İŞ MODELLERİNDE YAPAY ZEKA KULLANIMINA DAİR KURAMSAL TARTIŞMA

Ayşe Meriç Yazıcı [1]

Özet

Yapay zeka geliştikçe ve günlük hayatımızda daha yaygın hale geldikçe, kullanım alanı artmaktadır. Yapay zekanın yaygın olarak kullanıldığı alanlardan biriside işletmelerdir. İşletmeler arasında büyük bir rekabet vardır ve her işletme kendi alanında en iyisi olmak istemektedir. Birçok başarılı şirket, kendi işlerinde daha fazla bilgiye erişmek ve daha verimli müşteri veri tabanı oluşturmak istemektedir. Bu anlamda, işletmeler, yapay zekanın otomasyon, büyük veri analitiği, makine öğrenme ve derin öğrenme gibi özelliklerini kullanmaktadır. Yapay zekayı kullanan işletmeler ürünlerini yönetebilir, hizmetleri otomatikleştirebilir ve müşteri verileri ile proaktif olabilirler. Bu makalede, işletmelerin dijitalleşen dünyada yapay zekayı nasıl kullanması gerektiği ve yapay zekayı kullanan işletmelerin ne gibi faydalar sağlayabileceği teorik olarak değerlendirilmiştir.

Anahtar Kelimeler: Yapay zeka, işletme, dijitalleşme.

Jel Kodları: MO, M1

A THEORETICAL DISCUSSION ON THE USE OF ARTIFICIAL INTELLIGENCE IN BUSINESS MODELS

Abstract

Nowadays, artificial intelligence has been continuously advancing its technology and constitutes a more significant part of our lives. As a result, it has become more dominant in business world where the competition is fierce, and every enterprise aims at thriving in its own field. Successful companies are considered the ones with a capacity to access and control more information and the ones with a more efficient database. Hence, artificial intelligence offers a competitive advantage to the business enterprises thanks to its use in automation, big data analytics, machine learning and deep learning. Thanks to AI, businesses can manage their products, automate services, and be proactive with customer data. This article theoretically evaluates how businesses should use artificial intelligence in the digitalizing world and what benefits artificial intelligence can offer.

Keywords: Artificial intelligence, business, digitalization
JEL Classification: MO, M1

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1. Introduction

Artificial intelligence is a leading technology trend today since it allows computers to solve complex problems as humans do. Technologies such as big data, cloud computing, the internet of things, blockchain and artificial intelligence are changing our life quality as well as the way we work. Artificial intelligence supported applications range from digital assistants, image processing applications, real-time translation services, driverless vehicles to personalized product recommendations. These technologies contribute to the development of Hyper-automation and hyper-connectivity of Industry 4.0. However, developments in artificial intelligence are the main key point of all other technologies as well as Industry 4.0. In this context, artificial intelligence will facilitate human-machine interaction and change the functioning of current business models (Park, 2017). The reshaping of organizations, industries, markets and societies, the emergence of innovative ecosystems and new business models include the role of open, collaborative and user-focused innovation as a driver of the adoption of AI-based technologies (Brodoni & Zaninotto, 2018).

In addition to this transformation, AI allows all production steps to be tracked, recorded, and analysed to so that problems in the production process can be identified and resolved, including problems unfamiliar to humans. As the driving force of digitalization, artificial intelligence is expected to challenge and transform some fundamental axioms and assumptions underlying the innovation process and management (Tekic et al., 2019).

Artificial intelligence is an intelligent system created to use data, analysis, and observations to perform specific tasks without programming and represent the most important technological development. Companies such as Tesla, Amazon, Google, Alibaba, UPS and Uber, and many others have used artificial intelligence as a competitive advantage to innovate their business model. Since senior managers need to adopt an entrepreneurial and innovative mindset, the use of artificial organization can contribute to their survival by offering a competitive advantage (Lee et al., 2019).

This study examines how artificial intelligence affects and transforms businesses because it is the key to developing technologies. The study will initially focus on understanding artificial intelligence and its two essential components - machine learning and deep learning. The rest of the study will address the digital platform business model, future trends in optimization, innovations in artificial intelligence business models, business model data challenges, and business model digital transformation. Finally, these all will be followed by a conclusion.

2. Understanding the Concept of Artificial Inteligence

Artificial intelligence is one of the most important issues discussed by different disciplines today with the advancement of technology. In general, artificial intelligence is a concept that aims to produce devices capable of learning, sensing, communicating, reasoning, using, and relocating historical information (Bayuk, 2019). Artificial intelligence refers to the simulation of human intelligence in machines programmed to think like a human and mimic human action. The ability to rationalize and perform actions that have a good chance of achieving a specific goal is the main feature of artificial intelligence. Artificial intelligence is a part of computer science that focuses on automating intelligent behaviours such as learning and problem-solving. Learning and adaptation, information representation,

language processing and speech, synthesis and image understanding, autonomous intelligent agents, robots, cognitive modelling and mathematical funding are the main areas of use of artificial intelligence (Demir, 2021).

They are unique technologies processing artificial intelligence, machine learning, natural language processing, perception, and reasoning (Nadimpalli, 2017). Artificial intelligence also means the software, algorithms, systems, or machines that make up artificial intelligence. In general, artificial intelligence is a technology used to indicate a set of tools that can increase the intelligence of a product, service, or solution (Shankar, 2018).

Artificial intelligence is a method that uses a data set to determine the correct value. AI is also not an end that will eliminate the role of human employees. Instead, it is a tool. There is a big gap between the rapidly growing number of companies operating on AI and the much smaller number of AI companies in production. When used and applied by businesses, Artificial intelligence provides significant financial gains in terms of sales and employment. For example, Starbucks is seen as an artificial intelligence pioneer with 15-17% growth in the last two years, despite only 8% store growth (Allam, 2016).

Using AI-based applications in businesses can be used to store data requirements or to control databases. Businesses with efficient artificial intelligence can quickly detect pre-employment cases and resolve possible errors. Businesses with AI can also discover new business meetings or other mixed data. It can also find information and predict the following outcomes for offers, promotions and functional exercises. Similarly, large companies can use AI technology to completely transform machine self-management nodes, surface enhancements, front-end applications, and data technology (Whig, 2019).

Artificial intelligence is a technology similar to human intelligence created with the help of computer programs. It is a concept that started the Fourth Industrial Revolution and needs to be addressed with an interdisciplinary approach. Within the scope of the concept of artificial intelligence, approaches such as machine learning and deep learning are reshaping data analysis (Önder, 2020). The main element in these definitions is the intelligence of machines. The phrase "intelligence of machines" is the most accepted and commonly used expressive phrasing in the literature. In addition, it is possible to explain the concepts of machine learning and deep learning - the subcategories of artificial intelligence- within the definitions of machine intelligence. Artificial intelligence emerged in 1950-1980, machine learning in 1980-2006, and deep learning between 2006-2017. Thanks to these concepts developed within the artificial intelligence framework, such applications as search suggestions, voice recognition, virtual assistants, and image recognition can be developed and used (Ercan, 2020).

2.1. Machine Learning

Machine learning refers to the paradigms capable of making predictions about the unknown by creating algorithms that can make inferences from the existing input data to solve the machine or software's problems. The concept of artificial intelligence is about the ability to learn. Machine learning is computer algorithms capable of modelling a problem based on the data relating to that problem. Although machine learning algorithms are not explicitly programmed to perform a given task, they work with statistics-based logic based on predictions to make decisions (İnce et al., 2021).

3

Machine learning has always been at the heart of artificial intelligence research (Maithili et al., 2012). Artificial intelligence is a broad field of research, and thus it needs to be discussed in such a broader context as understanding rational thinking and acting patterns. Most AI research sees rational thinking and acting as prerequisites for intelligent behaviour. Like the prediction-result-behaviour cycle suggested as an abstract model in business processes, artificial intelligence works on rational thinking, forecasting, acting within the decision and action cycle. These activities are intertwined in complex ways, and many of these cycles overlap in human behaviour. However, these activities should be considered individually for a deeper understanding to contribute to the development of supportive and automating technologies (Koehler, 2018). Machine learning is a subcategory of artificial intelligence in which the machines use acquired information to make predictions through inferences.

2.2. Deep Learning

Deep learning, also defined as hierarchical learning or deep structured learning, is a part of a large family of machine learning techniques based on learning data representations, unlike traditional methods (Doger & Kurgun, 2021). In deep learning, there is a structure based on learning more than one feature or data representation. Top-level properties derive from lower-level properties, creating a hierarchical representation. This representation learns multiple levels of representation corresponding to different levels of abstraction. Essentially, deep learning is based on data representation (Şeker et al., 2017). Deep learning is used in image acquisition, natural language processing and object detection. The purpose of deep learning is to get a good generalization. It is unnecessary to find the global minimum, but it is expected to find the closest result to the solution in a reasonable time. It achieves the result with optimization algorithms (Seyyarer et al., 2020).

Thanks to advancements in forecast performance as foreseen by deep learning, computed personal assistants such as Apple's Siri, Amazon's Alexa, Google Now, or Microsoft's Cortana heavily use deep neural networks. In 2016, Microsoft released a speech recognition system that can spell spoken words almost as accurately as professionally trained people. In 2016, Google launched an update to its translation system that uses deep learning to improve translation accuracy and get closer to human performance. Deep learning is in natural language processing and image classification, object detection, object localization, and image rendering. Alipay has introduced a mobile payment application in China that allows more than 120 million people to use facial recognition. This technology was rated as one of the ten breakthrough technologies of 2017 by Technology Review. In addition to these applications, deep learning has also been successfully applied to recommendation systems. In this context, both Amazon and Netflix use deep neural networks for personalized product recommendations (Kraus et al., 2020).

3. Future Trends of Digital Platform Business Model Optimization

The proliferation of digital technology has revealed the critical role of a platform in the innovation process and has made it the central focus of innovation activities in many companies (Ruggieri et al., 2018). A digital platform provides a fundamental function to a technological system and serves as a foundation for developing complementary products, technologies, or services (Asadullah et al., 2018). Digital platforms consist of three essential features: (i) being technologically mediating, (ii) enabling interaction between user groups and (iii) allowing these user groups to perform their defined tasks (Bonina et al., 2021).

The digital platform should become the critical tool for regional economic growth in current conditions. In the context of digital transformation, the digital platform concept should be understood as a hybrid, multifunctional virtual platform for the interaction of a wide range of socio-economic relations issues, which are interested in achieving common goals based on the application of multimedia interactive communication.

The use of artificial intelligence technology to store and process large amounts of data can provide a mutually beneficial creation process for commercial and non-profit organizations and public authorities (Bekbergeneva, 2020).

Software technology rapidly affects new business models, organizational culture, platform scaling, purchasing behaviour and communication trend.

The advancement of new information and communication technologies such as big data, cloud technology, the internet of things and artificial intelligence, their continuous in-depth applications in enterprises contribute to the development of smart production. Simulation optimization and scheduling in smart businesses are efficient in practice. AI also has a big role in the new business modelling and digital platform business (Mishra & Tripathi, 2021).

4. Innovations in Artificial Business Model

AI has become a dominant force in various industries and as a result, it has created a drastic impact on business models. Business models consider artificial intelligence as a tool and enable paradigmatic changes in business practices (Burström et al., 2021).

As AI becomes more common in the future, all stakeholders will likely learn about AI's positive and negative aspects. For example, in research in the manufacturing sector, artificial intelligence in automation/robotization and product development, visualization systems will try to find out how to predict and discover and learn the radical use of solutions. In addition, businesses need to understand how they can transform business models and innovate by placing artificial intelligence capabilities at the heart of their business process (Sjödin et al., 2021).
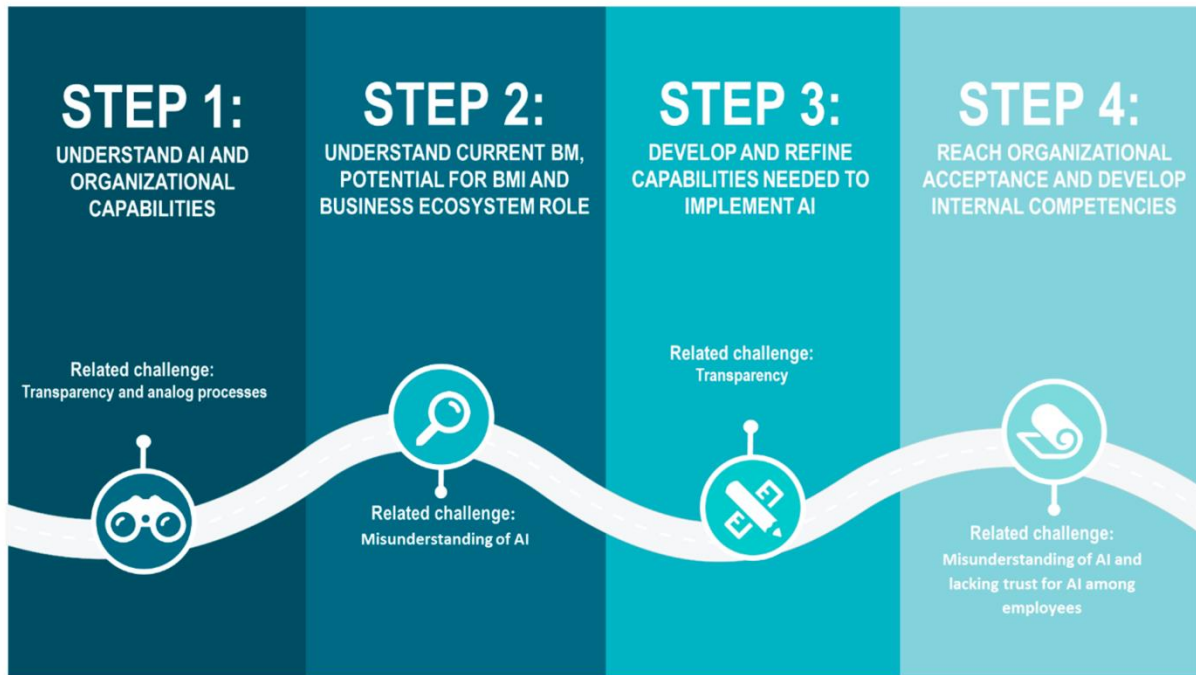
Figure 1. Roadmap for the implementation of the artificial intelligence business model

Source: (Reim et al., 2020: 187).

Artificial intelligence is a tool for businesses to perform various tasks. The use of artificial intelligence varies in several fields, such as recruiting new employees, underwriting, organizing complex logistics processes, diagnosing patients, advising customers on finance, and predicting technological developments. Artificial intelligence in businesses provides real-time, practical and active support to decision-makers, especially in the information processing process. Artificial intelligence demonstrates task performance through various systems such as machine learning, automatic reasoning, knowledge repository, image recognition, and natural language processing processes. This task performance process involves taking task input, processes, and output. Artificial intelligence needs qualified data as input to automate organizational tasks.

Systems need perfect data to learn task performance from their experiences and to receive feedback from their environment (Ünal & Kılınç, 2020).

4.1. Business Model Data Challenges

Artificial intelligence is rapidly taking its place in the digital world and is becoming the beating heart of all sectors. From Siri to Tesla's self-driving cars to video games to Google's fast-learning artificial intelligence, it has been revolutionizing a myriad of industries. Artificial intelligence analyses countless data on a business's servers, ranging from reducing market risks to improving customer service through virtual personal assistants. Artificial Intelligence uses data mining, pattern recognition, and natural language processing to take advantage of self-learning systems. Therefore, in terms of significant business advantages over human intelligence, artificial intelligence is highly scalable and relatively cost-effective for business enterprises. In addition, the consistency and rule-based programs of artificial intelligence allow businesses to minimize their mistakes (Kitsios & Kamariotou, 2021).

4.2. Business Model Digital Transformation

Companies in various industries use AI to transform their business strategies, business models and value creation processes (Teece, 2018). In recent years, artificial intelligence has penetrated many sectors such as manufacturing, logistics, financial markets (Truby et al., 2020). Artificial intelligence also offers a value proposition based on developing solutions for consumer behaviour to change both the inside of the market and the geographic location of stores by offering solutions to businesses to increase their turnover (Grewal et al., 2017). While the financial sector pioneered artificial intelligence to assess the possibility of fraud and reduce the consequences (O'Leary, 1995), urban planning and infrastructure development, collecting data on urban traffic, then analysed using artificial intelligence solutions and urban solutions in response to emerging needs. Artificial intelligence can benefit industries in many areas, including autonomous vehicles that offer suggestions for adapting infrastructure (Nallaperuma et al., 2019).

The use of digital technologies is leading to the emergence of a digital business, including the development of new business models that combine the physical and digital worlds (Nosova et al., 2020). Technologies such as big data, industrial internet, sensors, robotics, and artificial intelligence are central to digital businesses. The digital business has also influenced the emergence of an era of dramatic technological changes.

Digital transformation permeates all areas of economic activity through the introduction of advanced and often convergent technologies. Therefore, digital transformation aims to take advantage of digital opportunities to transform the traditional business into a leader in the digital economy. In digitally advanced industries such as Netflix, Uber, Google, and Airbnb, digitized, open and collaborative business models have been successfully developed and deployed in a unified ecosystem of producers and consumers (Sushkova et al., 2021).

Internet is used today by connecting all technologies with devices. The use of the internet in every technology has taken its place in businesses. Businesses have a chance to collect data and put it in the cloud and reinvent it as thinking in the digital revolution. In the coming years, it will be more likely to see self-motivated businesses with fast markets, increased returns and customers who are knowledgeable and aware. Accordingly, artificial intelligence can provide better products and more users, thanks to its capacity to generate more data, which is shown as a cycle (Mishra & Tripathi, 2021).
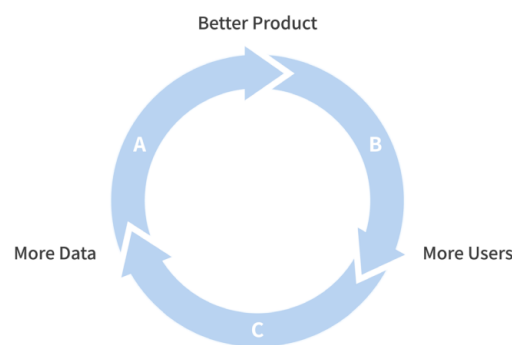

Figure 2. Cycle of AI

Source: (Mishra & Tripathi, 2021: 12).

A better understanding of the characteristics of artificial intelligence will form the basis of the plan for future applications. The aim here is to establish a conceptual framework for the use of artificial intelligence and evaluate businesses' capabilities. In addition to sound market research, research and development projects can be valuable for assessing the risks associated with AI. It will provide a further basis for identifying risks, challenges, and commitments to reduce them (Reim et al., 2020). The use of artificial intelligence in business applications is advancing rapidly.

Table 1. AI in Business Statistics

52% of executives say AI tools have boosted productivity.
48% of respondents handle data quality issues by using data analysis, machine learning, or AI tools.
25% of business executives state that adopting AI technology has fully enabled their business processes.
50% of business executives said that using AI has helped them achieve their cost savings goal.
53% of businesses have innovated their products and services using AI technology.
54% of company executives agree that AI plays a significant role in improving the decision-making process.
67% of US-based companies agree that adopting AI technology has helped them create better customer experiences.
86% of executives claim that AI is going to be a "mainstream technology" at their companies in 2021.
Falling behind AI adoption is one of the major concerns among 12% of CX leaders and 11% of mainstream companies in 2020.
39% of large organizations planned to invest in AI and/or machine learning tools in 2020 compared to 28% of mainstream companies.
39% of large organizations planned to invest in AI and machine learning in 2020 compared to 26% of mainstream organizations and 28% of CX leaders.

Source: (Finances Online Review for Business, 2020).

Businesses that use AI to solve problems are generally more productive and efficient. It is predicted that by 2035, businesses using artificial intelligence will double the economic growth rate and increase labour productivity by up to 40%. The following items are related to the benefits of using artificial intelligence (Verbeek & Lundqvist, 2021).

• Artificial intelligence accelerates decision making and enables early detection of the problem.

• AI can also enable more accurate decision making by detecting anomalies or long-term trends that are not easily detected by other methods.

• Artificial intelligence provides higher efficiency through automating manual processes

• Artificial intelligence can facilitate the automatic generation of machine-readable legal and compliance

documents and reduce the time required to prepare and analyse such documents.

• AI can also enable automatic language and speech recognition. In practice, businesses can use this functionality to deploy chatbots, thus reducing the time employees spend on calls.

5. Conclusion

Artificial intelligence has a wide range of uses in the business world. Artificial intelligence is a supporting tool rather than a replacement for human intelligence and creativity. Although artificial intelligence has some difficulty producing solutions to problems in the physical world, it can process and analyse any data faster than a human brain. Every future-oriented business must understand artificial intelligence and have an artificial intelligence strategy. Businesses with an understanding and strategy of artificial intelligence can achieve high goals and gain substantial competitive advantages. Artificial intelligence has many benefits and applications in the business world. It powers customer service, provides cybersecurity defence, analyses data, assists customer service, lowers energy costs, forecasts sales, and helps businesses become customer focused. Artificial intelligence will become more fluid and faster as its new technologies evolve in the coming years. Since AI offers unlimited benefits, the sooner they initiate the transition, the more competitive advantage they can retain.

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