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# *Application of Data Completion and Full Lifecycle Cost Optimization Integrating Artificial Intelligence in Supply Chain*

**Yanchun Wang**

*Supply Chain, The Antigua Group, Peoria 85382, Arizona, United States*

*Email: yanchunwang09@gmail.com*

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***Abstract:*** In the context of globalization and digital integration, enterprise supply chains are facing increasing risks of interruption, and traditional management focuses on efficiency while neglecting resilience. The existing research lacks empirical exploration of the specific mechanism of the role of AI driven big data analysis capabilities in supply chain risk management. This study integrates information processing theory and dynamic capability theory to construct a theoretical model of "AI driven big data analysis capability expected capability/improvisation capability supply chain elasticity". Social capital is introduced as a moderating variable, and the hypothesis is verified through hierarchical regression and Bootstrap method. Research has found that the big data analysis capabilities driven by artificial intelligence significantly enhance supply chain resilience, and generate partial mediating effects by enhancing expected capabilities (environmental trend prediction and strategy formulation) and improvisation capabilities (real-time decision-making and resource restructuring); Social capital plays a positive moderating role in the relationship between expected ability, improvisation ability, and supply chain elasticity. A high level of social capital can enhance the promoting effect of ability on elasticity and regulate the strength of mediating effects. Research provides a data completion path for optimizing the full lifecycle cost of the supply chain, emphasizing the synergistic effect of artificial intelligence technology and cross organizational social capital. Future expansion into multiple industries and exploration of vertical data deepening mechanisms.

## 1. Introduction

In the current era of accelerated globalization and digitization, enterprise supply chains [1]are facing unprecedented interruption risks, such as demand fluctuations, labor shortages, and structural issues caused by COVID-19, highlighting the shortcomings of traditional supply chain management that overly focuses on efficiency and neglects resilience. Although academia and industry have recognized the importance of supply chain resilience, existing research mostly remains at the descriptive level, lacking empirical exploration of the specific mechanism of the role of AI driven big data analysis capabilities in supply chain risk management, especially how this capability can enhance supply chain resilience through the dual paths of expected capability [2](predicting risks and developing contingency plans) and improvisation capability (quickly adjusting strategies in emergency situations), and how social capital (such as cross organizational relationship networks) can regulate the boundary conditions of this process. This study aims to fill these gaps by integrating information processing theory and dynamic capability theory, constructing a theoretical model of "AI driven big data analysis capability - expected capability/improvisation capability - supply chain resilience", and introducing social capital as a moderating variable to reveal its mechanism of action. In terms of theoretical contributions, the research has expanded the theoretical scope of the integration of supply chain management and digital technology, deepened the understanding of the complementarity between expected and improvisational capabilities, and verified the moderating effect of social capital in cross organizational cooperation; At the practical level, research responds to the global trend of digital transformation, providing strategic guidance for enterprises to enhance supply chain resilience through artificial intelligence technology, while emphasizing the key role of social capital in resource coordination and information sharing. The structure of the paper adopts a progressive design: the introduction clarifies the research background and significance; Theoretical basis and literature review, sorting out core concepts and research status; Research hypotheses and model construction are based on theoretical deduction to propose hypotheses; Research design optimizes measurement tools through questionnaire development and pre survey optimization; The data analysis uses hierarchical regression and Bootstrap method to verify hypotheses; The final conclusion and outlook summarize the theoretical contributions and practical implications, and propose future research directions.

## 2. Correlation theory

### 2.1. Integration and Application of Information Processing Theory and Dynamic Capability Theory

Information processing theory[3] regards organizations as open information processing systems, emphasizing the key impact of information processing capabilities and demand matching on decision quality - enterprises can respond to environmental changes by reducing uncertainty (such as redundant resource reserves) or enhancing information processing capabilities (such as using digital technology to improve information sharing and decision-making efficiency). This theory has been widely applied in the field of supply chain management, such as supply chain visibility improving operational performance by enhancing analytical capabilities and standardizing information formats to reduce supply chain interruption risks. The dynamic capability theory originates from the resource-based theory, which compensates for the shortcomings of its static resource perspective. It focuses on the ability of enterprises to maintain competitive advantage in dynamic environments through perception of opportunities and threats, capture of opportunities, and allocation of resources. It is highly compatible with supply chain resilience (resource reconfiguration and integration before and after interruption to restore or optimize operational status), providing a solid theoretical foundation for supply chain resilience research. This study is based on information processing theory and regards the AI driven big data analysis capability as an enhanced information processing capability, exploring its impact and mechanism on supply chain resilience; At the same time, combining the theory of dynamic capabilities, we will deeply analyze the mediating role of expected capabilities and improvisational capabilities, as well as the moderating effect of social capital, in order to reveal the specific path and boundary conditions of artificial intelligence empowering supply chain resilience.

### 2.2. AI Big Data Capability and Supply Chain Resilience Mechanism and Its Impact

Against the backdrop of accelerated globalization and digitization, enterprise supply chains are facing increasingly complex uncertainty challenges. Traditional management focuses on efficiency while neglecting resilience, and there is an urgent need to enhance risk response capabilities through digital technology. Information processing theory regards organizations as open information processing systems, emphasizing the crucial role of information processing capabilities and demand matching in decision quality - enterprises can respond to environmental changes by reducing uncertainty (such as redundant resource reserves) or enhancing information processing capabilities (such as AI driven big data analysis). This theory has been widely applied in supply chain management, such as improving operational performance through supply chain visibility and reducing interruption risks through standardized information formats. The dynamic capability theory originates from the resource-based theory and compensates for the shortcomings of its static resource perspective. It focuses on the ability of enterprises to maintain competitive advantage in dynamic environments through perceiving opportunities and threats, capturing opportunities, and allocating resources. It is highly compatible with supply chain resilience (resource reconfiguration before and after interruption to restore or optimize operational status). The AI driven big data analysis capability, as an enhanced information processing capability, achieves automatic data processing and analysis through machine learning, deep learning and other technologies, improving the comprehensiveness and accuracy of analysis, and demonstrating positive effects in supply chain management and enterprise performance, such as optimizing supply chain resilience and promoting green innovation. Expected ability (perceiving environmental changes and preparing in advance) and improvisation ability (adaptive response to unexpected events), as the core dimensions of dynamic ability, complement each other in supply chain resilience - expected ability enhances alertness and preparedness, improvisation ability compensates for insufficient planning, but improvisation ability is not fully explored in supply chain literature. Supply chain resilience, as a key capability for enterprises, relies on technological support such as collaboration, information sharing, agility, and digital technologies for its construction. Social capital (the sum of resources in a relational network) promotes resource exchange and information sharing through structural, cognitive, and relational dimensions, enhances adaptability and response speed, and plays an important role in supply chain interruption recovery and stable operation. Existing research mostly remains at the descriptive level, lacking empirical exploration of the relationship between AI driven big data analysis capabilities and supply chain resilience mechanisms, and the moderating effects of improvisation capabilities and social capital have not been fully elucidated. This study is based on information processing theory and dynamic capability theory, and constructs an "AI driven big data analysis capability expected capability/improvisation capability supply chain resilience" model. Social capital is introduced as a moderating variable, aiming to reveal its impact path and boundary conditions, and provide theoretical guidance and practical inspiration for enterprises to enhance supply chain resilience through digital technology.

## 3. Research method

### 3.1. Reliability verification of AI driven big data analysis capability questionnaire

This study is based on information processing theory and dynamic capability theory, constructing a theoretical model of how AI driven big data analysis capabilities affect supply chain resilience, and proposing a series of research hypotheses. Firstly, the AI driven big data analysis capability positively promotes supply chain resilience by improving information processing efficiency and decision quality (H1). Specifically, this ability works by enhancing the ability to anticipate changes in the environment and prepare in advance, as well as the ability to improvise in response to unexpected events. On the one hand, it strengthens the ability to anticipate market trends and demand changes accurately (H2), enabling enterprises to allocate resources in advance to cope with uncertainty; On the other hand, improving improvisation ability (H3) through real-time data analysis and rapid response mechanisms can assist enterprises in flexibly adjusting strategies in emergency situations. Expected ability and improvisation ability have a positive impact on supply chain resilience (H4, H5), and serve as mediating variables to convey the impact of AI driven big data analysis ability on resilience (H6, H7). In addition, social capital (the sum of resources in the relationship network) plays a regulatory role in the intermediary process: high levels of social capital enhance the positive effects of expected and improvisational abilities on supply chain resilience (H8, H9), and further regulate the strength of intermediary pathways (H10, H11). In summary, this study reveals that the big data analysis capability driven by artificial intelligence enhances supply chain resilience through the path of "capability enhancement intermediary transmission regulation strengthening", providing theoretical support and practical guidance for empowering supply chain management with digital technology for enterprises.

### 3.2. Research on the impact of AI driven big data analysis capabilities on supply chain resilience

This study is based on information processing theory and dynamic capability theory, constructing a theoretical model of how AI driven big data analysis capabilities affect supply chain resilience, and proposing a series of research hypotheses. Firstly, the AI driven big data analysis capability positively promotes supply chain resilience by improving information processing efficiency and decision quality (H1). Specifically, this ability works by enhancing the ability to anticipate changes in the environment and prepare in advance, as well as the ability to improvise in response to unexpected events. On the one hand, it strengthens the ability to anticipate market trends and demand changes accurately (H2), enabling enterprises to allocate resources in advance to cope with uncertainty; On the other hand, improving improvisation ability (H3) through real-time data analysis and rapid response mechanisms can assist enterprises in flexibly adjusting strategies in emergency situations. Expected ability and improvisation ability have a positive impact on supply chain resilience (H4, H5), and serve as mediating variables to convey the impact of AI driven big data analysis ability on resilience (H6, H7). In addition, social capital (the sum of resources in the relationship network) plays a regulatory role in the intermediary process: high levels of social capital enhance the positive effects of expected and improvisational abilities on supply chain resilience (H8, H9), and further regulate the strength of intermediary pathways (H10, H11). In summary, this study reveals that the big data analysis capability driven by artificial intelligence enhances supply chain resilience through the path of "capability enhancement intermediary transmission regulation strengthening", providing theoretical support and practical guidance for empowering supply chain management with digital technology for enterprises.

### 3.3. Pre-survey Validation: AI-Driven Big Data Analytics Tool Reliability & Validity

This study conducted a reliability and validity test on the initial questionnaire through a pre survey (distributing 80 questionnaires and collecting 67 valid questionnaires) to ensure the reliability of the formal survey. The reliability test adopts Cronbach's alpha[4]and the modified term total correlation (CITC) index, where the Cronbach's alpha calculation formula is

$$\alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i=1}^{k}\sigma_i^2}{\sigma_x^2}\right) \quad \alpha = \frac{k}{k-1}\left(1 - \frac{\sum_{i=1}^{k}\sigma_i^2}{\sigma_x^2}\right) \tag{1}$$

In the formula, k represents the number of items, $\sigma_i^2$represents the variance of the i-th item, and $\sigma_x^2$ is the variance of the total score. The research results indicate that the Cronbach alpha coefficients of AI driven big data analysis capability (Cronbach alpha coefficient=0.920), expected capability (0.922), improvisation capability (0.908), supply chain resilience (0.910), and social capital (0.899) all exceed the threshold standard of 0.7, and the total correlation coefficient (CITC) of all items is higher than 0.6, which fully verifies the excellent level of internal consistency reliability of the scale.The validity test evaluates the feasibility of data factor analysis through KMO value [5] and Bartlett's sphericity test. The KMO value calculation formula is:

$$KMO = \frac{\sum\sum_{i\neq j} r_{ij}^2}{\sum\sum_{i\neq j} r_{ij}^2 + \sum\sum_{i\neq j} P_{ij}^2} \quad \text{(Formula2)}$$

The overall KMO value is 0.832, and the KMO values of all variables are greater than 0.8. Bartlett's sphericity test is significant (p<0.001), meeting the conditions for factor analysis. Exploratory factor analysis (EFA) [6]used principal component analysis and Varimax rotation[7]to extract 5 factors from 24 items, with a cumulative explanatory variance of 79.674%. The factor loadings of each item ranged from 0.645 to 0.909 (all greater than 0.5), and the factor structure was consistent with the theoretical design dimensions (as shown in Table 1), verified the structural validity of the scale. The pre survey data confirms that the questionnaire has good reliability and validity, and can be used as a formal research tool.

*Table 1. Exploratory Factor Analysis Results*

| Variable | Item | Component 1 | Component 2 | Component 3 | Component 4 | Component 5 | Eigenvalue | Cumulative Variance Explained |
|---|---|---|---|---|---|---|---|---|
| AI-Driven Big Data Analytics Capability | AIBDAC1 | 0.806 | | | | | 1.453 | 16.891% |
| Anticipatory Capability | AC1 | | 0.726 | | | | 1.688 | 33.079% |
| Improvisational Capability | IC1 | | | 0.801 | | | 1.210 | 48.429% |
| Supply Chain Resilience | SCR1 | | | | 0.667 | | 11.334 | 62.917% |
| Social Capital | SC1 | | | | | 0.810 | 2.718 | 76.674% |

## 4. Results and discussion

### 4.1. Research on the impact of AI driven big data analysis capabilities on supply chain resilience

This study ensures data quality through normality testing, common method bias testing, and reliability analysis. The normality test results show that the absolute values of skewness and kurtosis of all latent variables (AI driven big data analysis ability, expectation ability, improvisation ability, supply chain elasticity, social capital) are less than 2, which meets the requirements of normal distribution. The specific statistical values are shown in Table 2 to 4.

*Table2. a Normality Test Results (AI-Driven Big Data Analytics Capability)*

| Variable | Mean | Std Dev | Skewness Stat | Skewness SE | Kurtosis Stat | Kurtosis SE |
|---|---|---|---|---|---|---|
| AIBDAC1 | 4.812 | 1.476 | -0.683 | 0.156 | 0.187 | 0.310 |
| AIBDAC2 | 5.241 | 1.438 | -0.721 | 0.156 | 0.039 | 0.310 |
| AIBDAC3 | 5.249 | 1.408 | -0.867 | 0.156 | 0.708 | 0.310 |
| AIBDAC4 | 5.278 | 1.375 | -0.883 | 0.156 | 0.611 | 0.310 |

*Table 3. b Normality Test Results (Anticipatory Capability)*

| Variable | Mean | Std Dev | Skewness Stat | Skewness SE | Kurtosis Stat | Kurtosis SE |
|---|---|---|---|---|---|---|
| AC1 | 5.310 | 1.132 | -0.479 | 0.156 | -0.112 | 0.310 |
| AC2 | 5.298 | 1.286 | -0.618 | 0.156 | 0.043 | 0.310 |
| AC3 | 5.110 | 1.159 | -0.424 | 0.156 | 0.099 | 0.310 |
| AC4 | 5.257 | 1.118 | -0.451 | 0.156 | 0.375 | 0.310 |
| AC5 | 5.408 | 1.107 | -0.606 | 0.156 | 0.648 | 0.310 |

*Table 4. b Normality Test Results (Anticipatory Capability)*

| Variable | Mean | Std Dev | Skewness Stat | Skewness SE | Kurtosis Stat | Kurtosis SE |
|---|---|---|---|---|---|---|
| AC1 | 5.310 | 1.132 | -0.479 | 0.156 | -0.112 | 0.310 |
| AC2 | 5.298 | 1.286 | -0.618 | 0.156 | 0.043 | 0.310 |
| AC3 | 5.110 | 1.159 | -0.424 | 0.156 | 0.099 | 0.310 |
| AC4 | 5.257 | 1.118 | -0.451 | 0.156 | 0.375 | 0.310 |
| AC5 | 5.408 | 1.107 | -0.606 | 0.156 | 0.648 | 0.310 |

The common method bias test used Harman's single factor method. Non rotated principal component analysis showed that the proportion of variance explained by one factor was 43.101% (<50%), indicating that homologous data did not significantly affect the research results. Reliability analysis was conducted using Cronbach's alpha coefficient and CITC value evaluation. The Cronbach's alpha values for each variable were 0.907 (AI driven big data analysis ability), 0.894 (expected ability), 0.835 (improvisation ability), 0.888 (supply chain resilience), and 0.834 (social capital), all of which were greater than 0.7; All items have CITC values greater than 0.5. Overall, the data quality is good and meets the requirements for subsequent empirical analysis.

## 4.2. Model experiment

In terms of ensuring content validity, it is achieved through a rigorous questionnaire development process: selecting authoritative and mature domestic and foreign scales as the basis, combining expert consultation to optimize the content for multiple rounds, and fine-tuning and calibrating the items through pre research to ensure that the measurement items accurately reflect the essential characteristics of the research core concept. The exploratory factor analysis results showed that the KMO statistic reached 0.933 (significantly higher than the applicable standard of 0.6), and the Bartlett sphericity test had a significance of 0.000 (p<0.001), fully meeting the prerequisites for factor analysis; The principal component analysis method extracted 5 common factors, with a cumulative variance explanation rate of 68.791% (exceeding the benchmark requirement of 50%). The factor loading range for each question item is 0.521 to 0.851 (all above the critical criterion of 0.5), and the eigenvalues are all greater than 1. The factor structure is highly consistent with the predetermined research model. Through confirmatory factor analysis using AMOS 26 software, it was shown that the model fitting effect was excellent: the chi square/df was 1.581 (far below the excellent standard 3), the RMSEA was 0.049 (below the threshold of 0.08), and the CFI, TLI, and IFI reached 0.959, 0.954, and 0.960, respectively (all significantly exceeding the excellent standard of 0.9). In terms of convergent validity, the CR values (0.908, 0.895, 0.843, 0.890, 0.835) of each variable combination reliability exceeded the 0.7 benchmark, indicating excellent internal consistency of the measurement tool, variance extracted (AVE)[8] were 0.711, 0.630, 0.574, 0.575, and 0.504, respectively (all>0.5), and the standardized factor loadings were all greater than 0.5; The discriminant validity was validated by comparing the AVE square root values with the correlation coefficients between variables. The AVE square root values (0.843, 0.794, 0.758, 0.710, 0.758) were all higher than the absolute correlation coefficients between variables, verifying good discriminant validity. Correlation analysis and collinearity diagnosis show that the Pearson correlation coefficients between variables are all<0.7, and the variance inflation factor (VIF) is<5, indicating no significant collinearity issue. Meanwhile, the AI driven big data analysis capability is significantly positively correlated with supply chain resilience (r=0.493, p<0.01), expected capability (r=0.551, p<0.01), and improvisation capability (r=0.359, p<0.01); The expected ability is significantly positively correlated with supply chain resilience (r=0.677, p<0.01), and the improvisation ability is significantly positively correlated with supply chain resilience (r=0.598, p<0.01), providing preliminary support for hypotheses H1-H5. The overall data validity is excellent, laying a solid foundation for subsequent hypothesis testing.

### 4.3. Effect analysis

This study tested the regression model using hierarchical regression and Bootstrap method[9], and the results showed that the sample data met normal distribution, good reliability and validity, and no significant multicollinearity, which is in line with the premise of regression analysis. In the main effect test, AI driven big data analytics capability (AIBDAC) has a significant positive impact on supply chain resilience (SCR)[10](β=0.486, p<0.001), supporting hypothesis H1. At the same time, AIBDAC is significantly positively correlated with expected capability (AC) and improvisation capability (IC) (β=0.558, p<0.001; β=0.356, p<0.001), verifying H2 and H3. Furthermore, the positive effects of AC and IC on SCR were also significant (β=0.671, p<0.001; β=0.589, p<0.001), supporting H4 and H5.

The mediation effect test showed that AC and IC partially mediate the relationship between AIB DAC and SCR: the indirect effect of AIBDAC on SCR through AC accounted for 66.87% (95% CI =[0.1332,0.2786]), and the indirect effect through IC accounted for 34.70% (95% CI=[0.0612,0.153 1]), supporting H6 and H7. In terms of regulatory effects, social capital (SC) plays a positive regulat ory role in the relationship between AC and SCR, as well as IC and SCR (interaction term β=0.187, 0.168, both p<0.001), supporting H8 and H9; And the higher the SC level, the stronger the mediatin g effect between AC and IC (with mediation effect indices of 0.1005 and 0.0550, respectively, and 9 5% CI excluding 0), supporting H10 and H11. In summary, the regression analysis system validated the direct effects of AIBDAC on SCR and the indirect effects through AC and IC, while revealing t he boundary condition role of SC in the capability elasticity relationship, providing empirical eviden ce for understanding how AI driven big data analysis capabilities enhance supply chain elasticity thr ough dynamic capabilities.

## 5. Conclusion

This study is based on information processing theory and dynamic capability theory, systematically exploring the interactive relationship between AI driven big data analysis capability, expectation capability, improvisation capability, and supply chain resilience, and revealing the boundary regulating role of social capital. The research conclusion shows that the big data analysis capability driven by artificial intelligence significantly improves supply chain resilience by enhancing information processing and decision optimization capabilities, while positively promoting expected capabilities (environmental trend prediction and strategy formulation) and improvisation capabilities (real-time decision-making and resource restructuring); Both expected ability and improvisation ability have a direct positive impact on supply chain resilience, and both play a partial mediating role between AI driven big data analysis ability and supply chain resilience, that is, technical ability indirectly enhances resilience performance through dynamic ability; Social capital plays a positive moderating role in the relationship between expected ability, improvisation ability, and supply chain elasticity. A high level of social capital can strengthen the promoting effect of ability on elasticity and further positively regulate the strength of intermediary effects. In terms of theoretical contribution, this study enriches the literature on the application of digital technology in the supply chain field, deepens the empirical explanation of information processing theory and dynamic capability theory in the digital scenario of supply chain; Revealed the mechanism by which AI driven big data analysis capabilities affect supply chain resilience, filling the research gap in the neglect of improvisation capabilities in risk response; Verified the moderating effect of social capital as a boundary condition and expanded the theoretical understanding of the cross organizational cooperation characteristics of supply chain elasticity. Management insights include: enterprises should invest in building AI driven big data analysis technology to enhance information processing and response capabilities; Emphasize the cultivation of expected abilities (trend prediction and warning) and improvisational abilities (dynamic resource optimization); Actively building close relationships among supply chain members to enhance the effectiveness of social capital, promote information sharing and resource synergy. The research limitation lies in the use of cross-sectional data, and in the future, mechanism exploration can be deepened through longitudinal data or case analysis; Unclassified types of artificial intelligence technology can be analyzed from the perspective of technology classification to assess the impact of differentiation; It is necessary to expand the validation conclusions to non-manufacturing industries to provide broader strategic guidance.

## References

[1] *Yan Y, Lei Y, Wang Y, et al. Digital transformation and customer enterprise innovation - From the perspective of supply chain spillover effects[J]. Finance Research Letters, 2025, 76. DOI:10. 1016/j. frl. 2025. 106941.*

[2] *Davis J, Robberechts P. Biases in Expected Goals Models Confound Finishing Ability[J]. 2024.*

[3] *Mwambe O O. Deployment of information processing theory to support adaptive e-learning systems: Feasibility study[J]. Computers in Human Behavior Reports, 2024, 14. DOI:10. 1016/j. chbr. 2024. 100420.*

[4] *Santos J R A. Cronbach's Alpha: A Tool for Assessing the Reliability of Scales[J]. Journal of Extension, 1999, 37(2):2TOT3.*

[5] *Tang X, Wu X, Bao W. Intelligent Prediction-Inventory-Scheduling Closed-Loop Nearshore Supply Chain Decision System[J]. Advances in Management and Intelligent Technologies, 2025, 1(4).*

[6] *Wu X, Bao W. Research on the Design of a Blockchain Logistics Information Platform Based on Reputation Proof Consensus Algorithm[J]. Procedia Computer Science, 2025, 262: 973-981.*

[7] *Liu Y. Blockchain Future in Cloud Computing: The Challenges to Implement Blockchain Technology in Cloud Computing[J]. Journal of Computer, Signal, and System Research, 2025, 2(5): 15-23.*

[8] *Li W. Building a Credit Risk Data Management and Analysis System for Financial Markets Based on Blockchain Data Storage and Encryption Technology[C]//2025 3rd International Conference on Data Science and Network Security (ICDSNS). IEEE, 2025: 1-7.*

[9] *Sun Q. Research on Accuracy Improvement of Text Generation Algorithms in Intelligent Transcription Systems[J]. Advances in Computer and Communication, 2025, 6(4).*

[10] *Su H, Luo W, Mehdad Y, et al. Llm-friendly knowledge representation for customer support[C]//Proceedings of the 31st International Conference on Computational Linguistics: Industry Track. 2025: 496-504.*

*[11]Yuan S. Application of Network Security Vulnerability Detection and Repair Process Optimization in Software Development[J]. European Journal of AI, Computing & Informatics, 2025, 1(3): 93-101.*

*[12]Liu X. Emotional Analysis and Strategy Optimization of Live Streaming E-Commerce Users Under the Framework of Causal Inference[J]. Economics and Management Innovation, 2025, 2(6): 1-8.*

*[13]Lai L. Risk Control and Financial Analysis in Energy Industry Project Investment[J]. International Journal of Engineering Advances, 2025, 2(3): 21-28.*

*[14]Wu Y. Software Engineering Practice of Microservice Architecture in Full Stack Development: From Architecture Design to Performance Optimization[J]. 2025.*

*[15]Z Zhong. AI-Assisted Workflow Optimization and Automation in the Compliance Technology Field [J]. International Journal of Advanced Computer Science and Applications (IJACSA), 2025, 16(10): 1-5.*

*[16]Wu Y. Graph Attention Network-based User Intent Identification Method for Social Bots[J]. Advances in Computer and Communication, 2025, 6(4).*

*[17]Chen X. Research on Architecture Optimization of Intelligent Cloud Platform and Performance Enhancement of MicroServices[J]. Economics and Management Innovation, 2025, 2(5): 103-111.*

*[18]Chen M. Research on the Application of Privacy-enhancing Technologies in AI-driven Automated Risk Detection Systems[J]. Advances in Computer and Communication, 2025, 6(4).*

*[19]Chen X. Research on the Integration of Voice Control Technology and Natural Language Processing in Smart Home Systems[J]. European Journal of Engineering and Technologies, 2025, 1(2): 41-48.*

*[20]Huang, J. (2025). Research on Resource Prediction and Load Balancing Strategies Based on Big Data in Cloud Computing Platform. Artificial Intelligence and Digital Technology, 2(1), 49-55.*