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APPLICATION OF ARTIFICIAL INTELLIGENCE IN THE BUSSNIUES

Abstract: *The development of artificial intelligence (AI) starts in the 1950-year whit lot of skepticism. Whit the development of informational technologies, skepticism related to the AI is decreasing ant its applicability is increasing. AI shown special usage in the management of the complex system as well as the help for humans in different kinds of processes. One of the most frequently used AI is in the business where is used for the decision-making process support, making different kind of the simulations as well as the base for the developing competitive advantage of the organization. Whit implementing the AI system in different departments in an organization there is a possibility to increase performances of the business processes as well as the increasing satisfaction whit the service or the products that organizations have. Some of the examples of usage of AI in business are marketing, research and development, production, and quality management.*

Keywords: *Artificial intelligence, competitive advantage, machine learning, organizational performances, quality management*

1. Introduction

The initiative for developing Artificial Intelligence (AI) system starts in the 1950 year. With the appearance of the initiative there is also the appearance of several doubts about its application and its usage. So, skepticism as the result have so-called AI winter which in a significant way decrease the speed of the developing AI. At the beginning of the development of AI, there is a challenge related to the lack of computer systems as well as computer technologies. Furthermore, there is also a challenge related to the speed of such systems that are not good enough. With the development of computer science and computers as a whole, the development of AI is increasing. The first usage of AI was in the United States Department of defense in which the main usage of the AI system was collecting and analyzing large amounts of

data. In the 1990 year, AI was used in the game industry. This year is also a pivotal year for AI and its popularity because AI chess software showed that it can win against humans in the chess game. After usage in the game industry, AI shown great potential and give the basis for the normal functioning of different kinds of other technological innovations such as robots and all other automated systems. Because of the increase in popularity of AI, AI today is often used in different kinds of science where the possibility of analyzing large amounts of data becomes the basis for the decision-making process. One of the most popular ways of using AI is in healthcare where AI showed special applicability when it comes to diagnostical procedures. Furthermore, AI can be used in civil engineering, business, etc. However, with development of AI system there is also the development of the risk

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related to the possibility to substitute humans and also for misuse AI system in different ways. Accordingly, there is a need for developing different kinds of policies and ethics when it comes to the use of AI in solving everyday problems and the decision-making process. Furthermore, the development of AI in the future will result in the redefining need for specific jobs and the possibility of substituting human labor in some sectors. It should be highlighted that AI has specific usage in the business organization in which organizational management will have the opportunity to create more precise decisions through simulations. In other words, with the help of AI some departments and education in the organizations will be redesigned.

This paper is based on conducted secondary research. The main aim of the paper is to show the applicability and advantages of using AI in everyday business as well as the usage of AI in the quality management of the organization. Paper is divided into five chapters. First chapter describe the short history and gives a short introduction of AI. The second chapter is about AI and its characteristics. The third chapter describes usage of AI in different organizational departments. The fourth chapter is about the implementation of AI in the organizational system as well as the maturity of the AI system in the organization. The fifth chapter is discussion about conducted research and the sixth chapter is the conclusion.

2. Artificial Intelligence

AI is a new scientific discipline which is aimed at creating new theories, mechanisms and creating new application and possibilities of AI-based creating systems that are similar to the human and inelegance that is similar to them. As science discipline, AI includes different kinds of systems that have characteristics similar to humans and also systems that are, in the context of the behavior, similar to humans. Furthermore, AI

include systems that have rational thinking and also systems that are created to look like humans (Putica M. , 2018).

The main goal of developing an AI system is to create a system that will be able to substitute humans beings in the context of the way of thinking and also creating alternatives for decision making. Furthermore, except for substituting human beings, AI is also aimed at supporting decision making or analyzing data in organizations. AI can be also related to the automated systems that have the possibility of thinking or have a significant level of intelligence based on which system can make decisions and adapt its behavior regarding the characteristics of the environment. In the practice, AI is often related to robots that have their drive system for moving and also sensors that system use for the scanning of the environment. Besides, with development of science and technology, AI finds new opportunities and possibilities in different kinds of softwares that are mostly used for analyzing data and also as the base for the decision making i.e. for the scenario analysis, different kinds of the simulations, etc. (Tourki, Keisler, & Linkov, 2013).

When comes to the defining intelligence and types of the intelligence, there are several different classifications such as spacious intelligence that is related to the possibility of the system to manage within the environment, linguistic intelligence that is related to the usage of words i.e. speaking different kinds of languages and understanding symbols in the language, social intelligence that is related to the coping in social situations, cognitive intelligence that is related to the solving complex problems, etc. So, regardless kind of intelligence, intelligence is a possibility for creating and finding the solution of the complex problem as well as the learning based on the identified conditions in the environment. (Barrientos-Fernández, Sánchez-Cabrero, Arigita-García, Pericacho-Gómez, & Novillo-López, 2019).

It should be highlighted that all different kinds of the intelligence are complementing each other and if the system has only one type of intelligence his functioning is incomplete which means that system will be not able to the fully adapt to the conditions in the environment or to solve identified problem (Andras, i dr., 2019). One of the challenges that are identified within systems based on the AI is lack of the possibility of the connecting emotional intelligence whit all different kinds of intelligence such as cognitive intelligence, etc. This challenge result in the inability for AI system to react to the specific stimulus that is coming from the environment that can result in problems related to the problems that within it have emotional component i.e. the wrong movement of the AI system can result in a feeling of pain if AI is used for medical purposes or is used for the supporting medical staff when they are performing a medical procedure on the patient.

Regardless of challenges with the development of AI systems, AI is showing growing big potential in its usage in different kinds of systems such as the business system, healthcare system, logistic system, etc. The possibility of usage of AI is described in chapter 2.1

2.1. Areas of AI application

Areas of the application of the AI are determined whit the design of the AI system. Mainly, AI can be used in different kinds of automated systems such as computer games, automated manufacturing systems, expert systems that are based on the existing organizational knowledge base but with AI such base can be effectively managed and an organization can perform analysis of the existing knowledge much easier. Furthermore, one of the usages of the AI system is in the healthcare in which such a system can be used for the easier comprehension of speech of people with difficult pronunciation or communication with people with speech impairment (Tadic, Cvjetkovic, & Milovanovic, 2009). One of

the main benefits of usage of AI is for collecting and analyzing large databases and to create a base for the decision making (Haleem, Javaid, & Khan, 2019).

In Table 1 are described areas of the usage of the AI in different kinds of activities. One of the main benefits of usage of AI is for collecting and analyzing large databases and to create a base for the decision making.

In Table 1 are described some of the possibilities for usage of AI. Parallel with the development of science and technology, comes also to the new cognitions about possibilities of usage of AI and also new AI system designs. Furthermore, with the development of the Smart City concept as well as with increasing concern about safety in the urban area, AI finds special application in tracking different kinds of indicators related to the safety of the inhabitants in the urban area as well as the safety of the traffic. On the other hand, different authors are describing in their research that 30% of the organizations that are listed as 30 most successful organizations in the world are using some kind of AI. Furthermore, trends are showing that until the 2030 year almost 50% of the most successful organization will be using some kind of machine learning to improve business processes within the organization (Vujovic, 2008). Besides advantages, there is also risk related to the misuse of AI as well as the risk that AI conclude that human beings are unnecessary for normal functioning of some parts in the system. Usage and implementation of AI can as result have increased efficiency and effectiveness of the business as well as managing the system. Furthermore, the usage of AI can result in risk-related substituting of the humans and the possibility for AI to take charge of managing system on its own.

When it comes to the reasons why organizations are implementing AI systems in the business, research conducted in the 2017 year showed that almost 84% of the organization implements AI into remain competitive with all other organizations on

the market. Furthermore, research showed that 75% of the organization considers that implementing of AI can as the result have the

possibility of penetrating new markets, as well as the fear of the penetrating of the competitive organization to the market.

Table 1. Area of AI usage and description

Area of the usage	Short description
Healthcare	In healthcare, AI can be used for the analysis of the different kinds of medical diagnostic procedures. In such cases, AI can be based on the learning previously analyzed data that is described in chapter 2.2, and also much faster and more accurately identify a health problem. Furthermore, intelligence can be used for the helping of medical staff when performing different kinds of medical procedures such as surgery procedures, for the education of medical staff, etc. With the development and possibilities of AI in healthcare, there is less need for medical staff because AI can be used for performing complex decision-making processes and providing diagnostic to the patient. Also, AI can make much more precise and accurate decisions about the therapy based on previously analyzed medical diagnostic procedures.
Logistics	In logistics activity, the focus is on costs and optimization. AI can be used for analyzing existing costs in the transportation and logistic system and for finding optimization opportunities in the logistic process. Furthermore, AI can be used for managing the automated system in the warehouse in which robots are transporting different kinds of goods. There is also the possibility of using AI in the managing stock in a warehouse that will as the result have decreasing costs related to the stocks.
Civil engineering	Usage of the AI in civil engineering is mostly related to creating a simulation of the planned structures and for complex mathematical calculations that are necessary for creating and building different kinds of structures. With the creation of the expert systems, AI can be used in the decision-making process and also for the optimizing design and construction of the buildings. Furthermore, there is also the possibility to use AI in managing vehicles in the construction yard as well as the usage of robots for conducting different operations in the building.
Managing and business	Most of the usage of AI is related to business and managing organizations. AI in the organization can be used for analyzing different kinds of data such as data that is describing environment in the which organization exist, analyzing different alternatives for finding one optimal, etc. Furthermore, AI can be used for creating and managing organizational knowledge with knowledge mining techniques. Also, AI can be used in different departments in the organization for different kinds of activities that are performing in such departments.

When it comes to the performance of the AI system, it should be mentioned that performances are determined with technical and technological competence of the organization. Technical competence is related to the machines and devices, and technological competence is related to the possibilities to use AI systems in performing different tasks in the organization. So, the possibilities of using AI in the business are determined with digital transformation, and

digital transformation brings implementing technical and technological innovations that can increase the competence of the organization.

2.2. Concepts of Artificial intelligence

Concepts of the AI can be divided accordingly to its ability for learning to the weak AI and strong AI. Weak AI is related to the system that is seeking imitation of human

beings and also to imitate the way humans make decisions. On the other hand, strong AI is related to proactive thinking and independent decision-making process which is one of the characteristics of humans. However, with development of the technology there is also the development of the so-called superior AI that can easily overpower humans and way of humans think and make decisions (Pohl, 2015).

When it comes to the weak AI, usage of weak AI system is characterized with achievement of the specific goals that are by its nature easy to achieve. So, such systems can solve simple problems without the need for consideration of the alternatives. Examples of such systems are navigation system that is recognizing different languages as well as systems for recognizing different kinds of symbols (Paschek, Luminosu, & Draghici, 2017). Implementing and using weak AI is limited in practice and it is related to the systems that have only one function that is by its nature easy to handle. On the other hand, strong AI systems are enabled to solve complex problems that are requiring logical and structural thinking that is characteristic to humans (Braga & Logan, 2017). That kind of intelligence can be considered as a threat to humans because it can become self-sufficient i.e. independent from humans. Furthermore, the development of such intelligence can be considered as the opportunity for solving problems that humans are not able to solve as well as managing organization.

AI systems have the possibility and characteristics of learning. AI learning depends on the type of AI system as well as its design. There is different kinds of learning that is characteristic to the weak AI system as well as the strong AI system. Basically, AI learning can be divided to machine learning, deep learning, and neuron networks. Learning is based on the normal functioning of AI and also represents an opportunity for the organization to create new knowledge and use it for managing the organization.

2.2.1 Machine learning

Machine learning is the process of learning which is similar to human learning. Through machine learning, AI-based experience i.e. collecting empirical data through experience in existing in the environment, is creating knowledge and storage it, and with every new cycle of learning solving the problem is becoming more efficient and effective. Machine learning is one of the concepts that are often used in internet search engines and it is classified as the weak AI system (Al-Jarrah, Yoo, Muhaidat, Karagiannidis, & Taha, 2015). So, machine learning is aimed at recognizing the patterns based on which are created algorithms. Created algorithms enable the system to recognize the situation and to shape its behavior according to the identified state. This kind of learning is often used for the simulating traffic in the intersections which have a big number of vehicles that are fluctuating through the intersection. With identifying patterns of the vehicles, AI can create an algorithm for future prediction and managing traffic flow through intersections (Simon, Deo, Venkatesan, & Babu, 2014). This kind of systems are often used in the statistic and for a designing system of AI (Smola & Vishwanathan, 2008).

2.2.2. Deep learning

Deep learning is similar to the machine learning with difference that, when learning, AI is creating neuron networks. Furthermore, deep learning require the intervention of the human operator because the human is an example for AI on how to solve the problem. This kind of learning is used in multi-layered learning and it is often used for the creation of the complex programs that are designed for solving complex problems (Khan & Yairi, 2018). When it comes to deep learning it is necessary to highlight that it is often used for the abstraction of the data, that is base for creating different levels of the learning and showing data which is base for the learning that is using AI. Deep learning can be used in

the different systems of AI which are covering areas such as speech recognition, recognition of the photos, the system that are enabling drug tests and for analyzing toxicological diagnostic or for the system for help or giving recommendations for solving problems (Hordri, Yuhaniz, & Shamsuddin, 2016). Taken into consideration possibilities that are arising from the usage of deep learning, it can be used for different purposes such as safety in the context of recognition of the face of a dangerous person, etc. (Vargas & Mosavi, 2017).

2.2.3. Neuron networks

Neuron networks are similar to the human brain. This kind of AI learning consists of several elements that are mutually related in the network and are enabling learning based on the example. Neuron networks consist of several nodes and every node has a task for conducting activity to ensure the outcome for which the network was created. This kind of network can be used for overseeing and optimization of complex systems and processes (Schmidhuber, 2015). They can adapt to the condition in the environment and also can be develop through an increasing number of data that are located in the environment. In practice, neuron networks are used for identifying a solution to the problems that are not linear. So, problems which request detailed analysis and seeking solution. The base for normal functioning of the neuron network are nodes that have tasks to connect network and contact with the environment. Furthermore, every nod has function based on which input is transferred in output based on the function of the neuron network (Grossi E & M., 2007). Neuron network is specially applicable because of development of the industry 4.0 as well as with development of the big data and storing a large amount of different data in databases, based on which the collected data can be used for different purposes, which is determined by their design, ie their form. Besides, one of the most used purposes of the neuron network

is creating decision because neuron network analysis and, based on the conducted analysis, can create a decision (Samborska IA, i dr., 2014). The usage of the neuron network is often when creating a system of strong intelligence because neuron networks are similar to the learning process of humans. In other words, that system enables AI, based on the collected data, to expand and to create knowledge related to the specific situation and based on the collected data in the future enable creating a decision.

3. Application of AI in the business

Benefits of using AI in the business are several and benefits are additionally arising with development of industry 4.0 and also with an increase of AI use. With collecting and creating large amounts of data, organizations can, thought the usage of AI, conduct different kinds of simulations which can lead to identifying future trends as well as the needs of stakeholders in the organizational environment. On the other hand, AI can be used to conducting risk analysis as well as the providing simulations of the possible measures aimed at risk-reducing.

It should be highlighted that possibilities of usage of AI are determined with organizational competence, most important technical and technological competence. Furthermore, the organization for the usage of the AI must conduct digital transformation of business. Digital transformation is aimed at changing the business model i.e. transforming the traditional way of doing business and turning organization to the virtual sphere. Besides changing the business paradigm, the organization significantly increase efficiency and effectiveness of the processes.

3.1. Customer relation management

Imperative of costumer relation management is arising from the fact that managing relations with customers can as the results have the increase of customer loyalty as well

as possibility of identifying all requirements from the customer. Furthermore, focus on the customer is also one of the requirements of the quality management system described with ISO 9001:2015 standard.

AI finds application in answering questions that costumers send to the organization. Such answers can be based on identifying needs that customer has as well as identifying problems with which costumers face. Furthermore, AI can be used also in the automatic answering to the customer questions and requests. One of the examples is answering telephone calls as well as answering the questions on social media.

Such systems are based on machine learning and the main aim when an organization uses such a system is increasing efficiency and effectiveness of the system. Through machine learning, the time in which customer receives answer is decreasing and there is also the possibility of collecting different kinds of the data related to the customer which can be additionally analyzed and can be created conclusion on which can be created, virtual assistant. Such an assistant can be used for substituting the need for human labor and can decrease costs in the process (Amnur, 2017). In practice, many organizations decide to create a virtual assistant and use it for communication with costumers. Such organizations record decreasing in employee workload by 30% which means employees can be focused on different tasks (Huang, Huang, Mao, & Yin, 2012). Decreasing in workload is especially visibly in call centers in which AI can direct all calls that can not be answered by AI to the human operator and answer all calls that can be answered by AI. So, AI can answer all questions that are repeated or frequently asked. Furthermore, usage of AI in call centers can result in automatic creation of data that can be analyzed and used for future purposes.

In literary analysis, authors find that there is a trend of creating and using different kinds of virtual assistants in the form of an avatar. Customers can ask a question and avatar will

answer based on the previous questions and previous contact with other costumers (Huang, Huang, Mao, & Yin, 2012). In general, all AI systems that are used for communication with the costumers are based on the keywords and also on the previously identified patterns. In other words, with analyzing of the customer behavior AI is collecting knowledge about the customer and can use created knowledge for future problem solving (Libai, i dr., 2020); (Weber and Chatzopoulos, 2019). Despite advantages, an organization can encounter challenges that are related to the substitution of products if her costumers don't accept new concepts and new technologies such as AI.

3.2. Marketing and sales

One of the main goals of every organization is foresight needs and requirements that costumers have. Because of that fact, in history, many organizations decide to engage different kinds of a specialist in different areas which collect and analyze information and data in a long period to create foresight regarding costumers and market. With development of the AI, the organization can substitute such specialists with one system which will do all foresight and also collect and analyze a different kind of information in a much efficient and effective way. Furthermore, with the development of AI and also the development of machine learning, the AI system can increase the speed of foresight market trends and also can be used for the purposes that are described in chapter 3.1. When it comes to the application of AI in marketing, it should be highlighted that AI can be used for conducting different types of predictive analysis which is particularly applicable when an organization is creating a marketing strategy. Such predictive analysis as the main goal has to simulate possible trends and results of the implementing strategy and also can be used as the base for decision making.

Furthermore, AI in marketing can be used in the context of providing specific services like

virtual assistant which can be used as the smartphone application and such application can be used for navigation through the shopping center or elsewhere. There is also the possibility to use AI in the simulation how will the customer look in new clothes without the need for the physical tryout of clothes. Another application of AI is in recommending clothes based on the physical characteristics of the customer (Stalidis, Karapistolis, & Vafeiadis, 2015). So, in basis, AI system in the marketing can be divided in systems that are recognizing the voice of the customer, systems that are recognizing customer face and facial expressions, systems

that are generating different kinds of the text and disseminating generated text through different platforms, the system for decision making support, etc. (Wierenga, 2010). With the appearance of the AI system in marketing there is also a high impact on the marketing mix which is shown in table 2. Table 2 is showing that with the help of the AI, an organization can create more accurate marketing plans and also to personalize the plan according to requirements of the customers. Also, the AI system can be used when it comes to creating the price of the product or service so the price generated covers costs of the production of the product

Table 2. Impact of the AI on the marketing and sales

Product	Price	Promotion	Position
Development of new product	Creating prices accordance to the buyer power	Creating unique customer experience	New distribution channels
Personalization of the product		Personalization of communication	Continuous customer support
Automatic suggestions to the buyers		Creating new value and benefits to the customers	Automatization of the sales
Creating added value to the customer		Decreasing disappointing effect	

Besides that, AI in a significant way affects customer and organization, and especially process of the creating a marketing plan, AI can also have a significant impact on decreasing the time needed for specific activities in the marketing campaign. This is in first hand related to the possibility of creating and using predictive analysis for the marketing strategy operationalization and creating new competencies of the marketing team. Using AI in advertising has a significant impact on collecting data related to the evaluation of efficiency and effectiveness of the marketing campaign. Furthermore, an organization can, with help of AI, collect data related to the customers and their reaction to the marketing campaign which is base for the creating future marketing plans. Usage of AI in sales and marketing can be used for conducting different kinds of analysis and using results of the conducted analysis for the improvements.

So, AI can suggest areas that can be improved in the marketing campaign and organizational management can decide if the suggested improvements are good or not and take future steps according to the given suggestions.

3.3. Risk management

The quality management system as the main principle has a risk-based approach. This is related to the need for the identification of the risk as well as the defining measures for the decreasing risks and also decreasing the consequence of the risks. AI in the process of risk management can analyze a different kind of variables and suggests areas of the risk so organizational management can avoid those areas. For example, through analysis AI can identify risky loans, risky credits, and all other risky investments of the organization.

A special application of the AI is in the insurance company. Such companies have imperative of decreasing risk related to the issuing insurance policies as well as conducting different kinds of analysis related to the predictive analysis with the main goal of decreasing risk. It should be highlighted that AI can be used when considering the approval of credit loans and identifying credit risk of the specific client. In history, insurance and credit companies must engage specialists for conducting analyses but with the development of the AI such jobs are substituted with AI systems. The main advantage of using AI in regards to human specialists is in decreasing time for the analysis and also much much more precisely conducted analysis.

AI shown special applicability in managing risk in the supply chain because of the complexity of such a system. In the supply chain, every organization has its risks and it is a challenge for analyzing risk of all organizations in the supply chain (Šoško, Grgurević, & Buntak, 2019). Imperative of risk analysis and risk management in the supply chain comes from the fact that delay in resources can result in a delay in the normal functioning of the entire supply chain. The complexity of using AI in the risk analysis in the supply chain is decreasing with the development of the industry 4.0 and technologies like big data and sensors. Such technologies can be used for collecting specific data and to analyze such data to predict risk situation in the future. It should be highlighted that risk management is also applicable to AI as such because, if not controlled, AI can become a risk to the humans and system especially if the AI system is based on strong AI. Such systems can become self-sufficient and can decide that humans are not required for the normal functioning of the system. So, this can as the result have a decreasing need for human labor.

3.3. System based on knowledge

Systems based on the knowledge or expert systems are systems that organizational management can use for the decision-making process as well as for help to solve a specific problem in the organization. This kind of system is based on collectin knowledge from the different kinds of specialists for a specific area. Specialists knowledge is the input for the AI, and AI, when the knowledge base is created, can use such knowledge for the creating suggestion or for the help to solve specific problem. Usage of the expert system is especially espessely applicable to quality management because organization management can base its decisions on the collected facts. Furthermore, expert systems are often used in the healthcare system as the help for medical staff for creating and seeking solution for specific medical condition. When making analysis with such system, medical staff can significantly increase quality of described therapy (Abu-Nasser, 2017). Furthermore, the expert system can be used for creating products and for the designing product as well as to the evaluation of the existing functionality of the product. It should be highlighted that for normal functioning of the expert system organization must create knowledge base which is the basis for conducting all kinds of the analysis.

4. Discusion

Artificial intelligence changes the shape of today's business paradigm. With the implementation of AI, many organizations can increase their effectiveness and efficiency but with the price of investing significant financial resources to ensuring all infrastructure needed for the normal functioning of such a system. Furthermore, to implement AI, every organization must conduct digital transformation that is related to the changes in the functioning of some organizational departments. Also, digital transformation means the translation of the

traditional way of doing business to the virtual system i.e. cloud.

AI can have a significant impact on the organizational performances because of the fact that the AI system can be used for conducting different kind of analysis and also as the help for decision making process. The decision-making process based on the documented fact is the basis for quality management in the organization. Furthermore, with the predictive analysis that AI can conduct, organizational management can simulate how the possible decision will affect different segments of the organization. Also, when it comes to AI and quality management, AI can be used for risk management and risk assessment which is also one of the requirements of the quality management system.

One of the most important features that AI can have is customer relations. Since one of the principles that the ISO 9001:2015 standard is highlighting is customer focus, AI can be used in marketing and sales for collecting different kinds of data related to the costumers. Such data can be analysed and the result of the analysis can be used for improvements in products and services that the organization is providing and that are participating in the market. Using AI in marketing and sales can results in increased satisfaction of costumers because of the fact that the AI system can answer almost all questions that costumers have immediately after the customer asks a question. Most importantly, the AI system can collect all questions that costumer asks and conduct analyses so the organization can create organizational knowledge and use it in the future for problem-solving or improvements in the products and services. Furthermore, when it comes to nonconformities, AI can be used for solving specific problems based on the collected knowledge of how to solve such problems. This is possible because AI can use different kinds of learning such as machine learning, deep learning, etc.

When it comes to the organizational knowledge and AI, digital transformation and the implementation of the sensors and also creating big data, enables AI to mine knowledge through different knowledge mining techniques. Once discovered, organizational knowledge can be used for different purposes and can be stored in a knowledge base that can be the basis for developing competitive advantages in the long term. Furthermore, different organizations have different maturity of the AI system and also digital transformation as a whole. For achieving a higher maturity level, the organization must ensure proper education of the employees and also technical and technological competence of the organization as a whole. In the process of the digital transformation and implementing AI in the organization, organizations can meet different kinds of challenges that can be related to the resistance of organizational employees as well as the resistance of management. So, for conducting digital transformation and implementation of the AI, an organization must plan and create projects that will gradually implement AI. Also, there is a need for proper communication that will be aimed at informing all employees why the organization is implementing AI and what are the main advantages of AI in the organization.

So, in conducted research, authors find that there is the connection between the quality management system and AI that is visible through customer relation management, increasing satisfaction with the products and services, using AI in problem-solving and also finding root cause i.e. creating improvements that will in future prevent the occurrence of nonconformities. Furthermore, AI can have a significant impact on the business excellence of the organization through the possibilities of conducting predictive analysis and taking steps based on the result of the analysis.

5. Conclusion

Development of the industry 4.0 and also need for increasing efficiency and effectiveness of the business as the result have need for developing new system that are based on the AI. This as the result have also changes in the paradigm of doing business because implementation of such systems in significant way have impact on normal functioning of the organization.

Furthermore, through implementation of the automatic systems there is also increasing complexity of the organization at whole through the prism of managing. Because other capacity of humans is limited, there is also limitation in managing complex system so implementation of the AI become imperative.

AI can be used in different organizational departments and can be implemented in different kinds of the organizational processes. In basis, it can be used in marketing, managing relations with customers, risk management, etc. It is important to highlight that it is necessary to

ensure ethics when using AI because of possibility of misusing such system that can result in the risk of existing of humans at whole.

AI finds applicability in conducting complex analysis of data for which humans need much more time in the comparison with AI system. Furthermore, AI find applicability in conducting predictive analysis that can lead to the increase in quality management.

When AI is implemented in the organization there is also risk of decreasing need for the human labor and there is also possibility for creating new workplaces that are specific as well as the creating programs and softwares for specific use of AI. Through conducted research, authors in this paper finds that AI have great opportunity for all organizations as well as many of today's organization are already using AI system. Implementation of AI in the business is the imperative and also possibility for the all organizations to gain a competitive advantage.

References:

- Abu-Nasser, B. (2017). Medical expert systems survey. *International Journal of Engineering and Information Systems*, 1(7), 218-224.
- Al-Jarrah, O., Yoo, P., Muhaidat, S., Karagiannidis, G., & Taha, K. (2015). Efficient machine learning for big data: A review. *Big Data Research*, 2(3), 87-93.
- Amnur, H. (2017). Customer Relationship Management and Machine Learning technology for Identifying the Customer. *International Journal on Informatics Visualization*, 12-15.
- Andras, I., Mazzone, E., van Leeuwen, F., De Naeyer, G., van Oosterom, M., Beato, S., . . . Crisan. (2019). Artificial intelligence and robotics: a combination that is changing the operating room. *World journal of urology*, 1-8.
- Barrientos-Fernández, A., Sánchez-Cabrero, R., Arigita-García, A. M.-P., Pericacho-Gómez, F., & Novillo-López, M. (2019). Measurement of different types of intelligence (general, verbal vs. non-verbal, multiple), academic performance and study habits of secondary students at a Music Integrated Centre. *Data in brief*, 25, 104124.
- Braga, A., & Logan, R. (2017). The emperor of strong AI has no clothes: Limits to artificial intelligence. *Information*, 8(4), 156.
- Daqar, M., & Smoudy, A. (2019). The Role of Artificial Intelligence on Enhancing Customer Experience. *International Review of Management and Marketing*, 9(4), 22.

- Grossi E, & M., B. (2007). Introduction to artificial neural networks. *European journal of gastroenterology & hepatology*, 1046-54.
- Haleem, A., Javaid, M., & Khan, I. (2019). Current status and applications of Artificial Intelligence (AI) in medical field: An overview. *Current Medicine Research and Practice*, 9(6), 231-237.
- Hordri, N., Yuhaniz, S., & Shamsuddin, S. (2016). Deep learning and its applications: a review. *Postgraduate Annual Research on Informatics Seminar*.
- Huang, X., Huang, X., Mao, H., & Yin, Z. e. (2012). Applied Mechanics and Mechatronics Automation. *Trans Tech Publications Ltd*.
- Khan, S., & Yairi, T. (2018). A review on the application of deep learning in system health management. *Mechanical Systems and Signal Processing*, 107, 241-265.
- Libai, B., Bart, Y., Gensler, S., Hofacker, C., Kaplan, A., Kötterheinrich, K., & Kroll, E. (2020). Brave New World? On AI and the Management of Customer Relationships. *Journal of Interactive Marketing*, 51, 44-56.
- Paschek, D., Luminosu, C., & Draghici, A. (2017). Automated business process management–in times of digital transformation using machine learning or artificial intelligence. *Matec Web of Conferences*, vol. 121.
- Pohl, J. (2015). Artificial Super intelligence: Extinction or Nirvana. *Intern Symposium*.
- Putica, M. (2018). Umjetna inteligencija: dvojbe suvremenoga razvoja. *Hum : časopis Filozofskog fakulteta Sveučilišta u Mostaru*, 13(20), 198-213.
- Samborska IA, Alexandrov V, Sieczko L, Kornatowska B, Goltsev V, Cetner MD, & HM, K. (2014). Artificial neural networks and their application in biological and agricultural research. *NanoPhotoBioSciences*, 14-30.
- Schmidhuber, J. (2015). Deep learning in neural networks: An overview. *Neural networks*, 61, 85-117.
- Simon, A., Deo, M., Venkatesan, S., & Babu, D. (2014). An overview of machine learning and its applications. *Int J Electr Sci Eng*, 22-24.
- Smola, A., & Vishwanathan, S. (2008). Introduction to machine learning. *Cambridge University*, 32(34).
- Stalidis, G., Karapistolis, D., & Vafeiadis, A. (2015). Marketing decision support using Artificial Intelligence and Knowledge Modeling: application to tourist destination management. *Procedia - Social and Behavioral Sciences*, 175, 106-113.
- Šoško, G., Grgurević, D., & Buntak, K. (2019). Risk management as a factor of increasing of competitiveness and more efficient supply chain management. *International Journal for Quality Research*, 13(2).
- Tadic, D., Cvjetkovic, V., & Milovanovic, D. (2009). Determining and Monitoring of the Therapy Procedures by Application of the Artificial Intelligence Methods Relevant for Acquiring of the Quality Excellence in the Processes of the Medical Treatment. *International Journal for Quality Research*, 3(3), 1-7.
- Tan, C., Wahidin, L., Khalil, S., Tamaldin, N., Hu, J., & Rauterberg, G. (2016). The application of expert system: A review of research and applications. *ARPJ Journal of Engineering and Applied Sciences*, 11(4), 2448-2453.
- Tourki, Y., Keisler, J., & Linkov, I. (2013). Scenario analysis: a review of methods and applications for engineering and environmental systems. *Environment Systems & Decisions*, 33(1), 3-20.

- Vargas, R., & Mosavi, A. R. (2017). Deep Learning: A Review. *Advances in Intelligent Systems and Computing*, 29(8), 232-244.
- Vujovic, A. (2008). Defining Preventive Action For Improvement Business Process Performances By Using Expert System. *Defining Preventive Action For Improvement Business Process Performances By Using Expert System*, 2(4), 309-317.
- Weber, M. & Chatzopoulos, C.G. (2019). Digital customer experience: the risk of ignoring the non-digital experience. *International Journal of Industrial Engineering and Management*, 10(3), 201-210.
- Wierenga, B. (2010). Marketing and artificial intelligence: Great opportunities, reluctant partners. *Marketing intelligent systems using soft computing*, 1-8.

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