



# The Impact of Industry-Finance Integration on the Performance of Intelligent Manufacturing Firm --Based on the Mediating Effect of Accounting Information Quality

Zeshuang Liu<sup>a</sup>, Panting Wang<sup>\*</sup>

Xi'an University of Technology, Xi'an 710054, Shaanxi, China

<sup>a</sup>1040128209@qq.com; <sup>\*</sup>824619118@qq.com

**Abstract.** The integration of industry and finance is being studied as a new mode of financial management due to the increasing complexity of enterprise operations and management brought about by the development of information technology in the manufacturing industry. This paper examines the impact of industry-finance integration on the performance of intelligent manufacturing enterprises using empirical analysis of annual report information and panel data from listed enterprises in Shanghai and Shenzhen A-shares between 2015 and 2021. A model for the intermediate variable is built using accounting information quality to study its influence path. The research shows that the integration of industry and finance can significantly improve the performance of intelligent manufacturing enterprises in China, and the implementation of industry and finance integration will inhibit the earnings management of enterprises from improving the quality of accounting information to improve enterprise performance. Enterprises should accelerate their financial transformation and drive the implementation of business-to-finance integration as a financial management model to meet the challenges of digitization.

**Keywords:** Integration of Industry and Finance; Accounting Information Quality; Enterprise Performance

## 1 Introduction

At present, "intelligent manufacturing" has become one of the world's most competitive industries. Countries worldwide are implementing the "re-industrialization strategy" to enhance the comprehensive strength of the national manufacturing industry; the manufacturing industry, from the traditional manufacturing industry to the modern manufacturing industry, has undergone significant changes. A new generation of information technology represented by artificial intelligence, cloud computing, and big data technology has prompted the emergence of several intelligent manufacturing pioneer enterprises. Meanwhile, the business environment is highly competitive under the constant impact of information technology and big data technology, and it has become mandatory for enterprises to optimize their corporate structure further and enhance their

operational efficiency. However, to realize the full potential of intelligent manufacturing, companies must make changes in production by closely strengthening the links between the various aspects of business operations, production and sales, and financial management. As early pilots in the manufacturing industry, intelligent manufacturing companies are gradually focusing on and adopting business-finance integration. In 2016, the Ministry of Finance issued the Basic Guidelines on Management Accounting, stating that "the implementation of management accounting by units should adhere to the principle of integration, apply management accounting tools and methods, and realize the organic integration of finance and business." The Accounting Information Development Plan (2021-2025) of 2021 proposes that business units should promote industry-finance convergence and accelerate the digital transformation of accounting work through the seamless integration of business and financial data. Although the business-finance integration model has been widely recognized, its implementation and impact on enterprise performance require more in-depth research.

With the development of the application of business-finance integration in enterprises, the question of whether the implementation effect of business-finance integration will have different impacts on the performance of enterprises gradually emerges. In order to further understand the impact of the integration of business and finance on the performance of intelligent manufacturing enterprises, this paper, based on collating and generalizing the literature, explores the idea of the integration of business and finance in enterprises, relevant theories, and specific practices, takes intelligent manufacturing enterprises as the main body of the study and uses empirical research to construct an index evaluation system for the impact of business and finance integration on the performance of intelligent manufacturing enterprises, and uses text analysis to measure the degree of business and finance integration in enterprises, focusing on the impact of business and finance integration on the performance of intelligent manufacturing enterprises. This text examines the impact of industry-finance integration on the performance of intelligent manufacturing enterprises through measurement.

## 2 Theoretical Analysis and Research Hypotheses

### 2.1 Industry-Finance Integration and Business Performance

The idea of business-finance integration was first put forward by H.W. Quaintance, pointing out that finance personnel should pay attention to business activities and extend the financial perspective to the front end of the business to make advance judgments and ensure the accuracy of financial data [1]. The integration of industry and finance is an essential way of financial transformation. The implementation of the integration of industry and finance and the lengthening of the implementation period will shift the function of finance and accounting from "after the fact" to "before the fact," eliminating the lag and asymmetry of information, effectively reducing the cost of the company. From the profitability perspective, A. Bonfiglioli (2007), from an empirical point of view, after studying data from a sample of 70 countries on industry-financial integration, concludes that industry-financial integration has a positive effect on the productivity of firms [2]. From the perspective of cost control, the active introduction

of the industry-finance integration management model by manufacturing enterprises is conducive to improving the internal control management of enterprises, improving the quality of financial information, and enhancing the level of financial management of enterprises (Guan S R,2023) [3]. In terms of enterprise development potential. Through the integration of business and finance, information technology is closely integrated with the organizational structure, giving full play to the role of the information technology system, combining multi-dimensional information such as operating data and business data with data analysis, using the information technology system as a platform and the business as the core, and optimizing the internal management process with the help of digital tools, to enhance the organizational efficiency and management level of the enterprise, and realize the innovation of the management mode(Li K K,2024)[4].From a comprehensive point of view, the integration of industry and finance has a specific positive significance and plays a positive role in enterprises. Firstly, the implementation of industry-finance integration mainly improves enterprises' economic efficiency. Secondly, the integration of industry and finance can promote the transformation and optimization of the enterprise's internal management structure, improve the enterprise's operation and management ability, and thus improve the performance of the enterprise. Based on the above analysis, hypothesis 1 is proposed:

H1: The implementation of industry financial integration can significantly improve the performance of intelligent manufacturing companies.

## 2.2 The Mediating Role of Accounting Information Quality

The integration of business and finance based on business processes can more accurately reflect the actual state of financial management, improve the quality of internal accounting information, and accounting information can provide a scientific basis for enterprise strategic planning and operational decision-making, reduce business risks, and improve the profitability and market competitiveness of enterprises(Zhang Y Y,2023)[5].On the one hand, the integration of business and finance can produce the "information effect," enhance the internal information environment of enterprises, promote the refined management of data in various departments of enterprises, and achieve the standardization and granularity of business and finance data(Jiang X,2022)[6].On the other hand, the integration of business and finance has a "supervisory effect," improves risk prediction, avoids agency conflicts between owners and operators by dynamically supervising the overall activities of the enterprise, and improves accounting quality(Zhang Y L ang Zhou N,2020)[7].In addition, the quality of accounting information has a significant positive impact on firms' market value. Lang (1993) found a significant positive relationship between information quality and firm performance, with better-performing firms having higher information quality [8]. By improving the quality of accounting information, agency costs can be reduced, which in turn improves firm performance. Based on this, hypothesis 2 is proposed:

H2: The integration of business finance can enhance business performance by improving the quality of accounting information, which is partly mediated.

### 3 Research Design

#### 3.1 Data Sources and Processing Instructions

The data sources mainly include three aspects: first, the selection of A-share listed companies in Shanghai and Shenzhen from 2015 to 2021, through the text analysis method to capture the keywords and screen the implementation of the integration of industry and finance, and the selection of intelligent manufacturing enterprises as the sample enterprises; second, the "2018 China Shared Services Sector Survey Report" published by the state. The third is the required data from the CSMAR database and WIND database. To ensure the accuracy of the data and the reliability of the subsequent modeling, it is proposed to carry out the following studies on the sample data: (1) ST, ST\*, and PT companies are excluded to prevent inaccurate conclusions caused by the particular financial data of individual enterprises; (2) due to the nature of the unique nature of the financial enterprises, all the financial enterprises are excluded; (3) the samples with seriously missing data and critical data are lost are excluded; (4) the samples of enterprises still unlisted in 2015; 103 sample enterprises were finally obtained. The article uses software such as Stata to perform descriptive and empirical tests by shrinking the continuous sample at the pre- and post-1% levels.

#### 3.2 Variable Selection and Explanation

##### *Explained Variable*

The explained variable is enterprise performance, based on previous scholars' selection of indicators. Considering that the impact of industry-financial integration on enterprise performance is mainly reflected in the aspects of cost reduction and efficiency enhancement, the three dimensions of profitability (Net profit margin of total assets), cost control ability (Total operating cost rate), and development potential (Sustainable growth rate) are selected to measure the performance of the enterprise.

##### *Explanatory Variable*

Referring to the study by Huang (2020) and others, a textual analysis was used to analyze the annual reports of enterprises to construct indicators of business and financial integration. In addition, drawing on Min Wang's (2018) study, the implementation of financial sharing was established as a primary stage and the keyword "financial sharing" was captured, and Python software was used to extract keywords for business and financial integration in the annual report, such as financial sharing, business, and financial integration, business and financial synergy, business and financial integration, and organic integration of business systems and accounting information systems; In the end, the collected data are manually identified and determined, and a comprehensive judgment is made on the enterprise's business-finance integration: if the enterprise has adopted financial sharing in the current year, it is regarded as the preliminary stage of business-finance integration and takes the value of 1; if it has adopted business-finance integration in the current year, the index takes the value of 2 for that year and subsequent years, and vice versa, it takes the value of 0.

### *Intermediary Variable*

Most of the existing literature reflects the quality of corporate accounting information by measuring the quality of surplus, and the modified Jones model can be used to measure the level of surplus quality, based on which we intend to improve the Jones model by calculating the absolute value of actionable accruals to reflect the quality of corporate accounting information.

### *Control Variable*

Control variables are selected to reflect the essential characteristics of the enterprise's indicators. To enhance the precision of the study's findings, the paper selected six variables to exclude the influence of company characteristics and corporate governance factors on the study as show in table 1:

**Table 1.** variable definitions and descriptions

	Variable Name	Symbol	Variable Definition	
Explained Variable	profitability	Net profit margin on total assets	ROA	Net profit/total assets
	Cost control capability	Total operating cost ratio	OCR	Total operating costs/total operating revenues
	development potential	Sustainable growth rate	SGR	Increase in owner's equity for the year/owner's equity at the beginning of the period
Explanatory Variable	integration of industry and finance	Whether or not to implement business-to-financial integration	BFII	2 if the enterprise has implemented business-finance integration in the current year; 1 if it has implemented financial sharing, which is regarded as the initial stage of business-finance integration; and 0 if it has not.
Intermediary Variable	Quality of accounting information		Absda	Modified Jones model: absolute value of manipulable accruals
	Enterprise size		Size	Logarithmic form of total enterprise assets
	shareholding concentration		Top10	Sum of percentage held by top ten shareholders
Control Variable	Gross sales margin		GPM	Gross profit/sales revenue
	Total asset turnover		ATO	Operating revenue/average total assets
	Revenue growth rate		Grow	Growth in operating income/total operating income of the previous year

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merging of two posts	Dual	The value of 1 if the chairman of the board of directors is also the general manager, otherwise it is 0.
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### 3.3 Model Construction

To test the research hypotheses outlined in the article, we constructed and sequentially tested the following regression models:

Model 1 is constructed to study the changes in firm performance before and after implementing industry-finance integration.

$$Y = \alpha_0 + \beta_1 Bfii_{it} + \beta_2 Size_{it} + \beta_3 Shareholder_{it} + \beta_4 GPM_{it} + \beta_5 ATO_{it} + \beta_6 Growth_{it} + \beta_7 Dual_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (1)$$

Model 2 is constructed to verify the mediating role of accounting information quality in industry-finance integration and firm performance.

$$Y_{it} = c_0 + c_1 absDA + \alpha_0 Bfii_{it} + \eta_1 Size_{it} + \eta_2 Shareholder_{it} + \eta_3 GPM_{it} + \eta_4 ATO_{it} + \eta_5 Growth_{it} + \eta_6 Dual_{it} + \lambda_i + \theta_t + \varepsilon_{it} \quad (2)$$

## 4 Empirical Analysis

### 4.1 Descriptive Analysis

The article analyses the relationship between research variables and presents the statistical results in Table 2. The ROA ranges from -0.175 to 0.186, indicating significant variation in profitability among the selected sample enterprises. The performance level gap is evident, and the overall performance is average. The OCR mean value is 0.934, with a minimum of 0.637 and a maximum of 1.263. This suggests that the operating costs of the sample enterprises should be lowered, and the data distribution should be concentrated. The SGR minimum value is -0.375, and the maximum value is 0.452, indicating a significant gap in development potential among the sample enterprises, with some needing better growth ability. In addition, the minimum value of Absda is 0.001 and the maximum value is 0.195, which is a large gap, indicating that there is an imbalance in the quality of information in the sample companies and that the quality of accounting information is poorer in some companies, and there is still some room for improvement.

**Table 2.** Descriptive Statistics of Key Variables

	(1)	(2)	(3)	(4)	(5)
	N	mean	SD	min	max
ROA	721	0.0466	0.0552	-0.175	0.186

OCR	721	0.934	0.0993	0.617	1.263
SGR	721	0.0668	0.0945	-0.375	0.452
BFII	721	0.761	0.743	0	2
Absda	721	0.0402	0.0371	0.0014	0.195
SIZE	721	22.98	1.143	20.64	26.02
TOP10	721	61.63	13.97	28.78	91.40
GPM	721	0.256	0.150	0.0343	0.830
ATO	721	0.764	0.448	0.176	2.558
Growth	721	0.151	0.297	-0.481	1.726
Dual	721	0.184	0.388	0	1

Note: ROA, COS, SGR, BFII, Size, TOP10, GPM, ATO, Growth, ADUAL are indented.

## 4.2 Relevance Analysis

The Stata correlation coefficient was used to test for multicollinearity between variables. As shown in Table 3, there is no significant correlation between industry-finance integration and net profit margin of total assets and cost ratio of total assets, and the correlation coefficient is opposite to the hypothesis; there is also no significant correlation between the quality of accounting information and the explanatory variables. The correlation test is only a preliminary judgment of the relationship between the variables, and the specific relationship needs to be tested using regression analysis.

**Table 3.** Relevance Analysis

	ROA	OCR	SGR	BFII	Absda	SIZE	TOP10	GPM	ATO	Growth	Dual
ROA	1										
OCR	-0.808 ***	1									
SGR	0.605 ***	-0.482 ***	1								
BFII	-0.004	0.000	0.137 ***	1							
Ab- sda	-0.035	0.028	-0.069 *	-0.220 ***	1						
SIZE	-0.012	0.020	0.026 0	0.096 **	-0.084 **	1					
TOP 10	0.241 ***	-0.240 ***	0.072 *	-0.113 ***	-0.083 **	0.289 ***	1				
GPM	0.525 ***	-0.739 ***	0.219 ***	-0.069 *	0.028 0	-0.176 ***	0.196 ***	1			
ATO	0.289 ***	0.008	0.280 ***	-0.0060	0.014 0	- 0.00900	0.108 ***	-0.304 ***	1		
Gro wth	0.217 ***	-0.189 ***	0.227 ***	-0.0400	0.144 ***	-0.0170	0.0300	0.011 0	0.220 ***	1	

Dual	0.119 ***	-0.059	0.118 ***	-0.0540	0.006 00	-0.090 **	0.064 *	0.025 0	0.118 ***	0.067 *	1
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### 4.3 Multiple Regression Analysis

As can be seen from the table, the coefficient of business-finance integration (BFII) and ROA is 0.006, which is significantly positively correlated at the 5% level, indicating that the implementation of business-finance integration can significantly improve the profitability of enterprises compared with enterprises that do not implement business-finance integration; the coefficient of BFII and OCR is significantly negatively correlated at the 5% level, indicating that the implementation of business-finance integration can significantly reduce the ability of enterprises to control costs; furthermore, the coefficient of BFII and SGR is significantly positively correlated at the 1% level, indicating that the implementation of business-finance integration can significantly improve the development potential of enterprises. BFII is significantly and positively correlated with SGR at the 1% level, indicating that the implementation of business-finance integration can significantly improve the development potential of enterprises. The synthesis shows that the implementation of corporate business and financial integration has a facilitating effect on the performance of intelligent manufacturing companies.

The coefficient of industry-financial integration and the quality of accounting information is -0.009, which is significantly negatively correlated at the 1 percent level, indicating that implementing industry-financial integration in enterprises can reduce corporate surplus management, improving the quality of accounting information. Moreover, the coefficient of business-finance integration (BFII) under accounting information quality is 0.004 with ROA and -0.006 with OCR, significantly correlated at the 10 percent level, and 0.019 with SGR, significantly correlated at the 1 percent level. Thus, the effect of business-finance integration on firm performance is at least partially realized through the mediating variable accounting information quality. In addition, the results show that the quality of accounting information is significantly correlated at the 1% level in all the results, and the coefficients of all three decreased compared to Model 1, indicating that the quality of accounting information within the firm has a partial mediating effect. Hypothesis 2 is verified. As show in table 4.

**Table 4.** Basic Regression Results

	(1)	(2)	(3)		(1)	(2)	(3)
	ROA	OCR	SGR	Absda	ROA	COS	SGR
BFII	0.006** (2.32)	-0.009** (-2.57)	0.022*** (3.69)	- 0.009*** (-3.49)	0.004* (1.71)	-0.006* (-1.86)	0.019*** (3.23)
Absda					- 0.166*** (-4.43)	0.259*** (5.29)	- 0.289*** (-3.23)



SIZE	0.023*** (4.50)	- 0.028*** (-4.24)	0.033*** (2.75)	-0.005 (-0.96)	0.022*** (4.39)	- 0.027*** (-4.12)	0.032*** (2.64)
TOP10	0.000 (0.27)	- 0.001*** (-2.66)	-0.002** (-2.42)	-0.001** (-2.34)	-0.000 (-0.15)	-0.001** (-2.20)	- 0.002*** (-2.74)
GPM	0.410*** (16.42)	- 0.879*** (-26.75)	0.515*** (8.69)	-0.039 (-1.44)	0.403*** (16.38)	- 0.869*** (-26.98)	0.504*** (8.55)
ATO	0.086*** (12.01)	- 0.104*** (-11.01)	0.145*** (8.49)	0.018** (2.37)	0.089*** (12.57)	- 0.109*** (-11.71)	0.150*** (8.83)
Growth	0.005 (1.11)	- 0.017*** (-2.78)	0.014 (1.24)	0.003 (0.65)	0.006 (1.24)	- 0.018*** (-2.98)	0.015 (1.33)
Dual	0.008 (1.61)	0.007 (0.99)	-0.010 (-0.80)	-0.006 (-1.13)	0.007 (1.43)	0.008 (1.26)	-0.011 (-0.96)
Constant	- 0.721*** (-6.17)	2.040*** (13.27)	- 0.955*** (-3.44)	0.289** (2.31)	- 0.673*** (-5.83)	1.965*** (13.01)	- 0.872*** (-3.15)
Observations	721	721	721	721	721	721	721
R-squared	0.757	0.870	0.532	0.383	0.765	0.875	0.540
Company FE	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES

Note: \* means significant at 0.1 level, \*\* means significant at 0.05 level, \*\*\* means significant at 0.01 level.

#### 4.4 Robustness Check

##### *Exclusion of ERP Substitutability*

Business-finance integration refers to integrating corporate culture and strategy at all enterprise levels, including human resources management, policy development, and information sharing (Yu Y M et al., 2021) <sup>[9]</sup>. ERP is a management information system that can achieve cross-regional, cross-departmental, and even cross-enterprise information integration. To exclude the effect of the ERP system, it is being controlled. The results show that after controlling for the substitutability of ERP systems, the implementation of business-financial integration still significantly improves business performance.

### *Replacement of Major Variables*

To ensure the reliability of the findings, earnings per share (Eps) was brought into the empirical model for regression analysis again, and the regression coefficients of the variables did not change and still support the conclusions. As show in table 5.

**Table 5.** Results of Robustness Tests

	(1)	(2)	(3)	(4)
	Eps	Eps	Eps	Eps
BFII	0.075**		0.064**	
	(2.51)		(2.14)	
Absda		-1.219***		-1.193***
		(-2.80)		(-2.73)
Control ERP	Yes	YES	YES	YES
Control variable	Yes	Yes	Yes	Yes
Individual fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Observations	721	721	721	721
R-squared	0.853	0.853	0.855	0.855

Note: \* means significant at 0.1 level, \*\* means significant at 0.05 level, \*\*\* means significant at 0.01 level.

## 5 Conclusions

### 5.1 Conclusion of the Study

The conclusions are as follows: (1) The implementation of industry-financial integration can promote the improvement of enterprise performance; (2) The quality of accounting information plays a partly intermediary role between industry-financial integration and enterprise performance, and industry-financial integration can curb financial surpluses, improve the quality of information, and enhance the performance of enterprises. The conclusions of the study can clarify the impact of the degree of integration of business and finance, to adjust the future management of the enterprise to provide a reference, better help the development of enterprise economic efficiency, want to carry out financial management changes in the enterprise has a specific practical significance of guidance.

### 5.2 Implications and Recommendations

Business-to-finance convergence can contribute to improved business performance. Enterprises should accelerate their financial transformation and drive the implementation of financial integration to meet the challenges of digitization. The following recommendations are proposed: (1) Formulate and improve the management system for

integrating industry and finance. Clearly define the responsibilities of each department, formulate relevant assessment mechanisms, and improve the reward and punishment system to encourage enterprise personnel to strengthen exchanges and carry out their work effectively while improving the supervision and management mechanism. (2) Enhance human resources training and strengthen the awareness of industry-finance integration. Actively strengthen the training of relevant skills of employees, enhance the learning and application of digital technology, and regularly carry out training activities and publicity lectures to increase the sense of identity of enterprise employees towards the integration of industry and finance. (3) Strengthening information construction and establishing a data integration and analysis platform. Take the initiative to use big data information technology to build an information system for integrating industry and finance, to promote interconnection at all levels of the enterprise, a comprehensive grasp of the enterprise's business by financial personnel, and rapid decision-making by enterprise managers. (4) Strengthen the guiding role of the Government and increase support. Governments should consider regional policy support for industries and implement targeted relevant measures and policies. It should also organize training and seminars, provide advisory services, and guide and train enterprises. It should also encourage research and development innovation, provide investment support, and enhance business and financial integration.

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