# DIGITIZATION IN LOGISTICS AS A TOOL FOR HIGHER FLEXIBLITY OF LABOR MARKET

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**Abstract**

This paper focuses on the issue of digitization in logistics and its processes, in relation to its effects on the shape and functionality of the labor market and the trends that affect it. Digitization as such brings and will bring in the future a number of new possibilities, which are expected to improve processes, we can say, in all areas of the modern world. But it is also a huge challenge that brings a number of unknowns. In the first part of the presented article, the digitization concept is briefly presented and the current trends that move the labor market and their impact in the short term are described. In the second part, these trends are considered in the long term horizon, in connection with the involvement of digitization.

**Keywords:** Digitization, flexibility, labor market, logistics

## 1. INTRODUCTION

The purpose of this paper is to have a look at digitization as a phenomenon of the today's world. Digitization is a part of almost all areas and the aim of presented article is to focus on influence of the digitization on labor market. As in every area, different trends are appearing, the same goes also for labor market. These trends determine and will determine its further direction and functions. The intensity and reach of these trends depends on the performance of the economy. And even in the context of digitization, the idea of its share on the transformation of the labor market functionality is appearing. That is because digitization brings many new possibilities which have the potential to support and improve the functionality of the market with manpower. In short, the objective of this paper is also to have a look on the way how could digitization help to implement into the real life currently discussed trend - possibility of shortening working hours.

## 2. DIGITIZATION

Nowadays digitization is no longer an unknown word, it represents a significant milestone in technological development, we meet it at every step of our ordinary lives, because in fact it affects the development of everything we can imagine. It is undoubtedly clear that digitization will guide us into the future and will gain increasing and greater influence, even in areas where we could not even imagine it before.

First of all just for setting in order let us have a look at a brief overview what exactly digitization is, what is its history, principle etc. What can we imagine under the term digitization? We can simply say that it is the transfer of data into such a way that these data and information are readable by computers.

## 3. DIGITIZATION AS AN INDUSTRIAL REVOLUTION

Nowadays digitization is often associated with the latest industrial revolution, whose core lies in the use of computer and network technologies. This latest revolution is characterized by usage of cyber-physical systems and a crucial role plays here so-called Internet of things (IoT for short). IoT represents the possibility of communication among many objects. In our home environment it is for example the communication among home appliances (fridges, washing machines, coffee makers, lights etc.) themselves, or with computers, smart phones, smart watches and other technologies via wireless connection (Wi-Fi). The same principles work or

should work also among the machines, vehicles etc. inside the factories. All the components of the factory are able to communicate among themselves, collect, forward data and information, alert problems, missing material etc.

It is obvious that the results of this communication way are and will be huge amount of data, which we can barely imagine. New term for this giant amount of data and information and as well one of basic principles of the digitization is so called big data. According to a study performed by DHL [1] the most important part of digitization is considered the big data, see the descending order below for more details. The items in the **Table 1** are sorted by amount of companies which marked each of them as "very important" or "extremely important".

**Table 1** Importance of the technologies within the digitization [1]

| Order | Technology |
|---|---|
| 1 | Big data analytics |
| 2 | Cloud-based applications |
| 3 | Internet of Things |
| 4 | Blockchain |
| 5 | Cognitive analytics |
| 6 | Sharing economic platforms |

If we think about the amount of produced data, it is not enough talk about giga- or terabytes, here we speak about so called zettabytes which are saved on cloud-based applications etc. Just for illustration, 1 zettabyte represents one thousand milliards gigabytes that seems unbelievable. However the amount of saved information on computers or in the cloud reached 4,4 zettabyte in 2013, in 2020 it should be 44 zettabytes, according IDC's Study "The Digital Universe in 2020" [2]. Just for imagination by this amount of data, more than 5 gigabytes of data would come to each person on the world in 2020 [3]. According another IDC's study [4] it should reach 163 zettabytes in 2025! It is obvious that the expected increase of data stored has and will definitely have exponential trend, as the **Figure 1** shows.

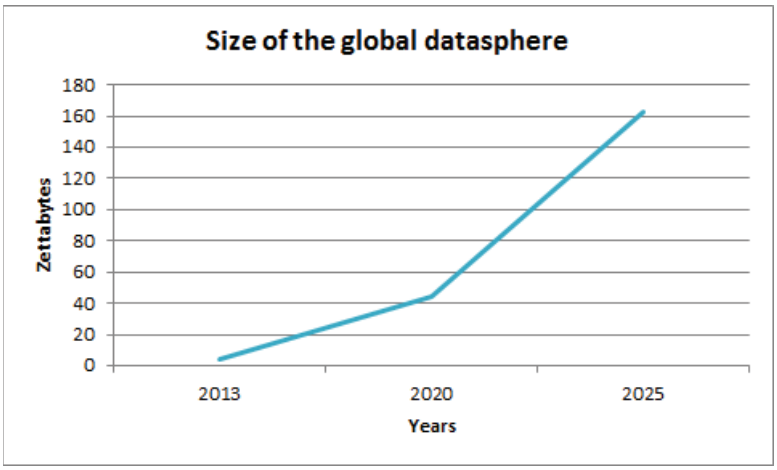


**Figure 1** Size of the global datasphere in 2013, 2020 and 2025 [2,4]

Storing those huge amounts of data and their careful analysis will help to better analyze the customer's needs and afterwards satisfy them and their needs better than the competitors. This plays a significant role if we speak about the competitive advantage, which is always a key element for the company's success on the

market. Digitization enables the move from mass or serial manufacturing to the individual one, where the products and services will completely fulfil customer's expectation.

Nowadays many factories try to fully apply the principles of the new industrial revolution which has its origins in Germany. Let us have a look on one example of these so-called smart factories. One of the first and most famous manufacturing plants using these principles is German enterprise EWA (Electronikwerk in Amberk) based in Amberg covered by company Siemens. EWA is focused on manufacturing of so-called programmable logic controls, you can imagine under this term small industrial computers whose task is to automatize the processes and that all in real time. These units find their use in many various branches. The manufacturing here is in two thirds automatized by computers and machines, the remaining third is still ensured by workers.

## 4. DIGITIZATION IN LOGISTICS

Nowadays digitization finds its use in any branch, the logistics is no exception. If we have a look on this branch, we can find many examples of digitization usage. The principles of modern (digital) logistics were applied for example by one of the most famous Czech enterprises, car maker Škoda Auto. Škoda Auto uses for transportation of material more than 100 autonomous carts which are navigated via magnetic tapes in the floor. In the future this technology should be replaced by laser navigation. By using these carts, the material is possible to transport from the palette delivered by supplier up to the assembly line, that all without direct human interaction. [5]

At Brose, one of top producers of components for car industry, there is used automatized palette storage. This storage is able not only store the palettes with material according to their turnover rate, but also can optimize layout of the material as it would be possible to remove it from storage as quickly as possible in the next shifts. [6]

It is obvious that all these technologies have and will definitely have considerable influence on usage of human work, as one of the key production factors. Let us see now how the digitization influences and could influence in the future the labor market and its function. [7]

## 5. LABOR MARKET TREND

One of the trends in the labor market, which gains popularity in the trade unions in many European countries, is short working hours. In many countries 8 hour working time is common, if we talk about the full-time job. This boom has many positive aspects not only for employees but also for employers.

## 6. PROC AND CONS OF SHORTENING WORKING HOURS - MODEL CASE

This trend stems from the fact that people are not machines, they have their own personal lives, families, they want to spend more time with them, they could feel happier, less stressed there, which could then positively affect their working productivity, because they may enjoy their job. These statements are confirmed for example by an experiment in Gothenburg in Sweden, where a group of 80 retirement-home workers was changed their weekly amount of working hours, decrease by 10 hours per week, from 40 to 30 hours [8]. The idea of spending a third of a day does not necessarily have to yield the desired results in the form of higher working productivity, even here it is true that less often means more.

Although it looks like a perfect state, we cannot expect that this working model is appropriate for every company. If we think about the job the workers do in the example above it is obvious that even if we reduce the number of working hours, the amount of work the worker did earlier will stay the same. It is necessary to employ someone who will do this work. At the end this solution whose base lies in reducing amount of working hours is supposed to be more expensive for the company, because it has to employ the another workers who will cope with the work which the first worker did not manage or could not do during his or her shortened shift.

This was also the reason why the above mentioned company reached the decision to return to the standard shift with 8 hours. Although the company may want the best conditions, satisfaction and happiness for its employees, it always follows its primary goal which is maximizing profit in short-term horizon and maximization of market value in the long-term horizon.

## 7. IMPACT OF DIGITIZATION ON LABOR MARKET

Sometimes it can look like there is no space for human work, in view of the fact that the machines are able to communicate and transfer data among themselves without human cooperation. We can often hear the opinions that because of the digitization and automatization in all the areas, chiefly in industrial branches, the people lose their job, the unemployment will increase etc.

The truth is a little bit different. It is evident that many job positions have lost their usage and many of position will await the same fate in the future, but it is true that when something old disappeared, something new is emerging, the same goes also for job positions. Because this paper is focused on logistics let me demonstrate it on this area, namely internal logistics. The transportation of materials and products is ensured in a plant by milk-runs and fork-lifts, which are served by the drivers (human resources). If we take into consideration the current trends whose base lies in wide usage of computing, networking and digitization, nowadays it is not a rarity in many companies that the materials and products are transported through the plant or rather among the assembly lines (workplaces) and stores by autonomous carts, which means that their drivers lost their jobs.

Let us look at the whole situation from the other side. New technologies have to be designed, programmed, and last but not least, someone has to take care of their maintenance, as in many cases it is a very precise job. This creates space for creation of new jobs, but we have to take into account the fact, that many of these new jobs require deepening of present knowledges and gain new ones, which can be achieved by using different methods such as trainings or retrainings. Similarly, it works in other sectors. It is obvious that the new changes bring some discomfort in the form of short-term unemployment, but after a certain period of time it will return to its original value.

We have now made it clear that, although digitization has and will have a share in the disappearance of some jobs, there is still space for creating new ones. Let us now have a look at what benefits which can digitization bring to people, in terms of working time. From the above mentioned example (Chapter 6) it is clear that shortening of working hours is not well applicable in all the sectors, mainly if we take into consideration the fact that the company wants to reach their short-term goal, maximizing profit. Let have a look on a bit different sector - manufacturing and internal logistics. We spoke about the digitization and right here it can find its usage. In comparison to the mentioned example there is much easier to replace (fully or partly) human work by machine or vehicle. And this is exactly what we can take into consideration if we talk about the possibility of shortening working hours and affecting the labor market.

A widespread trend are the part-time jobs, people can choose if they want to work full- or part-time, the reasons why they use this possibility (working less than 40 hours per week) are not unpredictable - more time for family, friends, social life at all. In 2002, even the Tony Blair's government in the UK presented a document that gives people the right to apply for shorter working hours, its purpose was to help parents with small children [9]. Well, people have this possibility for long time, but now we have to take into account the digitization. As we work part-time, it is obvious that the less hours we work the less money we get than if we work full-time.

As we mentioned the digitization enables in specific cases to replace sometimes fully and sometimes partly the human work by machines etc. This can bring many variable opportunities for both employers and employees. If human labor is not strictly necessary for the whole (an eight-hour or twelve-hour) shift, there is an opportunity to shorten working hours for workers from the original 8 or 12 hours, for example by one fourth, namely: to 6 or 9 hours per one shift. However, such a worker would still be employed as a full-time worker, would receive the same salary but would have worked less hours for the shift.

Due to the fact that the machines can work partly without a worker, it would not be necessary to hire additional workers to cover the time when the first worker does not serve the machine, because the machine can work independently. For example, this partial independence of machines could cause in a three-shift operation the situation, that the machines would still work for three shifts, but the workers only for two shifts, the night shift could disappear for the workers, which is in itself not natural for humans.

It is obvious that getting into this state is not and will not be easy, most businesses still do not use all the principles of digitization or do not fully use all the technologies brought by digitization. The DHL survey shown that 95 % of companies still does not fully use the benefits and possibilities which the usage of informational and hardware technologies and analytical tools brings to them [1], therefore the digitization is still not at such a level that the companies could fully apply for example these solutions related to working conditions.

## CONCLUSION

This paper was focused on the digitization and its impact on the labor market, namely on the possibilities which can bring to workers and employers. It is clear that the digitization opens wide possibilities in many areas, as I mentioned the same goes for working conditions, or rather amount of working hours etc. It is obvious that the digitization has an influence on jobs structure it affects the employment, at the beginning it can cause a certain disbalance on labor market, but these changes will finally return to standard values. The digitization in industrial areas brings many possibilities for working hours arrangement and therefore gives people the chance to make their lives more flexible, gives more time to their families, friends and hobby, this all can result in their higher satisfaction and finally also higher productivity at work, so both the employer and the employee can benefit from that.

It is important to look at everything from the other side, too. Let us be honest, to get into the state when the workers work less hours thanks to the perfect use of digitization can take some time and definitely will last few years, but thanks to the technologies this vision does not stay only an impossible wish, but in the future it can become a reality.

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