Artificial Intelligence in Business: Present and Perspectives

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Abstract: *This paper highlights the changes brought about by artificial intelligence (AI) systems on business. Developments in this area can complement the human decision-making process. Artificial intelligence can reshape companies, management and the innovation process. AI will continue to develop and modify the activity in various economic sectors, due to the high degree of adoption of new automation possibilities. Businesses will have more and more automated processes, but new processes will appear, in which human experts will be also needed. For example, AI may be used in the agricultural sector and may help farmers in their activities, at sowing, in crop and weather monitoring, pest control, harvesting, crop rotation, etc. Thus, AI may help farmers to adopt measures to improve crop quality.*

Keywords: *artificial intelligence; decision-making process; management*

JEL Classification: *M11; M15; M54; O32*

Innovative management is essential for the long-term success of any type of business. In today's economic environment, based on exponential knowledge and technological development, efficient business management through innovation has become an essential requirement for the organization to stay competitive. The long-term sustainability of an enterprise can be determined by its ability to direct resources and innovation in a complex approach in the ever-changing economic environment.

The development of technology and AI systems may positively influence the decision-making system and thus increase the efficiency of the management in a company.

AI refers to the ability of computers or computer-controlled robots to solve problems that are commonly associated with people's greater intellectual processing abilities (Ertel, 2017).

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The new global concept in the field, called "deep learning" (DL) is part of a wider family of machine learning methods based on artificial neural networks. Such DL architectures have been applied in areas such as speech recognition, natural language processing, audio recognition, social network filtering, machine translation, etc., if they produced results comparable to human experts.

The managers, scientists, etc. whose organizations consider the potential of DL, have in mind the significant area of growth and application of AI. Revenues in this area, both in terms of software, hardware and services, are projected to exceed 26 billion US dollars by 2025. The organizations consider that many of the competitors have already adopted DL and AI as part of the development strategy.

The availability of a great computing power, the great variety of data and not only, determine the need to create algorithms for management in order to streamline the companies and decision-making systems, by integrating AI and DL in companies.

The evolution of the AI and its use

A machine is considered intelligent if it can achieve human performance in various tasks. Intelligence is the ability to learn and understand, solve problems and adopt decisions. AI is a science that has defined its purpose as making machines do things that would require intelligence if those tasks were developed by humans.

Systems in which AI plays an important role are used in a wide range of activity sectors, from health, travel agencies, etc. to video games and the programming of robots that operate on production lines in factories. Alan Turing was an important scientist who strongly influenced this field of AI. During World War II, Turing tried to identify German codes, influencing the events. After the war, he worked on the idea of building a computer that could "think", a "smart" machine. Artificial intelligence has evolved in time, with the following periods (Negnevitsky, 2002):

- The birth of artificial intelligence (1943-1956);
- The rise of artificial intelligence or the era of high expectations (1956– late 1960s);
- Unfulfilled promises or the impact of reality (late 1960s-early 1970s);
- Expert systems technology or the key to success (early 1970s-mid-1980s);
- How to make a machine learn, or the rebirth of neural networks (mid-1980s-onwards);
- Evolutionary computation, or learning by doing (early 1970s – onwards);
- The new era of knowledge engineering or computing with words (late 1980s – onwards).

In recent decades, many studies have been conducted in the field of AI, with an emphasis on aspects such as video games, artificial life, machine learning, multi-agent systems, etc. In the age of the knowledge revolution, when the power of a nation is determined by the knowledge it possesses, science, medicine, engineering and businesses are leading to an increase in the quality of life, and it also requires highly qualified and skilled people. Smart machines are able to capture the expertise of specialists.

Table 1 – Enterprises using AI (% of enterprises with at least 10 people employed, excl. financial sector, 2020 data)

Country	% of enterprises	Country	% of enterprises
IE	23	CZ	6
MT	19	ES	6
FI	12	FR	6
DK	11	HR	6
ES	9	LU	6
LT	9	NL	6
PT	9	RO	6
SW	9	BG	5
IT	8	AT	5
EU	**7**	PL	4
BE	7	CY	3
DE	7	HU	3
EL	7	SI	3
SK	7	LV	2

Source: Eurostat

In 2020, AI applications/technologies were used by 7% of enterprises in the EU. The highest value is registered by Ireland (23%), followed by Malta (19%), Finland (12%) and Denmark (11%). The lowest values are found in Latvia (2%), Slovenia, Hungary, Cyprus (3%), and Poland (4%).

The inclusion of AI in development strategies must be considered the "4th Industrial Revolution" (Skilton, 2018). The 4th Industrial Revolution (4IR) is described in the 2016 book by Klaus Schwab, Founder and Executive Chairman of the World Economic Forum, as a climax of the fusion of emerging technologies as never seen before. The previous version of this description with a similar name was Industry 4.0 and the Industrial Internet of Things (IIoT). In 2006, Helen Gill of the American National Science Foundation (NSF) coined the term Cyber-Physical Systems (CPS) in the field of machine-to-machine automation. This is now considered as part of the 4th Industrial Revolution and is part of a broader reshaping of all industries and a new kind of economic, social and societal change.

Until 2014, the German government supported this idea by announcing that Industry 4.0 will be an integral part of the "High-Tech Strategy 2020 for Germany" initiative, which aims to be a leader in the technological innovation. In 2016, research initiatives in this field were funded with 200 million euros from government bodies.

The technologies' fusion and interaction in various fields make the 4IR different from other revolutions. The 4IR is not about intelligent and connected machines and systems. Its scope is much wider, and is related to waves of discoveries in various fields (Schwab, 2016).

To understand AI, it is necessary to understand how intelligence is defined. The intelligence involves activities such as:

- Learning - the ability to obtain and process new information;
- Reasoning - the ability to manipulate information in various ways;
- Understanding - considering the outcome of information manipulation;
- Determining the validity of information;
- Determining how validated data interacts with other data;

Determining whether the data are supported by valid sources.

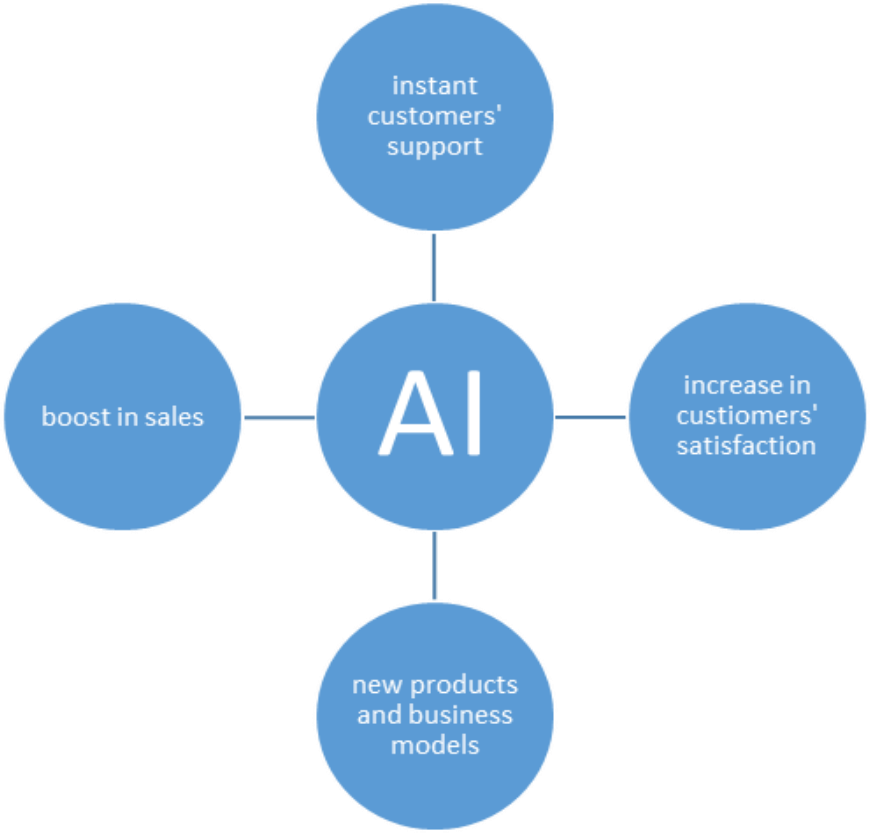
The influence of the AI on businesses

AI can influence the managerial process, and it can influence various work tasks. According to PWC (2017), artificial intelligence will contribute with 15.7 trillion US dollars to the global economy by 2030, some representing applications and AI use cases in business management, saving time and increasing profits. Also, 85% of executives believes that AI has a positive influence on a business regarding competitive advantage (Ransbotham et al, 2017).

AI can play an important role in companies to increase the efficiency of the management process. Thus, the need for the integration of AI in economic activities is underlined. The integration is related to the concept of "Industry 4.0", with emphasis on the development and adoption of systems and equipment related to AI.

The taking over by the machines of various activities that are difficult to perform (eg, high level of pollution, dirt, negative impact on health) can have a positive impact on society and on the economy, and thus automation can be considered a blessing. Also, this type of activities can be done faster and with lower costs. (Ertel, 2017).

Figure 1. AI impact on companies' activity



Source: the author

The socio-economic development in this period of modern society brought to the fore new phenomena, imposed the need to use appropriate ways to approach them, brought back the idea that evolution, progress of society is inconceivable outside of promoting relations specific to the market economy and some means of quantifying economic performance. The new realities and the new socio-economic conditions imprint new particularities on the management meant to identify the factors that define, implement and increase the efficiency of the economic variables.

The research-development system from an economic point of view highlights the causal relationship between the capacity of the human factor to develop decision support systems at the level of company and technology, in direct relation with the principles of management. Achieving this goal requires solving activities such as:

- identification and research of the main management paradigms;
- analysis of management directions in the context of improving the decision-making system;
- establishing the ways of improving the managerial activity by assesing the decision-making system, as well as its contribution to ensuring the performance.

AI can have an important impact on employment in various economic sectors. It can also influence the managerial process in the field of forecasts, related for example to the identification of a skilled workforce.

Such an impact can differ from company to company and can also have considerable risks to the business, such as stealing important and sensitive information, with cyber security becoming an important industry.

Therefore, AI can positively influence the activity in different departments of the company. AI can provide benefits to human resource management processes, by simplifying the interview process, CV analysis, salary processing, answering employees' questions, performance evaluation, meeting scheduling, etc. In the field of marketing, AI can influence the company's activity and can help specialists to provide personalized consumption experiences.

For example, AI may be used in the agricultural sector and may help farmers in their activities, at sowing, in crop and weather monitoring, pest control, harvesting, crop rotation, etc. Thus, AI may help farmers to adopt measures to improve crop quality.

AI is a set of technologies that are automated through programming. Therefore, farmers first need an infrastructure in terms of available technology. Farmers may use various sensors, or even drones, to make their work easier.

Figure 2. AI used in agricultural sector

Source: the author

Drones can be used to monitor crop health, and recorded data can be transferred to a computer. After the data is analyzed, the farmers might be able to adopt the best measures depending on the problems encountered. This information can be compared with older data, to make a history of the development of the crops.

Conclusions

Extensive approach to programming in various economic sectors can pursue a balanced development, in line with market requirements. The field of AI is rapidly developing, in the context of a fierce global competition. The scientific discoveries in the field of AI can be integrated within the economic sectors. In the sphere of AI adoption, a regulatory and investment-oriented approach is supported. Also, the need to reduce production costs, increasingly forces companies to move to the field of AI.

The use of AI technologies influences the increase of the companies' performance, in the sense of increasing the productivity, by involving the labor force in activities that result in diminishing the effective working time, substituting the working time with the free time in order to increase the worker's motivation. At the same time, the aim is to increase the efficiency of the resource's consumption (material resources, financial resources), and to reduce production times in order to increase the efficiency of the production process and to increase the economic competitiveness.

The paper emphasizes the importance of some aspects such as:

- the use (introduction) of AI in the managerial field by expanding in various sectors of the national economy because it is important for any organization, regardless of profile, to have high-performance systems in a knowledge-based economy;
- the use of integrated systems to ensure both operational and financial improvement of organizations' situations from various sectors of activity.

Adopting AI in managerial processes can help companies adapt better to an increasingly competitive environment, and manage the increasing amounts of information they face. In various fields of activity, human experts and machines will continue to work together to solve tasks. Human experts are needed in jobs that cannot be done by machines, and also in new jobs created with the development of AI.

In the agricultural sector, AI will register an increase in use, making it possible to improve the activities carried out by farmers, such as pest control, crop and weather monitoring, etc. The use of AI in agriculture can help to optimize the activities, to improve the yield of crops, with the possibility of using fewer resources.

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