



**ARTIFICIAL INTELLIGENCE IMPLEMENTATIONS
IN
HUMAN RESOURCES MANAGEMENT**

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Thesis for the Master's Program in Business Administration

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THESIS ADVISOR: Prof. Dr. Mehmet GENÇER

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2023

ETHICAL DECLARATION

I hereby declare that I am the sole author of this thesis and that I have conducted my work in accordance with academic rules and ethical behaviour at every stage from the planning of the thesis to its defence. I confirm that I have cited all ideas, information and findings that are not specific to my study, as required by the code of ethical behaviour, and that all statements not cited are my own.

Filiz ASLAN

03.01.2023

Signature:

ABSTRACT

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Master Program in Business Administration

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Technology is constantly advancing and bringing fierce competition. Organizations have started to use technology-based developments in every field, including human resource management, to maintain their existence. Especially in this era of big data, it is more important than ever to hire employees with high business competence. Traditional methods are no longer sufficient for the ever-growing candidate pool. Thanks to digital transformation, the human resources department of businesses should be supported at the organizational level. In this study, we will examine the use of AI-based technology implementations in the Human Resources department. In this research on the use of artificial intelligence applications in the field of human resources, it has been determined that artificial intelligence is generally applied in the field of recruitment in previous studies. However, during the research, it was determined that human resources are also used in some other fields

such as orientation and education. Also, it was seen that artificial intelligence implementations were not used in other areas of human resources yet and that there was a gap, and the study focused on illuminating this gap. The study aims to identify artificial intelligence application gaps in different areas of human resources management, which will form the basis of future research, and to investigate the expectations of human resources professionals. This study has reached findings that will contribute to the study of artificial intelligence implementations in human resources in the future.

Keywords: Artificial Intelligence, Digital Transformation, New Technology, Human Resources Management.



ÖZET

İNSAN KAYNAKLARI YÖNETİMİNDE YAPAY ZEKA UYGULAMALARI

Aslan, Filiz

İşletme Yüksek Lisans Programı

Tez Danışmanı: Prof. Dr. Mehmet GENÇER

Ocak, 2023

Teknoloji sürekli ilerliyor ve kıyasıya bir rekabeti beraberinde getiriyor. Örgütler varlıklarını sürdürmek için insan kaynakları yönetimi dahil her alanda teknolojiye dayalı gelişmeleri kullanmaya başlamışlardır. Özellikle bu büyük veri çağında, iş yetkinliği yüksek çalışanları işe almak her zamankinden daha önemli. Sürekli büyüyen aday havuzu için geleneksel yöntemler artık yeterli olmamaktadır. Dijital dönüşüm sayesinde işletmelerin insan kaynakları departmanı organizasyonel düzeyde desteklenmelidir. Bu çalışmamızda yapay zeka tabanlı teknoloji uygulamalarının İnsan Kaynakları departmanında kullanımını inceleyeceğiz. İnsan kaynakları alanında yapay zeka uygulamalarının kullanımına yönelik bu araştırmada, daha önceki çalışmalarda yapay zekanın genel olarak işe alım alanında uygulandığı tespit edilmiştir. Ancak araştırma sırasında insan kaynağının oryantasyon ve eğitim gibi diğer bazı alanlarda da kullanıldığı tespit edilmiştir. Ayrıca yapay zeka uygulamalarının insan kaynaklarının diğer alanlarında henüz kullanılmadığı ve bir boşluk olduğu görülmüş ve çalışma bu boşluğu aydınlatmaya odaklanmıştır.

Çalışma, gelecekte yapılacak arařtırmalara temel oluřturacak olan insan kaynakları yönetiminin farklı alanlarındaki yapay zeka uygulama boşluklarını tespit etmeyi ve insan kaynakları profesyonellerinin beklentilerini arařtırmayı amaçlamaktadır. Bu çalışma, gelecekte insan kaynaklarında yapay zeka uygulamalarının çalıřılmasına katkı sađlayacak bulgulara ulařmıřtır.

Anahtar kelimeler: Yapay Zeka, Dijital Dönüřüm, Yeni Teknoloji, İnsan Kaynakları Yönetimi.



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LIST OF ABBREVIATIONS

HRM : Human Resources Management

AI : Artificial Intelligence

NLP : Natural Language Processing

E-COMM : Electronic Commerce

EQ : Emotional Quotient

IoT : Internet of Things



CHAPTER 1: INTRODUCTION

1.1. Motivation: A universal overview of artificial intelligence implementations in the global market

Artificial Intelligence, which is one of the turning points of humanity, transforms into the realization of the ways of thinking and behavior seen in humans and living things, and even the routine dynamics in all business life, in the environment of digital systems (in other words, computers). (Livet and Varenne, 2020). This transformation and change in business life, in general, has led all businesses that use big data and want to have a say in the global market to use computer-based technology. This change provides benefits in many areas such as responding quickly, reducing time, high efficiency, and being effective. (O'Leary, 2013). Nowadays, businesses are not indifferent to increasingly advantageous technology. They have even gone further by using artificial intelligence. Artificial intelligence, which is indispensable, especially for the business world, is defined as the *new electricity* in terms of the value it adds to the industrial revolution. (Andrew, 2017)

1.2. Digital transformation in human resources with the effect of industry 4.0.

The concept of industry 4.0 started to be used for the first time in Germany to state the beginning of the industrial revolution, with the development of technology and its use in many areas. Industry 4.0 is the integration of complex physical machines and devices with technology-based sensors and software.

It is the acquisition of a new value chain throughout the life cycle of products to further improve the commercial and social outcomes of transactions. (Mrugalska and Wyrwicka, 2018)

Technology-based developments have changed the competencies of the personnel according to the technology. (Kaya, 2014).

In Industry 4.0, managers are redesigning HR practices such as training practices, performance appraisal, remuneration, and staffing to encourage innovation and learning in an organization. (Donate and Sanchez, 2015)

The industrial revolution, which led to modern automation systems, data exchanges, production technologies, and cultural changes in the world, has passed through some stages up to now. (Butter et al., 2014).

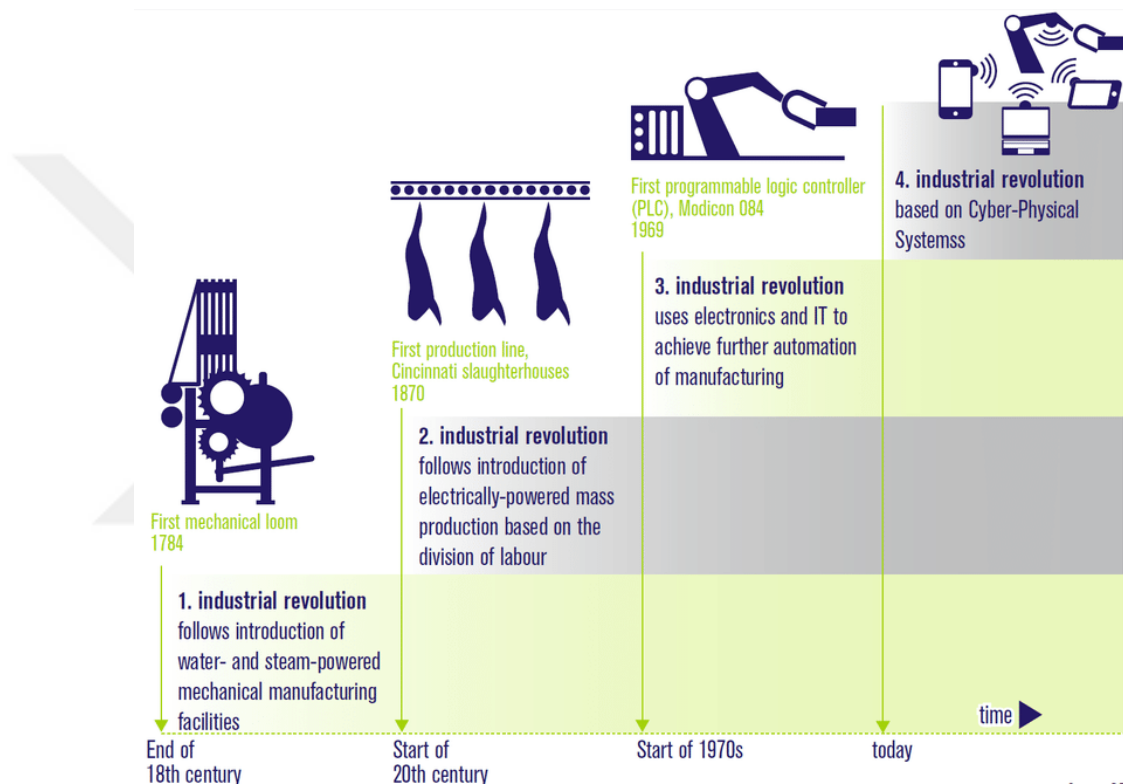


Figure 1. Industrial Revolutions (Source: Butter et al., 2014)

With the intense penetration of technology into our lives, artificial intelligence-based digitalization has been used in businesses for a long time in many business lines (education, automotive, marketing, e-comm, medical, agriculture, etc.). However, although it is not quite technology-centered, digital transformation has started to be used in human resources in recent years as well. (Coşkun and Gülleroğlu, 2021).

The importance of strengthening human resources information systems and using new technologies has increased as human resources gain a strategic role in enterprises. The use of artificial intelligence in recruiting and personnel selection will provide greater efficiency and quality for both companies and candidates. (Upadhyay and Khandelwal, 2018).

1.3. The key role of digitalization in human resources

The key role of human resources for businesses will significantly affect all operations of businesses. In this context, digital transformation should be supported and the human resources department should be prepared for it. (Abdeldayem and Aldulaimi, 2020)

Many companies that want to gain competitive advantage make technological investments in the human resources department. Digitizing HR processes reduces the workload by about 20 percent. In addition, in this way, companies reduce their operational burdens with the digitalization process. Most importantly, they save time and cost. (Machado and Davim, 2016).

The focus of this thesis is not that the human resource attraction, hiring, and retention process is completely human-independent, but the use of machine learning algorithms to assist the activities of human resources or recruitment teams. The process cannot be considered independently of experts.

The use of artificial intelligence in recruitment will significantly reduce the work of the human resources department. However, recruitment is not the only job of human resources. Therefore, it will be beneficial to benefit from artificial intelligence in other areas of human resources.

1.4. Research Aim and Question

The aim of the study: To determine the expectations of human resources professionals in Turkey from the digital transformation in the field of human resources and to fill the gaps in their different fields.

The research included the knowledge and experiences of human resources professionals working in companies operating in different regions of Turkey. In the Interviews with Human resources professionals, attention was paid to the fact that the participants were from different sectors. Artificial intelligence implementations in human resources examined in the study were also compared with implementations in different countries.

Digitalization, which is applied in all areas of our lives, is also used extensively in businesses. It was tried to determine how and what digital transformation, which provides ease of operation and time-saving, is used and what the expectations are in the human resources fields where the application has not been realized yet through the research question. With the determination of these expectations, it is aimed to fill the gaps in artificial intelligence implementations in other fields of human resources.

In this context, the research question, “*What are the expectations of HR professionals from Artificial Intelligence implementations in Human Resources Management?*”, has been determined.

CHAPTER 2: LITERATURE REVIEW

2.1. A Glance of Artificial Intelligence

Today, Artificial Intelligence, which is used in many fields, was discovered thousands of years ago. The earliest concepts of robots and self-moving objects appeared in works between 750 and 650 BC. (Mayor, 2020). Although machines and robotic concepts adorned legends in ancient times, their popularity continues to increase today.

Edmund C. Berkeley who is a computer scientist used the following statement in his book *Giant Brains or Machines That Think*: 'machines consist of complex structures similar to those of the brain. A machine can process information; can calculate, finalize and choose, can perform reasonable transactions with the information. That is, a machine can think '. (Berkeley, 1949)

So, a non-human system could be capable of receiving, interpreting, learning, and using data correctly. (Haenlein and Kaplan, 2019).

In the following years, Alan M. Turing mathematician and cryptologist who has considered the founder of computer science introduced the Turing test, which will form the framework of many artificial intelligence problems in computer science, in his *Computing Machinery and Intelligence* article. (Copeland, 2000)

Later, John McCarthy and Herbert Simon played a major role in the development of AI. They researched computer programs that mimic problem-solving like humans. (Frantz, 2003) Artificial intelligence studies, which gained momentum in the following years, moved beyond algorithms.

In our age, it is likely to divide artificial intelligence into sub-fields such as deep learning, (NLP) natural language processing, machine learning, neural networks, and computer vision, in terms of technology. Undoubtedly, machine learning plays a key role in all these sub-fields.

2.1.1. Machine Learning

In Artificial Intelligence techniques that focus on Machine Learning, it is possible to diagnose the problem pattern by optimizing various variables based on the known results of a problem, so that the processes of creating solutions to new situations that have not been encountered can be realized (Brink et al., 2016)

Although the most known technique of Machine Learning is Artificial Neural Networks, there are also different techniques such as Bayesian Learning, Decision Trees, and Q-Learning (Nabiyev, 2005). The performance of learning processes in Machine Learning varies in direct proportion to the consistency, accuracy, and integrity of the sample problem dataset. Typical Machine Learning is divided into three Supervised, Unsupervised, or Reinforcement Learning, depending on the condition of the target problem dataset (Atalay and Çelik, 2017).

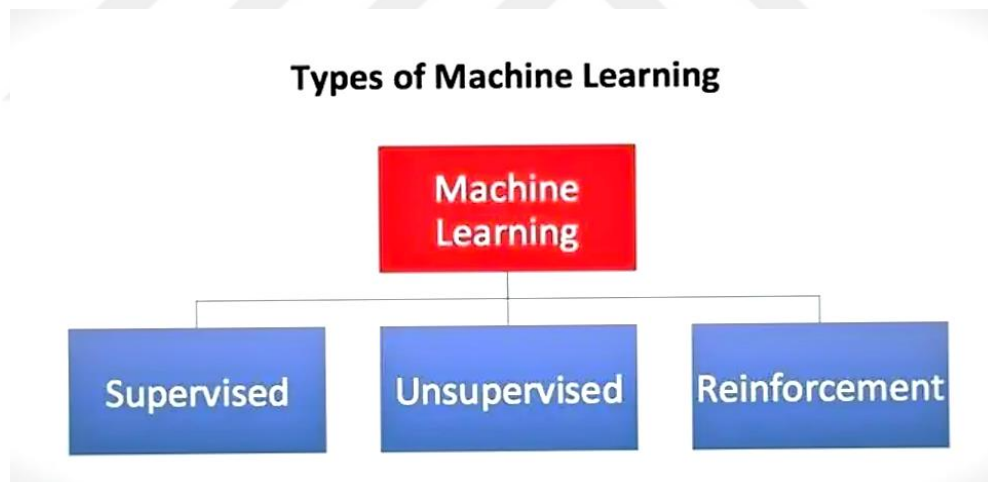


Figure 2. Types of Machine Learning (Source: Chinnamgari, 2019)

In supervised learning, a cluster is formed from the collected observations about the event to be learned. The desired output values are also given for each sample in this set. Using this information, a relationship is created between input and output.

In Unsupervised Learning, the result(s) are unknown.

Reinforcement Learning, on the other hand, is the directing of the learning process by giving rewards or punishments-warnings in the form of right-wrong, good-bad, to an action performed by the Machine Learning technique. (Nabiyev, 2005).

2.1.2. Deep Learning

Deep learning, which is a sub-branch of machine learning, is a machine learning approach that contains advanced types of artificial neural networks and thus copes with larger and more complex data clusters and produces effective solutions (Charniak, 2019, Goodfellow et al., 2017). Deep learning techniques have gained importance because of large and complex data in our age. These techniques are seen to give effective results in almost every field in the business world and their popularity continues to increase. (Minaee et al., 2021)

2.1.3. Swarm Intelligence

It is a self-coordinating subfield of Artificial Intelligence that does not need learning processes. It is based on the collective and swarm problem-solving of living things in nature (Karaboğa, 2014). Swarm intelligence algorithms are communities, in which swarms of living creatures in a common association such as real-life bee colonies, swarms of ants, and swarms of birds, solve problems with continuous optimization (Kobayashi and Simon, 2005). Since Machine Learning is a kind of optimization, hybrid uses of Swarm Intelligence algorithms and Machine Learning are also frequently seen in the literature (Mohammadi et al., 2015).

2.1.4. Cybernetic

Cybernetics, which has a long history, is also considered the science that tries to adapt the nervous system of living things to computer systems. He defined it as a field of study that deals with control and communication in living and non-living things (Buckley and Wiener, 2017).

Cybernetics, which is used in the development of computer systems, has contributed greatly to the formation and development of the robotic coding field. Cybernetics can be applied to systems with closed signal loops. The action generated in such closed signaling systems triggers changes in the system environment and this change also causes some kind of system change. That is, there is a closed loop where the action and reaction take place in the same system environment. It can employ the 'intelligent system' approach in the context of Artificial Intelligence, and in this respect, it can establish a close relationship with Robotics (Kline, 2015, Novikov, 2015).

2.1.5. Robotics

Robotics, as it is known, is an Artificial Intelligence sub-field that deals with the design and development of intelligent robot systems. Today, Robotics, which is divided into two types called hard-robotics and soft-robotics, can also produce solutions in connection with fields such as electronics, mechanical and materials engineering, and even biomedical and chemical engineering. Artificial Intelligence solutions in the infrastructure of robotic developments also receive support from different data processing solutions such as image processing and signal processing (Khokhar et al., 2015).

When the literature is reviewed, together with alternative classifications; For example, it is also possible to see sub-fields that blend classification with solutions, such as Natural Language Processing or Computer Vision (Forsyth and Ponce, 2011).

Artificial intelligence created Natural Language Processing (NLP), which is considered the discipline of image processing, speech recognition, speech-to-text, and text-to-speech conversion.

The first voice recognition began to be used in Apple smartphones. Apple's Siri is a very successful artificial intelligence in understanding and responding to words.

Later, Windows' Cortana was created as a rival to Amazon's Alexa and Apple's Siri.

These artificial intelligence applications, which provide convenience in many areas in the global world, have also attracted the attention of human resources management using big data, and artificial intelligence implementations have recently started to be used especially in the recruitment department.

2.2. Background of Human Resources

Although the concept of human resources management started to be used in the 20th century, the practices for the efficient and effective work of employees are much older.

Robert Owen, who had a factory producing textile products in the 1700s, said that the factory survived thanks to its employees. Owen argued that employees are very important to an organization. (Hatcher, 2013)

In the following years, thanks to Frederick Taylor's development of scientific management theory, a new perspective came to human resource management (Mouzelis, 2017). Approaches such as standardizing the jobs, placing the right staff in the right job, and training the employee were gained (Taylor, 2003).

Also, Elton Mayo's Hawthorne studies formed the foundations of modern human resource management. The main finding of these studies is that interpersonal relationships and the quality of these relationships are more effective in their productivity. (O'Connor, 1999)

In light of these concepts, more than one definition of human resource management can be reached in the literature. But almost all definitions imply the same meaning. According to one definition, HRM is to attract, retain and develop the workforce that the company will use to realize its purpose, vision, and mission (Schermerhorn Jr and Bachrach, 2020).

Another definition of HRM is an approach that aims to gain a talented and dedicated workforce that will provide a competitive advantage to the firm in the fierce business life (Storey, 2004). Generally, HRM practices include processes such as hiring, orienting, training-development, and performance evaluation of personnel with the required talent for vacancies in the organization (Wall and Wood, 2005). These practices, carried out by the human resources department of companies, focus on improving employee well-being and satisfaction.

So employees are the most important dynamics of organizations and they must be managed correctly for the sustainability of organizations (Bibi et al., 2016).

Generally, human resources management has 6 main functions and other functions are under these major functions.

Table 1. Major Functions of Human Resources Management



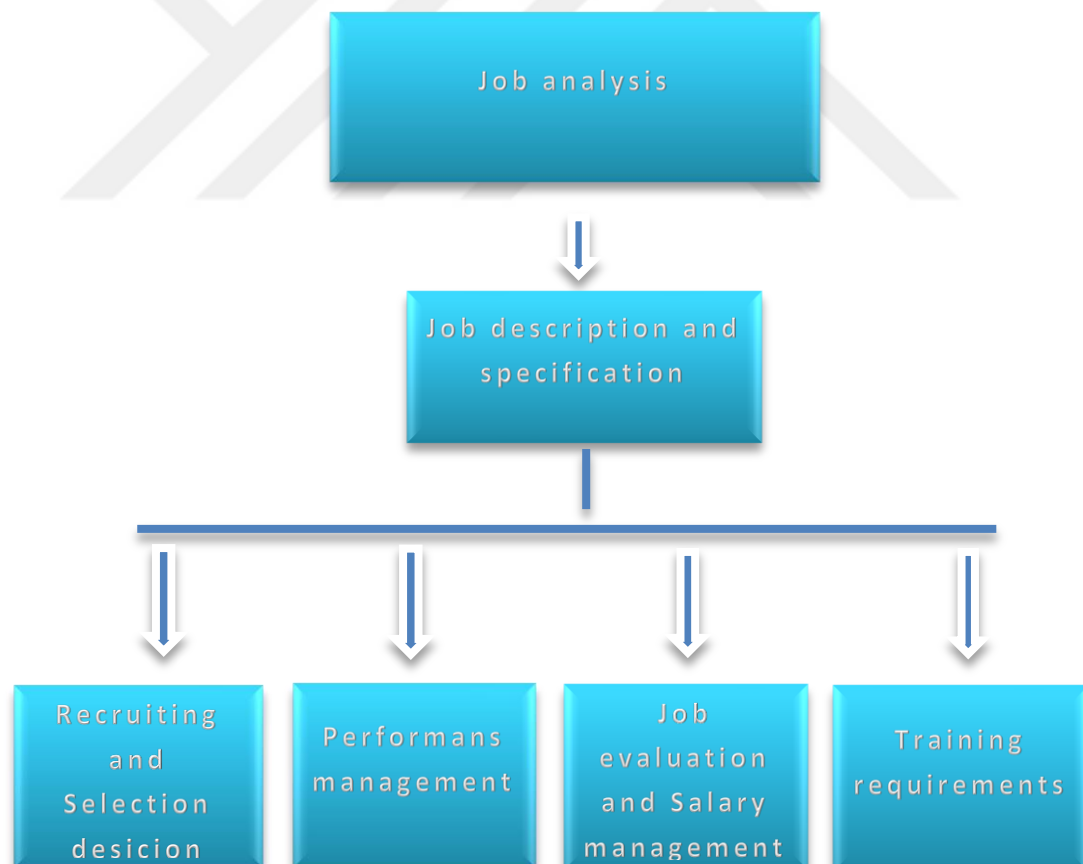
2.2.1. Job Analysis

Job analysis is to deal with a job in detail and to define the competencies that the employee of the job should have.

The business analyst systematically determines the definitions and requirements of the job. Correctly done job analysis makes it easy to implement some functions carried out in the human resources department (Wilson, 2014).

Strategically applied business analysis; It is used in important functions of human resources such as personnel selection and placement, training and development, performance evaluation, and salary determination (Schneider and Konz, 1989).

Table 2. The Benefits of Job Analysis.



2.2.2. Employee Recruitment & Selection

Organizations want to work with the most appropriate personnel to achieve their goals and objectives. It is an important process to select and recruit ideal candidates with the desired competencies from the candidate pool applying for vacancies in the enterprise. Selecting and hiring the desired personnel is also important for the sustainability of the company. (Ahmad and Schroeder, 2003).

The importance of human resources management has increased in the globalizing world. To ensure the sustainability of organizations, they need to choose well the most important resource, the employee (MAN). (Sabuncuoğlu, 2012)

The area where the essential data and information of all employees in the workplace is located in the human resources department. Thus, the HR department is a fundamental element, of any business regardless of the organization's size. It is in charge of finding, screening, recruiting, and training job applicants, as well as administering employee-benefit programs and evaluating the employees' performance. (Navarro, 2019)

2.2.3. Orientation Function

It is called the adaptation of newly hired employees to the working environment per the corporate culture. This training aims to make it easier for the new employee to be aware of the company rules, to adopt them, to get to know their colleagues with whom they will work and to adapt (Wanous and Reichers, 2000)

2.2.4. Employee Performance Evaluation

Performance evaluation is the systematic, fair, and regular evaluation of the employee according to his/her competencies in the business. The human resources department can regularly evaluate the performance several times a year, determine the competency and productivity of the employee and increase it with the necessary measures.

There are many methods of measuring employee performance, such as manager evaluation, self-assessment, subordinate evaluation, peer evaluation, and 360-degree feedback. (Hassanpour et al., 2021)

2.2.5. Employee Training & Development

To maintain their permanence, businesses need to increase their efficiency and productivity. This is ensured by the suitability of the competencies and qualifications of the employees for the job. (Laird et al., 2003)

Employee training and development is one of the most important functions of the human resources department. Training enables employees to maximize their competence and expertise. In the most general sense, education in companies is the process of gaining knowledge and skills for employees.

Effective training should meet the needs of the employees included in the training (Hassell-Corbiell, 2001).

2.2.6. Job Evaluation & Salary Management

Determining the salaries that employees will receive in a workplace is one of the vital issues of human resources.

It is of great importance both for themselves and for the business that the employees believe that they are treated fairly by the company management in terms of salaries.

Salary management is the determination of the salary levels that the employees of the company deserve according to the content or value of the work done. It is a field of human resources management that is created by taking into account individual merit and performance, and also considers company profitability. (Livy, 2020).

2.3. Literature of AI use in HRM

With the start of Industry 4.0, there have been developments in areas such as the IoT, machine learning, artificial intelligence, nano, and space technology, and intelligent production of objects in connection with each other has been realized. In almost every field where technology is applied, digitalization has made companies visible in the economic market. (Aksoy, 2017).

Artificial intelligence in the 21st century; has started to be used with increasing importance in almost every field such as computers, automotive, military,

education, health care, finance, marketing, security, economy. (Metaxiotis et al., 2003).

AI applications/studies in technology have increased tremendously in a way that is very difficult to follow. (Balazinski et al., 2002). Besides the application of AI in the aforementioned areas, It has started to be used even in many areas that are not very related to technology. One of them is the human resources department which has big data. (Oke, 2008)

In recent years, the use of technology in the HR field has become popular among large companies, especially in the recruitment process. (Anderson, 2013).

Now, the HR department is digitally revolutionizing, performing processes such as screening, onboarding, interviewing, and recruitment with artificial intelligence such as chatbots, robots, and virtual assistants (Amla and Malhotra, 2017).

The recruitment process for companies has always been difficult. It takes a lot of time to choose the right employee for the right job and get the maximum benefit from thousands of applications.

We can say that the process is risky considering that the only function of the human resources department is not recruiting and that the efficiency will be low in hasty elections.

Organizations turned to use online recruitment because finding potential job candidates through online recruitment is quicker, cheaper, and more efficient (Dhamija, 2012).

HR departments usually manually evaluate the received job applications, hence applicant ranking systems which can be created with the utilization of artificial intelligence can make the recruiter's evaluation task more efficient (Faliagka et al., 2012).

Organizations using AI in recruitment, enable recruiters to easily access a large pool of candidates, reduce the number of documents, find the talented candidate quickly, shorter interview times and more efficient recruitment activities (Dickson and Nusair, 2010)

Artificial intelligence implementations can improve administrative decisions in the human resources department of the companies and give it a more strategic function.

WE CAN LIST THE ROLE OF ARTIFICIAL INTELLIGENCE IN HUMAN RESOURCES AS FOLLOWS:

2.3.1. Orientation

Orientation training is a recruitment process designed to ensure that newly recruited personnel become competent personnel as soon as possible. (Klein and Weaver, 2000).

Starting a new job is typically exciting but stressful. New employees may feel disoriented. They may not fully understand the organization's corporate culture, rules and policies, current performance, or physical structure or they may not know basic information such as the names and positions of their colleagues, where the dining area is, and where they will get their office supplies.

Helping the new employee feel welcome and comfortable, taking direction, and being part of the team is a critical aspect of orientation and is among the most important elements of the first few days.

A well-structured orientation will ensure the employee's commitment to the organization, otherwise, it may disappoint the employee and look for an opportunity to escape from the first day. (Wallace, 2009)

2.3.2. Training and Development in the Workplace

Training employees at their workplaces, while increasing their competencies, prevent waste of time and enables them to work with high efficiency in a more modernized working environment.

AI tools; human resources customize its function and prepare special learning and training programs for each employee (Parsehyan, 2020)

2.3.3. Recruitment

Recruitment is an important stage of human resources and it is inevitable that if it is done successfully, it will increase the efficiency of the companies (Yawalkar, 2019).

Artificial intelligence used in this field provides benefits at almost every stage of the recruitment process, such as screening applications from the candidate pool, pre-interviewing the selected candidates, discovering new talents, tracking and returning to candidates (Hunkenschroer and Luetge, 2022).

Although the filtering method currently used in businesses is an effective choice, we can make face-to-face interviews with artificial intelligence robots thanks to the latest developments.

Especially in recent years, artificial intelligence implementations used in recruitment can filter the desired candidates from millions of data pools in seconds and obtain the best candidate in a very short time. AI keeps other candidates in the pool for potential recruitment and can return as needed.

2.3.4. MYA System

According to Fortune's 500 data, many large companies use a virtual recruitment assistant called MYA, which conducts face-to-face meetings since 2018.

MYA system is an AI-powered recruitment virtual assistant. It can find the candidate with the desired features in seconds from the data pool where there are thousands of candidates.

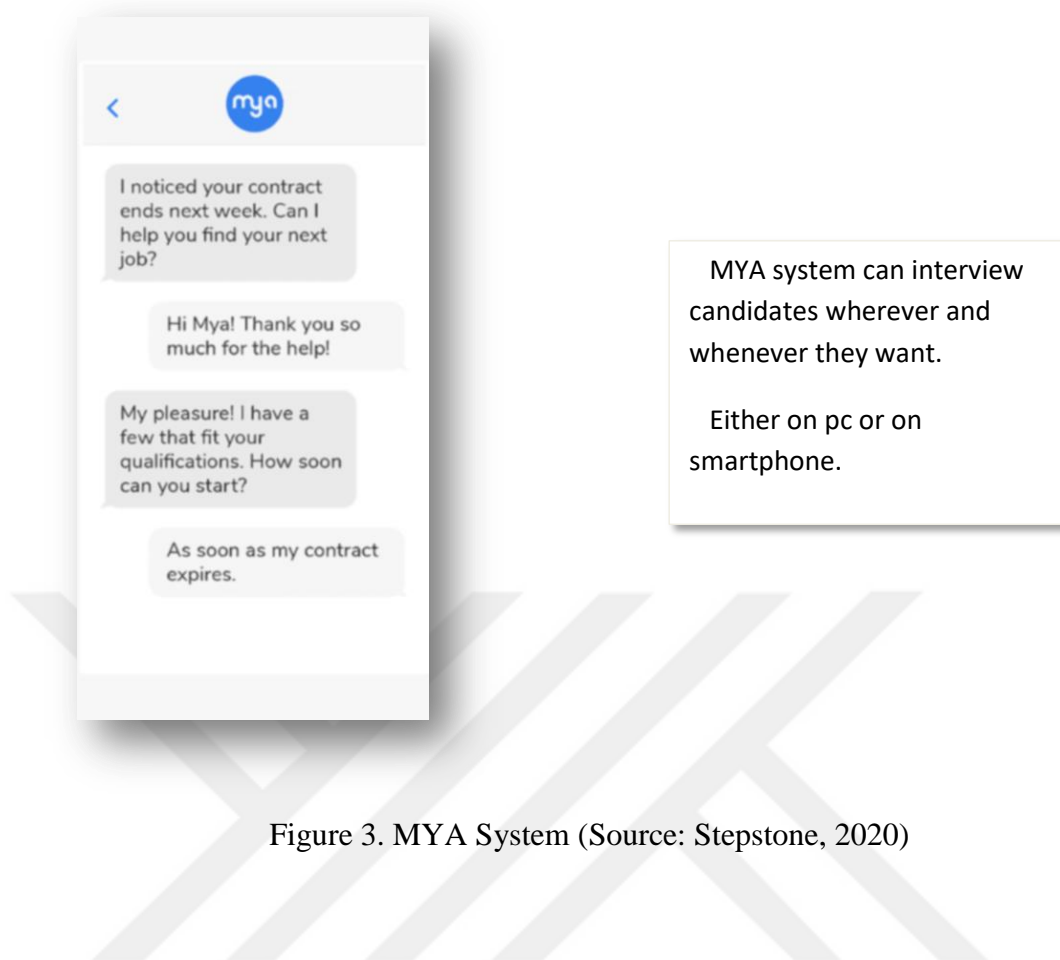


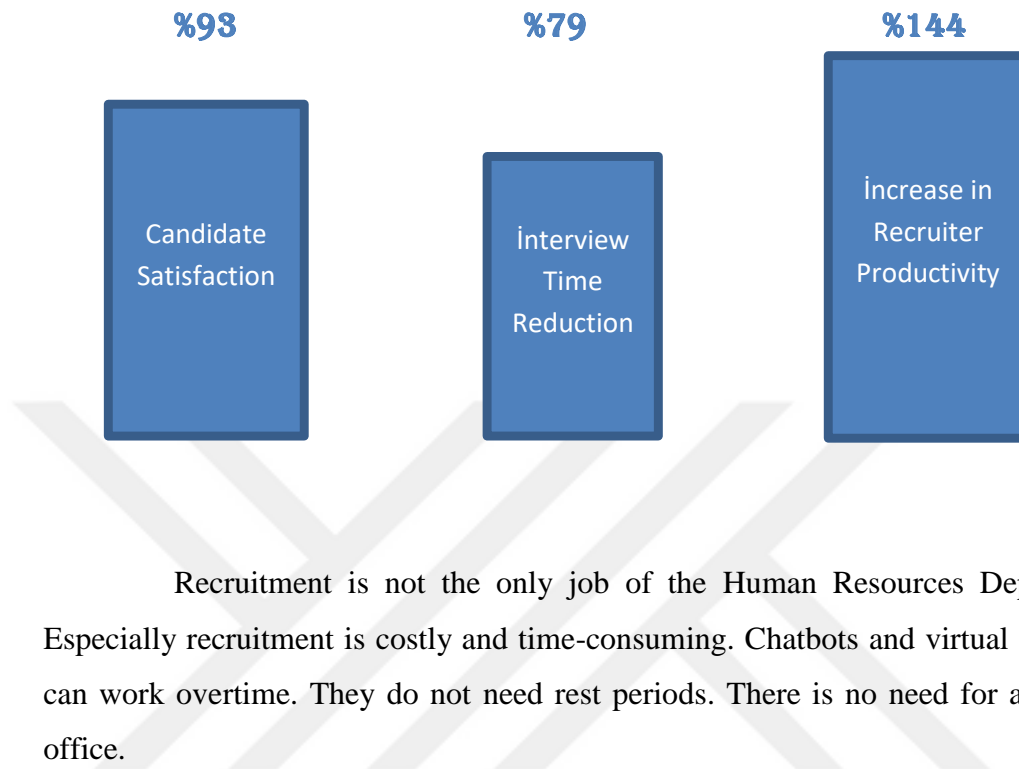
Figure 3. MYA System (Source: Stepstone, 2020)

It can conduct interviews in over 80 different languages. Mya can make interview candidates wherever and whenever they want. It directs selected candidates to Human Resources Department.

Another artificial intelligence-based virtual recruitment assistant is Vera. It can make hundreds of calls simultaneously, Interview candidates via calls or video chat. It can narrow down the selection to 10 percent most eligible candidates.

According to CB insights, the technology market intelligence platform that analyzes millions of data for companies, the results of using AI-based assistance in recruitment are as follows.

Table 3. The Results of Using AI-based Assistants in Recruitment. (Source: CB Insight, 2020)



Recruitment is not the only job of the Human Resources Department. Especially recruitment is costly and time-consuming. Chatbots and virtual assistants can work overtime. They do not need rest periods. There is no need for a separate office.

So, why not use Artificial Intelligence implementations in other activities of Human Resources?

For instance, It is known that businesses that use creative training and development practices perform better. Training and development make an organization strong in fighting competition.

Using artificial intelligence, an education system can be created and training needs in the organization can be analyzed.

Instead of offering the same content to all learners, AI-based Education System can create an education model for each learner in proportion to their individual goals, preferences, and knowledge. (Noe et al., 2018)

It can evaluate the training given and determine whether it should be repeated or different pieces of training should be taken.

Also, starting a new job is typically exciting but stressful. New employees may feel disoriented. They may not fully understand the organization's corporate culture, rules and policies, current performance, or physical structure or they may not know basic information such as the names and positions of their colleagues, where the dining area is, and where they will get their office supplies.

Helping the new employee feel welcome and comfortable, taking direction, and being part of the team is a critical aspect of orientation and is among the most important elements of the first few days.

A well-structured orientation will ensure the employee's commitment to the organization, otherwise, it may disappoint the employee and look for an opportunity to escape from the first day. (Wallace, 2009)

Time-consuming orientation activities can be done easily thanks to an artificial intelligence-based chatbot applied to the smartphone. This is a very easy operation, but the results are very efficient.

In addition, one of the human resources functions that are important for businesses and takes a lot of time to implement is payroll. Even in corporate companies, serious problems can be encountered in the payroll system.

In order not to encounter these problems, it requires human resources employees to be constantly alert and follow the processes very strictly. Businesses want to use digital-supported, fast, and accurate payroll applications soon.

To make an efficient payroll, with the help of artificial intelligence-based automation and metrics, especially payroll processing is turning from an administrative activity to strategic decision-making for modern organizations. (Kugasia, 2021)

Considering the advantages of artificial intelligence in human resources management, It will be a great advantage for human resources to use artificial intelligence applications in not only a few fields but also all other fields.

CHAPTER 3: RESEARCH METHODOLOGY

3.1. Research Philosophy & Research Approach

The grounded theory, which was first brought up by Strauss and Glaser, is to reach the theory by collecting data about the investigated phenomenon. The theory emerged as a result of the combination of the positivist approach represented by Barney Glaser and the interpretative tradition of Anselm Strauss.

Interpretivism is a qualitative methodology and uses, in particular, the interviewing method to measure certain phenomena (Saunders et al., 2019) The quantitative perspectives of Glaser and the near-qualitative perspectives of Strauss have been the determinants of the method on the way to theory formation. (Charmaz, 2006)

While Glaser argues that the theory is hidden in the data, according to Strauss, the theory needs to be interpreted by an observer. In addition, in response to Glaser's view that the researcher should be passive during the investigation, Strauss states that the researcher should be active (Jones and Alony, 2011).

The purpose of the theory is based on the logic of induction; to analyze the data, to code, to categorize in the light of the information obtained, and to provide theoretical saturation and sensitivity by making continuous comparisons systematically. (Strauss and Corbin, 1997).

3.1.1. Data Collection and Analysing

The first stage of data collection begins with discovering where to gather rich data. The way to build a strong grounded theory is to collect rich data. Well-detailed rich data gives important information for a vigorous analysis (Charmaz, 2006). Data collection in grounded theory; It can be done in different ways such as note-taking, interviewing, and recording. Where, how, and when to collect data about the selected phenomenon and how to make sense of them are other important points in data collection. (Thonberg and Charmaz, 2014).

The process of data collection and analysis, which is studied decisively and systematically, allows the researcher to realize all the perspectives related to the field or subject he is investigating (Corbin and Strauss, 1990)

3.1.2. Coding

Coding; It is a process in which we define categories and classify them according to their similarities and differences. Different views on the data obtained as a result of the interviews with the participants are carried out in the form of coding a word or a paragraph. (Belgrave and Seide, 2019)

Since the purpose of grounded theory is to create a specific theory by acquiring new concepts and categories through data, coding is crucial for the creation of categories and concept construction. (Glaser, 2007)

3.1.3. Theoretical Saturation

In grounded theory, the process of collecting and analyzing data continues until theoretical saturation is reached. This means that the researcher ends the research if the researcher is unable to identify a new category and a new sample.

Otherwise, category creation and coding will continue. When the researcher sees cannot add new data and improve the properties of the categories, the study has reached theoretical saturation. (Aldiabat and Le Navenec, 2018).

Reaching saturation, as many researchers confuse, is not to constantly witness the same events, it is to see that nothing new is happening. Data collection is terminated when the categories reach saturation. (Charmaz, 2006)

3.1.4. Theoretical Sensitivity

Theoretical sensitivity is the ability of the researcher to distinguish whether the data obtained is relevant to the research who is working on. The researcher can improve their skills, thanks to the knowledge and experience, who has gained from his previous studies. Shortly, theoretical sensitivity is the researcher's ability to comprehend and how make sense of the data. (Corbin and Staruss 1990).

3.2. Research Design

Grounded theory was used in this study. It is a qualitative method in which data collection and analysis are carried out simultaneously.

This research, it is aimed to understand how organizations benefit from the developing technology in conducting their human resources processes and their expectations.

Since artificial intelligence implementations are not yet used in all modules of human resources, a sample with a wide network of members was chosen to collect more reliable data and understand expectations. Additionally, the interview method is considered an appropriate approach to collecting data (Carson et al., 2001).

The interview, consisting of semi-structured questions, was conducted with the Human Resources Management Association, which consists of corporate and individual members in the field of human resources and has branches in 7 regions of Turkey. Interviews were conducted face-to-face, by phone, and online system. The identity of each participant was kept confidential and pseudonyms were used.

The data used in this study had been created by collecting primary data and secondary data. Primary data were collected from the researcher's studies and interviewed some professionals in the HR field. Also, secondary data were gathered from published papers, research materials, HR websites, online research blogs, and professional books.

In this study, 11 participants from 6 different industrial cities in Turkey were interviewed. The interview details of the participants are given in the table below.

Table 4. The Interview Details of The Participants

	TITLE	DURATION	LOCATION	MODE OF INTERVIEW	A G E
1st Interviewee A	Hr Director	25 min.	Manisa	phone	54
2 nd Interviewee B	Hr Assistant Manager	40 min.	İzmir	Face to face	29
3 rd Interviewee C	Hr Assistant Manager	45 min.	İzmir	Face to face	26
4 th Interviewee D	Hr Manager	20 min.	Bursa	phone	59
5 th Interviewee E	Hr Consultant	30 min.	İstanbul	Face to face	51
6 th Interviewee F	Hr Director	33 min.	İstanbul	Online	32
7 th Interviewee G	Hr Consultant	30 min.	Bursa	Face to face	41

Table 4. (continued) The Interview Details of The Participants

8 th Interviewee H	Hr Assistant	25 min.	Gaziantep	Phone	28
9 th Interviewee I	Hr Director	40 min.	İzmir	Face to face	38
10 th Interviewee K	Hr Specialist	30 min.	Kocaeli	Online	43
11 th Interviewee L	Hr Spesialist	25 min.	İstanbul	Online	44

Table 5. Summary Data of Interview Participants

# of HR Workers	11 participants
Cities from Turkey	6 different cities of Turkey (Izmir, Istanbul, Manisa, Bursa, Gaziantep, Kocaeli)
The average age	40 years old Max. 59 – Min. 26
Business Title	4 managers, 3 directories, 2 consultants, 2 specialists
Gender	6 men 5 women

CHAPTER 4: FINDINGS

4.1. Findings on Participants

In this study, participants who are suitable for the research, who have a good command of the subject, and who know were specially selected. For the collected data to be more effective, a large sample was selected in Turkey and 11 participants working in different sectors and having different demographic information were interviewed from this sample.

The interviews were conducted by telephone, zoom, or face-to-face with experts from 6 different cities, namely Izmir, Istanbul, Manisa, Bursa, Kocaeli, and Gaziantep. 5 women, 6 men, 4 managers, 3 directories, 2 consultants, 2 specialists, a total of 11 people in the age range of maximum 59 and minimum 26 years. The interview could not be recorded because the participants did not give permission, but notes were taken.

A face-to-face meeting was provided with the participants for whom the opportunities were available, but the participants for whom the face-to-face meeting was not suitable were interviewed via phone or zoom due to both the pandemic process and the distance. In the interview, participants were asked semi-structured questions and their answers were recorded by handwriting.

Interview data could not be recorded in any digital area because the participants did not allow recording to any digital media.

Semi-structured questions were asked for the participants to add their international knowledge and experience, and suitable environments and conditions were created for them to easily convey their knowledge.

Among the interviewees interviewed by the researcher, the international experiences of especially 3 participants were taken advantage of.

Since it is difficult for some of the participants to come together in the same physical environment as the interviewer, the meeting was held with the zoom application in the electronic environment.

Electronic meetings have always been advantageous in situations where the parties can't come together physically. (Bampton and Cowton, 2002)

4.2. Findings on Research Variables

In line with the information obtained from the interviews conducted in this research, 5 categories and 17 codes were created. Synonymous expressions were gathered under the same code. 11 participants repeated the codes 28 times. The five categories, codes, and repetition values are given below.



Table 6. Codes/Theme&Category

CODES	THEME	CATEGORY	REPETITION
<ul style="list-style-type: none"> *Good feedback from candidates *Interview time reduction *Increase in recruiter productivity 	Effective HR Activations	Satisfaction	6
<ul style="list-style-type: none"> *To make payroll *Reducing budget, cost, and administrative burden *To make suggestion systems *To make a satisfaction survey *Centralization 	Administrative Activations	Expectations	8
<ul style="list-style-type: none"> *Employee selection *Employee training *Employee orientation 	Human Resources Effectiveness	Areas Where AI is Used	3
<ul style="list-style-type: none"> *There may be a vulnerability *Devoid of human emotions 	Negative Opinions	Biases	6
<ul style="list-style-type: none"> *It's too early for our country *No suitable infrastructure *No available employees *Limited technology 	Negative Approaches /Thoughts	Obstacles	5

-Satisfaction;

The word "satisfaction" was repeated 6 times by the participants who applied artificial intelligence in human resources management in their companies. According to the statements of the participants, 3 different codes were determined in the "satisfaction" category.

***Good feedback from candidates**

***Interview time reduction**

***Increase in recruiter productivity**

Recruitment, which is of great importance for companies, is a very difficult and time-consuming process. In this difficult process, both the applicant candidates and the recruiter are asked to be happy. Recruiting the candidate or keeping in touch and returning to the candidate for other vacancies will increase this satisfaction.

“The candidates feel less stress thanks to the pre-recruitment interview with a virtual bot. In this way, the candidates can express themselves more easily. Also, the fact that the candidate can interview at any place and time with the virtual bot creates satisfaction.” (Interviewee E)

“Time is too valuable to be wasted, every business wants to use its time efficiently, the use of artificial intelligence-based technology in time-consuming activities such as recruitment will reduce interview times. This will increase satisfaction.” (Interviewee L)

-Expectations;

The expectations category was repeated the most in the use of artificial intelligence implementations in human resources management. 5 codes have been determined in this category. Expectations for facilitating administrative work in companies are high, and since the human resources department is an area that concerns all departments of a company, it is expected to benefit from administrative activations.

***To make payroll**

*** Reducing budget, cost, and administrative burden**

***To make suggestion systems**

***To make a satisfaction survey**

***Centralization**

Centralized human resources mean that HR professionals oversee the functions of all employees from one main office. Hiring and firing processes, training and orientation, compensation and benefits, and general motivational strategies are among the areas guided by experts in a central HR office. Centralization of HR is the management of all these processes by experts in a single center rather than leaving the management to local business unit leaders. (Palm, 2019).

“Even if HR activities are performed in local units, it is not as successful as in the main unit. Collecting data in a single center and making implementations from a single center is more advantageous in terms of providing control. Although it is advantageous to act from a single center, it is a very time-consuming and exhausting activity.

In this respect, centralization of human resources with artificial intelligence will provide a great advantage.”
(Interviewee K)

In the interviews with the participants in the research, the importance of payroll was specially mentioned and it is expected to create payroll, which is more reliable, more detailed, and integrated with the other units. Payroll is a valuable document showing the salary to be paid to the employee and the legal and special deductions to be made over this salary, taking into account the working hours of the employee in a workplace.

The data to be used in the payroll should be checked by the human resources employee one by one. Incorrect entries should be corrected, and retrospective comparisons should be made when necessary.

The following is an excerpt from the interview with interviewee C on this subject.

“Payroll process is extremely important in companies. Employees want to receive their rights regularly and fully. Employees want their working hours, and deductions, if any, overtime to be displayed on the payroll.

This is a detailed and tiring process, but doing all these processes with artificial intelligence-based implementations will certainly speed up and facilitate the work.” (Interviewee C)

According to interviewer G, the expectation of satisfaction surveys and suggestion systems to be on a digital platform,

“Satisfaction surveys and suggestion systems are necessary to adopt the corporate culture and to create employee loyalty. Executing these processes in a digital platform will save time for the human resources department.” (Interviewee G)

- Areas where AI is used;

In recent years, artificial intelligence implementations have been used in the field of human resources the world. Although it is not very common, it has also started to be used in some companies in Turkey.

In the interviews held with human resources professionals for this study, they stated that they used artificial intelligence implementations in some fields of HR and that they benefited greatly from these implementations.

*** Employee selection**

*** Employee training**

*** Employee orientation**

For instance, in the interview, interviewee L said that they have been using digital recruiting assistant at their company for about a year:

“Previously, human resources personnel were recruiting by meeting with candidates in several stages. First, many candidates who applied for the vacant position were manually eliminated and reduced to a certain number, then each candidate was interviewed one by one, the necessary notes were taken and the interview was arranged again for the final decision. This was quite a time-consuming and tiring activity.

In addition, it was very difficult for hundreds of candidates to apply for the vacant position, in which only one person would be taken, and to choose the fully competent and right person among these candidates.

We started using the digital recruiting assistant in our recruiting unit about a year ago, and our business speed has increased by two-thirds. Among hundreds of candidates, those with the appropriate criteria were quickly and accurately eliminated, an appointment for an interview with suitable candidates was quickly arranged, and a small number of candidates with the most sought-after qualifications were sent to the final interviewer.

Thus, we have completed a very time-consuming human resources function such as recruitment in a very short time. As both the applicants and the HR department, we were satisfied.”

(Interviewee L)

Starting a new job is typically exciting but stressful. New employees may feel disoriented. They may not fully understand the organization's corporate culture, rules and policies, current performance, or physical structure or they may not know basic information such as the names and positions of their colleagues, where the dining area is, and where they will get their office supplies.

Helping the new employee feel welcome and comfortable, taking direction, and being part of the team is a critical aspect of orientation and is among the most important elements of the first few days.

A well-structured orientation will ensure the employee's commitment to the organization, otherwise, it may disappoint the employee and look for an opportunity to escape from the first day.

According to *Interviewee E*, who consults companies in the field of human resources; *“The use of artificial intelligence in the recruitment of candidates and the orientation of the hired personnel has become widespread.”*

Personnel training is one of the most important functions for businesses after employee selection and orientation.

Training enables employees to maximize their competencies and expertise. Education makes employees gain knowledge and skills. However, training organization is not an easy process either. It is necessary to analyze training needs, determine general and special training, organize internal or external training, feedback, and continuously control.

“Training can be organized quickly and effectively in an artificial intelligence-based digital environment, and it is much easier to measure and evaluate after training.”

(Interviewee F)

-Biases;

Although artificial intelligence implementations are used in the field of human resources and those who use them are satisfied, some professionals think that there are biases and obstacles regarding the use of artificial intelligence implementations in human resources in the interviews with some human resources professionals.

The experts have biases about these two issues in particular:

*** There may be a vulnerability**

*** Devoid of human emotions**

According to *Interviewee D*, the recruitment interviewer should not be a virtual assistant with artificial intelligence technology, but an alive person who can perceive human emotions and act accordingly.

“Human is a being with feelings. Therefore, when we hire an employee, we first try to understand his feelings and advance the interview in that way. How can a being without feelings understand a human?”(Interviewee D)

“Our job is about humans, even if the priority is competencies in personnel selection, we also measure their emotional intelligence, which we call EQ, when they encounter extraordinary situations at work, we want them to control their emotions, manage their stress, stay calm, etc. The virtual recruitment assistant cannot understand this.”(Interviewee A)

In addition to the thought that the applicant's human feelings are ignored during the interview, some interviewed human resources professionals also believe that there will be a vulnerability.

“Artificial intelligence-based human resources functions can gain an advantage over competitors, but the use of personal data in the digital environment can create a very serious vulnerability.” (Interviewee I)

- Obstacles;

In the interviews held for this study, a substantial number of participants said that even if they believe that artificial intelligence implementations will benefit, there will be many obstacles to it. Among the 11 people who participated in the interview, 5 people stated that there may be the following obstacles.

- * **It's too early for our country**
- * **No suitable infrastructure**
- * **No available employees**
- * **Limited technology**

“In our country, even though businesses have switched to the digital platform, most fields of the human resources department are still used manually. Even in most large companies, there is no suitable infrastructure for artificial intelligence implementations that can be used in human resources.” (Interviewee B)

“For the artificial intelligence implementations to be used efficiently, there must be an appropriate technology infrastructure and employees with the necessary competence to use it easily.”(Interviewee H)



CHAPTER 5: DISCUSSION

In Turkey, some results were obtained in this research on the use of artificial intelligence implementations in the field of human resources management and detailed interviews with human resources professionals from different sectors.

In the one-on-one interviews with 11 human resources professionals, especially 3 categories are emphasized more than the others. These categories are; expectations, satisfaction, and biases. Of these three categories, the "*expectations*" category is the most repeated among participants. "Payroll" and "centralization" stand out among the codes created while interviewed participants were talking about expectations. Human resources professionals in Turkey have emphasized the importance of seamless payroll and expect it to be done in the fastest and most accurate way in the digital environment.

Throughout the literature review, the expectations of artificial intelligence-supported payroll applications are soon mentioned in some countries that use artificial intelligence in the human resources department. Payroll is a human resources function that must be done meticulously without making mistakes in terms of employee rights. Transferring the payroll to the digital environment to provide much fewer errors and ease of control is among the primary expectations of human resources employees.

Another stand-out coding in the expectations category, apart from payroll, is centralization. In this regard, the majority of human resources professionals agree on the artificial intelligence-based centralization of all modules of human resource management. Among the interviewed experts, there are also a small number of HR professionals who disagree with the centralization of HR in the digital environment, although they are moderate.

Another frequently mentioned category in the interview with the HR professionals of businesses that use artificial intelligence implementations in their human resources departments is "*satisfaction*".

Professionals think that both the applicants and the HR specialist who made the interview are mutually satisfied thanks to the use of artificial intelligence implementations in the selection and recruitment processes.

While it reduces the stress of applicants to make the first interview with a virtual bot or virtual assistant, on the other hand, it creates satisfaction that the interviewing HR specialist meets with the appropriate number of candidates with the desired characteristics after the preliminary interview.

When we look at the international market, in America and Europe, the results of using artificial intelligence-based help in recruitment are quite satisfactory. According to CB Insights, a technology market intelligence platform that analyzes millions of data for companies; It was concluded that Candidate Satisfaction was 98%, Interview Time Reduction was 79%, and an increase in Recruiter Productivity was 144%.

In America and some European countries that use artificial intelligence implementations in recruitment, they conduct the first interview with candidates with an artificial intelligence virtual assistant called MYA. According to my research, virtual assistants are not yet used in Turkey, but digital applications and chatbots that filter the desired criteria, send messages, manage questions or respond are used.

It has been concluded that artificial intelligence implementations are satisfactory in both ways, whether a virtual assistant or chatbot is used in recruitment.

In addition, In this research, "*biases*" were another highly emphasized category. Some interviewees mentioned that they had some reservations about the use of artificial intelligence implementations in human resources. They advocate that there may be a vulnerability and that chatbots or virtual assistants are devoid of human emotion.

During my interviews with human resources professionals; while interviewee D advocates the idea that "an artificial intelligence devoid of human emotions cannot understand a person and the interview will not be efficient", also interviewee A says, "besides measuring the educational background of all applicants, we also have to measure their EQ, and a virtual recruitment assistant will never do this."

In the interviews I had with human resources professionals, I determined that the categories of "*obstacles*" and "*areas where AI is used*" were less repeated compared to the categories of expectations, satisfaction, and prejudices.

Some HR managers interviewed stated that there are obstacles such as the appropriate technological infrastructure is not yet sufficient and the personnel to be employed are not ready for the efficient use of artificial intelligence in human resources management. Furthermore, they defended the idea that these obstacles would not disappear immediately soon.

However, the results of my research showed that; Artificial intelligence implementations have been used in the fields of employee selection, employee training, and employee orientation for a while.

As a result, although some artificial intelligence implementation modules are used in the human resources department, they are not yet used in other HR areas. Although there are satisfaction and expectations in the HR fields used, there are also experts who think that there are biases and obstacles. In this context, it is seen that there are gaps in the use of artificial intelligence in human resources management and it is thought that these gaps will be closed with advancing technology and the training of competent employees.

CHAPTER 6: CONCLUSION

In this study, the use of artificial intelligence implementations in human resources management has been examined. The study was conducted with the members of the human resources association, which has branches in 7 regions in Turkey, using the interview method. Detailed interviews were held with human resources professionals from different sectors and different regions by communicating face-to-face, online, or by phone.

As the research method, the qualitative method was used, and grounded was chosen as the research design. In this way, interviews with professionals were conducted with semi-structured questions. Human resources professionals working in different sectors were asked questions about the use of artificial intelligence implementations in the human resources department, and especially their expectations were determined. In the national and international literature review, I conducted on the subject, it was found that although artificial intelligence implementations have been used in different sectors much earlier, their use in the field of human resources is very new.

The use of artificial intelligence implementations in the field of human resources in America, some European countries and Russia has started earlier than in Turkey and has stood out by using virtual assistants, especially in recruitment. While the MYA system is used as a virtual assistant in America and some countries in Europe, a virtual assistant called VERA is used in Russia.

In Turkey, virtual recruitment assistants are not used yet, digital applications and chatbots are used. However, artificial intelligence-based recruitment assistant application is among the expectations.

Although it has been determined that artificial intelligence implementations are used more intensively in recruitment, it has been determined that it is also applied in other functions of human resources such as training and orientation.

However, professionals also have expectations in other functions of human resources such as payroll, centralization, recommendation systems, and satisfaction surveys.

CHAPTER 7: LIMITATIONS

Although this study creates new ideas about the use of artificial intelligence implementations in the field of human resources, there are some limitations.

Firstly, although the selected sample is large, the number of professionals who accept the one-on-one interview is less, furthermore, these interviewees did not allow digital recording during the interview.

In addition, since the use of artificial intelligence implementations in the field of human resources is a very new study both in the world and in Turkey, there have been difficulties in finding sufficient resources. In the literature review, there were not many bibliographies on the subject.



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