern technology breaks down work processes into parts, thereby reducing the skills required. The third theory is the polarisation theory, according to which the range of very simple and complex tasks will be widened and those requiring intermediate skills will be reduced.

According to a survey by Bochum, people with a good grasp of maths and science will be favoured in the future job market. Obviously not everyone will become a mathematician and computer scientist, but basic skills such as good analytical and technical skills are needed in the labour market. This also includes ICT skills, which means knowledge of information and communication technologies that are essential in the 21st century. By this we mean: digital competence, the ability to use new technology, including the ability to identify and analyse problems at work. Digital literacy is included here, which is just being able to use IT tools, for example being able to connect to the internet, but this alone is not enough to get by, as you need to know the credibility of information to recognise it or to recognise its lack or the possibility of eliminating it.

In a survey carried out by the European Commission, the Digital Economy and Society Index, an indicator that shows indicators of Europe's digital performance and even tracks how much digital competitiveness is growing in different EU Member States. This is called the DESI for short. And what does DESI measure? They look at network connectivity, internet coverage, quality, price, whether end users have the knowledge to use it in addition to access, they also look at how much content consumers are using online services, for example games, music listening etc. In addition to all this, they also look at businesses, they look at e-commerce transactions, their costs, whether they provide digital public services. They also look at e-health, how modernised public services are and even R&D, research and development in the ICT sector.

Hungary has been ranked 22nd in terms of the development of its digital economy and society, which is **Error! Reference source not found.**. is shown in green in Figure 5. But despite the low ranking, the good news is that the country is progressing in line with the EU average. This is shown in the graph below, where Slovakia, Poland and Romania are behind in terms of development.

At human capital level we are ranked 23rd, so 49% of people have some basic digital skills, which is below the EU average of 54%, so we need to improve this indicator, because even a small percentage of graduates have studied ICT, which is also below the EU average.

However, among the indicators, Hungary continues to lead the way in terms of broadband internet access, with 22% of households subscribing to broadband compared to an EU average of 7.6%.

In addition to this, there has been progress in the digitalisation of businesses, with 21% now using some form of online software for electronic sharing, 13% taking advantage of social media and 32% using e-invoicing. However, we are performing below average in the use of cloud services and artificial intelligence.

Labour Shortages and Possible Future Changes

In fact, there are labour shortages in many industries. In Hungary, the ageing of the population is bringing this with it, as is emigration. We often see foreign guest workers working in companies, doing simple physical tasks. One of the advantages of this is that their wage demands are lower, they may be more enthusiastic about the work, and they may even take on such tasks.

If you think about it, it's in manufacturing, automotive and these areas that we have the biggest labour shortages, which is why if companies can't find human workers, it makes sense for them to robotise, with the added benefit that there is less room for error in the work done by the robot. Just think of the factories that have been built recently, such as Howmet in Székesfehérvár, where robots of the FANUC type are working and performing tasks instead of humans, even using collaborative robots. This means that the robot is equipped with several sensors, thus reducing accidents at work.

I would also like to mention why it is important to introduce the use of robots in certain areas. Today we live much more consciously, our mental and physical health has become much more important, and companies should take this into account. That is why we can expect fewer applicants for a position that is monotonous and dangerous. So, in summary, robotisation can also help to reduce labour shortages and costs.

Just think of the presence of *ChatGPT*, developed by the *OpenAI* research group and released to the public in 2020. However, its visibility is expected to be around the end of 2022 - early 2023. It can be most easily seen as a language modelling system and was created to help people answer questions, give advice and generate content. It is important to note, however, that unlike humans, he does this without emotion, and to the best of my knowledge there is pure mathematics behind his sentence generation. Furthermore, he derives his knowledge from the data he imports, so his knowledge may be limited.

ChatGPT can also be used for certain jobs. I have personal experience. I used to work in IT recruitment, where I used *ChatGPT* to write search *booleans* for Google (e.g. (data analyst) AND (Python) OR (machine learning)

search engine usage), but I have also had occasion to use it in my current job, as I work with networks and if I don't understand a network concept or protocol, it can explain it very well and I have the opportunity to ask clarification questions. However, these were just my examples. Marketers can use it to create content, programmers can use it to review code and find bugs, write personalised messages, use it as a chatbot, help with research, translate text or give us creative, innovative ideas.

The Role of Training

Finding a technologically skilled workforce is already difficult for many positions, as in many cases the advertised job requires a higher level of professional knowledge than the potential workforce on the market. To automate, people need to have the right knowledge. This knowledge can be acquired in a number of ways: through schooling, or through life experience, where people can learn and acquire skills and abilities.

The key attributes identified are: effective use and application of technology, ability to work in a team, creativity, critical thinking, decision-making, empathy, problem-solving. These qualities help humans to perform tasks requiring interpersonal skills that robots are unlikely to be able to do in the longer term.

It is worth noting that companies can also play a role in education, as they can be involved in the development of teaching materials or the provision of theoretical and possibly practical training, whether in secondary schools, higher education or adult education.

Policy makers can also cooperate with companies and employment offices to set up retraining programmes, and employment offices can present statistics and statements as examples of the success of the placement of people trained by the institution.

Today, without lifelong learning, it would be difficult to manage both in our private lives and in the labour market. For adult working people, it is necessary to introduce it in the workplace not only to improve the technical skills of the individual, but also to increase job satisfaction at HR level. It is important to note that such training can not only enhance technical knowledge, but can also be soft skill training, for example training on stress management or even effective time management.

The type of training can be of three types: training with an external trainer, training at an off-site location, training within the company by a company employee, or training with an external trainer at the company's premises. The nature of the training will determine which is the best training, and the management will decide which is seen as the most effective.

Interestingly, there is currently a shortage of hundreds of thousands of digitally skilled workers in Hungary's labour market. "*Digitalisation and automation is happening everywhere much faster than some labour market players, policy makers and regulators realise.*" It is also worth noting that digitisation is most noticeable in larger firms, with smaller, medium-sized companies often lagging dramatically behind. This also means that these firms are losing competitiveness and efficiency and are finding it harder to win new business and are not even considered as attractive employers by employees, so very often they can only attract cheap and lower-skilled workers, often not of high quality, which also does not increase their market opportunities.

The Impact of Technology on Human Resources

It affects human resources, including psychologically. There are individuals who see in the development of technology the "devil" itself and believe that it will take away their jobs and that artificial intelligence may even turn against people, and there are individuals who absolutely welcome continuous innovation and see it as a positive force. This should not be forgotten at the company-management level either, it goes a long way in communicating with employees and maintaining their satisfaction.

There are currently 4 generations of people in the labour market, each of them affected differently by technological developments. Breaking down the 4 generations further, we can talk about the Baby Boom generation born between 1946-1967, Generation X born between 1965-1979, Generation Y born between 1980-1994 and Generation Z born between 1995-2009. Basically, in terms of the general form of employment, the majority of people work normal working hours, eight hours a day, 40 hours a week, in an employed status, indefinite hours. However, young people tend to work in flexible, atypical forms, even part-time, in multiple jobs, with a desire for knowledge, continuous training and a greater mobility.

The constant availability of online space and the disruption of the work-life balance in the work environment can lead to stress, overwork and social isolation. Digital communication can lead to alienation, which is why it is important to use technology consciously, for example by taking periodic digital breaks. Under the Labour Code, working in front of a monitor requires 10 minutes of screen-free activity per hour. Excessive home-office use can also lead to isolation, so organising joint programmes and team-building sessions is recommended to strengthen the bonds between colleagues.

Creating a conscious working environment is key, paying particular attention to ergonomics and comfort, as these can increase efficiency. The online space can also present other mental challenges such as identity disorder

or online bullying, and addictive technological tools can lead to imbalances. Stress and anxiety can lead to depression, so it is important to maintain mental health and use therapeutic solutions.

Workplaces can contribute to reducing stress by organising company events and workshops, where one-to-one discussions and the involvement of psychologists can help employees. Effective time management can also help to achieve work-life balance. Content arising from technological change - such as redundancy, outsourcing, burnout or insecurity - can be addressed through change management tools, including effective communication, psychological support and continuous feedback.

Primary Research

I have prepared a primary questionnaire on the impact of IT on the labour market, on the impact of technological development on human resources today, and in this chapter I will analyse the responses.

In order to make my questionnaire somewhat representative, i.e. to give a partial but fairly true picture of society, I asked 100 random people to help me. It is important to note that the 100 people were independent individuals who found my questionnaire online and took the time to help me. The 100 responses should be able to give a relatively comprehensive picture, but it is important to note that I would not project the picture to the whole of Hungarian society. At the beginning of the questionnaire, I emphasised that I only needed respondents who were working in some form, even as students, and who had work experience.

Multiple Choice Questions

I asked 14 questions, which were easier to answer, as there was a tick box for respondents to choose from. In the following, I will analyse the answers received, broken down into questions.

"How much do you think you are affected by technological change in your job?"

The majority of respondents marked levels four and five, indicating that technological change affects them in their work. Only one person selected level one, as they are not affected by change. People working in different fields rate the impact of technology differently. The ability to acquire new skills also plays an important role in the responses.

"How did you acquire your technical skills in general?"

88% of respondents acquired their technical skills through self-learning. The second most common response was courses and training. Workplace and peer support showed a low proportion. In many cases, training is not organised when learning new software and knowledge is shared between colleagues.

"Have you found that digitalisation has reduced manual and routine tasks in your work and given you more time for more hands-on tasks?"

55% of respondents experienced a reduction in routine tasks, while 44% did not. This indicates that digitalisation is having a positive impact on working conditions. Most prefer more practice-oriented work instead of monotonous tasks, while monotonous activities can lead to burnout.

"In your opinion, how have technological developments affected workplace efficiency?"

80% think efficiency has increased, 18% have seen no change, while two people report a decrease. The increase in efficiency is influenced by a number of factors, such as the introduction of innovation and the reaction of employees. It is also important to involve employees in improvements to achieve more effective results.

"How do you feel when you encounter technical difficulties?"

52% of respondents feel frustrated, while 48% feel a desire to improve. Responses also included uncertainty, despair and anxiety. Frustration is a common emotion, but the desire to improve is not felt by all, with many preferring to give up on a solution. Pride also emerged as a positive emotion, but with only a small share.

"How does technological change affect your motivation and commitment to your job?"

Technological change increases the desire for self-development, challenges and motivation, but it can also increase uncertainty and stress. Facilitation can give you more free time, which can improve engagement. If automation works well, it can even reduce working hours.

"In your opinion, does your workplace support the development of technological competences?"

66 respondents answered yes, while 23 were neutral and 11 were negative. Most people appreciate it when their employers recognise the importance of development. A supportive environment has a positive impact not only on the individual but also on the competitiveness of the company.

To what extent do you think technological changes affect your stress levels at work?"

Responses show that most people chose level 3, indicating a moderate impact. The second most common response was level two and, fortunately, level five was selected by only four respondents. A stressful work environment can potentially lead to burnout, so it is worth taking this issue seriously.

"How much do you think your current workplace wants to go digital?"

35 respondents said the workplace is very keen to develop digitally, 29 respondents said level four, while 24 respondents said level three. Although the responses suggest that the majority of workplaces want to go digital, in reality many companies do not know where they should be going or may lack the right resources.

"How afraid are you that advances in technology could take your job away?"

35 people are not at all afraid of losing their job because of technological advances, while only five are. It would have been worth discussing in more detail the intensity with which these fears are managed and expressed.

"How do you think technological change will affect your career in the long term? (Whether you think about jobs going away)"

The majority of respondents believe that technological changes are affecting their career, while 38% say the opposite. An interesting perspective is that if AI positively supports learning, then it doesn't bother people if teachers' workload is reduced.

"How do you feel technological developments are affecting the way you work?"

81% think that technological improvements make it easier to do the job, while 13% have not experienced any impact and 6% think that improvements make the job more difficult. The majority respond positively to technological innovations that make it easier to do their job.

"Choose which skills/abilities are important today."

The most important skills include flexibility, adaptability, communication skills, a willingness to learn continuously and problem solving. Rapid market changes make it essential to be receptive and open to innovation, while effective communication is essential in all areas.

"Have you ever used artificial intelligence (AI) in your work?"

59% have never used AI at work. Many people are afraid to use AI because of the protection of company data and the potential for leaks, even though it could be more useful within reason.

"Do you think AI can replace human work?"

57% think AI is not a substitute for human work, while 32% think it can. Responses include that AI has an impact on certain fields and jobs, but not all.

Questions that Need to be Answered

When assessing the impact of technological change on the workplace, responses fall into three main categories: positive, negative and neutral. Most respondents highlighted the positive effects of technological innovation, through increased efficiency and increased self-confidence. However, negative experiences were also reported, such as frustration and uncertainty. For introverts, technology provides more comfortable communication opportunities, while generational differences also emerge, with older people finding it harder to communicate new technological knowledge.

The majority of respondents believe that technology does not hinder their work, although some respondents mentioned bugs and incidents that they may encounter difficulties when implementing technology. Older age groups find it harder to learn or stick to old methods, while in communication areas new technologies sometimes cause complications.

The areas of data mining, information retrieval, development and programming, communication and creative brainstorming stood out in the responses on the use of artificial intelligence (AI). Many use it for writing letters and using autoresponders. Some respondents mentioned that they are also able to solve problems quickly using ChatGPT.

Respondents stressed the importance of education, training, new job creation and retraining to address the impact of digitalisation on the labour market. Others called for the introduction of strict regulations and ethical considerations. The importance of developing creativity and skills was also highlighted, alongside ensuring access to the benefits of digitalisation.

In addition to the benefits of technological progress, respondents also mentioned challenges such as the generation gap, privacy and legal risks, and the impact of rapid development. Technological innovations offer efficiency and time savings, especially for monotonous tasks, but can also lead to job losses for low-skilled workers.

The take-up of technology in the workplace is mixed. While some are open to progress, others fear it and do not understand the need for it. Low-skilled workers tend to reject technological innovation, especially if it threatens to end their employment. Those who are willing to evolve are favoured, but old conservative views are still present in the workplace.

CONCLUSION

Technological Innovations (Automation and Digitalisation) Increase Efficiency

The above hypothesis proved to be true. Technological innovations can make processes more efficient and, because of their speed, less compatible with human error, since a machine makes fewer mistakes than a living person.

Automation now makes monotonous tasks easy for companies to perform, freeing up human resources for more complex tasks and allowing companies to turn monotonous tasks into robots. I believe that this is an advantage because monotonous tasks become boring for people after a while, they cannot perform them accurately and fo-constantly, so there is a greater chance of error.

To support this, I would like to quote from a publication of the Global Lighthouse Network (GLN) initiative. This was actually produced by the World Economic Forum and the McKinsey Company and named GLN, in which they studied the champions of industry 4.0, or lighthouses as they call them, and grouped them together into a group of 95 companies.

Among the 95 GLN members, there were companies whose production increased by 140% as a result of automation, but there were also record improvements of up to 250%. They also noted that "Robotics has increased the efficiency of mun-factories by one and a half times, and as a result of wider digitalisation, the performance of engineering activities has increased by 30%."

In addition, according to a 2018 study by the Boston Consulting Group (BCG), digitisation can accelerate efficiency by nearly 30 percent and increase it by 25 percent.

Thanks to Digitalisation, Manual and Routine Tasks are Eliminated, There is Less Documentation and More Time for More Practical Work Tasks

The hypothesis also proved true. I would add that digitalisation has made creative and thought-provoking tasks more important and more present in work tasks. Another excellent example of this can be found in the GLN research mentioned above and even in BCG research, where it can be seen that companies have increased their efficiency and further growth is expected in the future.

I would also like to support this with another research, and the data in Figure 8, which shows that the number of robots sold in the world is constantly increasing, reaching 600,000 robots installed worldwide per year, according to research by the International Federation of Robotics, which not only analyses data but also makes forecasts, statements about what to expect in the future for a particular topic. Here we can also see that, after a steady improvement, there was a drop in purchases in 2019 and 2020, but this was either due to the economic downturn at the time, COVID-19, as those two years saw a significant economic downturn.

The Changes in The Labour Market Caused by Digitalisation Need to be Addressed not Only at the Company Level, But Also at the State Level (e.g. Providing Training and Further Education).

The role of the state in education and training is of paramount importance, as preparing people for the labour market is essential for a healthy economy. If education fails to equip students with the right skills, they will find it difficult to succeed in the world of work. This is why education is constantly evolving.

In 2016, the government introduced a re-industrialisation strategy named after János Irinyi. Its aim is to become one of the strongest industrialised countries in the EU, with a contribution to GDP of 30%. To achieve this, the country needs a highly skilled workforce and rapid development.

Every 7 years, the European Commission issues a set of rules on this under the heading Cohesion Policy, which Member States must comply with. The latest one is foreseen for 2021-2027 and aims to create a smart, digital, greener Europe, where climate change is tackled and investment in renewable energy and carbon use is reduced, and international relations are strengthened.

From a technological point of view, the promotion of digitalisation, the development of digital infrastructure and the advancement of e-commerce are considered important. To this end, they are also investing EU funds to support innovation. This of course requires skilled professionals, today's educators are educating the educators and explorers of tomorrow.

Society Welcomes Innovative Solutions in its Work

Yes, innovative solutions can often make work easier and save time. It has a positive impact on both the working environment and comfort, and is also an inherently curious nature. But there are exceptions, especially among the older generation, who, even if they listen to innovations, are unable to adapt them to their daily work, use them with fear, do not understand how they work or reject them outright.

I have previously done my own survey, which is not as representative, since only 61 people completed it, but in this one I asked the interviewees what they thought about whether some of their work would be easier if it was done by robots. Here 34% answered no, 29% maybe and 28% thought it would make it easier. The remaining 9% said they could not decide. Basically, the question is not focused on whether they would welcome it, but it can be

inferred. I find that a fluctuating 29% to 28% yes response is more prevalent than outright denial. So you can see that there is a positive willingness to accept innovative solutions.

Technological Changes are Increasing Employee Satisfaction and Commitment to the Company

If it makes the work more efficient, yes. More innovative employers can be attractive because they increase the challenges and opportunities for development for their employees. However, it is worth noting that there are many factors that influence job satisfaction, including the relationship with the employee, the employer, the management, the pay for the work done and even the environment in which they can work.

Almost every year, the international audit and consultancy firm KPMG (Klynveld Peat Marwick Goerdeler) produces a series of reports that look at, among other things, how employee satisfaction can increase. In this survey, they highlighted the importance of digitalisation and the fact that a satisfied employee tends to serve customer needs well.

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