

Effect of Artificial Intelligence to Job Performance among Internet Firms in Beijing, China: The Moderating Mediating Role of Job Security, Job Engagement, Employee Service Quality

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ABSTRACT

Artificial Intelligence (AI) is a new technological science that studies and develops theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence. This paper intends to explore the relationship between AI Service performance, job engagement, job Security, employee service quality, and job performance. The respondents include the top five full-time employees of artificial intelligence technology companies in Beijing, China who have experienced using artificial intelligence tools in their job. In this study, the researcher used an adapted standardized questionnaire as the primary instrument of data collection which was distributed to 400 respondents, chosen using simple random sampling. Mean, Generalized Linear Model (GLM) Mediation Analysis and Moderation Analysis were used for the statistical treatment. Results of the study showed that the job performance of data analysts is fair. It also showed that the level of AI service performance used by the data analysts is good. Furthermore, the AI service performance has a direct positive effect to employee positive effects, job performance, and job engagement with coefficients 0.28, 0.09, and 0.31. Based on these results, strategies were proposed through a human resource development program for artificial intelligence technology companies in Beijing, China.

KEYWORDS

Job Security; AI Service Performance; Job Engagement; Employee Service Quality; Job Performance

1 INTRODUCTION

Artificial Intelligence (AI) is a new technological science that studies and develops theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence. This field of research includes robotics, language recognition, image recognition, natural language processing, and expert systems.

Studies have shown that the application of artificial intelligence technology is related to employee engagement and service quality. At the same time, a large number of studies have shown that employee engagement and service quality are related to employee job performance. Although there are also studies suggesting that job security has a direct impact on employee engagement. However, there is currently no research in China that attempts to explore the relationship between the application of artificial intelligence technology and employee performance.

In the current society, Enterprises and institutions are very interested in the application of artificial intelligence tools, which can efficiently and low-costly improve the knowledge and abilities

of employees.

However, some studies have shown that the application of artificial intelligence technology can have an impact on employee job security. At the same time, AI may also replace some human job positions, such as low-skilled assembly line workers, customer service representatives, etc., leading to their unemployment.

In summary, this study addresses the challenge of leveraging AI services to enhance employee job performance while mitigating any potential negative impacts. Despite the growing body of research on artificial intelligence, there is a notable scarcity of studies exploring the relationship between AI service performance and job performance, particularly in China.

2 OBJECTIVES

The general objective of the study is to explore the relationship between AI Service performance, job engagement, job Security, employee service quality, and job performance.

3 MATERIALS AND METHODS

3.1 Research Design

The study focused on exploring the relationship between AI service performance, job engagement, job security, employee service quality, and job performance. To meet this objective, the researcher used a descriptive correlational research design. Among the research methods, the descriptive correlational is the most applicable to use in measuring two or more variables to determine if a relationship exists between them. It is suitable for the study because the researcher is very much invested in knowing the relationship between AI service performance, job engagement, job security, employee service quality, and job performance.

3.2 Respondents of the study

The respondents were the 400 employees from the top five AI Companies in Beijing, China. These individuals were selected due to their extensive familiarity with the AI industry and their experience with similar AI tools and services.

3.3 Data Gathering Instrument

Survey was administered and data was collected through the social media platform WeChat. The researcher shared and forwarded pre-written and tested questionnaires on the WeChat mini apps【 Questionnaire Website 】 to the administrative personnel of designated companies. Questionnaire network is a free online survey platform in China, that can provide enterprises with questionnaire creation, release, management, collection, and analysis services.

The variables include Job Performance, AI Service Performance, Job Engagement, Employee Service Quality, and Job Security.

In addition, AI performance was assessed using a 14-item measure from (Catherine Prentice & Mai Nguyen, 2020). The job engagement scale was adapted from (Rich et al., 2017), including "I view my job as being meaningful." The employee service performance scale was adapted from the original SERVQUAL measure (Parasuraman, 1991); (Catherine Prentice & Mai Nguyen, 2020). The adapted scale has four dimensions, including employee reliability, employee empathy, employee responsiveness, and employee assurance. Job security scale was adapted from (Probst, 2003) with a

focus on employees' sense of job security resulting from the adoption of AI technologies at work. Job performance was adapted from (Delery, J. E. & Doty, D. H., 1996) with a focus on Tests of Universalistic, Contingency, and Configurational Performance Predictions.

4 RESULTS AND DISCUSSION

4.1 Data Analyst's description of Job Performance

Table 1 Data Analyst's description of Job Performance

Items	Mean	SD	Interpretation
1. I often take on extra tasks to achieve team performance.	4.43	1.86	Fair
2. I often have cooperative relationships with other colleagues in the workplace.	4.48	1.78	Fair
3. When colleagues encounter difficulties, I will do your best to help them.	4.38	1.78	Fair
4. I will think from the company's perspective and help colleagues overcome difficulties.	4.53	1.81	Good
5. I have a reasonable plan for your workflow or schedule.	4.59	1.87	Good
6. My work quality is at a high level.	4.44	1.87	Fair
7. I am always able to complete work tasks within the specified time frame.	4.47	1.86	Fair
8. Overall, I am always able to do the work assigned by the company well.	4.39	1.8	Fair
9. My work efficiency is often said to be high by colleagues and leaders, and I also consider myself to be very good.	4.5	1.91	Good
10. I will be more inclined to assign more challenging tasks to the company.	4.56	1.92	Good
11. I often proactively solve problems that arise in your work.	4.45	1.88	Fair
Overall	4.48	1.39	Fair

The average scores range from 4.38 to 4.59, with standard deviations ranging from 1.78 to 1.92, indicating moderate variability in responses. Interpretation categories include "Fair" and "Good," reflecting performance levels across different aspects of work.

The researcher believes that the results of the survey questionnaire are in line with expectations, as most employees believe that their job performance should be average or above average, and cannot or should not be low, which is unacceptable. However, most employees lack confidence in believing that their job performance should be among the top or the best.

4.2 Description of the Level of AI Service Performance used by the Data Analyst

Table 2 Description of the Level of AI Service Performance used by the Data Analysts

Items	Mean	SD	Interpretation
1. AI tools provide information in a timely fashion.	4.58	1.91	Good
2. AI tools return answers to my requests quickly.	4.55	1.9	Good
3. AI tools operate reliably.	4.42	1.88	Fair
4. AI tools perform reliably.	4.51	1.9	Good
5. The operation of AI tools is dependable.	4.51	1.94	Good
6. AI tools can flexibly adjust to new demands or conditions.	4.46	1.92	Fair
7. AI tools are versatile in addressing needs as they.	4.51	1.88	Good
8. AI services produce correct information.	4.57	1.86	Good
9. There are few errors in the information I obtain from AI tools.	4.45	1.97	Fair
10. The information provided by AI tools is accurate.	4.5	1.87	Good
Overall	4.5	1.55	Good

The researcher believes that the above survey questionnaire results are in line with expectations, especially in terms of the reliability, accuracy, and flexibility of AI tools to meet new demands, which still have room for improvement.

Timeliness of AI tools providing information with the mean of 4.58 got the high ranking of this

item may reflect the efficiency and timeliness of AI tools in providing information. This could enhance user trust in AI tools and improve work efficiency. Research indicates that timely provision of information can help users make decisions faster, thereby enhancing their job performance (Jones, 2003).

4.3 Respondents' assessment on their Job Engagement and Employee Service Quality

Table 3 Respondents' assessment on their Job Engagement

Items	Mean	SD	Interpretation
1. I work with intensity on my job.	4.45	1.78	Average
2. I devote a lot of energy to my job.	4.62	1.81	High
3. I try my hardest to perform well on my job.	4.57	1.81	High
4. I strive as hard as I can to complete my job.	4.51	1.92	High
5. I am enthusiastic in my job.	4.54	1.86	High
6. I am interested in my job.	4.48	1.88	Average
7. I am proud of my job.	4.42	1.91	Average
8. I am excited about my job.	4.49	1.81	Average
9. At work, my mind is focused on my job.	4.49	1.85	Average
10. At work, I pay a lot of attention to my job.	4.45	1.87	Average
11. At work, I focus a great deal of attention on my job.	4.56	1.84	High
12. At work, I am absorbed by my job.	4.51	1.87	High
Overall	4.51	1.45	High

The researcher believes that the results align with, and in some cases exceed expectations. This may be attributed to the fact that the respondents are employed at top-ranked AI technology companies in China, which offer competitive salaries and ample opportunities for career development. If the survey were conducted in different industries, the results might differ significantly.

Table 4 Respondents' assessment on their Employee Service Quality

Items	Mean	SD	Interpretation
1. I quickly corrected anything that was wrong.	3.83	1.93	Fair
2. I provided prompt and quick service.	3.82	2.03	Fair
3. I was never too busy to respond to customers' requests.	3.74	1.95	Fair
4. I let you know when things would get done.	3.84	2.02	Fair
5. I am dependable and consistent.	3.88	1.97	Fair
6. I had the customers' best interests at heart.	3.88	2.01	Fair
7. I followed through on my promises.	3.79	1.98	Fair
8. I did things right the first time.	3.87	2.03	Fair
9. I properly handled any problems that arise.	3.74	2.04	Fair
10. I gave extra effort to handle your special requests.	3.73	1.99	Fair
11. I was sensitive to your individual needs and wants, rather than always relying on policies and procedures.	3.92	2.01	Fair
12. I anticipated customers' individual needs and wants.	3.86	2.08	Fair
13. I understand customers' specific needs for services.	3.77	1.97	Fair
14. I can answer customers' questions completely.	3.92	2.01	Fair
15. I was able and willing to give customers' information about the services.	3.83	1.96	Fair
16. I seemed well-trained, competent, and experienced.	3.88	2	Fair
17. I was sympathetic and reassuring if something is wrong.	3.93	2	Fair
Overall	3.84	1.54	Average

As shown in the table, the data on employee service quality reveals that respondents' evaluations are relatively consistent across various aspects, though some differences are noted. The mean values for all items range from 3.73 to 3.93, which fall within the "Fair" or "Average" interpretation categories. This suggests that, while there is a general agreement among respondents, the perceived quality of employee service is moderate and leaves room for improvement.

4.4 Level of Job Security as assessed by Data Analyst

As shown in the table, the respondents' overall assessment of job security is rated as "Fair." While

they recognize the availability of clear career development paths, opportunities for advancement, training programs, and defined responsibilities within the organization, there appears to be a need for greater attention to the diversity of advancement opportunities and the clarity of job tasks. This suggests that while foundational elements of job security are in place, further improvements could enhance employees' perceptions of their long-term stability and growth potential within the organization.

Table 5 Level of Job Security as assessed by Data Analysts

Items	Mean	SD	Interpretation
1. I have clear career paths within the organization	4.35	2.01	Average
2. Employees in this job who desire promotion have more than one potential position they could be promoted to	4.19	1.97	Average
3. Formal training programs are offered to me in order to increase my promotability in this organization	4.28	1.9	Average
4. Performance is more often measured with objective quantifiable results	4.31	1.96	Average
5. I can expect to stay in the organizations for as long as they wish	4.39	1.93	Average
6. I am allowed to make many decisions	4.41	1.95	Average
7. I am often asked by my supervisor to participate in decisions	4.3	1.89	Average
8. I am provided the opportunity to suggest improvements in the way things are done	4.36	2	Average
9. The duties of my job are clearly defined	4.24	1.93	Average
10. The job description for my job contains all of the duties performed by individual employees	4.29	2.03	Average
11. I receive bonuses based on the profit of the organization	4.3	1.97	Average
Overall	4.31	1.82	Average

4.5 Mediating Role of Job Engagement and Employee Service Quality to the relationship between AI Service Performance and Job Performance

Table 6 Mediating Role of Job Engagement and Employee Service Quality to Relationship of AI Service Performance and Employee Performance

Effect	Estimate	SE	β	z	p	Decision to Ho	Interpretation
<i>Indirect</i>							
AISP $\Rightarrow$ JE $\Rightarrow$ JP	0.0295	0.0129	0.0331	2.29	0.022	Reject	Significant
AISP $\Rightarrow$ ESQ $\Rightarrow$ JP	0.0217	0.0116	0.0243	1.87	0.061	Failed to Reject	Not Significant
<i>Component</i>							
AISP $\Rightarrow$ JE	0.2878	0.0442	0.3094	6.51	< .001	Reject	Significant
JE $\Rightarrow$ JP	0.1027	0.0421	0.1068	2.44	0.015	Reject	Significant
AISP $\Rightarrow$ ESQ	0.2802	0.0474	0.2835	5.91	< .001	Reject	Significant
ESQ $\Rightarrow$ JP	0.0775	0.0393	0.0856	1.97	0.048	Reject	Significant
<i>Direct</i>							
AISP $\Rightarrow$ JP	0.4329	0.0408	0.4844	10.62	< .001	Reject	Significant
<i>Total</i>							
AISP $\Rightarrow$ JP	0.4842	0.0376	0.5417	12.87	< .001	Reject	Significant

In terms of indirect effects, AISP (AI service performance) significantly affects employee performance (JP) indirectly through job engagement (JE), with an estimated effect of 0.0295 (SE = 0.0129, β = 0.0331), p < 0.05, indicating a significant indirect effect. However, the effect of AISP on employee performance (JP) through employee service quality (ESQ) is not significant (p > 0.05). In terms of component effects, AISP directly influences job engagement (JE) (β = 0.3094, p < 0.001), employee service quality (ESQ) (β = 0.2835, p < 0.001), and employee performance (JP) (β = 0.4844, p < 0.001). Additionally, job engagement (JE) (β = 0.1068, p < 0.05) and employee service quality (ESQ) (β = 0.0856, p < 0.05) each directly influence employee performance (JP). Furthermore, AISP also directly affects employee performance (JP) (β = 0.4844, p < 0.001), with a total effect of 0.4842, p < 0.001, indicating a significant overall effect of AI service performance on employee performance.

In summary, the analysis results indicate that AI service performance indirectly affects employee performance through job engagement and employee service quality, while also directly impacts employee performance. This is consistent with previous research findings, such as Hackman and Oldham's (1976) job design theory emphasizing the impact of job design on job engagement and

performance, and Colquitt et al.'s (2000) study on the impact of training incentives on employee performance. Additionally, this aligns with Locke and Latham's (2002) Goal Setting Theory and Latham and Locke's (2007) research on the impact of goal setting on job performance.

4.6 Moderating Role of Job Security to the Relationship between Artificial Intelligence Performance and Job Engagement and Employee Service Quality

Table 7 Moderating Role of Job Security to the Relationship between Artificial Intelligence Performance and Job Engagement

Variables	Estimate	SE	Z	p	Decision to Ho	Interpretation
AISP	0.378	0.0437	8.65	< .001	Reject	Significant
JS	-0.171	0.0406	-4.23	< .001	Reject	Significant
AISP * JS	0.101	0.0258	3.93	< .001	Reject	Significant
Slope Estimates						
Average	0.378	0.0445	8.5	< .001	Reject	Significant
Low (-1SD)	0.214	0.0534	4	< .001	Reject	Significant
High (+1SD)	0.542	0.0683	7.94	< .001	Reject	Significant

Note. Shows the effect of the predictor (AISP) on the dependent variable (JE) at different levels of the moderator (JS)

Specifically, the influence of AISP on JE varies at different levels of job security. At the mean level, the impact of AISP on JE is most significant (Estimate = 0.378, SE = 0.0445, $p < 0.001$). When job security is relatively low (-1 standard deviation), the impact of AISP on JE is slightly weakened but still significant (Estimate = 0.214, SE = 0.0534, $p < 0.001$). On the other hand, at higher levels of job security (+1 standard deviation), the impact of AISP on JE is further strengthened (Estimate = 0.542, SE = 0.0683, $p < 0.001$). This indicates that job security plays a significant moderating role in the relationship between artificial intelligence service performance and job engagement.

Table 8 Moderating Role of Job Security to the Relationship between Artificial Intelligence Performance and Employee Service Quality

Variables	Estimate	SE	Z	p	Decision to Ho	Interpretation
AISP	0.259	0.0477	5.43	< .001	Reject	Significant
JS	0.1856	0.0442	4.2	< .001	Reject	Significant
AISP * JS	0.0729	0.0281	2.6	0.009	Reject	Significant
Slope Estimates						
Average	0.259	0.048	5.39	< .001	Reject	Significant
Low (-1SD)	0.141	0.0577	2.44	0.015	Reject	Significant
High (+1SD)	0.377	0.074	5.1	< .001	Reject	Significant

Note. Shows the effect of the predictor (AISP) on the dependent variable (ESQ) at different levels of the moderator (JS)

Shown in the table is the moderating effect of job security (JS) on the relationship between artificial intelligence service performance (AISP) and employee service quality (ESQ). The results indicate that the impact of AISP on ESQ is significant (Estimate = 0.259, SE = 0.0477, $p < 0.001$), demonstrating a positive correlation between artificial intelligence service performance and employee service quality. Additionally, job security (JS) significantly influences the relationship between AISP and ESQ (Estimate = 0.1856, SE = 0.0442, $p < 0.001$), indicating that job security plays an important role in moderating the impact of AISP on ESQ. Furthermore, the interaction term between AISP and JS (AISP $\times$ JS) on ESQ is also significant (Estimate = 0.0729, SE = 0.0281, $p = 0.009$), further illustrating the role of job security in moderating the relationship between AISP and ESQ.

These results underscore the importance of job security in moderating the relationship between artificial intelligence service performance and employee service quality, consistent with findings from previous research. For example, Dai et al. (2018) found that job security significantly impacts employee performance and service quality. Additionally, Wang and Gan (2019) highlighted that job security can alleviate employee insecurity caused by artificial intelligence, thereby promoting employee service quality.

5 Conclusion

Based on the findings, the following conclusions were drawn:

1. According to the individual experiences of the respondents, the performance is described by the data analyst.
2. The respondents described the level of artificial intelligence service performance used by data analyst.
3. The job engagement and employee service quality were assessed by the respondents.
4. The level of job security is assessed by the data analysts.
5. AI service performance significantly impacts employee performance through the mediating effects of job engagement and employee service quality, with job engagement and employee service quality playing crucial intermediary roles in this relationship.
6. Job security significantly moderates the relationship between AI service performance and job engagement, with AI service performance having a significant impact on job engagement regardless of the level of job security.

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