

Research on The Impact of Aluminum Enterprise Information System on Performance after Implementation

Lin Guangbo^{1*}, Chen Shanyu²

¹ College of Tourism and E-Commerce, Baise University, Baise City, China

² Faculty of Design and Architecture, University Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

*Corresponding Author: linguangbo@bsuc.cn

Received: 20 January 2024 | Accepted: 5 March 2024 | Published: 31 March 2024

DOI: <https://doi.org/10.55057/ijbtm.2024.6.1.39>

Abstract: *Chinese aluminum companies and their industries are undergoing high-tech manufacturing industry upgrades. However, as its capital investment in industrial informatization continues to increase, its corporate performance is still uncertain. This study selects China's aluminum companies as the research object. Through a sample survey and analysis of the informatization level and corporate performance of these representative companies, the research conclusions are as follows: The first is the ongoing transformation of Chinese aluminum companies into high-tech manufacturing industries. With the investment in industrial informatization, their corporate performance levels have been significantly improved. Second, enterprise information concept does not have a significant impact on corporate business coupling and corporate performance. Third, the degree of enterprise business coupling plays a partial mediating role in the impact of the four dimensions of enterprise informatization level (organizational management informatization, marketing means informatization, product production and processing informatization, and artificial intelligence application) on enterprise performance. Fourth, employees' own information literacy level plays a positive regulating role between corporate business coupling and corporate performance.*

Keywords: Aluminum Enterprise, Enterprise Business Coupling, Employee Information Literacy, Enterprise Performances

1. Introduction

Aluminum is an indispensable basic raw material in the national economy and is widely used in construction, packaging, transportation, electricity and other fields. In recent years, China's aluminum industry has faced transformation and upgrading and is developing towards high-end manufacturing. Since 2021, the country's primary aluminum output has been 21.94 million tons. Calculated on the basis that one ton of aluminum requires 1.93 tons of alumina, China's alumina can fully meet the needs of domestic electrolytic aluminum production. China's aluminum production reached 39.43 million tons, a year-on-year increase of 27%, maintaining a relatively high growth rate. The development of high-tech manufacturing is inseparable from the investment in intelligent manufacturing processes. The basis of intelligent manufacturing is the informatization construction of enterprise infrastructure. However, as the level of capital investment in industrial informatization continues to increase, especially the high-tech characteristics of high-tech manufacturing such as artificial intelligence After intelligence and intelligent stamping systems are added, its industrial performance level is still uncertain.

The informatization content of aluminum enterprises mainly includes five aspects: informatization of enterprise management, informatization of marketing methods, informatization of product production and processing, and application of artificial intelligence (AI). Zan A, Yao Y, Chen H (2019) pointed out through a survey of some enterprises that enterprise informatization can increase the coupling degree between enterprises, including the coupling degree (fit) of enterprise affairs management, the coupling between the actual situation of the enterprise and the original development goals. It has significant improvement effects in four aspects: improving the coupling degree of product sales work among employees and improving the coupling degree of product production work. Berente, N., & Yoo, Y. (2012) and others have also proven that there is a certain promoting relationship between enterprise business coupling degree and enterprise performance. The improvement of the informatization level of aluminum enterprises can promote the degree of enterprise business coupling, but in reality it also depends on the effect of enterprise employees' use of information systems. Therefore, the information literacy level of employees themselves plays an important role in promoting the level of enterprise business coupling and enterprise performance. Lifting has a certain regulatory effect.

Therefore, this study aims to study the impact of the aluminum enterprise's information system (IS) on its performance after its implementation. The specific research objectives include: (1) The effect of the aluminum enterprise's information level after the implementation of IS on the business coupling degree of the enterprise. (2) The role of enterprise business coupling degree in improving enterprise performance. (3) The moderating effect of enterprise employee information literacy level on the relationship between enterprise business coupling degree and enterprise performance.

2. Literature Review

2.1 Aluminum Enterprise Informatization and Performance

The main purpose of enterprise informatization is to use advanced information technology and modern management methods to improve and optimize the level of enterprise business process management. de Ugarte, BS, Hajji, A., Pellerin, R. and Artiba, A. (2009) Based on the real scenario of the aluminum industry in the general enterprise information system, it is proposed that the aluminum enterprise resource management plan needs to utilize the enterprise's management system and raw materials. The production and processing system, product marketing system, intelligent data processing system, etc. constitute the enterprise resource management decision-making system. Viktor, K., Alexey, K., Andrey, D (2020) Study the functional potential of the latest information systems in enterprise management, processing enterprise economic information and forming management process information provision, confirming the role of the latest information systems in realizing company business and innovation success and improve profitability.

McAfee, A. (2002) presents the results of a natural experiment conducted by a high-tech aluminum manufacturer in the United States. The experiment was approached by employing a comprehensive enterprise information system at one point in time in a functional group responsible for customer order fulfillment. A few months later, the results of a longitudinal comparison of post-IT adoption and measurement of operational performance showed a significant improvement relative to pre-IS adoption levels. Zhang, JF (2011) proposed a set of three key first-level indicators (enterprise informatization status, production management characteristics and system functional requirements), 16 second-level indicators, and 80 third-level indicators, and proposed the use of gray correlation analysis method to Evaluate the

results of enterprise informatization. From the above research, it can be seen that the informatization research of enterprises mainly focuses on the process selection of information systems and the evaluation of the results of improving the informatization level of enterprises after the implementation of information systems.

2.2 Coupling Degree of Enterprise Informatization and Enterprise Performances

After the implementation of the enterprise information system, its purpose is to optimize the business processes of the original enterprise, improve the seamless connection between the enterprise's work and the degree of coupling in different types of work, so that the enterprise can proceed towards the established development goals, and ultimately output an efficient enterprise performance. Zhang, and supervision and incentive modules, making the enterprise chain information service platform based on blockchain technology provide technical support for improving the coupling degree of various work and business of the enterprise. Gosain, S., Malhotra, A., & El Sawy, OA (2004) drew on March and Simon's coordination theory and proposed the use of enterprise information systems to structure inter-organizational processes and information exchange, so that cooperative organizations are loosely coupled, and IT supports Dynamic adjustments between organizations enable enterprise organizations to quickly perceive changes and adjust their cooperative relationships. This research pioneered a new theoretical stream that focuses on the important role of information systems in managing organizational goals that provide cooperative flexibility.

2.3 The Regulating Effect of Enterprise Employees' information Literacy

Information literacy has been a topic of increasing debate and discussion since the publication of Paul Gilster's seminal book *Information Literacy* in 1997. Scholars mainly build information literacy capabilities around computer literacy and screening of massive network information. Belshaw, D. (2012). Extracted eight basic elements of digital literacy from research literature, and believed that these elements promote employees' efficient use of computers and network information and improve work efficiency. Klopper, J., Kalgovas, B., Borgman, H., & Benlian, A. (2023) Seven in-depth case studies conducted in Dutch companies in different industries found that employee quality literacy has important motivations in various business environments function. A high level of information literacy can enable employees to quickly become familiar with and master the use of new information systems, saving communication time between enterprise business flows. Create business benefits.

From the above literature research, it can be concluded that, firstly, there are many literatures on the impact of enterprise informatization on performance, and they all prove that enterprise informatization has a certain impact on enterprise performance. However, after the implementation of informatization based on a certain manufacturing industry, especially It is artificial intelligence introduced into high-tech manufacturing industry. The impact of high-tech technology on enterprise performance is still unclear. Second, in the existing literature, blockchain-based technology can improve the coupling degree of business cooperation of enterprises. After the implementation of high-tech intelligent enterprise information systems, it also needs to be clarified whether it will have an impact on the coupling degree of business work of enterprises. Third, after enterprise employees implement information systems, it also needs to be clarified whether their own information literacy level will have a moderating effect on work-business coupling and enterprise performance.

3. Research Models and Hypotheses

Based on the above research deficiencies and combined with the research purpose of the article, this article designed the following research hypotheses.

3.1 Hypothesis on the Relationship between Aluminum Enterprise Informatization and Enterprise Business Coupling Degree

After the implementation of the enterprise information system, its purpose is to optimize the business processes of the original enterprise, improve the seamless connection between the enterprise's work and the degree of coupling in different types of work. Zhang, and supervision and incentive modules, so that the enterprise chain information service platform based on blockchain technology can provide technical support for improving the coupling degree of various tasks of the enterprise. Based on this, this study puts forward the following hypotheses. H1: Aluminum enterprise informatization has a positive impact on enterprise business coupling. According to the informatization content of aluminum enterprises, it mainly includes: enterprise management informatization, marketing means informatization, product production and processing informatization, etc. In the actual investigation, with the transformation and development of high-tech manufacturing industry, the author should also include artificial intelligence. (AI) applications and other new information system technologies. Accordingly, this hypothesis can be divided into:

H1a: Enterprise informatization concept has a significant positive correlation with enterprise business coupling degree.

H1b: Organizational management informatization has a significant positive correlation with enterprise business coupling.

H1c: The informatization of marketing methods has a significant positive correlation with the degree of enterprise business coupling.

H1d: Product production and processing informatization has a significant positive correlation with enterprise business coupling.

H1e: Artificial intelligence applications have a significant positive correlation with enterprise business coupling.

3.2 Hypothesis on the Relationship between Enterprise Business Coupling Degree and Enterprise Performance

Zhao, J. (2023) took some manufacturing companies in the Yangtze River Delta region of China as samples and empirically proved that there is a positive correlation between corporate coupling and innovation performance. Berente, N., & Yoo, Y. (2012) and others have also proven that there is a certain promoting relationship between enterprise business coupling degree and enterprise performance. Based on this, this study proposes the following hypothesis.

H2: The degree of enterprise business coupling has a positive impact on enterprise performance

3.3 Hypothesis on the Relationship between Aluminum Enterprise Informatization and Enterprise Performance

After the implementation of the aluminum enterprise information system, it is necessary to measure whether the implemented information system or the implementation of high-tech smart information system can improve the performance of the enterprise, Viktor, K., Alexey, K., Andrey, D (2020) latest research The functional potential of information systems in business management, processing business economic information and forming management

process information provision confirms the key role of the latest information systems in achieving the company's commercial and innovative success and improving profitability. McAfee, A. (2002) presents the results of a natural experiment conducted by a high-tech aluminum manufacturer in the United States. The experiment was approached by employing a comprehensive enterprise information system at one point in time in a functional group responsible for customer order fulfillment. A few months later, the results of a longitudinal comparison of post-IT adoption and measurement of operational performance showed a significant improvement relative to pre-IS adoption levels. Based on this, this study proposes the following hypothesis.

H3: Aluminum enterprise informatization has a positive impact on enterprise performance. According to the five dimensions of aluminum enterprise informatization, the H3 hypothesis can be divided into the following five sub-hypotheses.

H3a: Enterprise informatization concept has a significant positive correlation with enterprise performance;

H3b: Organizational management informatization has a significant positive correlation with corporate performance;

H3c: Marketing informatization has a significant positive correlation with corporate performance;

H3d: Product production and processing informatization has a significant positive correlation with corporate performance;

H3e: Artificial intelligence application has a significant positive correlation with corporate performance;

Based on the analysis from 3.1 to 3.3, based on the mediating effect. We propose the following hypothesis.

H4: Enterprise business coupling degree plays a mediating role between aluminum enterprise informatization and enterprise performance.

3.4 The Regulating Effect of Employees' Own Information Literacy Level

Belshaw, D. (2012). Extracted eight basic elements of digital literacy from research literature, and believed that these elements promote employees' efficient use of computers and network information and improve work efficiency. Klopper, J., Kalgovas, B., Borgman, H., & Benlian, A. (2023) Seven in-depth case studies conducted in Dutch companies in different industries found that employee quality literacy has important motivations in various business environments function. Generally speaking, after the implementation of an enterprise information system, it requires efficient use by enterprise employees to reflect its system value. This is also limited by the level of information literacy of employees. Employees with high information literacy are generally more able to effectively play the role of information systems and promote enterprise business coupling. and corporate performance. On the contrary, low-level information literacy will affect or even weaken the capabilities of information systems, thereby reducing corporate business coupling and corporate performance. Therefore, this study proposes the following hypotheses:

H5: Employees' own information literacy level positively moderates the impact of corporate business coupling on corporate performance.

Based on the above theoretical derivation, the theoretical model of this study is shown in Figure 1.

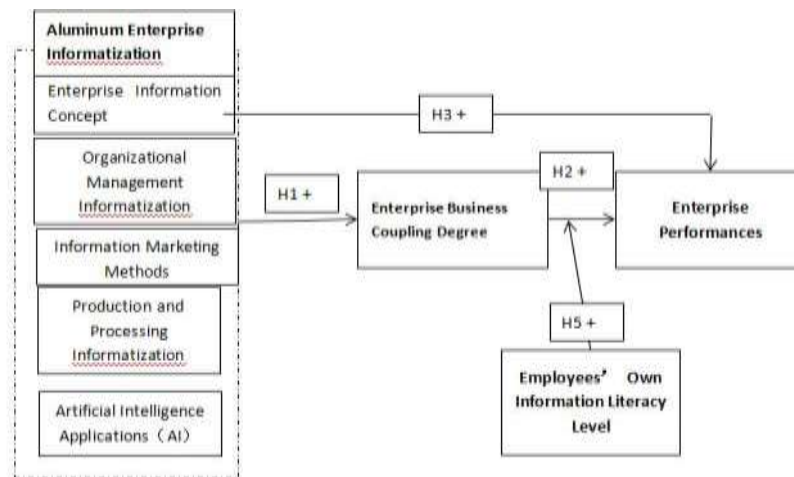


Figure 1: Research Model

4. Research Methods

4.1 Data Sources

This project selected Chinese aluminum enterprises as the research object, and conducted a sampling survey and analysis of the informatization implementation of these enterprises. From September to November 2023, random sampling method was used to select 128 samples for questionnaire survey, and finally 120 valid questionnaires were obtained. The sampling survey information is shown in Table 1.

Table 1: Basic situation of research objects of aluminum enterprises N= 120

Item	Description
Aluminum business nature	- There are 52 state-owned enterprises, accounting for 43%. - There are 68 private enterprises, accounting for 57%.
Enterprise size	- Micro companies (1-25 employees), 9.2%. - Small companies (26-99 employees), 17.5%. - Medium-sized companies (100-999 employees), accounting for 56.7%. - Large companies (1000+ employees) account for 16.7%
Position in the company	- Senior management (decision-making level), accounting for 7.5%. - Middle management (implementation level), accounting for 25%. - Bottom management (execution level), accounting for 39.2%. - Production employees, accounting for 11.7%. - Sales employees, 16.7%.
Gender	- Female, accounting for 52.5%. - Male, accounting for 47.5%.
Age	- 18-24, accounting for 15%. - 25-34, accounting for 58.3%. - 35-44, accounting for 16.7%. - 45-54, accounting for 6.7%. - Those aged 55 and above accounted for 3.3%
Information technology investment	- Less than 1 million RMB, accounting for 15.8%. - 2 million yuan--5 million RMB, accounting for 26.7%. - 5 million yuan--8 million yuan, accounting for 30%. - More than 8 million yuan, accounting for 27.5%.

It can be seen from the above table that state-owned enterprises accounted for 43% of the aluminum enterprises in this sample survey, and private enterprises accounted for 57%, which is relatively normal. Enterprise sizes are also distributed in different ways. A larger proportion of them are medium-sized enterprises, accounting for 56.7%, which is more consistent. The current company size trend in the aluminum industry shows that aluminum companies are

currently dominated by medium-sized enterprises, and the corporate managers questioned are mainly middle-level managers and bottom-level technical managers, who have direct front-line contact with the enterprise's information system applications. The company's investment in informatization is also mainly between 2 million yuan and 8 million yuan, which is more in line with the introduction of electrolytic aluminum, ecological aluminum and other production system investments after the transformation of high-tech manufacturing. The overall sampling objects meet the research requirements.

4.2 Variable selection and descriptive statistics

(1) Independent variable: The scales involved in this study all adopt a 5-level Likert format. The independent variable is the informatization level of aluminum enterprises. The items mainly refer to de Ugarte, BS, Hajji, A., Pellerin, R. and Artiba, A. (2009) Based on the real scene of the aluminum industry in the general enterprise information system, it is proposed that the aluminum enterprise resource management plan needs to use the enterprise's management system, raw material production and processing system, product marketing system, intelligent data processing system, etc. to form the enterprise Resource management decision-making system. Combined with the research objectives of this study on high-tech manufacturing, the informatization content of aluminum enterprises mainly includes five aspects: enterprise management informatization, marketing means informatization, product production and processing informatization, and artificial intelligence (AI) application. The scales used are all from authoritative journal articles at home and abroad, and have been repeatedly verified to meet the requirements for reliability and validity, and are proven to be mature scales. Descriptive statistics are shown in Table 2.

Table 2: Descriptive statistical results of informatization level of aluminum enterprises N= 120

Item	Description
Enterprise information conceptt	- mean value 4.1 - standard deviation 0.54.
Organizational management informatization	- mean value 4.08 - standard deviation 0.61.
Information Marketing Methods	- mean value 4.00 - standard deviation 0.7.
Production and Processing Informatization	- mean value 4.00 - standard deviation 0.79.
Artificial Intelligence Applications (AI)	- mean value 3.99 - standard deviation 0.76.

As can be seen from the table above, the average evaluation values of the five enterprise informationization indicators, namely enterprise informationization concept, organization and management informationization, marketing means informationization. Production and processing informationization and artificial intelligence application (AI), are mostly above 4.0, indicating that Corporate respondents relatively recognized the informatization level after the implementation of enterprise IS, and the standard deviations were all below 1.0, indicating that the respondents' attitudes towards various informatization level evaluations were not very different. During the on-site visit and survey, we learned that most of the interviewed companies are promoting high-tech manufacturing systems such as electrolytic aluminum and ecological aluminum. The level of industrial informatization and production capacity have been greatly improved.

(2) Intermediary variable: Enterprise Business Coupling Degree. Mainly referring to the coordination theory of March and Simon, enterprise information systems are used to structure the processes and information exchanges between enterprise organizations, so that cooperative

organizations are loosely coupled, and IT-supported dynamic adjustments between organizations enable enterprise organizations to quickly perceive changes and adjust their cooperation. relation. Four questions were set up to measure: the mean and standard deviation are shown in Table 3.

Table 3: Descriptive statistical results of enterprise business coupling degree N= 120

Item	Description
Enterprise business coupling degree	- mean value 4.01 - standard deviation 0.70.

As can be seen from Table 3, the mean value of the enterprise's business coupling degree is around 4.0, indicating that most respondents believe that the enterprise's business coupling degree is at a relatively high level.

(3) Dependent variable: corporate performance. The analysis of variables refers to the research results of Yang Zhong and Zhang Xiao (2009). Combining the current situation of surveyed enterprises and expert opinions, since there is no decisive theory for measuring enterprise performance, the performance of different enterprise types is also different. This study believes that corporate performance is the most intuitive experience of corporate personnel, who can feel the performance changes of the company. Four questions are set to measure: the mean and standard deviation are shown in Table 4.

Table 4: Descriptive statistical results of Enterprise Performance N= 120

Item	Description
Enterprise Performance	- mean value 4.27 - standard deviation 0.37.

As can be seen from Table 4, the mean value of Enterprise Performance is around 4.2, indicating that most respondents believe that Enterprise Performance has been greatly improved, and the standard deviations are all around 0.56, indicating that the survey respondents have relatively consistent views on this item.

(4) Modulating variable: employees' own information literacy level, mainly referring to the measurement indicators of employee information literacy by Taiwanese scholars Lee CC, et al (2013). Four questions were set up to measure based on the actual situation : the mean and standard deviation are shown in Table 5 .

Table 5: Descriptive statistical results of employees' own information literacy levels N= 120

Item	Description
Employees' own information literacy level	- mean value 4.11 - standard deviation 0.61.

As can be seen from Table 5, the mean value of Enterprise Performance is around 4.1, indicating that most respondents believe that using information systems can improve their information literacy. The standard deviations are all around 0.6, indicating that the survey respondents have relatively consistent views on this item.

5. Empirical Analysis

In order to further verify the theoretical model of this study, it is planned to use structural equations (SEM) to test the theoretical model in Figure 1. Structural equations can not only test the reliability and validity of the data, but also test the path assumptions of the model.

5.1 Structural Equation Analysis

(1) Initial model construction

The main purpose is to use AMOS structural equation analysis software to construct a model of the impact of aluminum enterprise informatization level on enterprise business coupling, employees' own information literacy level and enterprise performance (Figure 1). Then the questionnaire data is imported into the software and the model calculation results are executed. According to the operation results, the coefficients of each path of the equation are shown in Figure 2. The model includes 7 latent variables, 31 observable variables, 7 unobservable variables, and 10 mediating variables and dependent variable residuals.

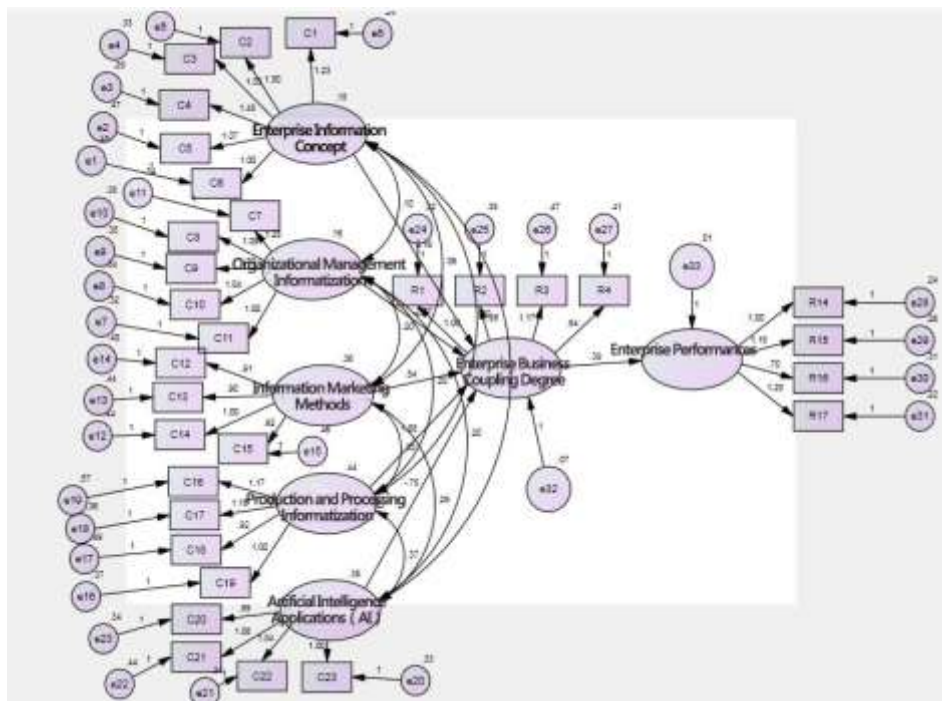


Figure 2: Theoretical Model Running Results

(2) Model fitting

The fitting index of the model is shown in Table 6 below. The CMID/DF chi-square degree of freedom value of the fitting index of the equation model is 2.85, which is between 2 and 5 in the effective range. The approximation error RMSEA value is 0.074, which is less than 0.8 within the valid range. The normative fit index NFI is 0.745, close to 0.8, and the CFI is 0.813. However, the RFI is only 0.637, and the NFI is only 0.745, both less than 0.8. The model fit is not very ideal. Although the model fit is not ideal, the P value of the structural equation model calculation result is significant, the reliability and validity of the model variables are qualified, and the correlation path correlation coefficient has certain reference significance, and the next step can be carried out Variable hypothesis path analysis.

Table 6: Model Fit Summary

Model	CMIN/DF	RMSEA	NFI	CFI	RFI	P
Default model	2.850	0.085	0.745	0.813	0.637	.000
Saturated model		.000	1	1		
Independence model	5.094	0.185	0	.000	0.000	.000

5.2 Test of the Intermediary Effect of Enterprise Business Coupling Degree

According to the detailed testing procedures and methods of intervening variable testing proposed by Wen Zhonglin (2005). The first step of the mediation test between the independent variable and the dependent variable is to conduct a modeling regression analysis on the five dimensions of the independent variable aluminum enterprise informatization level and the dependent variable enterprise performance. Specifically, the SPSS software is used to construct a linear equation model after the enterprise informatization. The five dimensions are used as independent variables in the regression equation, and Enterprise Performance is used as the dependent variable in the regression equation. The output results are shown in Table 7.

Table 7: Regression analysis results of aluminum enterprise informatization on enterprise performance (N= 120)

Independent variable	Dependent variable	Regression coefficients	Significant P value
Enterprise information concept	Enterprise Performance	- 0.017	
Organizational management informatization	Enterprise Performance	0.261	***
Information Marketing Methods	Enterprise Performance	0.118	*
Production and Processing Informatization	Enterprise Performance	0.172	**
Artificial Intelligence Applications (AI)	Enterprise Performance	0.204	***

Note: *** represents $p < 0.001$, ** represents $p < 0.01$, * represents $p < 0.05$

It can be seen from the above table that among the five dimensions of aluminum enterprise informatization, only the enterprise informatization concept is significant to enterprise performance, and the other four dimensions are all significantly positively correlated. Among them, the significant correlation coefficient between organizational management informatization and artificial intelligence application exceeds The significance level of 0.2 is high, and H3b, H3c, H3d and H3e are confirmed. H3a did not pass the test possibly because the enterprise information concept did not have a direct effect on the performance of the enterprise. The second step is to set the dependent variable of the regression equation to the degree of enterprise business coupling, and the five dimensions of the aluminum enterprise's informatization level are still used as independent variables for the regression equation analysis. The output results are shown in Table 8.

Table 8: Regression analysis results of aluminum Enterprise Informatization on Enterprise Business Coupling Degree (N= 120)

Independent Variable	Dependent Variable	Regression Coefficients	P Value Is Significant
Enterprise information concept	Enterprise business coupling degree	0.186	
Organizational management informatization	Enterprise business coupling degree	0.165	*
Information Marketing Methods	Enterprise business coupling degree	0.135	*
Production and Processing Informatization	Enterprise business coupling degree	0.217	**
Artificial Intelligence Applications (AI)	Enterprise business coupling degree	0.259	***

Note: *** represents $p < 0.001$, ** represents $p < 0.01$, * represents $p < 0.05$

It can be seen from Table 8 that among the five dimensions of the informatization of aluminum enterprises, only the enterprise informatization concept is not significant for the mediating variable. The other four dimensions are significant. Therefore, suppose that H1b, H1c, H1d and H1e are proved. According to the principle of mediating effect test. The hypothesis H1a is not established and neither is the mediation effect.

The third step is to set the dependent variable of the regression equation as Enterprise Performance, and the intermediary variable corporate business coupling as the independent variable for regression equation analysis. The output results are shown in Table 9.

Table 9: Regression analysis results of enterprise business coupling degree on enterprise performance (N= 120)

Independent Variable	Dependent Variable	Regression Coefficients	Significant P value
Enterprise business coupling degree	Enterprise Performance	0.325	***

Note: *** represents $p < 0.001$, ** represents $p < 0.01$, * represents $p < 0.05$

As can be seen from Table 9, the intermediary variable corporate business coupling degree is significantly positively related to the dependent variable Enterprise Performance, and H2 is confirmed.

The fourth step is to enter the intervening variable into the regression as an independent variable. The intermediary variable enterprise business coupling degree is regarded as an independent variable. Once again, the independent variable aluminum enterprise informatization and the dependent variable enterprise performance are entered into the regression analysis. The output result is shown in Table10.

Table 10: The results of the regression analysis of the independent variable on the dependent variable after adding the mediating variable (N= 120)

independent variable	dependent variable	Regression coefficients	Significant P value
Organizational management informatization	Enterprise Performance	0.226	**
Information Marketing Methods	Enterprise Performance	0.09	*
Production and Processing Informatization	Enterprise Performance	0.116	**
Artificial Intelligence Applications (AI)	Enterprise Performance	0.149	*
Enterprise business coupling degree	Enterprise Performance	0.21	***

Note: *** represents $p < 0.001$, ** represents $p < 0.01$, * represents $p < 0.05$

From Table 10 that after considering the degree of corporate business coupling as an independent variable, although the correlation between the informatization of aluminum companies and Enterprise Performance is still significant at the $p < 0.01$ significance level, the correlation coefficient is relatively small. The initial regression coefficients all have an obvious weakening trend. And the mediating variable and dependent variable are still significant. Therefore, according to the previous test steps and judgment criteria for the intermediary effect, among the five dimensions of the informatization level of aluminum enterprises, the four variables of organizational management informatization, marketing means informatization, Production and Processing Informatization and artificial intelligence application (AI) have an important impact on Enterprise Performance. The degree of enterprise business coupling plays a partial mediating role in the impact, and hypothesis H4 is confirmed. However, the intermediary effect of enterprise informationization concept is not significant.

5.3 Adjustment Test of Employees' own Information Literacy Level

Next, SPSS26.0 was used to test the moderation effect. First, the control variables such as gender, age, nature of the aluminum enterprise, working hours, enterprise size, nature of work, information system investment, etc. were tested (Model 1), and then the independent variable business coupling degree of the enterprise (Model 2) was gradually added, and the adjustment variables Employees' own information literacy level (Model 3). Finally, the adjusting variable and the independent variable are interacted, and the interaction term enterprise business coupling degree * employee's own information literacy level is obtained. Add interaction terms for testing (Model 4). The results show (see Table 11) that in Model 4, employees' own information literacy level has a significant effect on Enterprise Performance, and the regression relationship between the interaction term of corporate business coupling degree * employee's own information literacy level and Enterprise Performance is The number is significant (B=0.183, P<0.001), indicating that employees' own information literacy level plays a moderating role in the impact of enterprise business coupling degree on enterprise performance.

Table 11: Analysis results of the moderating effect of employees' own information literacy level (N= 120)

Variable		Dependent Variable			
		Enterprise Performance			
		Model 1	Model 2	Model 3	Model 4
Control Variables	gender	-0.099	-0.08	-0.078	-0.09
	age	-0.018	-0.011	-0.011	-0.01
	Aluminum business nature	0.014	0.021	0.017	0.014
	operating hours	0.069 *	0.033	0.032	0.033
	Enterprise size	0.052	0.041	0.007	0.001
	Nature of the work	-0.019	-0.014	-0.017	-0.03
	Information system investment	0.003	0.05	0.055	0.076
Independent Variable	Enterprise business coupling degree		0.341 ***	0.211 **	0.279 ***
Moderator	Employees' own information literacy level			0.186 **	0.348 ***
Interaction Term	Enterprise business coupling degree * employee's own information literacy level				0.183 ***
	R	0.327 _	0.662 _	0.683 _	0.732 _
	R 2	0.107 _	0.439 _	0.466 _	0.536 _
	F value	1.915 *	10.842** *	10.667 ***	12.589 ***

Note: * represents $P < 0.05$, ** represents $P < 0.01$, *** represents $P < 0.001$.

Generally, when testing the adjustment effect, if the adjustment is significant, it is necessary to use simple slope for further analysis, and use $M \pm SD$ to see which adjustment is significant. As can be seen from Figure 3, the degree of business coupling of the enterprise is positively related to the performance of the enterprise. When the degree of coupling between employees' own information literacy level and the enterprise's business is high, the slope of the regression line is larger. That is to say, if the employee's own information literacy level is at a high level, the enterprise's business coupling degree can more significantly improve the impact on Enterprise Performance. On the contrary, if the employee's own information literacy level is low, it will affect the enterprise's business coupling degree. Impact on Enterprise Performance. Therefore, employees' own information literacy level plays a significant positive regulatory role in the relationship between corporate business coupling and Enterprise Performance, and hypothesis H5 is confirmed.

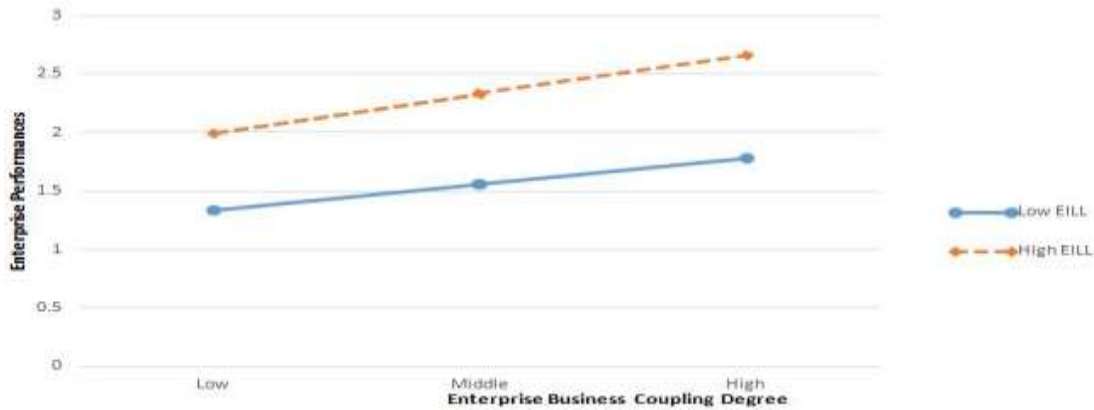


Figure 3: Adjustment effect diagram

5.4 Model Determination

According to the above main effect test, mediation effect test and moderation effect test, after deleting the paths with insignificant effects, the revised theoretical model is obtained as shown in Figure 4.

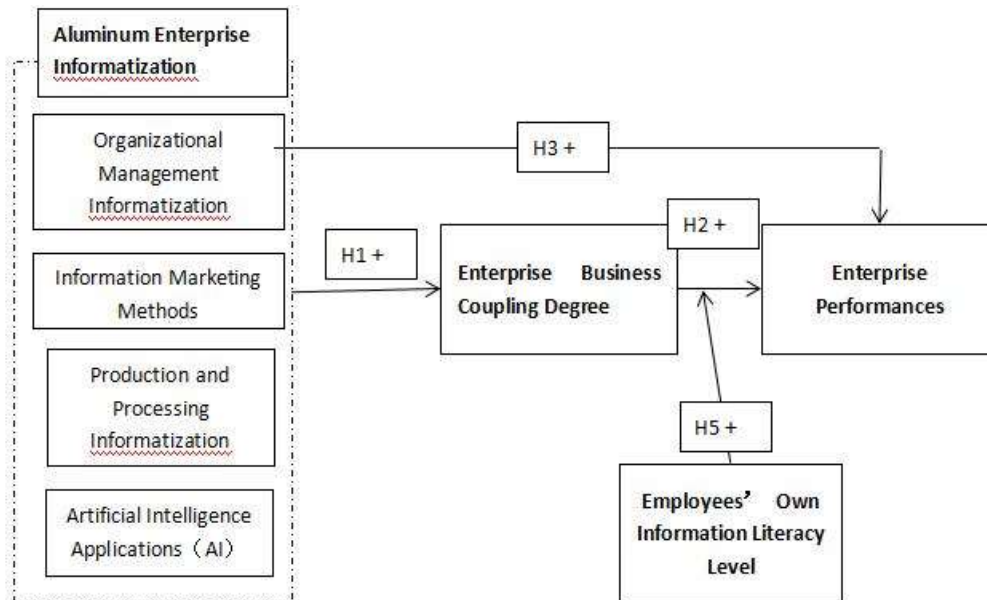


Figure 4: Theoretical model after verification

6. Conclusion

In summary, this study obtained the following results:

Conclusion 1: Chinese aluminum companies are undergoing transformation into high-tech manufacturing industries. With their investment in industrial informatization, their Enterprise Performance levels have been significantly improved.

More than 120 aluminum companies surveyed in this survey, the survey results show that investment in informatization has a significant positive impact on their Enterprise Performance. During the field survey, we found that the industrial industry promoted by the Chinese government is moving towards high-tech manufacturing. Under the influence of industrial transformation and upgrading, most aluminum companies are upgrading their informatization investment, such as vigorously developing electrolytic aluminum, ecological aluminum and

other high-yield and low-emission technology investments. Their current informatization level has a significant impact on Enterprise Performance. positive influence.

Conclusion 2: The concept of enterprise informatization does not have a significant impact on enterprise business coupling and enterprise performance.

The concept of enterprise informatization is a prerequisite for enterprise informatization investment. It is the basic management thinking of enterprise managers to realize that enterprises need to carry out informatization transformation and use informatization to continuously improve the coupling degree of enterprise business work and thereby improve enterprise performance. However, in this case In the survey, the concept of corporate informatization has no significant effect on Enterprise Performance and corporate business coupling. Perhaps it is because the concept only exists in the ideology of corporate managers and cannot directly affect the business and Enterprise Performance of the company. There are other intermediary influencing variables between corporate informatization concepts and Enterprise Performance, which are still unknown. This is also one of the directions for our subsequent research.

Conclusion 3: Enterprise business coupling degree plays a partial mediating role in the impact of the four dimensions of enterprise informatization level (organizational management informatization, marketing means informatization, Production and Processing Informatization, and artificial intelligence application) on enterprise performance.

The informatization of organizational management, the informatization of marketing methods, the informatization of product production and processing, and the application of artificial intelligence are all aimed at changing and improving the existing business and personnel management methods of enterprises. The use of more advanced information systems can shorten or even save business time. Spending process time, sharing important information about enterprise business flows, reducing communication costs, and improving enterprise performance. Therefore, enterprise business coupling degree plays a partial mediating role in the impact of the four dimensions of enterprise informatization on enterprise performance.

Conclusion 4: Employees' own information literacy level plays a positive regulating role between the degree of corporate business coupling and Enterprise Performance.

Existing research has shown that employees' own information literacy level is directly related to employees' familiarity with and operation of information systems. Employees with a high level of information literacy can quickly become familiar with and skillfully use information systems. If employees have a high level of information literacy, the business coupling degree of the enterprise can have a more significant impact on the performance of the enterprise, and vice versa. The low level of information literacy among employees will affect the impact of corporate business coupling on Enterprise Performance. Therefore, employees' own information literacy level plays a significant positive regulatory role in the relationship between corporate business coupling and Enterprise Performance.

Acknowledgement

This research was supported by the 2020 Guangxi Province, China University Young and Middle-aged Teachers' Scientific Research Basic Ability Improvement Project " Research on the Impact of IS Implementation on Performance in Aluminum Enterprises " [grant number: 2020KY19001]

References

- Berente, N., & Yoo, Y. (2012). Institutional contradictions and loose coupling: Post-implementation of NASA's enterprise information system. *Information systems research*, 23(2), 376-396.
- Belshaw, D. (2012). What is 'digital literacy'? A Pragmatic investigation (Doctoral dissertation, Durham University).
- de Ugarte, BS, Hajji, A., Pellerin, R., & Artiba, A. (2009). Development and integration of a reactive real-time decision support system for the aluminum industry. *Engineering Applications of Artificial Intelligence*, 22(6), 897-905.
- Goad, TW (2002). *Information literacy and workplace performance*. Bloomsbury Publishing USA.
- Gosain, S., Malhotra, A., & El Sawy, O. A. (2004). Coordinating for flexibility in e-business supply chains. *Journal of management information systems*, 21(3), 7-45.
- Klopper, J., Kalgovas, B., Borgman, H., & Benlian, A. (2023). Digital Business Strategy Implementation: Investigating the Use of Managerial Actions by the Leadership Team.
- McAfee, A. (2002). The impact of enterprise information technology adoption on operational performance: An empirical investigation. *Production and operations management*, 11(1), 33-53.
- Yang Zhong, Zhang Xiao. (2009). Research on the relationship between enterprise internationalization degree and performance. *Economic Research*, 2, 32-42.
- Lee CC, Lin SP, Yang SL, et al. (2013). Evaluating the influence of perceived organizational learning capability on user acceptance of information technology among operating room nurse staff. *Acta Anaesthesiologica Taiwanica*, 51(1), 22-27.
- Wen Zhonglin, Zhang Lei, Hou Jietai, Liu Hongyun. (2004). Mediation effect test procedure and its application. *Acta Psychologica Sinica*, 36(5), 614-620.
- Yao, F., Ji, Y., Li, H. X., Liu, G., Tong, W., Liu, Y., & Wang, X. (2020). Evaluation of informatization performance of construction industrialization EPC enterprises in China. *Advances in Civil Engineering*, 2020.
- Viktor, K., Alexey, K., Andrey, D., and Alexander, F. (2020, September). Assessing the informatization level of aluminum enterprises under the conditions of the digital economy. *IOP Conference Series: Materials Science and Engineering* (Volume 940, Issue 1, Page 012012). IOP Publishing.
- Zhang, J. F., Wu, Z. J., Feng, P. F., & Yu, D. W. (2011). Evaluation systems and methods of enterprise informatization and its application. *Expert Systems with Applications*, 38(7), 8938-8948.
- Zhang, X., & Jia, P. (2022, June). Blockchain+ industry-education integration enterprise: coupling path and platform construction. In *2021 International conference on Smart Technologies and Systems for Internet of Things (STS-IOT 2021)* (pp. 107-111). Atlantis Press.
- Zhao, J. (2023). Coupling open innovation: Network position, knowledge integration ability, and innovation performance. *Journal of the Knowledge Economy*, 14(2), 1538-1558.
- Alalwan J A, Weistroffer H R. (2012). Enterprise content management research: a comprehensive review. *Journal of Enterprise Information Management*, 25(5), 441-461.
- 2021-2026 China Aluminum Industry Development Analysis and Investment Prospects Forecast Research Report. [<https://www.51baogao.com/ysjs/2009lvhangye.shtml>]