

# Using artificial intelligence as business opportunities on the market: An overview

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**Abstract.** The usage of artificial intelligence as business opportunities on the markets has a wide potential for many fields. Due to the rapid development of technology, artificial intelligence is quite expensive but useful. The research is done by making basic SWOT analysis (analysis Strengths-Weaknesses-Opportunities-Threats) of the R&D (Research and Development) stage in the Czech Republic and by document analysis from articles on Web of Science and Scopus. The results shows, that the AI is beneficial for large number of fields and that the AI (Artificial Intelligence) has a great potential for implicating this in business, healthcare, economics and many more. The AI has potential to improve people's life and work.

**Keywords:** Artificial intelligence, robotics, business opportunities, manufacturing company, finance

## 1 Introduction

Artificial intelligence (AI) is very extensive nowadays and many people do not realize what all falls under this term, even though they use it every day. [1] said that Artificial Intelligence has been rising as a powerful general-purpose technology that promises to lower uncertainty with more accurate predictions and to reduce the cost of laborious tasks. This paper focus on the issue of artificial intelligence and its implementation in business. This research informs the reader about the concept of artificial intelligence and what all falls into it. How it has developed and what are the benefits of its use, opportunities or threats. With the constant development of artificial intelligence, the properties and extent of application, as well as awareness of its existence, evolve. Artificial intelligence can be used in variety of fields, for example in customer service. As a primary AI tool, chatbots have seen increasing use by companies to support customer service. The difference between human intelligence and artificial intelligence is topic of many research, the, one of them was done by [2], in which he said that, these kinds of differences in basic structure, speed, connectivity, updatability, scalability, and energy consumption will necessarily also lead to different qualities and limitations between human and artificial intelligence. The co-working between those two are being more and more implicated in the workplace. In his research he discovered that humans working with AI systems in the workplace or in policy making have to develop an adequate mental model of the underlying 'psychological' mechanisms.

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However, the basic concept of artificial intelligence was to create new machines that were able to think as humans. Artificial intelligence helps to streamline activities that are routine in the process. If entrepreneurs, and not only them, understand the principle of functioning and improving performance using artificial intelligence, incorporation will gain positive results of society indicators. Artificial intelligence quickly moves into this world of expertise step by step by replacing people with higher predictive ability, higher efficiency and better results. However, homo sapiens will not be replaced by all at once, but gradually over time due to the absorption of systemic knowledge. Robotics become an essential part of our human body and existence.

[3] say that because of artificial intelligence, people in developed countries can worry about losing their jobs and, conversely, low -income countries can perceive artificial intelligence as an offer of new opportunities to break the poverty circle. Czechs are a bit sceptical for these technologies. A smaller part thinks that robotics are beneficial and most are worried about the loss of jobs, even though artificial intelligence is one of the tools to make work easier and more efficient. Basically, we already use it as a tool for work at work.

People are concerned about losing their jobs - it is perceived negatively, but AI also has a share in healthcare, where it helps to treat patients. Artificial intelligence is one of the areas of computer science with a mathematical process that has the potential to improve the health care system through new strategies to provide informed decision -making and facilitate patient involvement. It can be used to automate decision -making and prediction based on patient data. The characteristics of this technological progress are already influenced by every aspect of society and create conditions for the disruption of human socio -economic, educational, health, legal and moral system, which may have a significant impact on human progress [4].

The topic of business opportunities of artificial intelligence in the Internet environment will address questions such as their advantages and disadvantages in implementation. At the same time, there will be a notification on out possible pitfalls in their use, such as abuse in breaking protection or reducing the number of jobs on the market. Furthermore, the research will be focused on the use of artificial intelligence across various fields on the market and compare or evaluate their use and benefits.

## 2 Literature research

Artificial intelligence (AI), a key technology in the 2010s, has been increasingly becoming a dominant technology in the 2020 [5]. Artificial intelligence technology (AI) in the last decade, partially supported by high progress in the field of large data and raw computing performance, has entered the extraordinary phase of rapid development and wide application. Which corresponds with the research od [6], in which he said that, Artificial Intelligence is a disruptive technology developed during the 20th century, which has undergone an accelerated evolution, underpinning solutions to complex problems in the business world. Techniques developed in traditional AI research areas such as computer vision, speech recognition, natural language and robotics, have found many innovative applications in a number of real environments, including medicine. General methodological contributions of artificial intelligence, such as various recently developed deep algorithms, were also applied to a wide range of disciplines [7]. In other words, [8] said that Artificial intelligence (AI), particularly computational intelligence and machine learning methods and algorithms, has been naturally applied in the development of recommender systems to improve prediction accuracy and solve data sparsity and cold start problems.

[9] claim that artificial intelligence is known for its ability to let the machines perform tasks associated with the human mind and has useful applications in many industries and fields, including medicine and healthcare. Medicine continues to evolve because artificial intelligence, machine learning and deep learning in technology become more accepted and used. The research of [10] was focused on the trust management for AI, in particular, the importance of trust analysis and

management technology for artificial intelligence systems is continuously growing so that users who desire to apply and use artificial intelligence systems can predict and safely use services. The usage of the AI is become more and more involved in variety of fields. It's widely used in healthcare, economic and management, marketing and many more. One of them is hotel industry. The research on this topic was done by [11]. The current study integrates these two concepts and explores how emotional and artificial intelligence influences employee retention and performance with a focus on service employees in the hotel industry. But the implementation of AI in services has some danger. As I said there are many differences between the human jobs and jobs done by the AI. The development of artificial intelligence (AI) does influence human jobs but not necessarily in a negative way. Although labor force participation rates and firms' job vacancies for human labor decline, the unemployment rate may be lower than that in an economy without AI [12].

## **2.1 Artificial Intelligence in economics**

The importance of AI in economics is no doubt. Artificial intelligence can affect economic growth and employment. The influence is assumed to be substantial because the adoption of AI technology may lead to increased productivity, lower wages, prices, and labor substitution [13]. On the other hand [14] done research on modelling AI in economics, in their research they said, that it is also illustrate that the contribution of AI to aggregate productive labor service depends not only on the amount of AI services available but on the endogenous number of automated tasks, the relative productivity of standard and IT-related labor, and the substitutability of tasks.

## **2.2 Artificial Intelligence in healthcare**

How can artificial intelligence improve existing approaches to supervision and response to public health and allow new ones? The answer lies in the basic challenges facing the supervision and response of public health. The supervision of public health is by its very essence controlled by data. Identification of early, accurate and reliable health anomalies and the outbreak of diseases from heterogeneous data sources have always been the main goal of supervision of public health. Artificial intelligence is one of the most exciting methodological shifts in our era. It holds the potential to transform healthcare as we know it, to a system where humans and machines work together to provide better treatment for our patients [15]. Technically, it is reflected in two different challenges: Promotions of data acquisition and analysis challenge. The first data acquisition prompt concerns the determination of easy -to -use data sources containing useful signals. The second analytical challenge concerns the development of efficient computational frames for extraction of such signals. Artificial intelligence provides a number of methods and techniques that help to deal with both challenges. Other main objectives and reactions of public health are to analyze and predict the trends of infectious diseases through modelling dynamics of disease transmission and evaluate public health reactions. Achieving these goals requires knowledge of domain and predictions rich in context, gentle risk analysis through contacts and social networks, quantification of reactions and control measures, and assessing these reactions and measures in the presence of complex interactions and restrictions.

Artificial intelligence methods can be very useful in building a virus detection system when there are too many data that people cannot easily handle. One example is usage of the AI during pandemic of COVID-19. During the pandemic, the researchers tried to predict patients trajectories to prevent more contacts, and become more aware of the spread.

Scanning system used at the airport for continuous scanning more faces. When AI methods are trained with some data on the properties of viruses, they can identify people who are patients without fever. Many researchers and scientists work on various methods such as Ann, machine learning and deep learning that can analyze available large data to detect signs of diseases before one can detect them with greater accuracy and efficiency [16].

One of the most important fields is neuroscience. Especially neurosurgery. Research done by [17] shows, AI is playing a pivotal role in the production, processing and storage of clinical and experimental data. AI usage in neurosurgery can also reduce the costs associated with surgical care and provide high-quality healthcare to a broader population.

### **2.3 Artificial intelligence and deep learning**

Technological advances in artificial intelligence and data science have been a large amount of technological progress in the last decade. Although research in artificial intelligence for various applications has been underway for decades, the current wave of hype in the field of artificial intelligence has different from the previous ones. The perfect combination of higher computer processing speed, larger data libraries for collecting data and the large AI talent fund enabled the rapid development of AI tools and technologies, including in healthcare [18].

In particular, the development of deep learning (DL) had an impact on how we look at AI today and is the reason for a large part of the recent excitement around AI applications. DL allows you to find corrections that were too complex to render using previous machine learning algorithms [3].

### **2.4 Artificial Intelligence and finance**

Prediction of the stock market is an important financial topic that has attracted the attention of researchers for many years. It includes the assumption that previous publicly available information has a certain predictive relationship to future shares revenues. By successful predicting future prices. Banks implement AI to provide digital assistance and financial advice to clients, measure their financial standing etc. [19].

Shares can be generated considerable profits. However, the actual pricing itself is much more demanding than just looking for a price direction. The methods listed in this article provide models to predict the stock price with reasonable accuracy. In addition, artificial intelligence machines can expand human abilities by intensifying their cognitive forces and can expand their physical abilities [20]. The sales forecast deals with the predication of the company's sales over a period of time in the near future, usually in the next fiscal year. Getting effective sales forecasts can help with decision -making powers to calculate production and material costs and allow them to determine the selling price, manage strategic operations, etc.

### **2.5 Artificial Intelligence in marketing**

In this case, we are talking about machine-human interaction. The interaction between man and machine (HMI) indicates different ways of interacting people and automated systems and communication through touches, gestures, voice and sensors. HMI -based HMI applications include both people helping machines and machines helping people [21].

[22] mention that artificial intelligence systems and people can coexist. People can focus on the feeling of tasks, while artificial intelligence can be used as a tool that allows people to make better decisions. The study by [23] found that AI is highly improving the marketing market. The current study looks at how marketing managers utilize machine learning and artificial intelligence to analyze large amounts of client data and develop effective marketing strategies.

## **3 Methodology and data**

Given the difficulty of a topic where it is difficult to do research using interviews or questionnaires, we will choose the methodology of document analysis. The research will be a gathering of information from professional articles, studies and literature and case studies.

We also will be making basic SWOT analysis on the Czech Republic stage of the Research and development (R&D).

For this research we chose the method of document analysis. The documents that the research is based on are professional articles will be sought after by the keyword "artificial intelligence" and these articles will be narrowed to economics and finance, business and other areas in business. In addition, publications from reliable scientific resources of two WOS and Scopus platforms will be used. Entering the criteria to website of Science, the publication will not be older than 2015 with limited articles, we have 85,636 articles that appear a key term "artificial intelligence." Scopus then offers us 71,772 articles. Articles are filtered from 2015 to the present and the type of documents are research articles, case messages and data articles. The other resources that will be used are official documents from the Office of the Government of the Czech Republic [24], which deals with the development of artificial intelligence in the Czech Republic.

## 4 Results

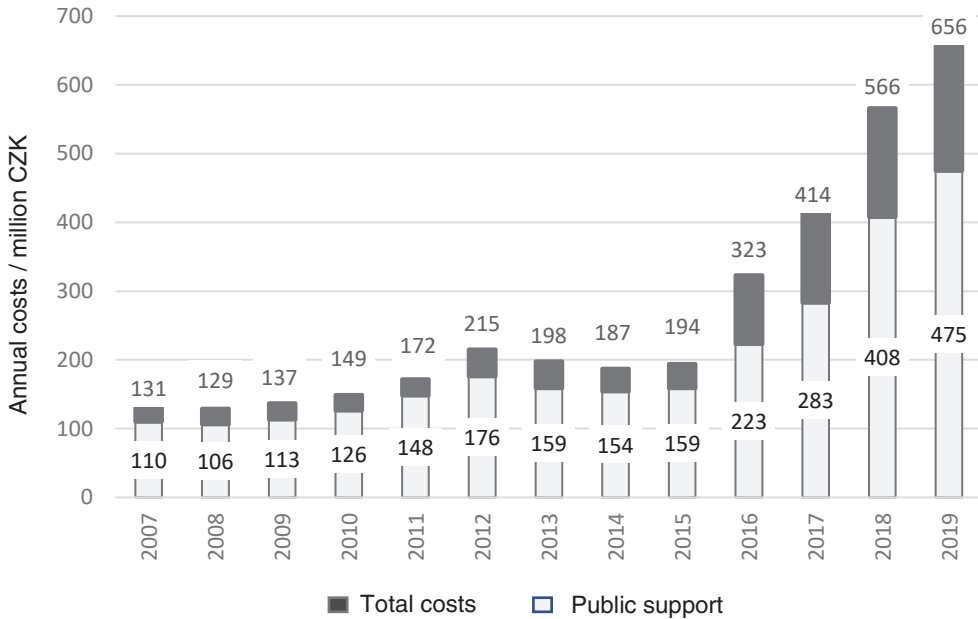
As we can see in the table 1 the SWOT analysis of the stage of Czech Republic.

**Table 1.** SWOT analysis of R&D in the Czech Republic (the CR).

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- <i>Infrastructure of research and development (R&amp;D) for AI is on a great level</i></li> <li>- <i>The results of R&amp;D can be compared to global quality levels</i></li> <li>- <i>R&amp;D application head to the fields with the greatest impart of AI</i></li> <li>- <i>The confederation of Industry of the CR has established a platform for AI</i></li> <li>- <i>Purposeful R&amp;D support in AI has been growing for a long time</i></li> <li>- <i>About 40AI start-ups operating in the Czech republic corresponds to comparable EU countries</i></li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- <i>Application R&amp;D does not have groundbreaking innovations</i></li> <li>- <i>Low involvement in international R&amp;D</i></li> <li>- <i>Application R&amp;D does not cover the fields of administration and trade</i></li> <li>- <i>Purpose support for the applied LWS lags behind the support of basic research</i></li> <li>- <i>The CR is a small market for AI start-ups</i></li> <li>- <i>Risk investment in the CR are insufficiently used for groundbreaking technologies and are significantly lower in volume than abroad</i></li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- <i>Pressing foreign markets with advanced AI technologies of newly emerging small and medium-sized enterprises is essential for the Czech economy and can significantly improve the competitiveness of the CR</i></li> <li>- <i>Wider involvement in international research and international research associations</i></li> <li>- <i>Improvement of cooperation between the public and private sectors in R&amp;D and in the area transfer of R&amp;D results into practice</i></li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>- <i>Insufficient AI reference in strategic-conceptual documents, long implementation of strategies</i></li> <li>- <i>Foreign research will invest more and faster in AI</i></li> <li>- <i>Brain outflow from research into multinational companies and abroad under better working conditions</i></li> <li>- <i>Risk investment in start-ups is not compared to foreign volumes, lack of ground breaking technologies in the CR</i></li> </ul>

Source: Authors.

Figure 1 displays annual public support and the total cost of AI research and development between 2007 and 2019 (before 2007 is r it does not provide complete annual financial information on projects). Data for 2018 and 2019 are planned (was determined according to the planned budgets of ongoing projects).



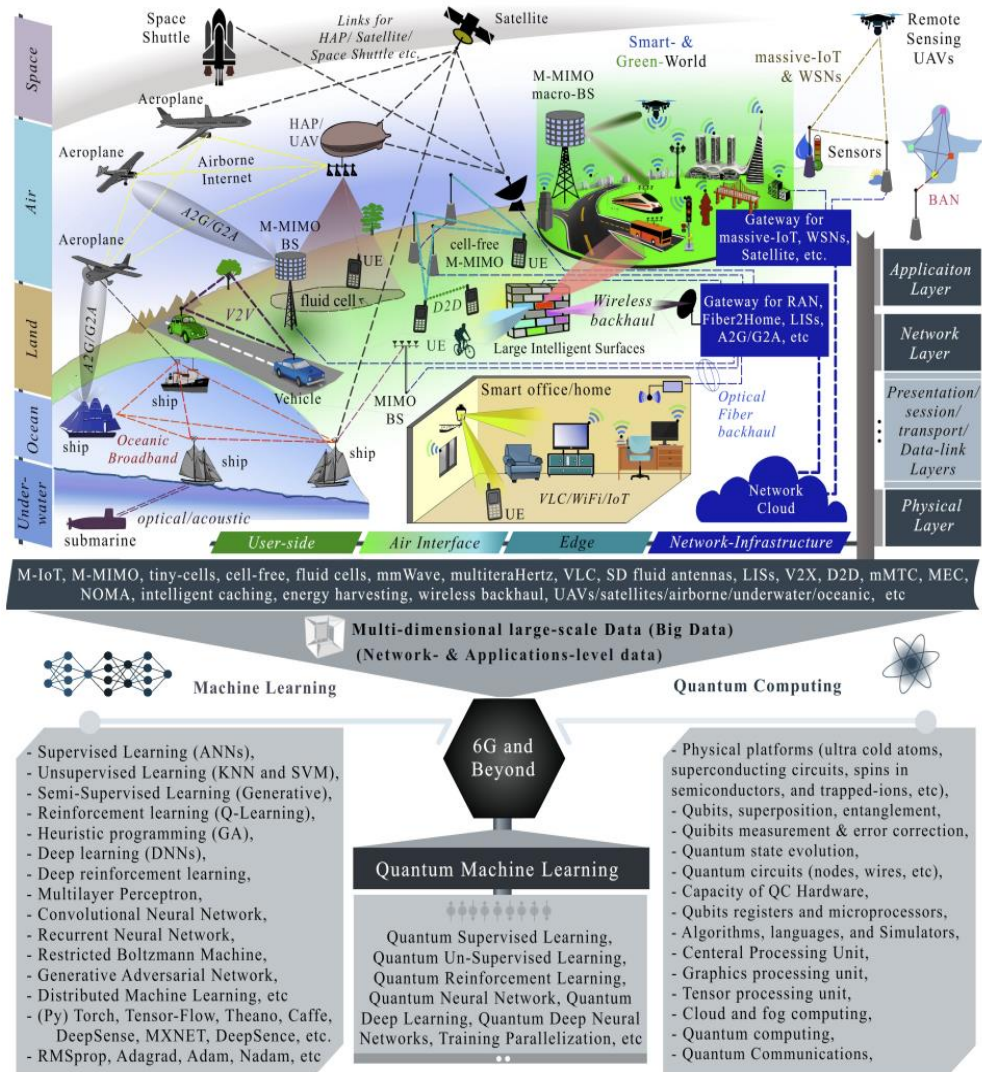
**Fig. 1.** Annual public support and total costs of research and development.

Source: [25].

Note: The number inside each column of the figure represents public support, the number always above the given column of the figure represents the total costs.

Many researchers have already illustrated the positive and negative impacts of the new network technology. 6G communication technology will be integrated with full artificial intelligence. In the 6G communication network, artificial intelligence will be an integral part of communication systems [26].

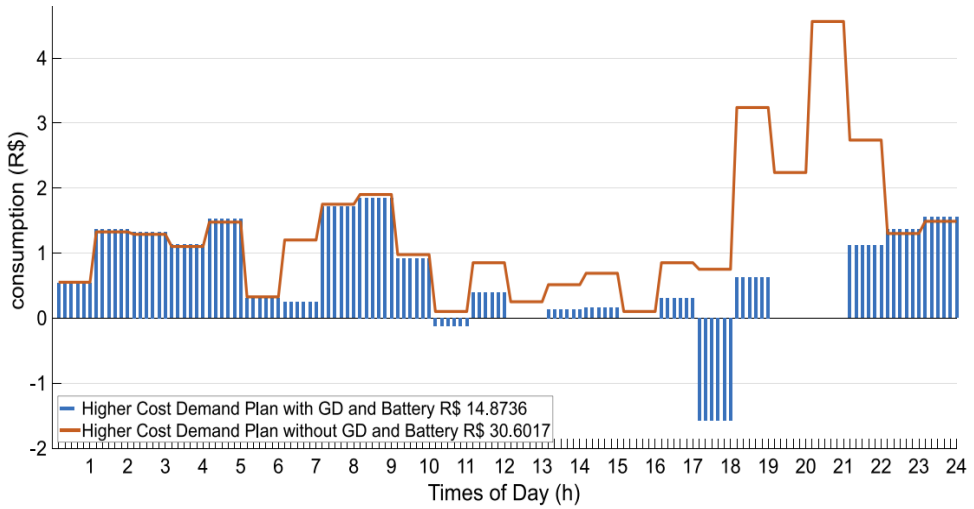
Figure 2 illustrates various new emerging technologies, complex and heterogeneous network structures, multi-spatial massive connectivity, and the wide range of available data across different structures and layers. An example of left horizons for providing high-performance continuous network connectivity is aerial Internet access. In the smart world of the future for travel, travelers across remote (oceanic) regions on ships and aircraft will also demand the same network service provision as is available to land/home users. To enable harmony across such massively interconnected complex 6G networks operating in coexistence with its predecessor will require tremendous learning and processing power [27].



**Fig. 2.** Multi-Dimensional large-scale Data (Big Data).  
 Source: [27].

For some time on the market, the intelligence of artificial intelligence into households has been a great potential. Rocha et al. [28] claim that the Smart Home (SH) concept is part of a smart network paradigm that integrates smartness into the dwelling to achieve greater comfort with minimal possible energy expenditure. One of the problems to be solved is the management of demand (DSM), which consists of planning, introducing and monitoring the activities of the distribution network operator (bottom), the purpose of which is to allow more energy consumption to support efficient use of electricity.

The method of integrating artificial intelligence into a smart home aims not only user comfort but also energy consumption. Autors deal with numerical simulations with real data obtained from smart household appliances. The efficiency of the combination of artificial intelligence was reduced by 51% when comparing smart houses with and without and without a battery bank.



**Fig. 3.** Money consumption for the maximum cost of the maximum cost with and without GD and battery.

Source: [28].

Note: Solid line represents Higher cost demand plan without GD and battery, hatched line represents Higher cost demand plan with GD and battery.

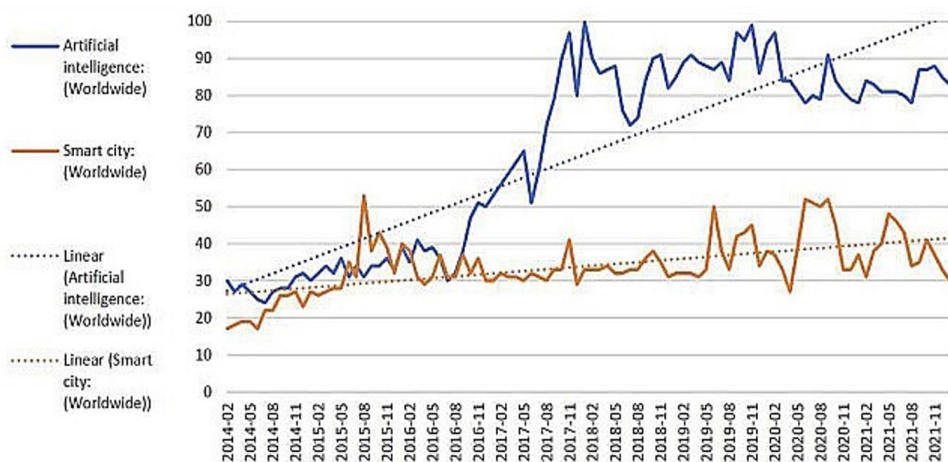
The trend of today's time is the smart home or smart houses. Bicakci and Gunes [29] mention that nowadays homes with systems that can be accessed remotely to turn devices on and off are referred to as "smart". However, there is no intelligent automation process in such houses. Although such houses are considered smart, it is only because the word "Smart" is used as a marketing term. For example, Riverside Concept Houses declared that for a house to be defined as smart, it must have a system that controls electrical devices such as lighting, curtains - blinds, TV, air conditioning, sound system, etc. with a single remote control or via the Internet.

**Table 2.** Records of the PM2 Simulation and AI algorithm process.

App name	id	version	mode	pid	status	restart	uptime	cpu	men	user	watching
AI_choice_prediction	4	N/A	fork	1195	online	0	45D	0%	39,7 MB	root	disabled
AI_location_prediction	3	N/A	fork	1144	online	0	45D	0%	41,5 MB	root	disabled
simulation	1	N/A	fork	1037	online	0	45D	0%	39,3 MB	root	disabled
simulation_web_interface_control	2	N/A	fork	1068	online	0	45D	0%	206,7 MB	root	disabled

Source: [29].





**Fig. 4.** Popularity of keywords "smart city and artificial intelligence".

Source: [30].

Note: The solid line peaking at 100 corresponds to Artificial intelligence: (Worldwide), the dotted line intersecting this curve represents Linear (Artificial intelligence: Worldwide), the solid line below represents Smart city: (Worldwide) and the dotted line intersecting this curve represents Linear (Smart cities: (Worldwide)).

As modern smart cities, we can imagine various uses of digital, information or communication technologies to reduce consumption, comfort of the inhabitants of these cities and streamline infrastructure.

Artificial intelligence enabling solutions for smart cities has several advantages, including more reasonable water supply, energy management, waste management and reducing traffic columns, noise and pollution. Most of the activities and technologies of a smart city focused on creating data and getting new information about the complexity of the city and dynamics [31].

## 5 Discussion

Artificial intelligence brings new opportunities and benefits to society. Figure 1 shows a gradual increase in the cost of the project of artificial intelligence. Research and development (R&D) of artificial intelligence is better than abroad. However, the involvement in international R&D is low. The R&D applications are heading to fields where artificial intelligence has the greatest impact. The Czech Republic is a small market for AI start-ups. In order to increase the competitiveness of the Czech Republic, the development and emergence of new start-ups of companies with high added value in AI technology is important.

Furthermore, according to the SWOT analysis between AI opportunities, we include the preparation of the national strategy for the implementation of artificial intelligence. Artificial intelligence with its technologies can capture newly emerging small and medium -sized enterprises on foreign markets and can improve the competitiveness of the Czech Republic. The threat to the Czech Republic is then greater and faster investment of foreign research and we will be lagging behind international research due to loss of cooperation with foreign leaders in the field.

In Figure 2, we can see the size of the range of artificial intelligence in the world. Artificial intelligence is in the form of virtual assistants, software and systems, for example, to recognize face or voice or in the form of robots, drones and internet of things. Nowadays, we can notice

the extent of the use of artificial intelligence, for example, when searching on the Internet, shopping online, mobile phone assistants who help us organize and perform tasks, answer questions through a virtual assistant and help with search or recommendations. Furthermore, they are smart domestic products - vacuum cleaner, refrigerator, television, thermostats or even washing machines used to reduce consumption, autonomous vehicles and house security, as well as security on the Internet and fight disinformation. Artificial intelligence has a large share in health care and was also used in the fight against Covid.

As artificial intelligence makes its progress and is constantly evolving in something through products known as smart appliances, smart mobile phones or smart homes that grow in "smart cities". The aim is to improve people's quality of life, increase the efficiency and availability of public and social services. These elements are incorporated in our country, for example, in public transport - contactless terminal for payments, in Ostrava there are smart stops with digital information panels. Unfortunately, the unsuccessful example of the involvement of artificial intelligence was smart benches with solar panels or smart lamps. We think that is a matter of time before such errors with dysfunction and the elements will be integrated for the test in larger cities.

The benefit of the paper is to raise awareness of the existence and development of artificial intelligence in the world, to present fields where artificial intelligence is currently used and what it has. Artificial intelligence is a great benefit for many, for achieving companies and organizations more efficient, improving the quality of life and facilitating manual work. Artificial intelligence helps to investigate the environment, energy consumption, while checking the functionality of technology and their security. It also helps to safety of real estate and other property, but also the health of persons. This is the aim of the work to realize society.

## 6 Conclusion

The article deals with the current topic of the use of artificial intelligence in the world. In the theoretical part of the article, examples of artificial intelligence in various fields are given. We mentioned that the most use of AI is in healthcare. We think that those who do not work in healthcare do not even realize the extent to which AI is used here, and many end consumers perceive the use of artificial intelligence on smartphones or in homes. Due to the rapid development of artificial intelligence, the Internet of Things and overall digitization, it is necessary for us to constantly educate ourselves and know how to use AI effectively. It is determined that, to understand and accept AI (include it into decision-making processes and business practices), institutions are required to make technologies more understandable for perception.

There are also negative comments and concerns about this discussed topic, especially concerns about the loss of jobs and their replacement by robots. Robots are of course used for various types of activities. But it is still necessary to check the work after these robots, so the robots aim to make stereotypical and manual work more efficient.

In the second part of the paper we stated how the Czech Republic is doing in the field of AI research and development. The scope of the implementation of artificial intelligence is pointed out here, whether it is transport – air, water or land, smart home, smart city, but also marketing and healthcare. The concept of smart home, smart appliances that are supposed to save consumption is explained in more detail here. New family houses and apartments already count on the introduction of a smart home during construction and adapt them to it. Individual elements of smart cities are currently being tested in larger cities such as Prague, Brno or Ostrava. In the future, the technologies used will also absorb a number of smaller cities. For the young generation, such a step forward is a great benefit, because this generation is close to new

technologies. The introduced technologies mainly have the goal of greater awareness of improving the quality of life and finding appreciation even by older generations.

By introducing AI technologies, the state is mainly inspired by foreign countries, where AI has more experience and development is many times faster here.

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