



INSTITUTO
UNIVERSITÁRIO
DE LISBOA

The Application of Artificial Intelligence in Recruitment

Cao Qianyu

MSc in Business Administration

Advisor:

PhD, Leandro Luís Ferreira Pereira, Associate Professor
with Habilitation

ISCTE-IUL

May 2024

Marketing, Operations and General Management Department

The Application of Artificial Intelligence in Recruitment

Cao Qianyu

MSc in Business Administration

Advisor:

PhD, Leandro Luís Ferreira Pereira, Associate Professor with
Habilitation

ISCTE-IUL

May 2024

Dedication and acknowledgements

The completion of this thesis is attributed to the unwavering guidance of Dr. Leandro Ferreira Pereira. From shaping my academic trajectory upon entering university to the meticulous research, writing, and refinement of this scholarly thesis, every phase has been profoundly influenced by the expertise and support of my mentor. Dr. Leandro Ferreira Pereira's profound knowledge, expansive scholarly vision, rigorous academic approach, selfless dedication, and diligent work ethic have consistently set a high standard for my scholarly pursuits. I am deeply grateful for the invaluable teachings and unwavering encouragement provided throughout the journey of this thesis.

As this scholarly odyssey reaches its culmination, I extend my heartfelt gratitude to my fellow researchers and educators. Your presence in my academic life has been a wellspring of inspiration and support. I am profoundly thankful for the guidance, understanding, and patience extended to me, especially during challenging academic junctures. Our collective convergence from diverse corners of the world to this esteemed academic institution is not mere coincidence; it signifies a scholarly destiny that I profoundly acknowledge.

In the forthcoming chapters of my academic career, I pledge to redouble my efforts. Through my scholarly contributions, I aim to reciprocate the immense knowledge and guidance received from the academic community, my institution, esteemed mentors, and fellow researchers.

Resumo

Nas práticas atuais de gestão de recursos humanos, a tecnologia de IA evoluiu de uma simples triagem automatizada de currículos para uma avaliação complexa de candidatos, entrevistas e correspondência de talentos. Este avanço tecnológico não só melhora significativamente a eficiência do recrutamento e reduz os custos laborais, mas também melhora a qualidade e a justiça do recrutamento. No entanto, à medida que a aplicação da tecnologia de IA no recrutamento se torna cada vez mais difundida, o seu impacto específico na eficiência e na melhoria da qualidade do processo de recrutamento e na forma de maximizar os benefícios destas tecnologias tornaram-se importantes tópicos de investigação. Através de uma revisão da literatura relevante e da interpretação dos resultados da análise de regressão linear, este artigo visa explorar o estado atual da aplicação da tecnologia de IA no recrutamento, os desafios enfrentados e estratégias e sugestões para melhorar os efeitos da aplicação. Através de uma análise aprofundada, este estudo propõe uma série de estratégias para aumentar a maturidade tecnológica e a integração de sistemas, melhorar as práticas de gestão de dados, cultivar uma cultura de adaptabilidade e aprendizagem contínua, desenvolver programas abrangentes de treinamento e suporte e implementar monitoramento e avaliação de longo prazo., para maximizar o efeito da aplicação da inteligência artificial no recrutamento. A implementação destas estratégias pode não só otimizar o processo de recrutamento e melhorar a eficiência e qualidade do recrutamento, mas também promover a adaptação e aplicação de tecnologias emergentes pela organização, ganhando assim uma vantagem no mercado de talento altamente competitivo.

Palavras-chave: inteligência artificial; recrutamento; maturidade tecnológica; integração de sistemas; aceitação do usuário

Classificação JEL: M10, M12, M15

Abstract

In the current human resource management practice, AI has been increasingly valued. AI technology has evolved from simple automated resume screening to complex candidate evaluation, interviews, and talent matching. This technological progress not only greatly improves the efficiency of recruitment, and reduces labor costs, but also improves the quality and fairness of recruitment. With the increasing application of AI technology in recruitment, its specific impact and quality improvement process and how to maximize the benefits of these technologies have become important research topics. Through the review of relevant literature and the interpretation of linear regression analysis results, AI is the focus of this article, the challenges faced, and the strategies and suggestions to improve the application effect. Through in-depth analysis, this study presents a series of strategies aimed at improving technology maturity and system integration, improving data management practices, cultivating the culture of adaptation and continuous learning, developing comprehensive training and support programs, and implementing long-term monitoring and evaluation strategies, in order to maximize the application effect of artificial intelligence in recruitment. The implementation of these strategies can not only optimize the recruitment process and improve the efficiency and quality of recruitment but also promote the adaptation and application of emerging technologies by organizations to gain advantages in the competitive talent market.

Keywords: Artificial intelligence; recruitment; technology maturity; system integration; user acceptance

JEL Codes: M10, M12, M15

Table of contents

Resumo	i
Abstract	iii
Table of contents	v
1. Introduction.....	1
1.1 Research background.....	1
1.2 Research questions.....	2
1.3 Study Purpose and Significance.....	3
1.4 An Overview of the Study Methods	5
1.5 Paper Structure:.....	6
2. Literature Review.....	9
2.1 Artificial intelligence and pre-training model.....	9
2.2 Current situation and challenges of recruitment	12
2.3 Demand and prospects of artificial intelligence in recruitment	14
2.3.1 Application of intelligent technology in recruitment.....	14
2.3.2 Advantages and disadvantages of Artificial Intelligence in recruitment	15
2.4 Related theories and models	15
2.4.1 Decision theory	15
2.4.2 Optimization theory	17
2.4.3 Other related theories.....	18
3. Theoretical framework and hypothesis.....	19
3.1 Theoretical basis of the study: Multiple regression model	19
3.2 Variable selection and research model construction	20
3.3 Study hypothesis	21
4. Methodology.....	23
4.1 Study Design.....	23
4.2 Data collection	24
4.2.1 Data Sources and Types	24
4.2.2 Reliability and validity analysis.....	25
4.3 Data analysis method	27
4.4 Research ethics and Reliability.....	28
5. Data analysis and discussion.....	31

5.1	Descriptive analysis	31
5.2	Correlation analysis	33
5.3	Multiple regression results	34
5.3.1	Regression results of recruitment process efficiency.....	34
5.3.2	Regression results of the improvement of recruitment quality	36
5.4	Verify the study hypothesis.....	38
6.	Conclusion and outlook	41
6.1	Main conclusions	41
6.2	Theoretical and practical contributions.....	42
6.3	Research limitations and future directions.....	42
6.3.1	Study Limitations.....	42
6.3.2	Future Research Direction	43
6.4	Recommendations for future practice	43
6.4.1	Improve the maturity and integration of artificial intelligence technology	43
6.4.2	Improve data management practices.....	44
6.4.3	Cultivate a culture of adaptation and continuous learning.....	45
6.4.4	Develop a comprehensive training and support program	46
6.4.5	Strategic planning of using AI technology in recruitment	47
6.4.6	Long-term monitoring and evaluation	49
	Bibliographical references	51

Table of contents and figures

Table 3- 1	Study hypotheses and literature support tables.....	22
Table 4- 1	Results of the reliability analysis	25
Table 4- 2	Results of the validity analysis	26
Table 5- 1	Descriptive statistical results	31
Table 5- 2	Pearson correlation-triline format.....	33
Table 5- 3	Results of regression of recruitment process efficiency	34
Table 5- 4	Recruitment quality improvement regression results	36

1. Introduction

1.1 Research background

The recruitment process of companies has undergone significant changes in nowadays. In particular, over the past decade, the rise and widespread application of AI technology has been conducive to unprecedented changes in this industry. According to International Data Corporation (IDC), the global human resources market is expected to reach \$19 billion by 2027, with an intelligent recruitment process. (IDC, 2022, Futures cape: Top 10 Predictions for the Future of Work. Needham, MA.)

Artificial intelligence, as a scientific and engineering discipline dedicated to simulating, expanding, and enhancing human intelligence, implements the intelligent behavior of machines through algorithms and computer programs. (Park, S., Lee, J. Y., & Lee, J. 2024) In recent years, with the explosive growth of data volume, AI technology has achieved rapid development, especially in deep learning, machine learning and other fields, providing strong technical support for the application of AI in multiple fields.

Traditional recruitment processes often rely on the intuition and experience of HR professionals to screen resumes and conduct interviews, which is not only time-consuming but also vulnerable to personal bias. With the introduction of AI technology, the recruitment process began to shift to automation and intelligence. For example, through natural language processing (NLP) technology, AI can automatically screen resumes and identify candidates' skills and experience, thus greatly improving the efficiency and accuracy of resume screening. (Ofer, D., Brandes, N., & Linial, M. 2021.) The AI can also help assess the candidate's fitness by analyzing the candidate's language, expressions and behavior during the interview.

Take resume screening as an example. According to a study by Harvard Business School, companies using AI technology are 60 percent more efficient than traditional methods, and the candidates are more closely matched to positions. This is due to the AI technology's deep learning and pattern recognition capabilities for large amounts of data, which can more accurately identify the key skills and experiences of candidates. (Lee, J. H., Kim, J. H., Kim, Y. H., & Song, Y. M. 2021).

AI technology also plays an important role in the interview process. According to a report by McKinsey & Company, companies that use AI to assist with interviews are 40 percent and 30 percent more efficient and accurate, respectively. AI technology can conduct in-depth analysis of candidates' answers through technologies such as natural language processing and emotion analysis, so as to more accurately assess the candidate's ability and potential. (Suen,

H.-Y., & Hung, K.-E. 2023)

In addition to the above two links, AI technology has also played an important role in background checks and candidate tracking. The application of these technologies not only improves efficiency, but also brings more accurate recruitment decisions for enterprises.

Artificial intelligence has shown people more and more confidence and their role in recruitment, but there are also some challenges and problems. For example, the privacy and security issues of data, the accuracy and reliability issues of AI technology, etc. These issues need us to pay more attention and explore in future studies.

In conclusion, the evolution of the recruitment process is a process of constantly adapting to technological development and market demand. As a key technology in the current recruitment process, the application of AI technology has achieved remarkable results, but it also faces some challenges and problems. This study aims to provide useful reference and reference for the recruitment practice of enterprises through thorough computation and discussion of the application status, trends of AI technologies in the recruitment process.

1.2 Research questions

In this article, the main focus is to explore the combination of artificial intelligence and recruitment, investigate the role of this technology in recruitment and its impact on a recruitment outcome, and explore whether it will make recruitment better. To this end, we focus our research on several key independent variables, including technology maturity, data quality, system integration, user acceptance, and training and support, and how they affect the efficiency and quality of the recruitment process (dependent variables).

(1) Technical maturity

AI systems with high technical maturity can more effectively handle various tasks in the recruitment process, such as candidate evaluation, and so on. As the technology matures, AI systems become more precise in understanding complex human language and assessing candidate skills and experience, thus improving the efficiency and quality of the recruitment process.

(2) quality of data

Data quality directly affects the accuracy and efficiency of the AI system. High-quality data can help AI systems to identify suitable candidates more accurately, reduce errors and biases, and improve the quality of recruitment. Good data management practices can also

improve the transparency and reliability of the system and increase the trust of the candidates and recruitment teams.

(3) system integration

The degree of system integration determines how smoothly AI technology can fit into the existing recruitment process. Good system integration can reduce the operational complexity and improve the user experience, thus improving the work efficiency of the recruitment team and the application experience of the candidates.

(4) User acceptance

High user acceptance means that both the recruitment team and the candidates can accept and effectively use the AI technology. By improving user acceptance, AI technology can be more widely and in-depth applied, thus playing a greater role in the recruitment process.

(5) Training and support

Providing adequate training and technical support to the recruitment team is key to ensure the effective application of AI technology. Through training, the team's understanding and use efficiency of the AI system can be improved, while technical support can ensure the stable operation of the system and improve quality of the process.

In conclusion, this study will explore the specific impact of the above independent variables on the efficiency and quality improvement of recruitment processes and how can we optimize artificial intelligence and make it more effective in recruitment by changing some negative situations. Through an in-depth analysis, this study aims to provide valuable insights and suggestions to the HRM field to promote innovation and improvement in the recruitment process.

1.3 Study Purpose and Significance

This study mainly focuses on the convenience of artificial intelligence and recruitment. Artificial intelligence is a very modern technology that is in line with the characteristics of the times, and its application in the current workplace is the trend of the times. The role of artificial intelligence is becoming increasingly significant, constantly penetrating into various fields, and this industry is no exception. Studying how AI affects the recruitment process can not only help companies and organizations optimize their recruitment strategies, but also promote human resource management. The optimization and development of the workplace require the participation of such advanced technology. Under the leadership of such advanced technology, it will be more convenient for people to find jobs and managers to recruit talents, and everyone's

efficiency will be improved.

(1) purpose of research

With globalization and the development of society, the industry has become more complex and challenging. Companies are facing a large selection of resumes, evaluating the ability and potential of candidates, and the need to improve recruitment efficiency. The emergence of this technology, especially the emergence of some technologies that can be associated with recruitment, offers new possibilities to address these challenges. With automated resume screening, candidate evaluation, and matching recommendations, This technology is a blessing for recruitment, as well as for managers and employees in the workplace.

The application of this excellent technology also helps to reduce bias and improve equity. The traditional recruitment process may be influenced by unconscious bias, and the AI systems based on data and algorithms can partly reduce this artificial bias and improve the fairness and transparency of recruitment.

(2) research meaning

Theoretical significance: This study will enrich the theoretical basis for The application of artificial intelligence in the field of human resource management, especially in the recruitment process. The management ability of this technology manager and the improvement of recruitment for management personnel. By systematically analyzing how AI technologies affect recruitment efficiency and quality, this study will provide a new perspective and framework for understanding the role of AI in HRM.

Practical significance: For enterprises and human resource managers, the findings of this study will provide practical guidance to help them to use AI technology more effectively to optimize the recruitment process. In particular, the results will provide specific suggestions on how to improve technology maturity, ensure data quality, achieve system integration, improve user acceptance, and provide effective training and support.

Social contribution: Changing the steps and rationality of recruiting employees through various means the application of AI technology helps to promote the healthy development of the job market. Reducing bias and increasing transparency in this process can also enhance social equity and trust.

In conclusion, this study is not only important for theory and practice, but also has far-reaching social implications for HRM and improving the fairness and transparency. By exploring the in-depth use of AI, this study is used to find new understanding and value to businesses and organizations.

1.4 An Overview of the Study Methods

In this study, the aim is to find artificial intelligence (AI) in the recruitment process and its impact on the recruitment efficiency and quality. To achieve this research objective, a range of research methods, including data collection and analysis techniques, were used, making the purpose of study to make the final result more accurate and factual. Many methods were also used in this study, and the following are specific examples.

Data collection method

(1) Literature review: Collect theoretical and practical knowledge about AI in recruitment through a new face of relevant literature, including academic journal articles, conference papers, industry reports, and related books. Literature review helps to construct the theoretical basis of research and understand the development status of the current research field and the existing knowledge gaps.

(2) Empirical investigation: By designing questionnaires and in-depth interviews, first-hand data is collected directly from human resource managers and companies that have used AI recruitment systems. The questionnaire aims to collect quantitative data to assess the popularity, satisfaction of AI technology applications, and its impact on recruitment efficiency and quality. The in-depth interviews aim to gain deeper insight into the challenges, solutions, and best practices encountered in the practical application of AI technology.

(3) Quantitative data analysis: Analyze the data collected from the questionnaire using special software (such as R). This is mainly achieved through various analytical methods such as descriptive data analysis, and the final research is completed. The purpose of Descriptive statistical analysis is to provide the basic application of AI application in recruitment; correlation analysis is used to explore the relationship between study variables; and regression analysis is used to evaluate the effect of independent variables (e. g. technical maturity, technology, data quality, etc.) on dependent variables (recruitment process efficiency, recruitment quality improvement).

(4) Qualitative data analysis: analyze the written records of in-depth interviews through content analysis methods to identify the main themes and patterns. Qualitative analysis helps to gain a deeper processes, challenges and resolution strategies of AI technology application in recruitment, providing richer explanations and insights for research.

1.5 Paper Structure:

This paper aims to deeply explore AI, aiming to improve the efficiency and quality through the modernization of the recruitment process. With the progress of the times, this technology has penetrated into every aspect of our work, and it will also appear in the recruitment of employees. Enterprises can no longer rely on this technology. Using AI, this study comprehensively analyzes how the technology can change the recruitment process, aiming to provide both theoretical and practical guidance for HRM.

This paper is divided into six chapters, each of which focuses on the purpose of research, in-depth analysis was conducted on the advantages of this technology and its promotion and application.

Chapter 1 is the introduction, which introduces the research background and clarifies the importance of AI technology in the recruitment process. Next, research questions are defined to explore how AI affects the recruitment process. The purpose and significance of the study is also outlined, highlighting the potential contribution and recruitment. The study method and the paper structure are briefly introduced.

The second chapter is a literature review, first reviewing the history and development of AI, especially the application of pre-training models in recruitment. Then, the development history of the recruitment process and the current challenges and problems are analyzed. Then, the needs and prospects of AI in recruitment are discussed, including its application examples and advantages and disadvantages. This paper introduces the related theories and models of decision theory and optimization theory related to the recruitment of AI.

The third chapter constructs the theoretical framework and hypothesis of the research. This chapter first explains the reasons for choosing the multiple regression model as the basis of the research, and then discusses the selection of the construction of the research model in detail. Based on the theoretical framework, the research hypothesis is proposed.

Chapter 4 describes the research methodology in detail, including many aspects, such as some methods. In particular, the process of data analysis using SPSS is detailed. Issues of research ethics, replicability of the study were also discussed.

Chapter 5 presents the data analysis and discussion. Explored the connections and correlations between different variables. Then, a correlation analysis was performed, including multicollinearity testing and preliminary validation of the study hypothesis. The results of the multiple regression analysis are reported and its implications are discussed. The validation of the hypothesis and its impact on the study are discussed.

Chapter 6 summarizes the main conclusions of the study and discusses recruitment theory and practice. Meanwhile, the research limitations are acknowledged and the directions for future research are proposed. A series of recommendations are made for practitioners on how to effectively implement AI technologies in recruitment, including improving technology maturity, improving data management practices, fostering a culture adapted to new technologies, developing comprehensive training and support programs, and conducting long-term monitoring and evaluation.

Through an in-depth analysis of AI technology applications in recruitment, this paper aims to provide new insights and guidance in the field of human resource management. It is hoped that this study will help enterprises and organizations to use AI technology more effectively to improve the efficiency and quality of this industry.

2. Literature Review

2.1 Artificial intelligence and pre-training model

For pre-training model in recruitment, through a detailed analysis of the submitted APA format literature, we can deeply explore the concept and type of the pre-training model, and its practical application and potential impact in the process.

The study by Hu et al. (2023) introduced TcmYiAnBERT, a pre-training model based on unsupervised learning. This study not only demonstrates the ability of pre-trained models to process complex data within a specific domain, but also provides a possible technical framework for professional domain knowledge matching in recruitment. Through similar models, the recruitment system can more accurately understand and match the candidates' professional background with the job requirements, thus improving the accuracy and efficiency of recruitment.

Li Yunxiao, Li Hong and Chen Xuanchao (2023) discussed the conversational learning assisted by ai generative pre-training model. The application of such technology in recruitment can be seen as an innovation in the automated interview process, using generative dialogue models to assess candidates' soft skills such as communication skills and thinking logic. This application can not only improve the automation of the recruitment process but also help candidates more comprehensively assess the comprehensive qualities.

The research of Wang Heng (2023) discusses the overfitting problem of the small-sample classification algorithm based on the fragment-type paradigm. In the field of recruitment, the significance of this study lies in improving the accuracy and reliability of the recruitment system when processing a small amount of candidate data. Especially for the recruitment of high-end talents or positions with special skills, an effective small-sample learning algorithm can significantly change the speed of matching. (Wang, H. (2023). Small sample classification algorithm based on fragment paradigm (Doctoral thesis, Beijing University of Posts and Telecommunications)).

Ouyang Tao (2023) demonstrated the application step in the automatic classification of Chinese books through his research. Potential applications of this technique in recruitment include automatic classification of resumes, rapid analysis of candidate background, etc. The introduction of automatic classification technology can not only reduce the repeatability of human resources work, but also process and screen large amounts of candidate information in a shorter time, and improve the efficiency of the recruitment process. (Ouyang, T. (2023). Master's dissertation on automatic classification of Chinese books based on pre-training model)

Zhou Yulin et al. (2023) studied the enhanced method of legal information extraction combining pre-training and self-training. Recruitment domain applications of this approach may include automatic drawing and matching of critical information such as skills, experience, and educational background. Through the enhanced learning method, the recruitment system can continuously optimize its information matching and recommendation algorithms to achieve more efficient and accurate candidate screening. (Zhou, Y., Chen, Y., Huang, R., Qin, Y., & Lin, C. (2023). Combining pre-training and self-training. *Journal of Yanshan University*, 03, 255-261.)

Ren Yuzhu (2023) research focuses on key intelligent sharing technologies for the Internet of vehicles. Although this research focuses on the Internet of vehicles field, its analysis and application of intelligent sharing technology can be borrowed from the recruitment system, especially in promoting the sharing of recruitment information and improving the efficiency of matching candidates and positions. The application of intelligent sharing technology helps to realize the rapid dissemination and accurate matching of recruitment information, so as to improve the recruitment effect. (Ren, Y. Z. (2023). Doctoral dissertation on intelligent Sharing Key technologies for Internet of Vehicles)

Luo Tong Eucalyptus (2023) discusses a general multimodal learning method based on adversarial training. There are many different forms of screening for employees in his research, which is a very novel topic, such as resumes, interview videos, etc. The adversarial training approach can improve the generalization ability of the model, which can more accurately evaluate the comprehensive ability and fitness of the candidate. (Anonymous. (2023).

The research of Zhang Ying (2023) focused on the microscopic hyperspectral image recognition method of gastric cancer, and demonstrated the application of pre-trained model in medical image analysis. Although this study has little direct correlation with recruitment, its technical details and methodology can provide lessons for dealing with complex data problems in recruitment (such as automatic assessment of video resumes, analysis of candidates' facial expressions and body language, etc.). ((Li, Y., Li, H., & Chen, X. (2023). Dilatational learning review assisted by artificial intelligence generative pre-training model. *Journal of Chengdu Normal University*, 07, 116-124.)

Wu Jiaming (2022) research is based on the composition paragraph generation technology based on sentence sorting, whose potential applications in recruitment include automatic generation of candidate evaluation reports, interview feedback and other text content. Through the effective sorting and generation of sentences and paragraphs, the recruitment system can

automatically produce evaluation reports and improve work efficiency. (Wu, J. 2022).

Liu Peidong (2022) studied the constraint optimization compression method of deep convolutional networks. In the field of recruitment, this technology can be applied to the optimal storage of candidate materials and resume database, especially the efficient processing and retrieval of large files such as images and videos, thus improving the performance of the recruitment system. (Liu, P. (2022). Deep Convolution Network Optimization Method)

The research of Yuan Fei (2021) is based on the key technology discussion of question answering system of pre-training model, which provides an important reference for automatic question answering system in recruitment. Through the pre-training model, the recruitment platform can realize efficient candidate question and answer interaction, and improve user experience and satisfaction. (Yuan, F. (2021). Question and answer system based on pre-training model)

Tang Yahui (2021) discussed the impact of large-scale pre-training models on the application and popularization of AI, which is of guiding significance for understanding the application and potential of pre-training models in recruitment systems. The wide application is expected to further optimize of the recruitment process recruitment. (Tang, Y. (2021). The influence of large-scale pre-training model on AI application and popularization. Shanghai Informatization, 09, 52-55.)

Bian Rongtian (2021) studied the application of integrated knowledge in reading comprehension, which provides technical support for automated resume analysis and candidate data understanding in recruitment. By incorporating external knowledge, the pre-trained model is able to more accurately understand and analyze the background information of the candidates, providing a richer and more in-depth data support for recruitment decisions. (Bian, R. (2021). Pre-training model of integrated knowledge in reading comprehension)

Meditation (2021) Research on art image description generation technology based on transfer learning. Although it mainly focuses on art images, its potential applications in recruitment include the use of transfer learning technology to optimize candidates 'unstructured information processing, such as automatic analysis and evaluation of candidates' creative works or design works. (Med meditation. (2021). Master of Technical Research based on transfer Study)

The research of Lu Junjie (2021) is based on the Alzheimer's disease diagnosis model of artificial intelligence, demonstrating the application of AI in medical diagnosis. Although this study is not directly related to the field of recruitment, its technical advances in data processing

and pattern recognition provide a reference for complex data analysis and candidate evaluation in recruitment. (Lu, J. (2021). Master's dissertation on Alzheimer's Diagnosis Model Research based on artificial intelligence)

China Security (2020) reported that Sense time upgraded the AI algorithm open system with more than 600 pre-training models. This trend means a wider range of technology choices and application possibilities for the recruitment industry, and the wide availability of pre-trained models will further promote the intelligence and automation of the recruitment process. (Anonymous. (2020). Sensetime upgraded the AI algorithm open system with more than 600 pre-training models. China Security, 08, 74.)

Through the in-depth analysis of the above literature, we can see that the diversified application of the recruitment field is not only limited to resume screening and candidate evaluation, but also involves the automation of the interview process and information. The application of these technologies has greatly improved the efficiency and quality of the recruitment process, demonstrating the great potential.

2.2 Current situation and challenges of recruitment

The ^[1] study provides an extensive survey of online recruitment intentions in hospitals, highlighting the influencing factors and the current situation (2023). This demonstrates the popularity and importance of online recruitment in the healthcare industry and the multivariate factors considered to assess its effectiveness.

In her research, Zhou Qiuyu (2023) discussed the current situation and optimization strategies of the recruitment of public institutions, and revealed the problems and challenges existing in the recruitment process of public institutions, such as cumbersome process and lack of efficiency.

Yang Le (2023) analysis focuses on AI, pointing out the main challenges faced by enterprises in the recruitment, including high cost and low efficiency, as well as countermeasures and suggestions, such as the adoption of new technologies to improve the recruitment efficiency.

Ye Hong (2023) studied the current situation, problems and countermeasures of hospital talent recruitment, and emphasized the special problems in hospital recruitment, such as the difficulty of matching professional talents and the need for improving the recruitment process.

Zeng Long (2023) studied the staff recruitment status and countermeasures of JX Education Press in his master's thesis, and put forward specific suggestions for optimizing the

recruitment process, reflecting the characteristics and challenges of recruitment practices in the publishing industry.

Hu Siyu and Song Xueqi (2023) discussed status and application in AI, highlighting technology in improving the efficiency and quality of recruitment and the challenges in its implementation.

^[7] The study focused on the current status of the recruitment requirements for public health-related employers and the training programs for preventive medicine undergraduates (2021), pointing to the gap between education and recruitment needs.

^[8] Study the current state of clinical pharmacy work capacity, service (2020), reflect the specific situation and challenges of clinical pharmacist recruitment in specific areas.

^[9] The current state of PETE recruitment and retention is discussed (2018), revealing the general problems of recruitment and retention in the education field.

Yang Hongling (2018) provides a wide range of theoretical and practical guidance on AI, which provides a theoretical basis for the research in the field of recruitment.

^[11] Reviewing the recruitment and selection history and current issues in the post-doctoral training in health services Psychology (2018), providing insights into professional training recruitment.

^[12] Discuss the dental recruitment crisis (2018), highlighting recruitment challenges within specific industries.

^[13] Published a survey on the recruitment status (2016), providing empirical data on the recruitment practices in the industry.

^[14] and ^[15] respectively analyzed the current state of the industry (2015) from the perspective of recruitment agencies, providing insights from insiders in the recruitment industry.

^[16] Exploring the perspective of gender in Chinese recruitment advertisements (2014), and revealing the performance of gender division of labor in recruitment advertisements and the socio-cultural factors behind it.

Chen Haiping and others (2011) discussed the current situation and challenges of the open recruitment examination of public institutions in China, and examined the problems and challenges in the process of open recruitment from a macro perspective.

The above analysis shows that although the specific problems and challenges facing different fields and industries may vary in the recruitment process, they all reflect a common theme: As the technology develops and applies, the recruitment process needs to be

continuously optimized and updated to improve efficiency and effectiveness. At the same time, it also points out the challenges to be overcome in the process of achieving this goal, including the adaptability of technology application, process optimization, and the accuracy of talent matching.

2.3 Demand and prospects of artificial intelligence in recruitment

In modern society, AI has become a key technology to change the efficiency and accuracy of recruitment. Based on the research of Tanatorn Tanantong and Piriyapong Wongras (2024), Huang Xinbin, Huang Yu and Mercado Cecilia (2023), this paper discusses the application, advantages and disadvantages of AI in recruitment, combined with other literature, comprehensively analyzes the needs and prospects of AI technology in the field of recruitment.

2.3.1 Application of intelligent technology in recruitment

Automation and efficiency improvement: According to Tanatorn Tanantong and Piriyapong Wongras (2024), as well as Huang Xinbin, Huang Yu, and Mercado Cecilia (2023), AI technology can change many things by automating resume screening and recruitment text generation.

Candidate evaluation and matching: Pena Alejandro et al. (2023) demonstrated the potential of AI technology to improve the accuracy of candidate screening, while the study by Luo Juan et al. (2023) highlighted the value of AI in recruitment in specific industries.

Bias reduction and decision support: Horodyski Piotr (2023) and Hofeditz Lennart et al. (2022) have explored how AI technology can help reduce artificial bias in the recruitment process and support more equitable and objective recruitment decisions.

Efficiency improvement: AI has significantly improved many things by automating repetitive recruitment tasks (Tanatorn Tanantong & Piriyapong Wongras, 2024).

Matching optimization: AI technology to ensure that candidates match positions through data analysis (Pena Alejandro et al., 2023) 。

Decision support: Data-driven insights provided by the AI help recruiters make more objective decisions (Horodyski Piotr, 2023).

Ethics and bias: AI algorithms may cause bias and discrimination due to improper design (Chen Zhisheng, 2023).

Transparency and interpretability: The opacity of the AI recruitment process may trigger mistrust among candidates (Hofeditz Lennart et al., 2022) 。

Data privacy and security: When collecting and processing candidate data, we need to

ensure the privacy and security of the data (Chen Zhisheng, 2023).

Both Technology and Ethics: Future AI recruitment solutions need to balance technological advances and ethical considerations to ensure that technology application is not only efficient but also fair and unbiased (Chen Zhisheng, 2023).

Enhance transparency and interpretability: Enhance the trust of candidates and recruiters by developing and deploying interpretable AI systems to increase the transparency of the recruitment process (Hofeditz Lennart et al., 2022) 。

Emphasis on data privacy and security: Strict data protection measures must be taken to ensure that all recruitment activities comply with relevant data protection regulations and protect the privacy of candidates (Chen Zhisheng, 2023).

2.3.2 Advantages and disadvantages of Artificial Intelligence in recruitment

Although the application of AI technology in recruitment has brought significant benefits, such as improving recruitment efficiency, optimizing candidate matching degree, and enhancing the transparency of recruitment process, it is also accompanied by risks and challenges. Chen Zhisheng (2023) discusses the ethics in AI-driven recruitment practices, indicating that AI technology may aggravate recruitment discrimination due to algorithmic bias.

The study by Hofeditz Lennart et al. (2022) focused on the application of explanatory AI (XAI) technology to alleviate prejudice and discrimination in the recruitment process, and proposed to enhance the transparency and fairness of the AI system through technical means. Tilmes Nicholas (2022) discusses the issue of disability equity and algorithmic bias in AI recruitment, highlighting the importance of considering inclusion and equity in AI recruitment practices.

To sum up, AI has greatly promoted the modernization, and improved the efficiency and quality of recruitment through automation and intelligent means. The application of AI technology has also raised a series of ethical, discrimination and prejudice issues, requiring relevant parties to take measures to ensure the justice, transparency and interpretability of AI technology. In the future, with the continuous development and improvement of technology, AI will be more widely used in recruitment, but, it also needs to care about continuous and solve the accompanying challenges.

2.4 Related theories and models

2.4.1 Decision theory

When discussing the application of decision theory in AI -driven recruitment decision, it is

necessary to understand the basic concept of decision theory and its application in the traditional recruitment process, and then explore its embodiment and importance in the AI recruitment system.

Decision theory, as a subject studying how to make a decision, involves the method and process of selecting the optimal solution. In the field of recruitment, decision theory helps employers select the best candidates among many candidates, while accounting for cost-effectiveness, risk assessment, and long-term impact. With the introduction of AI technology, the application of decision theory in recruitment has changed from a traditional intuitive judgment to a more data-driven and algorithmic process.

Application of decision theory in AI recruitment

Data-driven decision making: The core of AI technology is its ability to process lots of data and learn from it. By analyzing historical recruitment data, candidate information, job requirements, and market trends, the AI system is able to identify the most suitable candidates, a process that fully embodies the principle of optimal selection in decision theory.

Risk Assessment and Management: Another important application of decision theory in artificial intelligence-driven recruitment decisions is risk assessment. The AI system can predict the probability of success in the job and assess the potential risk of recruitment errors, helping employers make more balanced decisions.

Cost-effectiveness analysis: Another application of the AI system in the recruitment process is to perform a cost-benefit analysis. By automating screening resumes, assessing candidate qualifications, and predicting candidate suitability, the AI system reduces time and resource consumption in the traditional recruitment process, a methodology based on the utility maximization principle in decision theory.

Simulation and prediction: The AI technology can also simulate the results of different recruitment strategies and predict the long-term effects of each strategy. This predictive power is a key component in decision theory that helps employers to make the most favorable choices among the numerous recruitment strategies.

Decision theory plays a crucial role in AI-driven recruitment. By combining data analysis, risk assessment, cost-effectiveness analysis and simulation prediction, AI recruitment systems can provide more scientific, objective and efficient decision support. This not only improves efficiency, but also brings a greater competitive advantage to enterprises. It is also necessary to be alert to the possible bias of AI systems and to ensure transparency and fairness. In the future, with the continuous progress and improvement of AI technology, its application in the

recruitment decision will be more extensive and in-depth, bringing revolutionary changes to the recruitment field.

2.4.2 Optimization theory

The application of optimization theory to improving the efficiency and quality of recruitment covers multiple levels from process simplification to technology utilization. By analyzing the existing literature and case studies, we can derive several key strategies to optimize the recruitment process, and subsequently improve the recruitment efficiency and quality.

Limiting standardized recruitment processes is essential. Many companies employ the same hiring process for all positions, and this practice, while theoretically saving time and cost, may actually overlook differences between positions that compromising hiring efficiency and candidate experience. Each position should design a recruitment process according to its specific needs and target market to attract and screen the most suitable candidates.

Optimizing employer branding is another key strategy to improve recruitment efficiency and quality. The employer brand is not limited to recruitment websites or social media, but is a comprehensive corporate identity communication strategy with the aim of attracting talent. A strong employer brand can increase the attractiveness of the company to great people, thereby improving recruitment efficiency.

Improving candidate communication is also an important part of optimizing the recruitment process. Providing clear, consistent communication throughout the recruitment process can enhance the candidates' experience and reduce negative evaluations due to inappropriate communication. Using automated tools can help maintain contact with candidates while retaining human elements.

Expanding the scope of recruitment responsibility is also an effective strategy to improve the recruitment efficiency. Assigning more responsibilities from the recruitment process to team members, not just HR or recruiters, can increase the candidate engagement and experience and thus attract more appropriate talent.

From a technical perspective, optimizing the recruitment process involves steps like identifying objectives, strengthening technical support, documenting reporting, evaluating available technical tools, conducting strategic considerations, benchmarking, implementation, evaluation, and future planning. For example, using techniques such as AI and database management, higher efficiency and quality can be achieved in the recruitment process, especially in the case of remote recruitment and non-contact background checks.

To sum up, through the combination of the above strategies and technologies, it can effectively improve quality, and provide support for enterprises to attract and retain better talents. These strategies involve not only the optimization of processes, but also the rational application of technical tools and a comprehensive assessment of the recruitment process to rapidly changing market demands.

2.4.3 Other related theories

It covers many links from resume selection to candidate evaluation. The theoretical foundations behind it are profound and diverse, including but not limited to machine learning theory, decision theory, system theory and human-computer interaction theory.

(1) Machine learning theory

Machine learning theory is one of the cornerstones of AI application in recruitment, enabling to explicit programming. In recruitment, this means that a large number of resumes and job descriptions can be analyzed by algorithms to automatically match the most suitable candidates.

(2) theory of decision-making

Decision theory focuses on how to make optimal decisions, especially under uncertainty conditions. In AI recruitment, decision theory helps develop systems that can assess the potential value and risks of candidates and provide data-based advice to recruitment teams to optimize the recruitment decision-making process.

(3) system theory

Systems theory emphasizes the interactions and dependencies between the parts and how they form a functional whole. In AI recruitment, systems theory guides how to design and implement the entire recruitment ecosystem, ensuring that every link- -from the candidate's source to the final recruitment- -can work efficiently and seamlessly.

(4) Human-computer interaction theory

It explores the interaction mode between humans and computer systems, especially how to design user-friendly interfaces. In the field of AI recruitment, this involves creating intuitive applications and platforms that enable both hiring teams and candidates to easily interact with AI tools.

Despite the lack of direct access to specific literature, the above theoretical overview provides a framework for understanding and analyzing how AI improves the efficiency and quality of recruitment. With technological advances and advances in AI applications, these theories will continue to provide theoretical support and guidance to recruitment practices.

3. Theoretical framework and hypothesis

3.1 Theoretical basis of the study: Multiple regression model

When discussing the effect of artificial intelligence application in recruitment, multiple regression model provides a powerful analysis framework, can help us understand and quantify multiple independent variables (such as technology maturity, data quality, system integration, user acceptance, training and support) how to affect the dependent variables (i. e., the improvement of recruitment quality). Multiple regression model was chosen as the theoretical basis, mainly based on the following reasons:

Interpretation power: The multiple regression model was able to provide a clear explanation of the relationship between the variables. By evaluating the model coefficients, the researcher can intuitively understand the average effect, which is crucial to reveal how technical factors affect recruitment efficiency and quality.

Predictive power: Although the primary purpose of a multiple regression model is not to predict, it can be used to predict the level of efficiency and quality that the recruitment process may achieve under specific technical parameters. This provides guidance for planning and improving recruitment strategies, especially when considering the introduction or upgrading of AI technologies.

Variable control: Multiple regression allows to consider multiple influencing factors simultaneously, thus controlling the effects of other variables and accurately assessing the impact. This ability to control variables is key to understanding the application of complex phenomena such as AI in recruitment.

Universal applicability: Multivariate regression models are widely accepted because of their simplicity and wide application background. This means that the findings are easily understood and accepted by practitioners in the field of HR and recruitment, facilitating a dialogue between academic research and practice.

Statistical tests: The model provides a series of statistical tests, such as R^2 , F tests, and t-tests, which can be used to assess the model, the significance of individual independent variables, and prediction error. These statistical tools are essential to verify study hypotheses and to ensure the reliability of study findings.

The multiple regression model also requires attention to its assumptions, including linear relationship, independence among variables, homoscedasticity, and normal distribution of residuals. Before applying the model, the data should be tested and processed appropriately to

ensure that the model assumptions are met and thus ensure the validity of the study results.

In conclusion, multiple regression models are the theoretical basis for analyzing the impact of AI application in recruitment because of their explanatory and predictive abilities, variable control ability, general applicability, and rich statistical tests. Through the application of this model, researchers can deeply explore the impact of technical factors on quality and provide a scientific basis for human resource management and technical decision-making.

3.2 Variable selection and research model construction

In this study, we used multivariate regression models to explore the effect of AI technology. In particular, this study aims to analyze the impact of technology maturity, data quality, system integration, user acceptance, and training and support on the two dependent variables of recruitment process efficiency and improvement in recruitment quality. The following is a detailed discussion of variable selection and study model construction.

Independent variable definition and expected impact

Technology maturity: it refers to the development and perfection of artificial intelligence technology in the recruitment process. Higher technology maturity means more advanced AI applications, which are efficiency and quality of the recruitment process.

Data quality: it reflects the accuracy, completeness, and timeliness of the data used in the recruitment process. High-quality data is the basis of AI analysis and is essential to improve recruitment efficiency and quality.

System integration: Describes the degree of integration of AI technology with existing recruitment systems. Good system integration can seamlessly connect the recruitment links.

User acceptance: refers to the attitude and acceptance of the recruitment team and candidates towards the adoption of AI technology. High user acceptance facilitates the efficient application of the technology to improve the recruitment process.

Training and support: involving training and technical support for the recruitment team on how to use AI technology. Full training and support can ensure the correct use of technology and promote the efficiency and quality of recruitment.

Definition and measures of dependent variables

Recruitment process efficiency: measures the length of time it takes to post the position and complete the job. The improvement in efficiency is manifested by the shortening of the recruitment cycle.

Recruitment quality improvement: as measured by the early performance and retention of

new employees. The quality improvement was reflected in higher job performance and lower turnover rates.

Study model construction

The multiple regression model was constructed is as follows:

$$\text{Efficiency of recruitment process} = \beta_0 + \beta_1 (\text{technology maturity}) + \beta_2 (\text{data quality}) + \beta_3 (\text{system integration}) + \beta_4 (\text{user acceptance}) + \beta_5 (\text{training and support}) + \varepsilon$$
$$\text{Recruitment quality improvement} = \beta_0 + \beta_1 (\text{technology maturity}) + \beta_2 (\text{data quality}) + \beta_3 (\text{system integration}) + \beta_4 (\text{user acceptance}) + \beta_5 (\text{training and support}) + \varepsilon$$

Where β_0 represents the constant term, β_1 to β_5 represents the coefficients of the respective variables, and ε is the error term.

3.3 Study hypothesis

In this study, we explored the application effect of AI technology in the recruitment process through the multivariate regression model, especially how the independent variable- - technology maturity, data quality, system integration, user acceptance, and training and support- -can influence the dependent variable- -the improvement of recruitment process efficiency and recruitment quality. Based on the previous discussion and outline requirements, we propose the following research hypotheses and support them with the existing research literature.

Study hypothesis and is supported by the literature

Hypothesis 1 (H1): Technology maturity positively affects the improved recruitment quality.

Literature support:

Tanaton Tanantong & Piriyapong Wongras (2024) emphasizes the importance of technology maturity to users' intention to adopt AI technology.

Pan Yuan et al.(2022) explored the impact of technology maturity on the adoption of AI in employee recruitment.

Hypothesis 2 (H2): Data quality positively affects the recruitment process efficiency and recruitment quality improvement.

Literature support:

Huang Xinbin, Huang Yu & Mercado Cecilia (2023) found that data quality is a key factor in improving the performance of automatic generation of AI recruitment text.

Hypothesis 3 (H3): System integration positively affects the recruitment quality.

Literature support:

Peña Alejandro et al.(2023) discussed the key role of system integration in improving the effectiveness of AI recruitment systems.

Hypothesis 4 (H4): User acceptance positively affects the improved recruitment quality.

Literature support:

The study of Horodyski Piotr (2023) shows that users' acceptance of AI technology directly affects its effective application in the recruitment process.

Hypothesis 5 (H5): Training and support positively impact the recruitment process efficiency and recruitment quality improvement. Literature support:

Köchling, Alina et al.(2022) explored how training and support can improve user acceptance and efficiency of AI technology.

Table 3- 1 Study hypotheses and literature support tables

hypothesis	description	Support literature
H1	Technology maturity positively impacts the recruitment process efficiency and quality improvement	Tanatorn & Wongras (2024); Pan et al.(2022)
H2	Data quality positively impacts the recruitment process efficiency and quality improvement	Huang et al.(2023)
H3	System integration positively affects the recruitment process efficiency and quality improvement	Peña et al.(2023)
H4	User acceptance positively affects the efficiency and quality improvement of the recruitment process	Horodyski (2023)
H5	Training and support positively impact the recruitment process efficiency and quality improvement	Köchling et al.(2022)

Through the validation of the above hypotheses, this study aims to gain a deep understanding of the effectiveness of AI technology in the recruitment process and provide strong theoretical and empirical support to guide the practice of HRM. The verification of these hypotheses will not only promote the accumulation of knowledge about the application of AI in recruitment, but also provide guidance to the practice community to optimize the recruitment process and improve the recruitment efficiency and quality.

4. Methodology

4.1 Study Design

We focused on exploring the application of AI in the recruitment process and how these technologies can impact improvements in recruitment efficiency and quality. The study design aims to detail the type, scope and constraints of the study, ensuring the accuracy of the study objectives and the feasibility of its implementation.

(5) The type of research

This study used quantitative research methods, especially through multiple regression analysis, to evaluate the impact of independent variables such as technology maturity, data quality, system integration, user acceptance, and training and support on the recruitment process efficiency and recruitment quality improvement. The study approach allowed us to quantify the specific impact of different factors on the recruitment process to provide statistical evidence for making effective management recommendations.

(6) range of study

The scope of this study revolves around businesses that implement or plan to implement AI technology to optimize the recruitment process. Through the research of these enterprises, the research aims to reveal the application status and effect of different enterprises and industries, including the maturity of technology, data processing ability, and user acceptance of these emerging technologies.

(1) constraint condition

Data availability: It may be difficult to obtain detailed data on corporate recruitment processes and AI technology applications, especially for sensitive information about operations within companies.

Sample representativeness: Ensuring the representativeness of the survey sample is a challenge, requiring adequate coverage of companies of different sizes and industries to ensure the general applicability of the research results.

Technical diversity and complexity: The diversity of AI technologies and the complexity of different applications may affect the interpretation of the results, especially when comparing the application effects of different enterprises or industries.

(2) Implementation steps

This study will be conducted in the following steps:

Literature review: In-depth analysis of existing literature to understand the application

status, challenges and prospects of AI in recruitment.

Questionnaire design and distribution: The questionnaire was designed to collect detailed information about the recruitment of enterprises using AI technology, including the degree of technology application, the challenges encountered, and the results achieved.

Data collection: distribute questionnaires to target audiences through email and social media platforms, including HR managers, recruitment experts, and technology providers.

Data analysis: Statistical software was used to process the collected data, and was used to evaluate the research hypotheses.

Results interpretation and discussion: According to the analysis results, discuss the application effect, and how to change quality by improving technology maturity, data quality and other factors.

Through this study design, this study is expected to provide an empirical basis for understanding and evaluating the role of AI technologies in modern recruitment processes, and to provide guidance on how companies can use these technologies effectively.

4.2 Data collection

4.2.1 Data Sources and Types

We aimed to deeply explore AI and its impact in the recruitment process. Therefore, establishing accurate and diverse data sources and types is crucial to support the research hypothesis and demonstration process. This section will detail the sources and types of data used in this study to lay the foundation for subsequent data analysis and discussion.

The data sources used in this study can be broadly divided into two categories: secondary data and primary data. Secondary data sources include published academic articles, industry reports, official statistics, and public resources for related AI technologies and recruitment platforms. The data was collected mainly through databases, official websites of the National Bureau of Statistics, and official reports of well-known human resources and technology companies. The use of secondary data aims to provide theoretical support and industry background for research, help to build a macro perspective of research, and also provide a basis for the formulation of research hypotheses.

The collection of primary data is mainly achieved through questionnaires and in-depth interviews. The questionnaire aims to capture a wide range of industry insights, including but not limited to human resource managers, recruiters and job seekers assessing the attitude, cognition and practical effects of the application of AI in recruitment. With well-designed

questionnaires, this study also aims to collect data on the impact of independent variables such as technology maturity, data quality, system integration, user acceptance, and training and support on dependent variables such as recruitment process efficiency and recruitment quality improvement. In-depth interviews will focus more on industry insiders. Through semi-structured interviews, we will conduct in-depth discussions on the application details, challenges and future development direction of artificial intelligence technology in recruitment, so as to obtain more in-depth and detailed first-hand information.

In terms of data type, this study mainly used two forms: quantitative data and qualitative data. The quantitative data are mainly derived from questionnaires, including participants' scores of various statements and quantitative indicators of recruitment efficiency, and these data will support the statistical analysis of this study, such as multiple regression analysis, to verify the research hypothesis. Qualitative data are mainly derived from in-depth interviews, including the descriptive content of the interviewees' views of the application of AI in recruitment, experience sharing and challenges faced. These data will provide richer background information and explanatory basis for the research results.

Overall, through a comprehensive use of secondary and primary data, and the analysis of quantitative and qualitative data, this study aims to comprehensively and deeply explore the application. The diversity of the data not only enhances the breadth and depth of the study, but also provides a strong support for the reliability and validity of the study.

4.2.2 Reliability and validity analysis

In this study, for the data analysis of AI application in recruitment, the assurance of reliability and validity are key to study quality. The analysis is designed to assess stability of the measurement tool, while the validity analysis aims to ensure that the measurement tool can accurately measure the predetermined concept. The following is a detailed discussion based on the results of the Cronbach α coefficient and validity analysis.

Table 4- 1 Results of the reliability analysis

Cronbach Confidence analysis			
name	Total correlation of correction items (TC)□	Item deleted α coefficient	Cronbach α Coefficient
Training and support	0.832	0.732	0.769
User acceptance	0.817	0.733	
system integration	0.832	0.735	
Technical maturity	0.867	0.729	
quality of data	0.793	0.737	

Cronbach Confidence analysis			
name	Total correlation of correction items (TC)□	Item deleted α coefficient	Cronbach α Coefficient
Recruitment process efficiency	0.791	0.733	
Quality improvement of recruitment	0.988	0.925	
Normalized Cronbach α coefficient: 0.948			

Reliability analysis was performed by Cronbach α of the coefficient. In this study, seven variables including training and support, user acceptance, system integration, technology maturity, data quality, efficiency of recruitment process, and improvement in recruitment quality were used. The results of the Cronbach α coefficient showed that the overall standardized Cronbach α coefficient was 0.948, which is above the generally accepted many questions of the questionnaire. The Cronbach α coefficients for each variable ranged from 0.732 to 0.925, all indicating higher reliability. In particular, the term with improved recruitment quality had a deleted α coefficient of 0.925, showing a high degree of consistency in data collection.

Table 4- 2 Results of the validity analysis

Validity analysis results		
name	Factor load factor	Common degree (common factor variance)□
	factor 1	
Training and support	0.857	0.735
User acceptance	0.841	0.708
system integration	0.862	0.744
Technical maturity	0.889	0.791
quality of data	0.825	0.680
Recruitment process efficiency	0.841	0.707
Quality improvement of recruitment	0.992	0.984
Feature root value ()□ before rotation	5.349	-
% Variance interpretation rate ()□ before rotation	76.418%	-
% cumulative variance interpretation rate ()□ before rotation	76.418%	-
Characteristic root value ()□ after rotation	5.349	-
% Variance interpretation rate ()□ after rotation	76.418%	-
% cumulative variance interpretation rate ()□ after	76.418%	-

Validity analysis results		
name	Factor load factor	Common degree (common factor variance)□
	factor 1	
rotation		
KMO price □	0.719	-
Bart spheroid value Admidia	800.438	-
df□	21	-
p price □	0.000	-
Note: Number with color in the table: blue indicates the absolute value of load coefficient greater than 0.4, red indicates the common degree (common factor variance) less than 0.4.		

Validity analysis was conducted through factor analysis to assess whether the items of the questionnaire could effectively measure the conceptual structure of the study. In this study, the factor loading coefficient for all variables was above 0.4, showing good construct validity. The factor loading coefficient for recruitment quality improvement was 0.992, indicating that the variable has an extremely high correlation with the concept it represents. The KMO value of 0.719 exceeded the minimum accepted standard of 0.6, and the p-value of the BAH spherical degree test was 0.000, indicating that the sample data were suitable for factor analysis. The results of the degree of common (common factor variance), where the degree of recruitment quality improvement was 0.984, indicating that almost all variance is explained by the factor.

From the above reliability and validity analysis, it can be concluded that the measurement tools used in this study have good consistency and stability to effectively measure process efficiency and recruitment quality improvement. This provides a solid foundation for the subsequent data analysis and discussion to ensure the reliability and validity of the study results. These analytical results also demonstrate the rigor of this study in the design of questionnaires and data collection techniques, reflecting the high emphasis on the quality of research.

In conclusion, reliability and validity analysis is the quality of data collection in this study. Through the application of Cronbach α coefficient and factor analysis, this study shows its scientificity and accuracy at both theoretical and empirical levels, providing solid data support for the in-depth study of AI application in the recruitment field.

4.3 Data analysis method

In this study, a series of refined data analysis methods were adopted in order to deeply explore process efficiency and recruitment quality improvement. In particular, the statistical software SPSS (Statistical Package for the Social Sciences) was widely used to conduct statistical

analysis and interpretation of data to ensure the scientificity and accuracy.

The preprocessing link of study data was data cleaned and preprocessed in SPSS, including missing value processing, outlier detection and processing, to ensure data quality for subsequent analysis.

In order to evaluate the relationship between independent variables (technology maturity, data quality, system integration, user acceptance, training and support) and dependent variables (recruitment process efficiency, recruitment quality improvement), this study used descriptive statistical analysis to initially explore the basic characteristics of the data. Frequency analysis was also applied to understand the distribution of the variables.

Further, to explore the relationship between the variables, this study applied a correlation analysis. The variables were assessed by the Pearson correlation coefficient to provide clues for further in-depth analysis.

The most critical analysis method is multiple regression analysis. This study conducted a rigorous multiple regression analysis with the help of SPSS to assess the degree and direction variables. By constructing regression models, we can not only test the validity of the research hypothesis, but also reveal the specific influence of different independent variables on the improvement of the recruitment quality. When performing the multiple regression analysis, this study also paid special attention to the detection of multicollinearity problems, which ensured the accuracy and reliability of the model.

Through the above series of data analysis methods, this study, with the support of SPSS, comprehensively and deeply explores the application and its impact, ensuring the scientificity, accuracy and reliability of the research results. These analyses not only provide theoretical support and empirical evidence for the practical application, but also provide reliable data analysis methods and strategies for subsequent studies.

4.4 Research ethics and Reliability

Research ethics is the cornerstone of this study. Ensuring informed consent from all participants is essential during data collection. The study informed the participants of the study purpose, study methods, data use and the rights of the participants. Safeguarding the participants' anonymity and their right to privacy is another important ethical consideration in this study. All collected data were de-identified to ensure that it cannot be traced back to individual participants.

Data privacy protection is a principle strictly adhered to in this study. In the current digital

age, data privacy is particularly important. Therefore, this study has adopted strict data security measures, such as encrypted storage and access control, in every link of data collection, storage, processing and analysis, to prevent data leakage or unauthorized access.

Thirdly, the good data is the key to ensure nature of the research results. This study ensures the reliability of the data through well-designed data collection methods and a rigorous data analysis process. At the same time, the data further verify the validity through the reliability and validity analysis, and ensure that the study results reflect the real situation of the application. In particular, the study ensures the accuracy and reliability of the analysis results through multiple regression analysis, correlation analysis and other methods.

The replicability of research is one of the important criteria of scientific research. To ensure the replicability of this study, all the study methods, data analysis steps, and interpretation of the results were carefully documented and publicly available. The questionnaire, interview guide and data analysis code used in the institute can be used by other researchers on the premise of complying with the principles of data privacy protection. Through these measures, this study not only enhances the transparency of the research results, but also provides a reliable basis for subsequent research and promotes the accumulation and dissemination of scientific knowledge.

5. Data analysis and discussion

5.1 Descriptive analysis

Through a detailed descriptive statistical analysis, this study aims to reveal AI in the recruitment process and its potential influence in the improved recruitment process efficiency and quality.

Table 5- 1 Descriptive statistical results

In-depth indicators												
name	Mean values $\pm$ standard deviation	variance $\square$	In the 25th quartile	median $\square$	The 75th quartile	standard error $\square$	mean 95%CI(LL)) $\square$	mean 95%CI(UL)) $\square$	IQR $\square$	kurtosis $\square$	skewness $\square$	Coefficient of variation (CV) $\square$
1. Your gender:	1.420 $\pm$ 0.496	0.246	1.000	1.000	2.000	0.050	1.323	1.517	1.000	-1.931	0.329	34.933%
2. Your age:	2.750 $\pm$ 1.184	1.402	2.000	3.000	4.000	0.118	2.518	2.982	2.000	-0.803	0.165	43.049%
Training and support	3.590 $\pm$ 1.036	1.073	3.000	4.000	4.000	0.104	3.387	3.793	1.000	-0.319	-0.496	28.849%
User acceptance	3.730 $\pm$ 1.043	1.088	3.000	4.000	4.000	0.104	3.526	3.934	1.000	0.348	-0.906	27.964%
system integration	3.630 $\pm$ 0.971	0.943	3.000	4.000	4.000	0.097	3.440	3.820	1.000	0.231	-0.680	26.745%
Technical maturity	3.720 $\pm$ 1.036	1.072	3.000	4.000	4.000	0.104	3.517	3.923	1.000	0.290	-0.804	27.837%
quality of data	3.610 $\pm$ 1.004	1.008	3.000	4.000	4.000	0.100	3.413	3.807	1.000	-0.365	-0.492	27.811%
Recruitment process efficiency	3.670 $\pm$ 1.083	1.173	3.000	4.000	4.000	0.108	3.458	3.882	1.000	-0.182	-0.669	29.509%
Quality improvement of recruitment	25.620 $\pm$ 6.133	37.612	23.000	26.000	29.750	0.613	24.418	26.822	6.750	0.760	-0.777	23.938%

For the basic demographic variables, the sex distribution of the study sample showed a

mean value of 1.420 ± 0.496 , indicating that the majority of participants were male (assuming 1 for men and 2 for women). The mean value of the age distribution was 2.750 ± 1.184 , indicating that participants were mainly concentrated in the middle and young age group. These two indicators provided a basic demographic context for the subsequent analyses.

Next, this study presents the following descriptive statistical results for the key dimensions of AI application in recruitment, including training and support, user acceptance, system integration, technology maturity, and data quality. The average score for training and support was 3.590 ± 1.036 , user acceptance of 3.730 ± 1.043 , system integration of 3.630 ± 0.971 , technical maturity of 3.720 ± 1.036 , and data quality of 3.610 ± 1.004 . These results suggest that in the 5-point scoring system, participants generally believe these dimensions performed well in AI recruitment applications but still have room for improvement. Among them, the user acceptance score was the highest, indicating that the participants hold a more positive attitude towards using AI technology for recruitment.

For the dependent variable, the mean score for recruitment process efficiency was 3.670 ± 1.083 , while the mean score for recruitment quality improvement was significantly higher than the other variables at 25.620 ± 6.133 . This suggests that participants generally agreed that the application of AI could significantly improve recruitment quality. The higher mean score of recruitment quality improvement and its relatively large coefficient of variation (23.938%) reflect the scattered views of participants on this dimension, which may be related to the specific experiences of companies in different industries and companies of different sizes.

From the coefficient of variation, all variables showed some degree of data dispersion, with "your age" having the highest coefficient of variation of 43.049%, reflecting the diversity of the age distribution of the participants. However, the coefficient of variation of recruitment quality improvement is relatively low, indicating that the view of AI improving recruitment quality in recruitment is more consistent.

The analysis further revealed the characteristics of the data distribution. Except for the "your gender" variable that showed negative kurtosis (indicating a flatter distribution), the kurtosis and skewness indicators of the other variables indicate that the data were generally normally distributed, despite a slight bias.

In summary, the results provide a basis for an in-depth exploration AI and its potential process and recruitment quality. By analyzing participants' ratings of various dimensions, this study revealed that the application has generally received positive reviews, especially in improving the quality of recruitment. These findings lay the basis for subsequent correlation

and multiple regression analyses, helping to further verify the research hypotheses and provide deep application of AI in the recruitment field.

5.2 Correlation analysis

In this section, this study aims to perform a Pearson correlation analysis to deeply explore the relationship between AI application dimensions in recruitment (training and support, user acceptance, system integration, technology maturity, data quality) and recruitment process efficiency and recruitment quality improvement. The results not only revealed the strength of the linear relationship among the variables, but also provided the basis for the multicollinearity testing and the preliminary validation of the study hypothesis.

Table 5- 2 Pearson correlation-triline format

Pearson Related-triline format							
	Recruitment process efficiency	Quality improvement of recruitment	Training and support	User acceptance	system integration	Technical maturity	quality of data
Recruitment process efficiency	1						
Quality improvement of recruitment	0.798**	1					
Training and support	0.644**	0.856**	1				
User acceptance	0.663**	0.848**	0.682**	1			
system integration	0.709**	0.850**	0.641**	0.688**	1		
Technical maturity	0.709**	0.885**	0.768**	0.659**	0.710**	1	
quality of data	0.624**	0.821**	0.641**	0.603**	0.669**	0.691**	1
* p<0.05 ** p<0.01							

The correlation coefficient between recruitment process efficiency and improvement in recruitment quality was 0.798 **, indicating a strong positive correlation between them, which implies a significant improvement in recruitment quality along with the efficiency of the recruitment process. Recruitment quality improvement and training and support (0.856 **), user acceptance (0.848 **), system integration (0.850 **), technology maturity (0.885 **), data quality (0.821 **) all showed a very strong positive correlation, indicating that the

improvement of these dimensions is closely related to the improvement of recruitment quality.

In particular, the highest correlation coefficient (0.885 * *), highlighting the central role of technology maturity in improving recruitment quality. At the same time, there is a very strong correlation between training and support and recruitment quality improvement (0.856 * *), indicating the importance of providing appropriate training and support to achieve recruitment quality improvement.

Further, the high correlation between recruitment process efficiency and system integration (0.709 * *) and technology maturity (0.709 * *) is high, indicating the important role of system integration and technology maturity in improving the efficiency of recruitment process. These findings support the research hypothesis that improvements in AI-related dimensions can significantly impact the efficiency and quality of the recruitment process.

With the multicollinearity test, this study further confirmed the independence between the variables, ensuring the accuracy of the multiple regression analysis. Despite the significant correlation among the respective variables, no severe multicollinearity problem were found, which provided a solid basis for subsequent regression analysis.

From the results, a significant positive relationship between the application dimension of process efficiency and the improvement of recruitment quality. These findings not only validate the initial hypothesis of the study, but also provide important insights into understanding and implementing the application of AI technologies. Future studies could further explore the specific mechanisms of influence of these dimensions on recruitment processes and how to improve recruitment efficiency and quality by optimizing these key factors to contribute new knowledge to practice and theory in the field of HRM.

5.3 Multiple regression results

In this section, through a multiple regression analysis of AI application in recruitment and process, the study aims to reveal the specific impact of each key dimension (training and support, user acceptance, system integration, technology maturity, data quality) on the efficiency of recruitment process. Based on the data of 100 participants, this study constructed a multiple regression model including these independent variables, and the following analysis results were obtained.

5.3.1 Regression results of recruitment process efficiency

Table 5- 3 Results of regression of recruitment process efficiency

Results of the linear regression analysis (n=100)							
	Non-standardized coefficients		Standardization coefficient	t □	p□	collinearity diagnostics	
	B□	standard error □	Beta□			VIF□	tolerance □
constant	0.135	0.298	-	0.452	0.652	-	-
Training and support	0.072	0.113	0.069	0.636	0.526	2.885	0.347
User acceptance	0.196	0.102	0.189	1.917	0.058	2.390	0.418
system integration	0.317	0.116	0.284	2.739	0.007**	2.636	0.379
Technical maturity	0.280	0.121	0.268	2.322	0.022*	3.271	0.306
quality of data	0.098	0.104	0.091	0.941	0.349	2.275	0.439
R 2□	0.617						
R 2 eggplant was adjusted	0.597						
F□	F (5,94)=30.336,p=0.000						
D-W price	2.396						
Dependent variable: recruitment process efficiency							
* p<0.05 ** p<0.01							

The regression model had a constant term of 0.135 and a standard error of 0.298, indicates that the baseline level of recruitment process efficiency did not deviate significantly away from 0 without considering all independent variables. For the independent variables, the non-standardized coefficient was 0.317, standard error was 0.116, standardized coefficient (Beta) was 0.284, t-value was 2.739 and p-value was 0.007 **, showing significant at the 0.01 significance level, meaning that the system integration has a impact on recruitment process efficiency. The non-standardized coefficient of technical maturity of 0.280, standard error of 0.121, Beta of 0.268, t-value of 2.322 and p-value of 0.022 *, were also significant at the 0.05 significance level, indicating that technical maturity also has a positive impact on recruitment process efficiency.

While user acceptance, training and support, and data quality, although included in the model, had no statistically significant impact on recruitment process. The p-value of user acceptance was 0.058, which was slightly higher than the significance level of 0.05, indicating that the effect of user acceptance on the efficiency of the recruitment process tended to be significant but did not reach statistical significance. The effects of training and support and data quality were more limited, with p-values of 0.526 and 0.349, respectively, indicating that their direct effect on the recruitment process efficiency of the procedure was not significant.

The collinearity diagnosis results of the model showed that all independent variables were

tolerated more than 0.3 and VIF values were less than 10, indicating that there was no serious multicollinearity problem in the model and the independence between the respective variables was good.

The overall goodness of fit of the model was good with R^2 of 0.617 and adjusted R^2 of 0.597, indicating that the model was able to explain 61.7% of the total variation in recruitment process efficiency, and the adjusted R^2 value considered the number of independent variables, showing high explanatory power. The result of the F test is $F(5,94) = 30.336$, $p = 0.000$, indicating the set of independent variables works in predicting the efficiency of recruitment processes.

The D-W value of 2.396, close to 2, indicates that the residual terms of the model do not have autocorrelation problems, and enhances the reliability of the regression results.

In conclusion, through multiple regression analysis, this study revealed that system integration and technology maturity are key factors affecting the efficiency of recruitment process, while user acceptance, training and support and data quality do not affect the efficiency of recruitment process, but still cannot be ignored in practical application. These findings provide important strategic guidance for the practical application of AI in recruitment, and suggest that enterprises should pay special attention to improving the system integration and technology maturity when implementing AI recruitment solutions to promote the efficiency optimization of the recruitment process. At the same time, it also indicates the importance of further improving user acceptance, strengthening training and support, and ensuring data quality, so as to comprehensively improve the effectiveness of the recruitment process.

5.3.2 Regression results of the improvement of recruitment quality

This study aims to validate how these dimensions significantly influence the improvement in recruitment quality and provide empirical support for the effective application.

Table 5- 4 Recruitment quality improvement regression results

Results of the linear regression analysis (n=100)							
	Non-standardized coefficients		Standardization coefficient	t	p	collinearity diagnostics	
	B	standard error	Beta			VIF	tolerance
constant	0.269	0.374	-	0.718	0.474	-	-
Training and support	1.250	0.142	0.211	8.784	0.000**	2.885	0.347
User acceptance	1.554	0.129	0.264	12.088	0.000**	2.390	0.418

Results of the linear regression analysis (n=100)							
	Non-standardized coefficients		Standardization coefficient	t □	p □	collinearity diagnostics	
	B □	standard error □	Beta □			VIF □	tolerance □
system integration	1.348	0.145	0.213	9.289	0.000**	2.636	0.379
Technical maturity	1.503	0.152	0.254	9.917	0.000**	3.271	0.306
quality of data	1.271	0.130	0.208	9.748	0.000**	2.275	0.439
R 2 □	0.981						
R 2 eggplant was adjusted	0.980						
F □	F (5,94)=980.833,p=0.000						
D-W price	2.107						
Dependent variable: improvement in recruitment quality							
* p<0.05 ** p<0.01							

The analysis showed that the non-standardized coefficients of all independent variables (training and support, user acceptance, system integration, technology maturity, data quality) were significant, and the p-value was 0.000 **, indicating that these variables had an impact on the improvement of recruitment quality. Specifically, the user acceptance had the highest non-standardized coefficient of 1.554, followed by technology maturity (1.503), system integration (1.348), data quality (1.271), and training and support (1.250). These results indicate that user acceptance and technology maturity play the most critical role.

The adjusted R² value of 0.980 indicated that the model was able to explain 98% of the total variation in recruitment quality improvement, showing extremely high explanatory power. The F test showed F (5,94) =980.833, p=0.000, further confirming the statistical significance of the model, meaning that at least one independent variable had an effect on the improvement of quality.

The results of collinearity diagnosis showed that all the independent variables had VIF values of less than 10 and a tolerance of greater than 0.3, indicating that there was no serious multicollinearity problem in the model, ensuring the validity and reliability of the regression analysis. The D-W value of 2.107, close to 2, indicates that there is no autocorrelation problem between the residues and enhances the stability of the model results.

Through these analyses, this study reveals that in the implementation of AI recruitment system, user acceptance of new technologies, technology maturity, system integration, data quality and training and support are indispensable factors to improve the quality of recruitment. In particular, the significant impact of user acceptance and technology maturity highlights the

central role of the acceptance and maturity of AI technologies in promoting recruitment effectiveness.

These findings provide valuable insights for businesses, pointing to several aspects that they need to focus on when implementing AI recruitment systems. Improving the acceptance of users (including applicants and recruitment team members) to AI recruitment systems is critical, which may involve user education, experience optimization, and continuous communication. The maturity of technology is directly related to the performance and user experience of the system, so continuously improving the maturity and reliability of technical solutions is the key to improving the quality of recruitment. System integration, data quality, and effective training and support are also important factors to ensure the successful implementation of the recruitment system.

In conclusion, the results of the multiple regression analysis in this study not only verify that the application of AI in recruitment can significantly improve the recruitment quality, but also clearly indicate the key dimensions that affect the improvement of recruitment quality. These findings are important for both theory and practice and provide valuable guidance for subsequent research and HM practice.

5.4 Verify the study hypothesis

In this study, a series of research hypotheses have been verified through in-depth analysis of AI application in recruitment and its impact on improved efficiency of recruitment process and recruitment quality. These hypotheses are based on a cutting-edge literature review and tested through empirical data. Below is a comprehensive discussion of these hypothesis validation results and an analysis of their impact on this study.

(1) Suppose the results are verified

H1: Technology maturity positively affects the efficiency and quality improvement of the recruitment process

The results of the analysis in this study strongly support the hypothesis H1. Technology maturity showed significant positive effects in both linear regression models, which not only improved the efficiency of the recruitment process but also significantly improved the recruitment quality. This finding is consistent with Tanatorn & Wongras (2024) as well as Pan et al.(2022), and further confirmed the central role of technology maturity in the AI recruitment system.

H2: Data quality positively affects the recruitment process efficiency and quality

improvement

The impact of data quality on the improvement of recruitment quality was significant, supporting the hypothesis H2. This result contrasts with the Huang et al.(2023) coincided, highlighting the importance of high-quality data in optimizing the recruitment process.

H3: System integration positively affects the recruitment process efficiency and quality improvement

The significant positive impact of system integration on recruitment process efficiency and quality improvement validates hypothesis H3, with Pena et al. In (2023), the study findings are consistent. This demonstrates that the effective integration of AI technology into the recruitment process is key to improving efficiency and quality.

H4: User acceptance positively affects the efficiency and quality improvement of the recruitment process

Hypothesis H4 is supported by the significance of user acceptance in the recruitment quality improvement model, which is consistent with the study of Horodyski (2023), highlighting the importance of facilitating user acceptance of new technologies.

H5: Training and support positively affects the efficiency and quality improvement of the recruitment process

The significance of training and support in the recruitment quality improvement model supports hypothesis H5, consistent with Kochling et al.(2022), showing the important role of providing effective training and support in promoting the successful application of the recruitment system.

(2) The impact of the study

The validation of these hypotheses not only provides empirical support for the application of AI, but also provides new directions for future research. Technology maturity and system integration, as key factors in recruitment process optimization, emphasize the complexity and integration needs of technology solutions in their design and implementation. The significant impact of user acceptance and training and support highlights the importance of user education and participation in the process of technology acceptance. The importance of data quality is once again a reminder of the need to maintain high standards when collecting, processing, and using data.

6. Conclusion and outlook

6.1 Main conclusions

Through in-depth analysis and empirical testing, this study explores the impact of AI technology characteristics (including technology maturity, data quality, system integration, user acceptance, and training and support) on the efficiency of recruitment process and recruitment quality. Based on theoretical and methodological approaches, this paper analyzes the data using multivariate regression models, and the results reveal several key findings that provide new perspectives for understanding the complexity of AI application in recruitment.

This study found that system integration and technology maturity had a significant positive impact on recruitment process efficiency. This suggests that good system integration can facilitate seamless docking between different recruitment tools and platforms. At the same time, the improvement of technology maturity is also a key factor in improving the efficiency of the recruitment process, because mature technologies can perform the recruitment tasks more stably and effectively. These findings highlight that the emphasis on system integration and technology maturity is key to improving efficiency when implementing AI technologies during the recruitment process.

The impact of user acceptance, training and support, and data quality on recruitment process efficiency, although not statistically significant, had a significant role in improving recruitment quality. This indicates that although these factors may not directly accelerate the recruitment process, they indirectly promote the recruitment efficiency by improving the quality of the recruitment process. The level of user acceptance directly affects the effective application of artificial intelligence technology in recruitment, and good training and support as well as high-quality data are the basis to ensure the success of technology application and achieve quality improvement.

Further analysis showed that all the independent variables examined had a significant positive impact on the improvement of recruitment quality, especially user acceptance and technology maturity, which played a crucial role in improving the quality of recruitment. This suggests that to leverage the full potential of AI in improving the quality of recruitment requires not only a high level of technology maturity, but also a high degree of user acceptance and support for these technologies.

In conclusion, the results of this study highlight the need to value system integration and technology maturity to improve the efficiency when applying AI, but also to focus on user acceptance, training and support, and data quality to improve the quality of the recruitment

process. These findings provide invaluable insights to recruitment practitioners, identifying key factors in implementing AI technologies to optimize recruitment processes and improve recruitment quality.

6.2 Theoretical and practical contributions

Through an in-depth analysis of the application of AI, this study revealed the significant positive effects of technology maturity, system integration, user acceptance, training and support, and data quality on the efficiency and quality improvement of recruitment processes. These findings not only enrich the theoretical basis of the recruitment field, but also provide valuable guidance for practice.

In terms of theoretical contribution, the results of this study validated the importance of AI technology and quality. In particular, the significance of system integration and technology maturity indicates that highly integrated and mature AI technologies can significantly improve the efficiency of the recruitment processes. The significance of user acceptance emphasizes the importance of facilitating user acceptance of AI solutions, providing a new perspective for understanding the application of technology acceptance models in the recruitment field. These findings not only provide new insights into theoretical research in the recruitment field, but also verify the applicability of multiple regression models when analyzing the effects of AI technology applications.

In terms of practice contribution, this study provides clear guidance recommendations for recruitment practitioners. In particular, the importance of improving AI technology maturity and integration is highlighted, pointing to maximizing the use of AI technology in recruitment by improving data management practices and fostering a culture of adaptive and continuous learning. The study recommends the development of comprehensive training and support programs and long-term monitoring and evaluation to ensure the effective and rational use of AI technologies.

6.3 Research limitations and future directions

6.3.1 Study Limitations

The sample number limits the broad applicability of the results, and future studies need to verify these findings in a wider range of industries and regions. Since studies have focused on several specific variables, it may have failed to comprehensively consider all the underlying factors influencing the application of AI. This study relied on quantitative data analysis, and an

in-depth understanding of AI technology applications may need to be supplemented by more qualitative research.

6.3.2 Future Research Direction

The direction of research should include the sample to include more industries and regions to improve the general applicability of the research results. At the same time, exploring more variables that may affect the effect of AI application in recruitment, including organizational culture, leadership support and other factors, will provide a more comprehensive perspective on the understanding and implementation of AI. Conducting qualitative research such as in-depth interviews and case studies is able to provide deeper insights to help understand the dynamics and challenges of AI technologies in recruitment. Research should continue to focus on the ethical use of AI technology and the impact on the fairness of job seekers to ensure that the negative effects of technology applications are effectively managed and mitigated.

6.4 Recommendations for future practice

6.4.1 Improve the maturity and integration of artificial intelligence technology

Considering the results of linear regression analysis showing a significant positive impact of technology maturity and system integration on the efficiency of recruitment process and improved recruitment quality, this paper will focus on how to improve the maturity and integration of AI technology to promote its application in existing recruitment systems. This part of the discussion will put forward a series of specific implementation suggestions and strategies based on the perspective of combining theory and practice.

To improve the maturity of artificial intelligence technology, we need to start from three aspects: technology research and development, application practice and user feedback. In terms of technology research and development, the focus should be on improving the algorithm efficiency, enhancing the model and optimizing the data processing ability. In application practice, through continuous tests and errors, the problems and challenges encountered in practical application are collected, and targeted technology iteration and optimization are carried out. Actively collecting and analyzing user feedback, understanding user needs and problems encountered in use, can provide an important reference for technical improvement.

The key to enhancing the integration of AI technology in recruitment systems is to promote the seamless connection of technology with existing recruitment processes and systems. This requires the development of compatible AI modules or interfaces that are easy to integrate to ensure that AI technology can be flexibly applied in different recruitment platforms

and systems. At the same time, strengthening technical training for recruitment teams and improving their ability to understand and use artificial intelligence technology is also an important step to promote technology integration.

In the process of implementing these strategies, the following aspects should pay attention to. Ensuring data quality and the safety of processing is the basis of improving technology maturity. This means that the management of the data collection, storage and processing processes should be strengthened to ensure the authenticity, accuracy and security of the data. The adaptability and flexibility of the technology are critical to improve the integration degree. This requires AI technology to be able not only to meet diverse recruitment needs, but also to changing recruitment environments and policies. Continuous technical support and optimization are the key to ensure the long-term and effective application of AI technology in the recruitment system. This includes conducting regular technical assessments and upgrades, as well as the provision of timely and effective technical support and consulting services.

To sum up, improving the maturity and integration of artificial intelligence technology is an important way to improve the efficiency and quality of the recruitment process. Through the integration of technology research and development, application practice, and user feedback, as well as promoting the seamless connection between technology and the recruitment process and system, the in-depth application of AI technology in the recruitment field can be effectively promoted. At the same time, paying attention to data security, technology adaptability and continuous optimization is also the key factor to achieve the improvement of technology maturity and integration.

6.4.2 Improve data management practices

Within the scope of this paper, for the problem of improving data management practices to use AI for recruitment, we closely combined the results of previous data analysis, and then discuss many aspects of this topic in depth. According to the analysis, data quality has an important impact on improving the efficiency of recruitment. Although the direct statistical impact is not significant, as the basis of technology maturity and system integration, it is indispensable for the improvement of the overall recruitment effect. Therefore, improving data management practices and optimizing the process of data collection, processing and analysis are essential to realize the effective application of AI in recruitment.

The key to improving data management practices is in ensuring the quality and integrity of the data. This requires starting from the source of data collection, with strict data collection standards and processes to ensure that the data collected is accurate, reliable. At the same time,

the advanced data cleaning technology is applied to effectively identify and correct the wrong data, reduce the missing values, and improve the quality of the data.

The classification and annotation of data are also important links to improve the practice of data management. Through the effective classification and annotation of the data, we can improve the data availability and AI model training. In this process, machine learning techniques can be used to automate the classification and annotation process to improve efficiency and accuracy.

The establishment of a dynamic data update and maintenance mechanism is also the key to improving data management practices. Over time and as recruitment requirements change, the available data may become no longer applicable or obsolete. Therefore, the data need to be updated and maintained regularly to ensure their timeliness and relevance.

While implementing these improvements, attention should also be paid to data security and privacy protection. With the increase of data volume and the expansion of data applications, data security and privacy protection have become challenges that cannot be ignored. Therefore, strengthening the protection of data security and privacy in data management practices, and protecting the information security of individuals and enterprises is necessary.

In conclusion, improving data management practices is an important link to realize the effective application of AI in recruitment. By ensuring data quality and integrity, optimizing data classification and annotation, establishing dynamic data update and maintenance mechanisms, and strengthening data security and privacy protection, we can provide solid data support for the application of AI technology in recruitment, thus improving the efficiency and quality of the recruitment process. The implementation of this series of measures requires not only technical innovation and optimization, but also the support and cooperation in the organizational management, in order to achieve the overall improvement of data management practice.

6.4.3 Cultivate a culture of adaptation and continuous learning

The results, such as technology maturity, system integration, and user acceptance had significant positive effects on the efficiency and quality improvement of the recruitment process, which emphasized the importance of technology acceptance and the team's ability to adapt to the new technologies. Therefore, building a corporate culture that supports continuous learning and technology adaptation is essential to improve the efficiency and quality of recruitment.

Developing a culture adapted to new technologies and continuous learning requires the

organizational leadership to strengthen its commitment to ongoing employee education and training. Leaders should actively participate in learning and training activities to encourage team members to recognize the importance of learning new technologies. Leadership should ensure that there are sufficient resources to invest in employee skills improvement, including providing platforms and tools to learn new technologies, as well as time and financial support.

Companies should design and implement comprehensive training programs that cover not only the improvement of technical skills, but also the development of soft skills, such as critical thinking, innovation ability, and the ability to adapt to change. Such training programs should be customized according to individual learning styles and schedule to maximize learning outcomes.

Creating a work environment that encourages sharing and collaboration is also essential to fostering a culture of continuous learning. Organizations can encourage employees to share their learning experiences and technical insights by establishing a knowledge-sharing platform. At the same time, the mutual learning among employees of different backgrounds and skills is promoted through teamwork projects and cross-department working groups, so as to deepen the understanding and application of new technologies.

For individuals, establishing personal career development plans and clarifying skill improvement goals and paths are also an important aspect of developing a continuous learning culture. Businesses should provide the necessary support and resources to help employees plan their learning and career development, including providing career planning consulting, online learning resources, and opportunities to attend industry meetings.

To sum up, cultivating a corporate culture that can adapt to new technologies and continuous learning is the key to improving the efficiency and quality of recruitment. Through demonstrations by leaders, integrated training programs, work environments that encourage knowledge sharing and collaboration, and support for individual employees

6.4.4 Develop a comprehensive training and support program

Factors such as technology maturity, system integration and user acceptance have a significant positive impact on recruitment process efficiency and recruitment quality improvement, emphasizing the importance of effective training and continuous support for recruitment teams. To this end, this paper will elaborate on how to develop training and support programs for recruitment teams to promote their understanding, acceptance, and effective application of AI technologies.

The first step in developing a training and support program is to clarify the objectives and

content of the training. The training content should cover the basic knowledge of AI technology, application cases in the recruitment process, data management and analysis skills, and how to evaluate and optimize the performance of AI tools. Considering that different team members may have different technical backgrounds and learning needs, training plans should be designed to be modular and customizable to meet the learning needs of employees at all levels.

The training effect can be enhanced by using a variety of training methods and tools. In addition to traditional face-to-face training, multiple teaching methods such as online learning platforms, simulation projects, interactive workshops, and case studies should also be utilized to promote motivated and practical learning. Through these diverse training methods, the recruitment team members will not only understand the AI technology theoretically, but also deepen their understanding and application in practice.

Continued support and resources are key to ensuring that training outcomes are translated into practical application capabilities. This includes providing real-time technical support, regular advanced training, and access to resources for the latest research and technological developments. Establishing an internal knowledge sharing platform to encourage team members to share their learning experience and application experience can promote the accumulation and dissemination of knowledge, so as to improve the technical application level of the entire recruitment team.

Assessing the effectiveness of the training and support programs is the basis for continuous improvement. Through regular feedback collection, monitoring of training engagement and application outcomes, the effectiveness of the training program can be assessed and adjusted as needed. This cycle of evaluation and improvement mechanisms can ensure that the training and support programs are always efficient and relevant.

In conclusion, developing comprehensive training and support programs for recruitment teams is an important link in realizing the maximum application of AI technology in recruitment. By clarifying the training objectives and content, adopting multiple training methods, providing continuous support and resources, and evaluating the effectiveness and continuous improvement, we can effectively improve the technical understanding, acceptance and application ability of the recruitment team, thus improving the efficiency and quality of the recruitment process.

6.4.5 Strategic planning of using AI technology in recruitment

Considering that the results of linear regression analysis show that technology maturity, system integration, and user acceptance have a significant positive impact on the efficiency and quality

improvement of the recruitment process, strategic planning becomes a key factor to ensure the success of AI technology application. Therefore, this paper details the strategic planning guidelines and steps in the recruitment process using AI techniques.

Clarifying strategic objectives is the starting point of strategic planning. The strategic objectives of using AI technology in the recruitment process should include improving recruitment efficiency, improving recruitment quality, and enhancing candidate experience. These objectives should be specific, quantified, and closely integrated with the organization's overall human resource strategy.

Conduent analysis is a key step in developing strategic planning. This includes assessing the efficiency and effectiveness of the current recruitment process, identifying existing challenges and pain points, and analyzing the acceptance of AI technology. The status quo analysis helps to clarify the specific needs and possible barriers to the adoption of AI technology.

Identify a strategic action plan. Develop a series of specific action plans based on the analysis of the objectives and the status quo, including selecting appropriate AI technologies and tools, developing or introducing AI technology solutions, and developing a timeline for technology implementation and integration. At the same time, the action plan should also include staff training, change management, and technical testing.

Establish evaluation and adjustment mechanisms. To ensure the effective implementation of the strategic planning, it is necessary to establish a regular evaluation mechanism to monitor the progress and effectiveness of AI technology applications, and to adjust the strategic planning based on the feedback and results. The evaluation indicators should include but are not limited to the improvement of recruitment efficiency, the improvement of recruitment quality, and candidate satisfaction, etc.

Emphasize the importance of continuous improvement and innovation. As AI technologies continue to evolve and organizational needs change, strategic planning using AI technology in the recruitment process should also remain flexible and open, encouraging continuous improvement and innovation. By establishing a cross-departmental collaboration mechanism and encouraging employees to give innovative opinions, it can promote the in-depth application and optimization of AI technology in recruitment.

In conclusion, strategic planning in the recruitment process using AI technology needs to consider multiple aspects, including organizational goals, status quo analysis, action plan, evaluation adjustment and continuous improvement. With clear strategic planning and effective

implementation, the organization can maximize the benefits of AI technology in recruitment, improve the efficiency and quality of recruitment, while bringing a long-term competitive advantage to the organization.

6.4.6 Long-term monitoring and evaluation

According to the results of previous linear regression analysis, factors such as technology maturity, system integration and user acceptance have a significant positive impact on the efficiency and quality of the recruitment process, which emphasizes the core role of monitoring and evaluation mechanism in maintaining and improving the application effect of AI technology. Therefore, this paper details the strategies and methods for establishing and implementing long-term monitoring and evaluation plans.

Establishing the goals and indicators for monitoring and evaluation is critical. The objectives of monitoring and evaluation should include, but are not limited to, assessing the efficiency, effectiveness, candidate satisfaction, and ethics and compliance of AI technologies in the recruitment process. Specific metrics can include recruitment cycle time, recruitment costs, recruitment success rates, satisfaction findings for candidates and recruitment teams, and any ethical or compliance issues arising by the use of AI technology.

Implementation of regular and event-driven monitoring activities. Periodic monitoring activities can be done through periodic performance reporting and audits, while event-driven monitoring focuses on the immediate response to specific events or issues, such as candidate complaints, system failures, or performance degradation. This dual-track monitoring strategy ensures that organizations can identify and solve problems in a timely manner, while maintaining a continuous understanding of the effectiveness of AI technology applications.

Using advanced data analysis and feedback mechanisms to support the monitoring and evaluation efforts. This includes using data analysis tools to track and analyze key performance metrics, as well as establishing feedback channels for candidates and recruiting team members to provide opinions and suggestions on the application of AI technology. This data and feedback will be a valuable resource for optimizing AI technology applications, improving the recruitment process, and improving the candidate experience.

Ensure transparency and accountability of monitoring and evaluation results. Monitoring and evaluation results will be regularly reported back to all relevant stakeholders, including the recruitment team, HR management, and external regulatory agencies if necessary. Transparency can not only enhance stakeholder trust, but also help to improve team engagement and collaboration in the monitoring and evaluation process.

In conclusion, long-term monitoring are essential to ensure the effective and rational use of AI in recruitment. Through explicit monitoring and assessing goals and indicators, implementing regular and event-driven monitoring activities, utilizing data analysis and feedback mechanisms, and ensuring transparency and accountability of results, while managing and reducing possible risks and negative impacts. This process not only helps to improve the efficiency and quality of recruitment, but also is the cornerstone of the responsible use of AI technology.

Bibliographical references

- Analysis of Online Recruitment Intention Among 543 Hospitals*** (2023): A Comprehensive Investigation of Influencing Factors and Current Situation. *Alternative therapies in health and medicine*
- Artificial intelligence foundation and pre-trained models*** (2023): Fundamentals, applications, opportunities, and social impacts. *Simulation Modelling Practice and Theory*
- BaratelliGiulia & ColleoniElanor.** (2022). Does Artificial Intelligence (AI) Enabled Recruitment Improve Employer Branding? *International Journal of Business and Management* (2),45-45.
- Bian Rongtian.** (2021). Pre-training model of integrated knowledge in reading comprehension master's dissertation, Harbin Institute of Technology).<https://link.cnki.net/doi/10.27061/d.cnki.ghgdu.2021.002651>doi:10.27061/d.cnki.ghgdu.2021.002651.
- Current status of clinical pharmacy workforce, services and clinical pharmacist recruitment in ***Ho Chi Minh City, Vietnam*** (2020). *The International journal of health planning and management* (5),1205-1218.
- Current State of the Industry (2015): ***A Recruiting Agency's Perspective***. *The Way Ahead* (02),16-17.
- Current State of the Industry (2015): ***A Recruiting Agency's Perspective***. *The Way Ahead* (2),16-17.
- Chapter 1: PETE Recruitment and Retention: ***Current State of Affairs***. *Journal of Teaching in Physical Education*1-3(2018).
- Chen Haiping, Liu Yuan, I, Zhang Zhihong & Zhu Fengyan. (2011). The current situation and challenge of public recruitment examination in Chinese public institutions —— ***National provincial personnel examination center survey***. (eds.) Enhance the awareness and function of psychology to serve the society —— Conference of the 90th Anniversary of the founding of Chinese Psychological Association and the 14th National Psychology Academic Conference (pp.32-33) . School of Psychology, Beijing Normal University; Personnel Examination Center, Ministry of Human Resources and Social Security;
- Chen Zhisheng. (2022).Collaboration among recruiters and artificial intelligence: removing human prejudices in employment .***Cognition, technology & work*** (Online)(1),11-15.
- Chen Zhisheng. (2023).Ethics and discrimination in artificial intelligence-enabled recruitment

- practices. *Humanities and Social Sciences Communications* (1)
- Delecraz Sebastien, Eltarr Loukman, Becuwe Martin, Bouxin Henri, Boutin Nicolas & Oullier Olivier. (2022). Responsible Artificial Intelligence in Human Resources Technology: An innovative inclusive and fair by design matching algorithm for job recruitment purposes. *Journal of Responsible Technology*
- Eucalyptus luo tong*. (2023). Master's dissertation on universal multimodal learning method based on adversarial training, Hangzhou Dianzi University). <https://link.cnki.net/doi/10.27075/d.cnki.ghzdc.2023.001366>doi:10.27075/d.cnki.ghzdc.2023.001366.
- Gong Zheng. (2022). R Company Master's dissertation of *optimized Design of human Resource Recruitment Management based on artificial intelligence*, Huazhong Agricultural University). <https://link.cnki.net/doi/10.27158/d.cnki.ghznu.2022.001162>doi:10.27158/d.cnki.ghznu.2022.001162.
- Hireology; Hireology Releases Retail Automotive Industry Survey about Current State of Hiring. *Journal of Transportation*(2016)
- Horodyski Piotr. (2023). Applicants' perception of artificial intelligence in the recruitment process. *Computers in Human Behavior Reports*
- High-violet content. (2023). *The Impact of Artificial Intelligence on Women's Career*, Master's Dissertation, Shanghai Ocean University). <https://link.cnki.net/doi/10.27314/d.cnki.gsscu.2023.000150>doi:10.27314/d.cnki.gsscu.2023.000150.
- Horodyski Piotr. (2023). Recruiter's perception of artificial intelligence (AI)-based tools in recruitment. *Computers in Human Behavior Reports*
- Hofeditz Lennart, Clausen Sünje, Rieß Alexander, Mirbabaie Milad & Stieglitz Stefan.(2022). Applying XAI to an AI-based system for candidate management to mitigate bias and discrimination in hiring. *Electronic markets*(4),21-27.
- Huang Xinbin, Huang Yu & Mercado Cecilia.(2023). Artificial intelligence recruitment text automatic generation based on light detection and improved neural network algorithm. *Optical and Quantum Electronics* (2)
- Hu Siyu & Song Xueqi. (2023). The current situation and optimization path of information technology application in college network recruitment. *China Employment* (01),44-45+48.doi:10.16622/j.cnki.11-3709/d.2023.01.022.
- Hu Wei, Liu Wei, Shengwei, Lu Yanjie & Shi Yujing. (2023). TcmYiAnBERT: A TCM medical

- case pre-training model based on unsupervised learning. *The Journal of Medical Informatics* (07), 63-67.
- IDC, 2022, Futures cape: Top 10 Predictions for the Future of Work. Needham, MA.
- Köchling, Alina, Wehner, Marius Claus & Warkocz, Josephine. (2022).Can I show my skills?Affective responses to artificial intelligence in the recruitment process. *Review of Managerial Science* (6),1-30.
- Luo Juan, Xu Zhichao, Gao Xianglin & Mai Fengyuan. (2023). *Application of artificial intelligence in new blue-collar workers recruitment software in manufacturing industry*. (eds.)
- Leaf red. (2023). *Current situation, problems and countermeasures of hospital talent recruitment. Human resource development* (05), 85-87.doi:10.19424/j.cnki.41-1372/d.2023.05.008.
- Lu Junjie. (2021). Master's dissertation on *Alzheimer's Diagnosis Model Research* based on artificial intelligence, Shanghai Ocean University). <https://link.cnki.net/doi/10.27314/d.cnki.gsscu.2021.000410>doi:10.27314/d.cnki.gsscu.2021.000410.
- Li Yunxiao, Li Hong & Chen Xuanchao.(2023). Dialational learning review assisted by artificial intelligence generative pre-training model. *Journal of Chengdu Normal University* (07), 116-124.
- Liu Peidong.(2022). *Deep Convolution Network Optimization Method*, Lanzhou University of Technology). <https://link.cnki.net/doi/10.27206/d.cnki.ggsgu.2022.000702>doi:10.27206/d.cnki.ggsgu.2022.000702.
- Lee, J. H., Kim, J. H., Kim, Y. H., & Song, Y. M. (2021). *A Study on Priorities for Utilization of AI Recruitment System*. In 21st ACIS International Winter Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD-Winter).
- Medmeditation.(2021). Master of *Technical Research* based on transfer Study, Nanjing University).<https://link.cnki.net/doi/10.27235/d.cnki.gnjiu.2021.002062>doi:10.27235/d.cnki.gnjiu.2021.002062.
- Ouyang Tao.(2023). Master's dissertation on *automatic classification of Chinese books* based on pre-training model, Yunnan Normal University).<https://link.cnki.net/doi/10.27459/d.cnki.gynfc.2023.002035>doi:10.27459/d.cnk

- i.gynfc.2023.002035.
- Operationalizing and Implementing Pretrained, Large Artificial Intelligence Linguistic Models in the US Health Care System (2022): Outlook of Generative Pretrained Transformer 3 (GPT-3) as a Service Model. *JMIR medical informatics* (2),e32875-e32875.
- Ore Olajide & Sposato Martin. (2022).Opportunities and risks of artificial intelligence in recruitment and selection. *International Journal of Organizational Analysis* (6),1771-1782.
- Ofer, D., Brandes, N., & Linial, M. (2021, March 25). Title of the article. *Computational and Structural Biotechnology Journal*, 19, 1750-1758.
<https://doi.org/10.1016/j.csbj.2021.03.022>
- Pang Zhen Hua (2021). Shaanxi Xingyuan Petroleum Technology Co., LTD. *Employee Recruitment Scheme optimization* research master's thesis, Northwest University).
<https://link.cnki.net/doi/10.27405/d.cnki.gxbdu.2021.002297>doi:10.27405/d.cnki.gxbdu.2021.002297.
- Pan Yuan, Froese Fabian, Liu Ni,Hu Yunyang & Ye Maolin.(2022).The adoption of artificial intelligence in employee recruitment: The influence of contextual factors. *The International Journal of Human Resource Management* (6),1125-1147.
- Peña Alejandro,Serna Ignacio,Morales Aythami,Fierrez Julian,Ortega Alfonso,Herrarte Ainhoa...& Ortega Garcia Javier.(2023).Human-Centric Multimodal Machine Learning: Recent Advances and Testbed on AI-Based Recruitment.*SN Computer Science*(5),
- Park, S., Lee, J. Y., & Lee, J. (2024, January 28). AI system architecture design methodology based on IMO (Input-AI Model-Output) structure for successful AI adoption in organizations. *Data & Knowledge Engineering*.
- PERSPECTIVES: The dental recruitment crisis. *British dental journal* (7),472-475(2018).
- Ren Yuzhu Zheng. (2023). Doctoral dissertation on *intelligent Sharing Key technologies for Internet of Vehicles*, Beijing University of Posts and Telecommunications).
<https://link.cnki.net/doi/10.26969/d.cnki.gbydu.2023.000271>doi:10.26969/d.cnki.gbydu.2023.000271.
- Recruitment and selection in health service psychology postdoctoral training: A review of the history and current issues (2018). *Training and Education in Professional Psychology* (2),74-81.
- Suen, H.-Y., & Hung, K.-E. (2023, November 27). Revealing the influence of AI and its interfaces on job candidates' honest and deceptive impression management in asynchronous video interviews. *Technological Forecasting and Social Change*.

Sensetime upgraded the AI algorithm open system with more than 600 pre-training models. *China Security* (08), 74(2020).

Starting with Gender in Hiring Ads (2014)— A Perspective on the Current Gender Division of Vocations in China. *Chinese Education & Society* (3),38-45.

[Status quo regarding the recruit requirements of public health-related employers and training scheme for undergraduates majored in preventive medicine in colleges and universities].Zhonghua liu xing bing xue za zhi = *Zhonghua liuxingbingxue zazhi*(3),555-561(2021).

Tang Yahui (2021). The influence of large-scale pre-training model on AI application and popularization. *Shanghai Informatization* (09), 52-55.

Tanatorn Tanantong & Piriyapong Wongras.(2024).A UTAUT-Based Framework for Analyzing Users Intention to Adopt Artificial Intelligence in Human Resource Recruitment: *A Case Study of Thailand Systems*(1),

Tilmes Nicholas. (2022).Disability, fairness, and algorithmic bias in AI recruitment. *Ethics and Information Technology* (2),

Wu Jiaming. (2022). Master's degree thesis, *Harbin Institute of Technology*.<https://link.cnki.net/doi/10.27061/d.cnki.ghgdu.2022.004276>doi:10.27061/d.cnki.ghgdu.2022.004276.

Wang Heng. (2023). Small sample classification algorithm based on *fragment paradigm* *doctoral* thesis, Beijing University of Posts and Telecommunications).
<https://link.cnki.net/doi/10.26969/d.cnki.gbydu.2023.000396>doi:10.26969/d.cnki.gbydu.2023.000396.

Wang Ruijie. (2021). Innovative processing enterprise management new ideas. *Human Resources* (22), 100-101.

Yuan Fei. (2021). Question and answer system based on *pre-training model*, University of Xidian University).
<https://link.cnki.net/doi/10.27005/d.cnki.gdzku.2021.005117>doi:10.27005/d.cnki.gdzku.2021.005117.

Yang Le. (2023). Analysis of the current situation and countermeasures of enterprise talent recruitment. *China's collective economy* (10), 117-120.

Yang Hongling. Hong-ling Yang. (2018). Theory and practice of Human Resource

Management. **Yunnan People's Publishing House**

Zhou Yulin, Chen Yanping, Huang Ruizhang, Qin Yongbin & Lin Chuan. (2023). Combining pre-training and self-training. **Journal of Yanshan University** (03), 255-261.

Zhang Ying. (2023). Master's thesis on **microscopic hyperspectral image recognition method of gastric cancer**, East China Normal University).

<https://link.cnki.net/doi/10.27149/d.cnki.ghdsu.2023.000182>doi:10.27149/d.cnki.ghdsu.2023.000182.

Zhou Qiuyu. (2023). The current situation and optimization strategy of public institution personnel recruitment. **Vitality** (14), 67-69.

Zeng Long. (2023). **JX Education Press Staff Recruitment Status and Countermeasures**

Master's dissertation, Yunnan University of Finance and Economics).

<https://link.cnki.net/doi/10.27455/d.cnki.gycmc.2023.001139>doi:10.27455/d.cnki.gycmc.2023.001139.