# Evaluation of new trends and reasons for attendance artificial intelligence at the operational level

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**Abstract:** The contribution is focused on the analysis of the current state of the introduction of artificial intelligence in enterprises in *Slovakia*. Here are also the results of a questionnaire survey aimed at finding out what the participating small and medium-sized enterprises mean by the term digitization, whether they use it and consider it important. The questionnaire also investigated whether companies are familiar with the national strategies of *Industry 4.0* or how they see the service provision and financing system in this context. The conclusion of the article is devoted to the evaluation of new trends and reasons for the emergence of artificial intelligence.

**Keywords:** artificial intelligence, new trends, operational level

## INTRODUCTION

Artificial intelligence was just a fantasy in the past, even though machines that copied human activities were already created in the past. Nowadays, fantasy is becoming more and more a reality, as modern technology continues to develop and advance. Many people may have a negative opinion about the benefits of this technology to the lives of ordinary people because of science fiction movies. At the same time, artificial intelligence is a great helper, even if we don't realize it, we use it every day. We can encounter artificial intelligence, for example, during online shopping, in advertisements, in self-driving cars, in the health sector for the development of new medicines or in normal weather forecasting. The use of artificial intelligence deepens every year, whether in businesses or in everyday life.

# 1 NEW TRENDS FOR ATTENDANCE ARTIFICIAL INTELLIGENCE

As part of the evaluation of the findings from the analysis of the current state of the introduction of artificial intelligence in enterprises in the Slovak Republic, possibilities for the use of new trends and reasons for the introduction of artificial intelligence at the operational level were proposed for enterprises. At the same time, the chapter contains different possibilities of using elements of artificial intelligence, risks of artificial intelligence and the current use of artificial intelligence in companies around the world.

The arrival of a new wave of technologies, including artificial intelligence, is inevitable and is influenced by the following trends currently prevailing in the industry [1-3].

## 1.1 Aging of the automation infrastructure

Automation systems that today perform various manufacturing operations have existed since the beginning of the second industrial revolution. This has created a huge gap between the rapid progress in *ICT* and the aging automation infrastructure. For reasons such as the risk of unplanned downtime and non-compliance, competitive disadvantages and increasing maintenance costs only further increase the need to modernize traditional automation systems [4].

Recommendation for businesses:

From the point of view of the aging of the automation infrastructure, it is recommended for enterprises at the operational level to carry out a survey of the possibilities of modernizing the technological park in order to be competitive. Furthermore, carry out research on the modernization of the introduction of artificial intelligence elements into production.

## 1.2 Aging workforce

With advancing technology affecting production, businesses face new challenges in the form of a shortage of skilled labour. An aging workforce cannot keep up with evolving technologies or run smart digital factories. This results in the development of a new kind of industry expertise that is needed to develop and maintain advanced automation systems [5-7].

Recommendation for businesses:

Together with the implementation of new technologies, train competent workers regarding the methods of operation of the given technology. It is easier for a company to train an original employee who is already familiar with the operation of the company than to train a completely new employee.

## 1.3 Resistance to new technologies

Change in any form comes with some resistance. It is very difficult to deploy newer technologies without affecting current business or production processes. The change also means that producers will have to use more of the existing resources [4].

Recommendation for businesses:

Since workers have a familiar system of work and may feel resistance to change when introducing elements of artificial intelligence, the recommendation may be to implement training and educational programs for the development of their skills in the use and operation of new technologies.

# 2 ARTIFICIAL INTELLIGENCE, AUTOMATION, ROBOTIZATION AND ITS IMPACT ON SOCIETY

Due to the continuous development of artificial intelligence, automation and robotization, entire industries will be abolished in the future. It is estimated that between 9 % and 47 % of the workforce could be replaced by automation. The consulting company *McKinsey* predicts that by 2030, robots should replace around 800 million workers in the world [8-10].

According to *OECD* data, robotization should replace about a third of current jobs in *Slovakia*. The most endangered positions are located in the west of the country, which amounts to 40 % of jobs. For the previous generation, the skills acquired at school were enough for 26 years, today it is only four and a half years. Therefore, it is necessary for universities to adjust their focus and focus on lifelong learning. It is estimated that up to 65 % of children who enter primary school will have jobs that do not yet exist. Jobs that require interaction with people, the use of social intelligence or work in an unpredictable environment will be difficult to automate in the first wave [11].

On the contrary, job positions such as assembler, storekeeper, cashier, baker, taxi driver or truck driver, i.e. routine activities or activities in predictable environments, will completely disappear. Among the less threatened professions are, for example, assistants, consultants or accountants, although their occupations will require far fewer workers due to the automation of most tasks [12-13].

Relatively safe positions are represented by professions such as teacher, doctor, dentist, nurse, businessman, hairdresser, artist or scientist. In very many cases, the professions themselves will not disappear, but the work performed will be significantly automated. For example, cardiologists reviewing medical images will be assisted by expert

systems capable of instantly evaluating millions of patient images from around the world, with the resulting report signed by the cardiologist to the patient. In turn, artificial intelligence will help lawyers analyse hundreds of documents in the stage of preparation for the hearing, but it will be the lawyer who will advise on presenting the case to court. It is expected that an ever-increasing number of people will remain not only unemployed, but also unemployable. Also, the growing supply of cheap machine labour will eventually reduce human fees far below the cost of living [14-16].

Recommendation for businesses:

Businesses could cooperate with secondary schools and universities, for example in the framework of dual education, so that there is a transfer of needs and requirements to employees.

## CONCLUSIONS

The various possibilities of using elements of artificial intelligence include:

Optimization of production - by production optimization we understand a wide and diverse group of artificial intelligence and mathematical modelling with the aim of efficient management of resources, maximization of outputs and minimization of negative outputs of the given process. This often means a set of partial smaller solutions rather than a single monolithic solution. Production optimization is suitable for companies from the manufacturing or processing industry that have data in various information systems. The use of artificial intelligence therefore represents a continuation or extension of an already started automation process [17-18].

Quality management, control and analysis - suitable for various companies in which the control of serial and mass production plays an important role and in which it is possible to replace the visual control of the product either during production or at the output of the finished product. Full automation using the vision system, based on artificial intelligence, is possible wherever a visual inspection without further analysis is sufficient to detect a defect or analyse a sample. The key to deploying artificial intelligence is to have enough reference samples and identifiers for machine decision making. This is the deployment of the so-called machine vision systems, the basis of which is a higher level of artificial intelligence working on neural networks.

Intelligent automation of non-production processes-this technology is ideal for companies that value processes as repeatable, not requiring a higher degree of human creativity.

The smart industry action plan also published the conclusions of the *Hungarian* study, which, in cooperation with partner institutions from the *Czech Republic*, *Slovakia*, *Poland*, *Germany* and *Italy*, drew up the most important effects of digitization and aspects of *Industry 4.0* on the basis of a questionnaire survey among small and medium-sized enterprises in the mentioned countries. The questionnaire survey focused on questions such as: what do the participating companies imagine by the term digitization, do they use it, or do they consider it important. The questionnaire also examined whether companies are familiar with the national strategies of *Industry 4.0*, whether they have heard about them, or how they see the service provision and financing system in this context.

Main findings from the mentioned questionnaire survey:

- digitization is not an option, but an irreversible process, taking into account the extent to which it is necessary for small businesses and not forgetting the fact that it depends on the type of work,

- surveys indicate that robotics together with digitization will be included in all areas of life, which will cause the demise, but also the creation of new professions,

- from the point of view of small businesses, robotics and digitization should be considered not only as a problem, but also as an opportunity,

- due to the lack of information of small businesses about the overall progress of the mentioned processes, they suffer. Therefore, they need continuous and more extensive access to information sources to find out what these processes will mean for them in the future.

## REFERENCES

[1] ATP journal (2019): *Artificial intelligence at the operational level (1).* (In Slovak) [online]. Available on:
https://www.atpjournal.sk/buxus/docs/casopisy_cele/ATP%20Journal%209%202019.pdf

[2] ATP journal (2019): *Artificial intelligence at the operational level (3).* (In Slovak) [online]. Available on: https://www.atpjournal.sk/buxus/docs/casopisy_cele/ATP%20Journal%2011%202019.pdf

[3] ATP journal (2020): *Artificial intelligence augments human capabilities, not replaces them.* (In Slovak). [online]. Available on: https://www.atpjournal.sk/buxus/docs/casopisy_cele/ATP%20Journal%207%202020.pdf#page=1

[4] EUROPARL (2020): *Artificial intelligence: definition and use.* (In Slovak). [online]. Available on:

https://www.europarl.europa.eu/news/sk/headlines/society/20200827STO85804/umela-inteligencia-definicia-a-vyuzitie

[5] BIELIKOVÁ, M. et al. (2019): *Analysis and proposal of possibilities for research, development and application of artificial intelligence in Slovakia* (In Slovak). [online]. Available on: https://www.mirri.gov.sk/wp-content/uploads/2020/03/Dielo2-Manual.pdf

[6] MHSR (2021): *Concept of intelligent industry for Slovakia.* (In Slovak) [online]. Available on: https://www.mhsr.sk/uploads/files/DIBTWTJL.docx

[7] MHSR (2021): *Proposal of an action plan for the intelligent industry of the Slovak Republic* (In Slovak) [online]. Available on: https://www.mhsr.sk/uploads/files/8U6RKSS5.pdf

[8] MIRRI (2021): *Action plan for the digital transformation of Slovakia for years 2019-2022.* (In Slovak). [online]. Available on: https://www.mirri.gov.sk/wp-content/uploads/2019/07/Akcny-plan-DTS_2019-2022.pdf

[9] MIRRI (2021): *Slovakia's digital transformation strategy 2030.* (In Slovak) [online]. Available on: https://www.mirri.gov.sk/wp-content/uploads/2019/06/Strategia-digitalnej-transformacie-Slovenska-2030.pdf

[10] ANTONIUK, I. - SVITEK, R. - KRAJČOVIC, M. - FURMANNOVA, B. (2021): *Methodology of design and optimization of internal logistics in the concept of Industry 4.0.* In: Transportation Research Procedia, 55, 503-509.

[11] BUCKOVA, M. - GASO, M. - PEKARCIKOVA, M. (2020): *Reverse logistic.* In: InvEnt: Industrial engineering - Invention for enterprise - proceedings. Bielsko-Biała: Wydawnictwo Akademii Techniczno-Humnistycznej, pp. 36-39, ISBN 978-83-66249-48-6.

[12] Burganova, N. - Grznar, P. - Mozol, S. (2020): *Design of logistics system in production.* In Technologie, procesy i systemy produkcyjne. Bielsko-Biala : Wydawnictwo naukowe Akademii techniczno-humanistycznej w Bielsku-Białej, ISBN 978-83-66249-56-1, p. 11-18.

[13] VAVRIK, V. - FUSKO, M. - BUČKOVÁ, M. - GASO, M. - FURMANNOVÁ, B. - STAFFENOVA, K. (2022): *Designing of machine backups in reconfigurable manufacturing systems.* In: Applied Sciences, 12(5) p. 1-27, ISSN 2076-3417.

[14] FILIPOVA, I. - DULINA, L. - BIGOSOVA, E. - PLINTA, D. (2021): *Modern Possibilities of Patient Transport Aids.* In: 14th International scientific conference on sustainable, modern and safe transport - Transcom. Virtual conference 26 May-28 May, Slovakia. Transportation Research Procedia, 55, pp. 510-517.

[15] SUKALOVA, V. - STOFKOVA, Z. - STOFKOVA, J. (2022): *Human Resource Management in Sustainable Development.* In: Sustainability, 14(21), 14258.

[16] AHMED, N. (2021): *What is artificial Intelligence? (AI)* [online]. Available on: https://www.aitimejournal.com/@nisha.arya.ahmed/what-is-artificial-intelligence-a

[17] ATOZOFAI (2021): *Ľudská reč* [online]. Available on: https://atozofai.withgoogle.com/intl/sk/speech-recognition/