THE IMPACT OF ARTIFICIAL INTELLIGENCE ANXIETY ON EMPLOYEES: A COMPREHENSIVE REVIEW OF PSYCHOLOGICAL AND ORGANIZATIONAL DYNAMICS[1]

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ABSTRACT

This comprehensive compilation article has been written with the aim of examining the in-depth effects of artificial intelligence anxiety on employees in the workplace and the psychological and organizational dynamics underlying these effects. Artificial intelligence is rapidly spreading in the business world, transforming business processes. However, during the adoption and proliferation of this technology, significant concerns have emerged among employees. The article will take a broad perspective on the impact of artificial intelligence on employees' job expectations, job security, and work styles, and will delve into the psychological factors underlying these effects. Additionally, it will investigate the effects of artificial intelligence anxiety on job productivity, job satisfaction, and workplace relationships. Furthermore, the article will discuss strategies and policies that employers and managers can adopt to alleviate artificial intelligence anxiety and create a more positive workplace environment. In this context, measures such as education, communication, and support mechanisms will be examined, along with how they can be successfully implemented in practice. In conclusion, this compilation will serve as a valuable resource to gain a better understanding of the role of artificial intelligence technology in the business world and to help employees approach this technology more positively. It will also assist employers, managers, and policymakers in increasing their awareness of how artificial intelligence applications affect the human factor in the workplace.

Keywords: Artificial intelligence anxiety, employees, workplace, organizational impact.

[1] This research was conducted within the scope of the author's doctoral dissertation.

INTRODUCTION

The rapid proliferation of studies in the field of artificial intelligence and the diverse applications in various sectors have been noted to increasingly contribute to individuals' concerns about their jobs and future. In today's fast-paced technological advancements, it is crucial to determine the extent of artificial intelligence anxiety among employees and ensure their adaptation in the workplace. The remarkable developments in the field of artificial intelligence are of paramount importance in the business environment. The widespread expectation is that artificial intelligence will become a vital competitive tool in various industries, affecting business processes, management styles, organizational structures, and corporate culture in the coming years (Macijauskienė and Stankevičiūtė, 2021: 525). The relationship between artificial intelligence and anxiety has been explored through various studies. These studies encompass topics such as the compatibility of artificial intelligence (Coppin, 2004: 365), fear of artificial intelligence taking over employees' jobs (Civelek, 2009: 105), and the potential use of artificial intelligence to threaten personal privacy (Rilho, 2019: 10). The connection between rapidly advancing technology and its impact on the human condition creates a significant concern. The main issue here is the potential dehumanization caused by extraordinary and contemporary reasoning, rendering individuals vulnerable to various psychological and social risks in perceiving the world and environment (Choi, 2017: 46). Furthermore, artificial intelligence is data-driven technology. In the McKinsey 2020 Turkey report, it was stated that automation processes in our country could be applied to six out of every ten jobs in the coming years. This implementation is expected to result in some job losses for workers and the emergence of many new professional groups. Consequently, many individuals may become unemployed while new job opportunities are created. The implementation of artificial intelligence applications will reshape people's lifestyles and social relationships, requiring society to adapt to these changes (Kafalı, 2021: 100). Individuals' efforts to adapt to this new reality, the challenges they face, their anxieties, and observed concerns all contribute to artificial intelligence anxiety. The sub-dimensions of artificial intelligence anxiety include learning, job displacement, and socio-technical blindness. Anxiety about learning as new technology applications are acquired, fear of losing one's job due to the proliferation of artificial intelligence techniques, and concerns about the potential consequences of artificial intelligence surpassing human intelligence and becoming uncontrollable are all part of artificial intelligence anxiety (Kafalı, 2021: 100). The primary objective of this research is to comprehensively examine the impact of artificial intelligence anxiety on employees in the workplace and to understand the psychological and organizational dynamics underlying these effects. This study aims to elucidate how the rapidly spreading artificial intelligence technology in the business world affects employees' job experiences, job security, and work styles.

The significance of this research stems from the increasing prevalence of artificial intelligence technologies in workplaces, necessitating an understanding of how employees react to this technology and its repercussions on productivity, job satisfaction, and workplace relationships. Additionally, it is essential to identify strategies and policies that employers and managers can implement to alleviate artificial intelligence anxiety and foster a more positive working environment. In conclusion, this research will contribute valuable insights into comprehending the impact of artificial intelligence technology on human resources in the business world and the creation of

healthier and more productive work environments. Clarifying the psychological and organizational dimensions of artificial intelligence anxiety may assist workplaces in effectively integrating this technology while addressing employees' concerns.

BACKGROUND

Concept and Evolution of Artificial Intelligence

Artificial intelligence (AI) refers to the general field of science and engineering where intelligent computer programs are developed (McCarthy, 2007). It involves creating machines that can perform tasks typically requiring human intelligence, such as decision-making, problem-solving, and learning (Haugeland, 1985; http-1).

Table 1. Development of Artificial Intelligence (Khan et al., 2021; Jin et al., 2018; http-2; http-3)

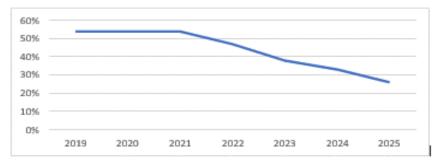| Year	Developments
1950	Alan Turing introduces the concept of computation
1956	John McCarthy uses the term "artificial intelligence"
1957	General Problem Solver (GPS)
1960	ADALINE (Adaptive Linear Neuron) developed
1962	Unimation, the first industrial robot company, is founded
1965	Development of the natural language program ELIZA
1968	Arthur C. Clarke introduces "HAL 9000" in "2001: A Space Odyssey"
1969	Marvin Minsky and Seymour Papert publish "Perceptrons: An Introduction to Computational Geometry"
1974-1980	First AI Winter
1980	First National Conference of the American Association for Artificial Intelligence
1984	Depiction of artificial intelligence in the Terminator film
1986	Development of deep learning through backpropagation
1987-1993	Second AI Winter
1995	Introduction of Support Vector Machines (SVMs)
1997	IBM's Deep Blue defeats world chess champion Garry Kasparov
2001	Release of the film "AI: Artificial Intelligence"
2006	Development of deep learning with GPUs
2006	Google develops its first self-driving car
2011	Introduction of Apple's personal assistant, Siri
2012	Emergence of the era of Graphics Processing Units (GPUs)
2014	Introduction of chatbots capable of human-like interactions by Google
2015	AlphaGo defeats a professional Go player
2016	Creation of the social humanoid robot Sophia
2017	Introduction of Transformer networks
2018	Google releases BERT for natural language processing
2019	Release of OpenAI's GPT-2 with 1.5 billion parameters
2020	Progress in protein folding problem with AI
2021	Publication of DALL-E, capable of generating images from text descriptions

Before the widespread adoption of AI, research mainly focused on artificial neural networks. The earliest work on artificial neural networks dates back to 1943 when Warren McCulloch and Walter Pitts developed the first

model (McCulloch and Pitts, 1943). However, the term "artificial intelligence" was introduced by John McCarthy in 1956 during a conference held at Dartmouth College (http-1).

The use of the term "artificial intelligence" marked the beginning of rapid advancements in the field. This period was later referred to as the "Golden Age" of AI. During this time, significant developments included the creation of the General Problem Solver (GPS), ADALINE technology, the founding of Unimation (the first industrial robot company), the development of the ELIZA natural language program, and the portrayal of AI in movies, such as "2001: A Space Odyssey." However, from 1974 to 1980, the field experienced the "First AI Winter," characterized by reduced interest and funding (http-1).

The "First AI Winter" ended in the 1980s when AI regained momentum. The American Association for Artificial Intelligence held its first national conference in 1980. AI gained recognition in the entertainment industry with the depiction of AI in films like "The Terminator." In 1986, researchers developed deep learning techniques through backpropagation, and in 1987-1993, the "Second AI Winter" occurred due to factors including the end of the Cold War (http-3).

Following the Second AI Winter, AI experienced a resurgence. In 1995, Support Vector Machines (SVMs) were introduced, and in 1997, IBM's Deep Blue defeated world chess champion Garry Kasparov. In 2001, the film "AI: Artificial Intelligence" featured a robot child as the main character. In 2006, the development of deep learning with Graphics Processing Units (GPUs) marked a new era. In 2014, Google introduced chatbots capable of human-like interactions. In 2015, AlphaGo defeated a professional Go player. In 2016, Sophia, a social humanoid robot, was created. In 2017, Transformer networks were introduced, and in 2018, Google released BERT for natural language processing. In 2019, OpenAI released GPT-2 with 1.5 billion parameters. In 2020, AI made significant progress in solving the protein folding problem. Finally, in 2021, DALL-E, capable of generating images from text descriptions, was published (http-2).

Today, AI technologies continue to advance rapidly. Despite their potential to enhance efficiency and reduce costs, they also raise concerns about job displacement, security, and ethics. The increase in AI-related businesses from 2013 to 2018 was followed by a decrease, potentially due to market saturation. To address supply-demand imbalances, some governments have restricted market entry. Nevertheless, interest in AI remains high, leading to increased production and patent applications (Peeteekçi, 2021)

Figure 1. Growth Rates in the Global Artificial Intelligence Software Market (Zhang et al., 2022)

As seen in Figure 1., the artificial intelligence software market grew by 54% in 2019, 2020, and 2021. The sector's growth rate in 2022 is 47%, and it is projected to be 38% by the end of 2023. In the coming years, growth rates of 38% in 2024 and 26% in 2025 are predicted. Despite a post-2021 decline, the percentage decrease is due to the sector's growth, making the increases seen between 2019-2021 unfeasible.

Impacts of Artificial Intelligence

Artificial intelligence, widely used today, has had various impacts in many fields. These effects can be positive or negative. There have also been many differences of opinion about the development of artificial intelligence from the past to the present. Concrete examples of these differing views include the First AI Winter (http-1) and the Second AI Winter (http-3). During these periods, controversies arose regarding the development and safety of AI, leading countries to limit their market investments (http-1). The impacts of AI are categorized into five areas: employment effects, social effects, economic effects, effects on efficiency, and effects on competition.

The Impact of Artificial Intelligence on Employment

Technological advancements, increasingly replaced by AI, could lead to job losses. Keynes, as early as the 1930s, introduced the theory of technological unemployment (Keynes, 1937, p. 210). Technological advancements, depending on the conditions of the time, lead to unemployment when machines start doing jobs previously done by humans. While technological advancements contribute positively to economic growth, they inevitably cause job losses (Schwab, 2018, p. 25). Unskilled workers are affected more than skilled workers by these job losses.

New technologies create new skills. Consequently, the demand for skilled workers is rising compared to unskilled workers (Manning, 2004, p. 582). Candidates trained to work in various sectors must adapt to these technological advancements and develop themselves accordingly (Blanchard et al., p. 81). Despite these adaptations, AI is projected to continue creating unemployment.

One of the anticipated negative impacts of AI is its potential to create unemployment. A study by Zippia (2023) examined potential AI-induced job losses over the next 20 years in 20 European countries. The study, referencing current job sectors and professions, predicts an average job loss of 53.86% in these countries. More than half of the current workforce is expected to become unemployed. Even though new job areas and employment opportunities are anticipated, AI is likely to cause widespread unemployment.

Howarth (2023) researched the employment rates in the UK's sectors and the potential for AI-induced unemployment by 2030. According to the data, the sector with the highest employment share is wholesale and retail trade at 14.80%, followed by the health and social service sector at 12.40%. In terms of employment numbers and automation risk, the wholesale and retail sector is expected to be most affected. The sector most likely to be impacted percentage-wise is water, sewage, and waste management at 62.6%.

The Economic Impact of Artificial Intelligence

The AI market is continuously growing. This growth is leading investors to see the market as an opportunity and make investments. As AI becomes a significant component of many products and an integral part of human life, investor confidence significantly influences (Chen et al., 2016, p. 3).

Investments in AI increased from $6.08 billion in 2013 to $176.47 billion in 2021, showing a nearly $170 billion increase. The study categorizes investments into mergers/acquisitions, individual investments, minority stakes, and IPOs, with the largest share in individual investments. Despite fluctuations in other areas, individual investment share has continuously increased, followed by mergers/acquisitions. Minority stakes and IPOs have remained low compared to other areas, except for surges in 2020 and 2014, respectively.

The Social Impact of Artificial Intelligence

The increasing use of AI technologies in everyday life has led to social changes. AI technologies used in various service sectors, especially in healthcare, hold great potential. Their use in disease diagnosis, treatment planning, and medical imaging is steadily increasing. The accuracy achieved in diagnosis processes enables faster and more accurate treatment of patients (Obermeyer and Emanuel, 2016).

AI also impacts social equality and ethical issues. Since AI is based on data, the results can include biases and lead to social discrimination. Therefore, it is crucial to improve these decision-making mechanisms. The increase in studies on ethical AI aims to ensure these technologies behave in alignment with human values and internalize ethical principles (Jobin, Ienca, and Vayena, 2019, p. 393).

Privacy and security are also concerns. The collection, processing, and analysis of personal data by AI can potentially violate privacy and security rights. It is vital to take necessary precautions when users entrust their personal data to these systems (Acquisti, Brandimarte, and Loewenstein, 2015, p. 511). While AI can simplify people's lives, it also presents challenges, making the identification and improvement of potential problems important for AI's future and societal impact.

Increased Efficiency in Business Processes

AI technologies are widely used by businesses, particularly for reducing costs and increasing efficiency. AI's capabilities in forecasting and big data analysis contribute to efficiency (Provost and Fawcett, 2013, p. 24). Rapid and effective analysis of large data sets helps accurately identify market trends and customer preferences, improving decision-making quality. Better decision quality helps avoid losses due to incorrect forecasts (Davenport and Harris, 2017, p. 9).

Automation and robotization are crucial in enhancing efficiency. Repetitive tasks are automated through robotic process automation and machine learning (Chui, Manyika, and Miremadi, 2016, p. 5-6). Operations involving

repetitive tasks can be transferred to machines, ensuring error-free and consistent outcomes (Brynjolfsson and McAfee, 2014, p. 37).

AI is also effective in optimizing business processes and management. Companies can identify gaps and weaknesses in their processes through analysis and make necessary improvements (Davenport, 2018).

The Competitive Impact of Artificial Intelligence

Big data analysis and customer relationship management offer significant competitive advantages. Understanding customer behaviors and preferences through analyzed data allows for more strategically marketed products compared to competitors, gaining a competitive edge (Brynjolfsson and McAfee, 2014, p. 37).

AI also offers competitive advantages in process automation and operational efficiency. Robots and algorithms help produce more quickly and flawlessly than traditional methods, reducing costs. Companies that can run their production processes smoothly and more rapidly than their competitors gain a significant advantage (Makhija and Song, 2018, p. 140). Companies actively using AI can gain competitive advantages by creating innovative products and services (Chui, Manyika, and Miremadi, 2016, p. 7).

AI has become a factor shaping competition in the business world. From data analysis and customer relations to operational efficiency, process automation, and product/service innovation, AI provides competitive advantages to businesses. Thus, correctly adopting and using AI technologies is crucial for businesses to maintain a competitive position.

The Environmental Impact of Artificial Intelligence

The use of AI technologies, especially in industrial production, offers more environmentally friendly processes compared to traditional methods. AI's use in logistics, transportation, and smart home systems reduces carbon emissions (Liu et al., 2022, p. 3).

AI applications, when processing large amounts of data, require powerful hardware, leading to the establishment of large data centers. These centers often use fossil fuels for energy, potentially increasing carbon emissions (Birol, 2017, p. 15). However, efforts are underway to reduce carbon footprints with AI-based solutions (Birol, 2017, p. 99). AI is also extensively used in smart transportation and logistics services. Optimizing traffic flow to reduce fuel consumption decreases carbon emissions (Guo and Yuan, 2021, p. 5).

Despite the significant energy consumption by AI applications, they contribute to substantial energy savings in energy management. Smart home systems, along with similar applications, optimize energy consumption, resulting in savings. These systems can be monitored remotely, assisting in reducing consumption (Kuncan and Çaça, 2019, p. 273).

The Future of Artificial Intelligence Applications

The advancement and widespread use of artificial intelligence (AI) in various sectors raise concerns about the future necessity of human skills. While AI has reduced the number of people needed in some job areas, there are differing opinions on its future use (Gupta & Kumar, 2021, pp. 4-5; Haeckel & Kaplan, 2019, p.8; Ford, 2013, p.37; Goralski & Górniak-Kocikowska, 2020, p. 67). The optimistic view suggests that humans will still be needed for the development, installation, and maintenance of machines, and that ethical and normative decisions made by the human mind cannot be fully replicated by machines (Gupta & Kumar, 2021, pp. 4-5). However, some researchers argue that AI will create unemployment and eliminate certain job sectors (Haeckel & Kaplan, 2019, p.8; Ford, 2013, p.37; Goralski & Górniak-Kocikowska, 2020, p. 67).

It's not difficult to predict that AI will be used more intensively in different fields in the future. In management, the development of AI is progressing rapidly, especially in decision-making and forecasting tools. Therefore, senior managers have a significant responsibility to master these AI systems (http-7). In healthcare, AI is used in processes like diagnosis, prognosis, treatment, research, early detection, and home care. Machine learning and AI-assisted studies in the healthcare sector are highly effective in diagnosing and treating chronic diseases like heart diseases, cancer, and Alzheimer's, and are expected to continue being used in the future (Akalin & Veranyurt, 2020, pp. 135-138). In the education sector, expert systems created by specialists in certain areas (Önder, 2003, p. 143), Intelligent Student Systems (ISS) that provide personalized learning environments tailored for different courses (Alkhatlan & Kalita, 2018, p. 1), and dialogue-based student systems that identify and correct students' misunderstandings (Arslan, 2020, p. 84) are being used. Academics in the field of education also need to master AI technologies and use them effectively to adapt to current needs.

In the current century, processes like information transfer and data storage have become highly complex. Technological advancements in this field have become significant for countries, and developed countries are marketing their technologies to less developed ones (Gültekin, 2021, p. 8442). In the future, countries are expected to invest more in AI technologies.

Modern AI systems are observed to perform tasks faster and more efficiently than humans. For instance, using automated machines for storage tasks in a company is both faster and more efficient than using humans (Ünver & Altunok, 2020, p. 489). Consequently, businesses today prefer these technologies. However, while the preference for machines in physical tasks may lead to unemployment, new job fields are also emerging. People are needed for the creation, installation, and development of these technologies, creating new career opportunities. As most jobs in various sectors are expected to be transferred to AI, the role of humans in the workforce will change, leading to increased competition among individuals and changing expectations from candidates during job applications. Therefore, it is important for businesses to adapt their human resources training and development functions, and for universities and other educational institutions to adjust their curriculums to meet contemporary needs.

DISCUSSION and CONCLUSION

AI, with the rapid development in technology, is being used in many areas including production, language processing, image processing (Cireşan, Meier & Schmidhuber, 2012, p. 1), drug development, recognizing drug interactions (Hoşgör & Güngördü, 2022, p. 396), personalized education programs, lesson content preparation (Coşkun & Gülleroğlu, 2021, p. 955), and in the aviation sector for route determination, predicting part demands for airplanes, and suggesting alternative solutions to problems (Çankaya, 2020, p. 467). While AI simplifies life, it also brings certain risks. AI systems:

- May not always work correctly and can produce biased results if loaded with incorrect data (Derin & Öztürk, 2020, p. 44),
- Pose privacy risks due to digital data storage and can interfere with personal lives, leading to ethical issues (Bostrom & Yudkowsky, 2018, p. 3),
- Can be misused for malicious purposes and create security vulnerabilities if deceptive data is inputted (Efe, 2021, p. 145).

To reduce the risks associated with AI:

- The quality of training data for AI algorithms is crucial. Enhancing data quality is necessary as errors in data can lead to incorrect outputs by AI (Bathaeian, 2018, pp. 893-894).
- AI algorithm decisions are complex, so transparent and understandable input data can increase output quality and reduce the likelihood of incorrect outcomes (Bathaeian, 2018, pp. 893-894).
- AI systems still require human oversight. Despite their ability to perform some human tasks, they can produce erroneous results. Human verification of outputs is necessary (Şahiner, Ayhan & Önder, 2021, p. 83).
- AI systems can repeat the same mistakes due to their dependence on input data and commands (Dilek, 2019, p. 49).
- Ethical design is essential to prevent ethical violations. Setting standards during production for health, safety, and confidentiality is of great importance (Dilek, 2019, p. 52).
- AI systems are self-learning and evolving, so setting certain limits and restrictions is necessary to prevent future risks. These limits should aim to prevent AI systems from harming human life and nature (Dilek, 2019, p. 52).
- Despite their positive effects and contributions to businesses and various organizations, it is crucial to identify and mitigate potential risks associated with AI.

SUGGESTIONS

Based on the research findings, here are some recommendations:

- **Employee Education and Training**: Employers should invest in educating and training employees about artificial intelligence, its benefits, and its limitations. Providing employees with the necessary skills to work alongside AI systems can help alleviate anxiety and promote acceptance of the technology in the workplace.

- **Transparent Communication**: Open and transparent communication about the integration of AI into business processes is essential. Employers should clearly communicate how AI will impact employees' roles and job security, addressing any concerns or misconceptions.

- **Support Mechanisms**: Establishing support mechanisms, such as counseling services or employee assistance programs, can help employees cope with anxiety related to AI. Providing a platform for employees to express their concerns and receive support can contribute to a positive work environment.

- **Job Redesign and Reskilling**: As AI technology automates certain tasks, employers should consider redesigning job roles to focus on tasks that require human creativity, emotional intelligence, and problem-solving skills. Additionally, offering reskilling opportunities to employees whose roles are affected by AI can help them transition to new positions within the organization.

- **Ethical Guidelines and Governance**: Implementing ethical guidelines and governance frameworks for the development and deployment of AI systems is crucial. Ensuring that AI systems are designed and used ethically can mitigate concerns about privacy, bias, and security.

- **Promoting Collaboration**: Encouraging collaboration between humans and AI systems can foster a sense of partnership and mutual benefit. Emphasizing the complementary nature of human and AI capabilities can help alleviate fears of job displacement and promote a more positive attitude towards AI in the workplace.

- **Continuous Monitoring and Evaluation**: Continuously monitoring the impact of AI on employees and regularly evaluating the effectiveness of implemented strategies is essential. Employers should be proactive in addressing any emerging concerns or challenges related to AI anxiety among employees.

By implementing these recommendations, employers can create a supportive and inclusive work environment where employees feel empowered to embrace artificial intelligence technology and adapt to the changing landscape of the workplace.

ETHICAL TEXT

This article adheres to the journal's writing standards, publication principles, research and publication ethics rules, and journal ethical guidelines. The author is responsible for any and all violations related to the article.

Since this article was conducted through document analysis, one of the qualitative research methods, it does not require ethical board approval.

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