



# SPECIAL ANALYSIS

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## **Czech industry cannot do without robots, do not fear them**

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## Introduction

*Karel Čapek's utopian ideas about robots are slowly but surely becoming a reality. Soon we will consider robots part of our daily lives. Do we need to worry about their presence?*

The document from the Ministry of Labor and Social Affairs called Initiative Work 4.0 (Iniciativa práce 4.0) from December 2016 discusses how in the Czech Republic over the next 20 years automation will threaten 10% of jobs (in absolute terms about 400,000) and in 35% of jobs (1.4 million) substantial changes will occur in the activities performed. Domestic trade unions warn that automation and robotization of manufacturing endangers over 50% of all jobs. Robots are not just a threat however. Quite the contrary – for Czech industry they are a great opportunity for the production chain to reach the next level, which will bring with it not only increased productivity but ultimately also higher pay for employees' work. How is the current situation with robots, what is the starting position of the Czech economy in the European context, what issues are some European countries and the European Parliament addressing in connection with robotic automation, and what can we expect?

### Economics: Firms will replace workers with robots if it pays off

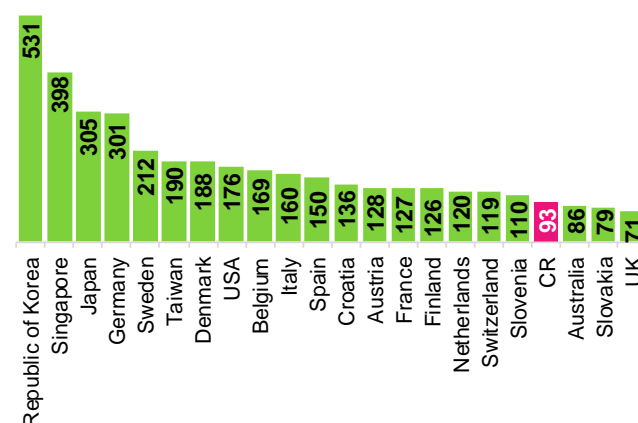
Production functions in economic theory tell us simply that companies try to maximize the volume of their output with the resources available to them. These resources or factors of production are land, labour and capital. If we do not concern ourselves with land, then manufacturing companies basically resolve whether to produce a given product using more labour or using more capital (technology, machinery). And they do so by comparing the price (marginal cost) of labour and the price (marginal cost) of capital. If the cost of labour is high (or when it is not available) then companies will begin replacing it with capital such as machinery, using greater automation of production, engaging robots or linking all production elements into a mutually communicating network, which is described today by the concept of Industry 4.0 (this also applies the other way around, for example in the form of moving production to countries with cheaper labour).

### Robots are not new

Automation and deployment of robots in manufacturing are not recent innovations. Gradual automation of production began in the 1950s and the first industrial robot was developed and installed in the factory of the Japanese company FANUC in 1974. Since then, thanks to huge developments in computer technology, industrial robots have come a very long way. At first, they were large dangerous machines that had to operate in closed rooms. Over time they were improved and above all expanded into more and more areas of industry. Today large industrial companies from Siemens to the domestic company Skoda Auto cannot even imagine production without them. Development is quickly moving forward. The

current innovation is the so-called koboti, or robots designed to work with people (there is no risk that they will injure workers). The global market for robots is growing rapidly. According to the research firm International Data Corporation, global spending on industrial robots and related services between 2015 and 2019 almost doubled from 71 billion USD to 135.4 billion USD in 2019. The most industrial robots are sold each year in China, Korea, Japan, the USA and Germany. When compared relative to population however, Korea, Singapore and Japan are first and our neighbor Germany next.

**Number of multipurpose industrial robots per 10,000 employees in the manufacturing industry**



Source: IFR, data as of 2015

### Cost of robot work = 5 euros/hour

Today a company can purchase a basic version of an industrial robot with a carrying capacity of about 5 kg and a reach of one meter for about half a million crowns. To this it is however necessary to add the additional costs of installation, adjustment of the working environment services, training and other items according to the planned use. The final price may thus even double. Moreover, these are basic types of robots and larger robots cost from a million crowns and more.

Former board member responsible for human resources of the automaker Volkswagen, Horst Neumann said at the beginning of 2015 that while an hour of human labour (including expenses for pension and health insurance) costs the company 40 euros, hourly costs for robot work come out to 5 euros.

### Calculation of the hourly costs of a robot in Volkswagen factories

Data:						
▪ Period of operation: 7 years						
▪ Working time: 250 working days per year, 20 hours of work per day = 5000 hours per year x 7 years = 35 thousand hours						
▪ Operating costs: Energy (from 1 to 13 kW) x 0.1 euros x 35,000 hours						
▪ Maintenance: 5% of the original price of the robot						
Total cost of the robot:						
30,000 €	75,000 €	112,000 €	182,000 €	217,000 €	250,000 €	400,000 €
+ 35,000 working hours = Cost of robot work per hour						
0.90 €	2.10 €	3.20 €	5.20 €	6.20 €	7.10 €	11.40 €

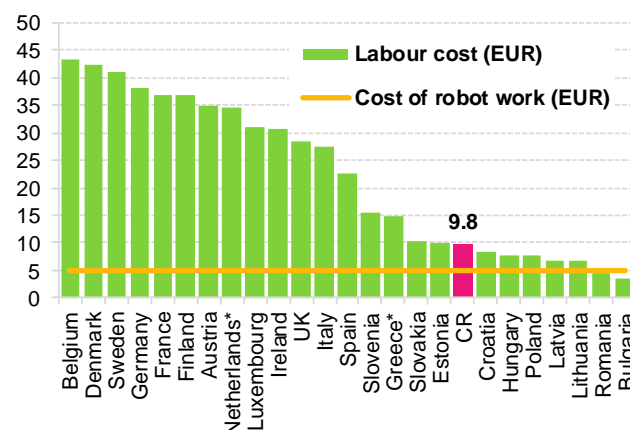
Source: Die Welt

Apart from price, the advantage of robots is also that they can work 24 hours a day, do not need rest, let alone sleep, do not want to raise wages and do not even go on strike. In addition, thanks to them, companies can cover seasonal peaks when they cannot get staff. On the other hand, the robots used at present still cannot assess quality, taste or for example damage to packaging as a person can, they are not as flexible, and they cannot respond to unexpected situations like humans. Therefore in the future as well robots will best be able to fill positions where there is monotonous and repetitive work and work that is physically demanding, which will relieve people. Nevertheless, the benefits of robots do not mean that firms will start automatically and abruptly laying off their workers and replacing them with robots. On the contrary, large companies deploying robots in their plants on a large scale, from the German company Siemens to the American company Amazon, have not dismissed employees (but instead have recruited) and assert that they will continue to need people (although after robots they will want a different, more sophisticated type of work). For them industrial robots in fact primarily serve to increase manufacturing productivity. From this perspective, for Czech companies robotization and increasing automation of production is a necessity in order to increase their productivity and keep pace with international competition. Fighting against the deployment of robots could ultimately lead to not having anyone to compete against.

### Czech Republic: Low costs, but robots are cheaper

How does the Czech Republic stand in its potential for substituting labour with capital (robots) in European competition? Domestic labour costs for staff are still much lower than in advanced industrialized Western countries, where the rate of robotization is at a higher level than in

Labour cost in Manufacturing (2015)

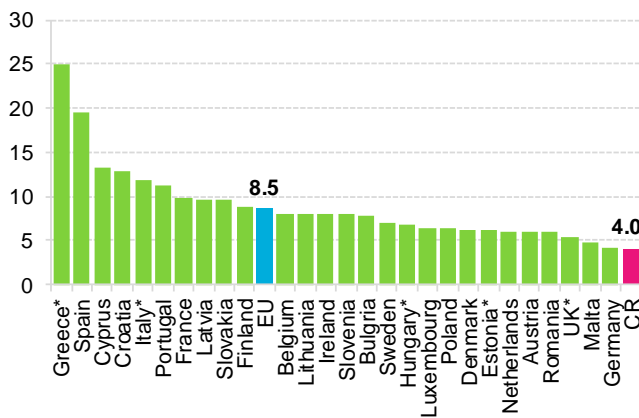


Source: Eurostat; data for Cyprus, Malta a Portugal not available; \*2014

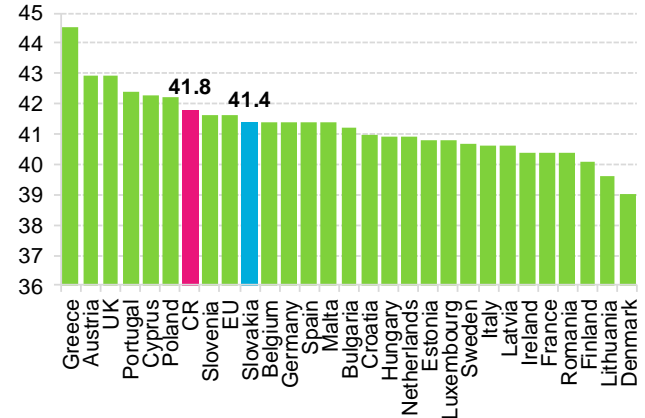
the Czech Republic. Even so Czech labour costs are higher than the hourly work of a robot. In advanced industrial countries such as Germany, Sweden or Denmark, despite the already much higher level of robotization a large increase in the unemployment rate has not occurred however. Conversely, the most advanced industrial EU countries with high labour costs have some of the lowest unemployment rates.

What is important is not only that people in a given country or industry can find work, but also how much they receive for the work performed and how long they work. Comparison with the EU shows that people in the Czech Republic work a lot relative to other EU countries, but their remuneration for work is less than half the average wage in the EU.

**Unemployment rate in the EU (% , 2016)**



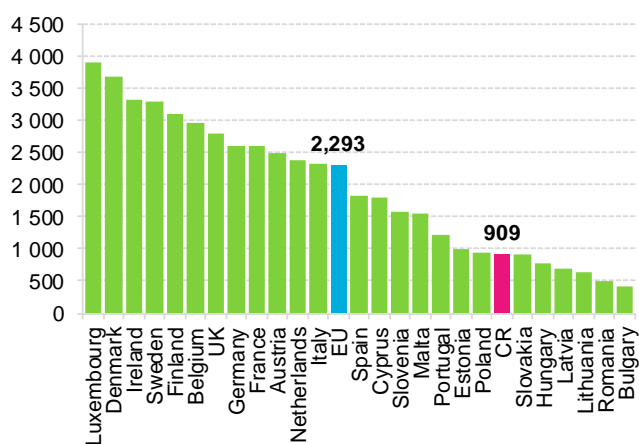
**Hours worked per week (2015)**



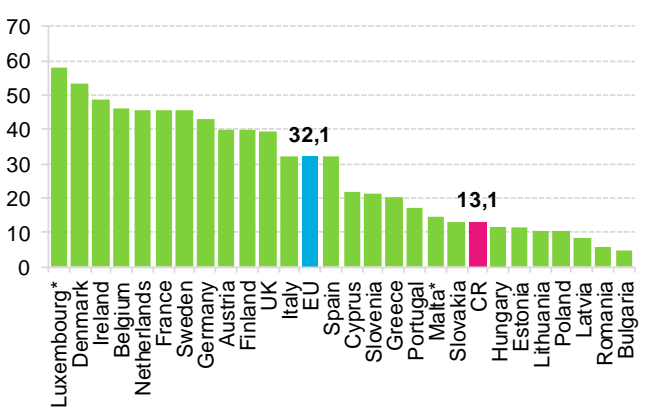
Source: Eurostat; percentage of active population; \* data as of 2015 Source: Eurostat; average number of hours

Use of robotization and automation is thus one of the ways to increase labour productivity in industry (which still has not reached the level of Western countries) and also the wages of Czech employees.

**Average monthly earnings (EUR, 2014)**



**Real labour productivity per hour worked (EUR, 2013)**



Source: Eurostat; Industry, construction and services; data for Greece and Croatia not available

Source: Eurostat, \*data as of 2012



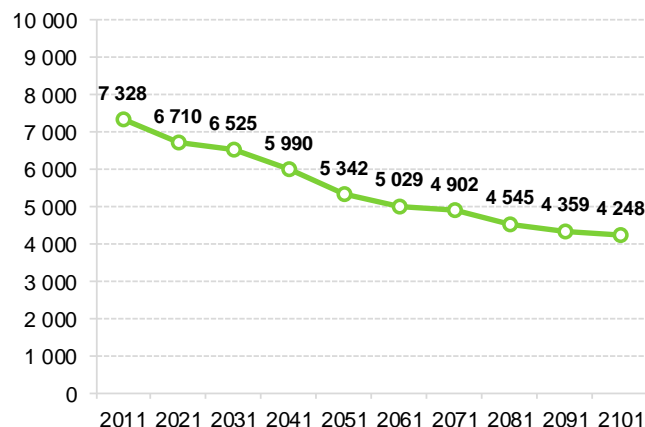
From a long-term point of view, a higher degree of automation and robotization is also definitely an opportunity simply because the number of people of working age in the Czech Republic will decline in the coming decades and quite significantly.

While in 2011 in the Czech Republic there were 7.3 million inhabitants of working age, in 2021 it will already be 6.7 and in 2031 only 6.5 million inhabitants. Over 20 years that represents a loss of 800,000 people of working age or 11%.

### Minimum income for all or a shorter working week?

The current approaches of countries on how to deal with a greater degree of automation and robotization in the economy are different. Some European states base their approach on the assumption that thanks to robots people will simply work less (for example Sweden). Another approach to this reality is to let robots work rather than people and guarantee a minimum income to those who do not work (Finland, Switzerland). Bill Gates, the head of Microsoft, in turn suggests that robots should be taxed. And the issue of the rights and obligations of robots has also been a theme for the European Parliament.

### Population Projection for Czech Republic (ths.)



Source: CSO - Population projection; age 15-64

### Shorter working hours in Sweden

In 2015, some employers in Sweden decided to move to reduced daily working hours of 6 hours total. When based on the assumption that a reduction of working hours can prolong the working lives of people who perform demanding activities, this could therefore have long-term benefits for society. At the same time employees were guaranteed the salary that they would receive for an 8 hour work period. This experiment was tested, among others in the Svartedalens nursing home for seniors in Gothenburg, where for 82 nurses and nursing assistants working hours were shortened to six hours. How was the experiment evaluated after two years? According to its authors it is too expensive. The city in fact had to recruit additional staff (17 in total) so that all work tasks could be carried out. Thus although it showed that employees felt better and patient care improved, the city does not yet intend to introduce reduced working hours across the board.

### Finland tries guaranteed monthly income

Starting in January 2017 an experiment was launched in Finland - a total of two thousand selected people without jobs were given a guaranteed monthly income of 560 euros (about 15,000 crowns) for a period of 2 years. They will however still be able to earn extra money. Kela, the organization which runs social insurance, decided to extend the experiment after a year. Finland is the first country where such a system is being tested on a national level. Participants do not have to prove that they are actively looking for work and incidental earnings do not reduce the basic income. In this way the government wants to find out whether people will be more motivated to seek employment. According to its promoters, guaranteed income will help in the fight against poverty and unemployment and in the future could replace the complex system of benefits not only in Finland. A different stance was taken by the inhabitants of Switzerland - in 2016 the possibility of introducing an unconditional basic income (2,500 Swiss francs, about 54,000 crowns) was rejected in a referendum, with almost 77% of voters voting against it.

### Bill Gates: The work of robots should be taxed

Bill Gates proposes the introduction of an income tax for the work of robots which governments would levy on companies that operate robots. According to him the introduction of the tax would help in sectors where there is a need for empathy and understanding - working with older people, helping children with special needs etc.

Workers who lose their jobs due to automation could work in these areas. Resources for retraining such workers could be derived precisely from taxation of robotic work.

The European Parliament has also addressed taxation of operators of robots, but the proposal did not pass. This result was welcomed by the International Federation of Robotics for example, according to which the tax would have a negative impact on competitiveness and employment.

### **The European Parliament has voted on the rights and obligations of robots**

The European Parliament passed a [resolution](#) on February 16 which contains recommendations to the Commission on rules for robotics.

*"While between 2010 and 2014 sales of robots rose each year on average by 17%, in 2014 sales increased by 29%, which is the highest historical annual increase; this jump was caused above all by demand from manufacturers of automotive parts and electrical respectively electronic equipment (International Federation of Robotics, IFR)."*

The document calls on the Commission for example to propose a uniform definition of cyber-physical systems, autonomous systems, intelligent autonomous robots and their subcategories. Furthermore, MEPs ask for the introduction of a code of ethics for researchers and designers in the field of robotics, which should ensure that robots perform activities in accordance with legal and ethical standards, and that their design and usage will respect human dignity. Parliament also considers that provision of liability rules for accidents involving autonomous means of transport are essential.

The Commission should also consider creating a European agency for robotics and artificial intelligence, which would draw up expert reports on the technical, ethical and regulatory issues for relevant public officials at the EU and national levels.

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