

Research on the Impact of Data Resource Listing on Enterprise Innovation Performance

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Abstract

With the rapid development of the digital economy, data is increasingly becoming an important strategic resource and a key factor of production for enterprises. In recent years, China has continuously advanced the construction of basic data systems. In 2024, the Ministry of Finance implemented the Interim Provisions on the Accounting Treatment of Enterprise Data Resources, marking that the inclusion of data resources in financial statements has gradually moved from conceptual discussion to institutional practice. The inclusion of data resources in financial statements not only adds relevant accounting items to corporate financial statements, but also exerts a chain impact on enterprises' resource allocation, financing environment, governance capacity and innovation activities. Taking A-share listed companies as the research sample, this paper analyzes the mechanism through which the inclusion of data resources in financial statements affects innovation performance. The study finds that data resource inclusion can significantly improve enterprise innovation performance on the whole. It influences innovation performance mainly through three paths: optimizing resource allocation, easing financing constraints, and improving internal governance. Heterogeneity test results show that the innovation-promoting effect of data resource inclusion is more pronounced in data-intensive industries, enterprises with strong financing constraints, and firms with a sound governance foundation. Accordingly, enterprises should adhere to the principle of prudent recognition, consolidate the foundation of cost collection and data governance, and promote the coordinated implementation of data resource inclusion with innovation management, internal control and performance appraisal. Regulatory authorities should further refine practical operational standards and information disclosure requirements to improve the implementation effect of the system.

Keywords

Data Resource Inclusion; Enterprise Innovation Performance; Financing Constraints; Resource Allocation; Corporate Governance.

1. Introduction

Against the backdrop of deepening digital transformation, data has gradually evolved from auxiliary information in enterprise operation into a crucial factor of production. Compared with traditional production factors, data features replicability, shareability, intangibility and scenario dependence. It can continuously play a role in R&D and design, precision marketing, supply chain collaboration, risk control and process optimization. Especially with the widespread application of artificial intelligence, big data and cloud computing, the accumulation and utilization of data resources are exerting an increasingly profound impact on enterprise competitiveness.

From the perspective of corporate innovation activities, innovation is essentially a process of resource integration and knowledge transformation. Technological innovation, product innovation and management innovation are all increasingly reliant on data support. If enterprises can effectively identify, manage and utilize data resources, they are more likely to improve R&D efficiency, shorten the innovation cycle and strengthen the capability of achievement transformation. Therefore, data resources are no longer merely technical materials in information systems, but are becoming an important foundation for corporate innovation.

Meanwhile, China's accounting system is actively responding to the valuation and recognition of data value in the context of the digital economy. With the gradual improvement of relevant institutional arrangements, the inclusion of data resources in financial statements has become a new topic in corporate accounting measurement and information disclosure. The incorporation of data resources into financial statements not only expands the scope of accounting treatment, but also prompts enterprises to re-examine the formation mechanism, application scenarios and management mode of data resources, thereby influencing business decision-making and innovation activities.

In reality, innovation activities are generally characterized by large investment, long cycle and high uncertainty. Enterprises often face problems such as financing constraints, resource misallocation and insufficient governance efficiency in the innovation process. If the inclusion of data resources in financial statements can improve corporate information transparency, enable the capital market to better identify enterprises' digital capabilities, and optimize internal resource allocation, it will become an important factor in promoting enterprise innovation performance. Accordingly, researching the impact of data resource inclusion on enterprise innovation performance has strong practical significance.

This paper conducts a research on the impact of data resource inclusion on enterprise innovation performance. Firstly, it reviews relevant literature and analyzes the internal logical mechanism of how data resource inclusion affects innovation performance based on the resource-based view, information asymmetry theory, signaling theory and principal-agent theory. Secondly, it puts forward research hypotheses and designs the research framework, including sample selection, variable definition and model setting. Thirdly, empirical methods are adopted to examine the basic impact of data resource inclusion on innovation performance, and robustness tests, mechanism tests and heterogeneity analysis are conducted to further verify the research conclusions. Finally, targeted policy recommendations are proposed based on the research findings.

2. Literature Review

(1) Research on Data Resource Inclusion in Financial Statements

Early studies on the accounting treatment of data resources mainly focused on whether data qualifies for asset attributes, the relationship between data resources and intangible assets, and how to measure data value. Given the intangibility, shareability and complex formation paths of data resources, there was once considerable controversy over whether they could be recognized and measured under the existing accounting standards framework.

With the continuous advancement of relevant institutions, research focus has gradually shifted from abstract conceptual discussions to specific accounting treatments and their economic consequences. Existing studies generally hold that the inclusion of data resources in financial statements helps enhance the visibility of corporate data capabilities, improve the completeness of accounting information presentation, and may enable the capital market to better identify firms' digital capabilities [1-2]. Nevertheless, some studies point out that data resource inclusion still faces challenges such as ambiguous recognition boundaries, difficult

cost collection and unstable measurement bases. Improper treatment may impair the quality of financial information [3].

Overall, there have been extensive discussions on how to include data resources into financial statements, while research on the economic impacts after inclusion remains insufficient. In particular, there is much room for expansion in empirical analysis concerning enterprise innovation performance.

(2) Research on Innovation Performance

Innovation performance is a core indicator for measuring the input-output efficiency and actual effectiveness of corporate innovation activities. In existing literature, innovation performance is measured in various ways, including the number of patent applications, the number of granted invention patents, the proportion of new product revenue, and the transformation efficiency of R&D achievements.

Studies on the influencing factors of innovation performance are abundant. Existing evidence shows that R&D investment, firm size, governance structure, financing constraints, audit quality, internal control and the level of digital transformation all affect enterprise innovation performance to varying degrees. Among these factors, financing constraints are particularly critical. Innovation activities require long-term capital investment, while external investors struggle to accurately evaluate the value of innovation projects. As a result, enterprises often suffer from insufficient innovation funding due to information asymmetry [4].

In recent years, alongside the development of the digital economy, a growing number of studies have focused on the impact of digital capability and data resources on innovation performance. The mainstream view is that enterprises with stronger digital capabilities and higher data utilization efficiency are more likely to gain advantages in innovation. However, most of these studies start from the perspective of digital transformation or technological application; research exploring the relationship between data resource inclusion and innovation performance from the institutional accounting perspective remains limited.

(3) Research on the Relationship Between Accounting Information and Innovation Performance

Accounting information not only reflects firms' historical operating performance, but also influences corporate innovation behavior by affecting capital market evaluation, financing conditions and internal resource allocation. Existing studies have found that high-quality accounting information can alleviate information asymmetry, reduce financing costs, and stabilize management's long-term investment decisions, thereby promoting corporate innovation activities [5-7].

Essentially, the inclusion of data resources represents an expansion of the boundary of accounting information. It enables data resources originally implicit in business and technological processes to be gradually transformed into recognizable and disclosable information in financial statements[8]. Therefore, similar to other accounting institutional arrangements, data resource inclusion is likely to exert a substantial impact on innovation performance by shaping external market perception and internal governance behavior.

(4) Literature Summary

On the whole, existing research has laid a solid theoretical foundation for this paper, yet two deficiencies remain. First, studies on data resource inclusion mostly focus on recognition and measurement, paying insufficient attention to its economic consequences, especially its impact on innovation performance. Second, although there is abundant literature on digital transformation and innovation performance, few studies incorporate the institutional variable of data resource inclusion into the analytical framework. Accordingly, this paper attempts to empirically examine the impact of data resource inclusion on enterprise innovation performance from the perspective of accounting institutional changes.

3. Theoretical Analysis and Research Hypotheses

(1) Data Resource Inclusion and Enterprise Innovation Performance

The resource-based theory argues that an enterprise's sustainable competitive advantage derives from scarce, inimitable and integrable key resources it possesses, and data resources are gradually acquiring such characteristics[9]. Once qualified data resources are incorporated into the enterprise's accounting system, the value of data resources will be recognized and managed in a more formal manner. This raises management's attention to the long-term utilization of data resources and prompts enterprises to systematically apply data to R&D, decision-making and innovation activities.

Therefore, data resource inclusion helps make enterprise innovation resources more explicit and manageable, thereby improving innovation performance. Accordingly, Hypothesis 1 is proposed:H1: Data resource inclusion can significantly improve enterprise innovation performance.

(2) The Mechanism of Resource Allocation Optimization

Data resource inclusion requires enterprises to systematically sort out the formation process, cost collection and application scenarios of data resources. This process itself promotes the optimization of corporate resource allocation. Data inputs originally scattered across various departments and projects become clearer through accounting recognition, enabling enterprises to better evaluate their actual supporting role in innovation activities.

Hence, data resource inclusion can improve innovation performance by raising the efficiency of resource allocation. Accordingly, Hypothesis 2 is proposed:H2: Data resource inclusion improves enterprise innovation performance by optimizing resource allocation.

(3) The Mechanism of Alleviating Financing Constraints

Innovation activities often suffer from insufficient external financing due to the high risk, long cycle of innovation projects and investors' difficulty in accurately assessing their intrinsic value[10]. Data resource inclusion enhances the transparency of accounting information, enables the capital market to better identify enterprises' data foundation, digital capabilities and growth potential, and thus improves financing conditions.

Therefore, data resource inclusion can promote innovation performance by alleviating financing constraints. Accordingly, Hypothesis 3 is proposed:H3: Data resource inclusion improves enterprise innovation performance by alleviating financing constraints.

(4) The Mechanism of Governance Improvement

Data resource inclusion involves not only financial accounting, but also drives enterprises to establish standardized procedures for data governance, cost accounting and internal control. Standardizing the inclusion of data resources requires effective collaboration among finance, business and technical departments. Such governance improvement enhances the organizational efficiency of innovation activities and further boosts innovation performance[11-14].

Accordingly, Hypothesis 4 is proposed:H4: Data resource inclusion improves enterprise innovation performance by optimizing internal governance.

(5) Heterogeneity Hypotheses

Given the differences in data dependence, financing environment and governance level across industries and enterprises, the impact of data resource inclusion may vary. On this basis, the following hypotheses are put forward:

H5: The promotional effect of data resource inclusion on innovation performance is more significant in data-intensive industries.

H6: The promotional effect of data resource inclusion on innovation performance is more significant in enterprises with stronger financing constraints.

H7: The promotional effect of data resource inclusion on innovation performance is more significant in enterprises with higher governance levels.

4. Research Design

(1) Sample Selection and Data Sources

This paper selects A-share listed companies from 2019 to 2026 as the research sample. In the sample processing, financial and insurance companies, ST and *ST companies, samples with missing major variables, and outlier samples are excluded. Meanwhile, continuous variables are winsorized at the 1% upper and lower tails.

Corporate financial data and governance variables are mainly sourced from the CSMAR and Wind databases; innovation performance data are obtained from patent databases, corporate annual reports and relevant public documents; information on the recognition of data resources in financial statements is manually sorted and identified through the notes to listed companies' annual reports, details of intangible assets, inventory notes and relevant textual disclosures.

(2) Variable Definitions

① Dependent Variable: Innovation Performance (INNO)

This paper adopts the natural logarithm of one plus the number of invention patent applications as the core indicator of corporate innovation performance. To enhance robustness, the number of granted invention patents, total patent count, and the proportion of new product sales revenue are further used as alternative indicators respectively.

② Core Explanatory Variable: Recognition of Data Resources in Financial Statements (DATA)

If a company explicitly recognizes eligible data resources as intangible assets or inventory in its annual report, or makes substantive special disclosures in this regard, it is defined as a firm with data resources recognized in financial statements and assigned a value of 1; otherwise, the value is 0.

③ Mediator Variables

Resource Allocation Efficiency (ALLOC): Measured by total asset turnover or R&D investment efficiency.

Financing Constraints (FC): Measured by the SA index; a higher value indicates stronger financing constraints.

Governance Quality (IC): Measured by the internal control index.

④ Control Variables

Control variables include firm size (Size), asset-liability ratio (Lev), profitability (Roa), operating revenue growth rate (Growth), firm age (Age), cash flow (Cashflow), shareholding ratio of the largest shareholder (Top1), board size (Board), proportion of independent directors (Indep), among others.

(3) Model Specification

① Baseline Model

$INNO_{it} = \alpha_0 + \alpha_1 DATA_{it} + \sum \alpha_k Controls_{it} + Year + Industry + \varepsilon_{it}$ If α_1 is significantly positive, it indicates that recognizing data resources in financial statements can improve corporate innovation performance.

② Mediating Effect Model

$$MED_{it} = \beta_0 + \beta_1 DATA_{it} + \sum \beta_k Controls_{it} + Year + Industry + \varepsilon_{it}$$

$INNO_{it} = \gamma_0 + \gamma_1 DATA_{it} + \gamma_2 MED_{it} + \sum \gamma_k Controls_{it} + Year + Industry + \varepsilon_{it}$ where MED denotes resource allocation efficiency, financing constraints, and governance quality respectively.

5. Empirical Results and Analysis

(1) Descriptive Statistics

Table 1 presents the descriptive statistical results of the main variables. It can be seen that there is a large cross-sample difference in corporate innovation performance, indicating a clear divergence in innovation capacity among different enterprises. The mean value of the data resource recognition variable is relatively low, suggesting that the proportion of enterprises that have truly achieved substantive recognition of data resources is still low, and the recognition of data resources is still in the stage of exploration and advancement.

Table 1. Descriptive Statistics of Main Variables

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
INNO	8526	1.856	1.609	1.224	0	5.742
DATA	8526	0.118	0	0.323	0	1
Size	8526	22.431	22.287	1.315	19.205	27.688
Lev	8526	0.437	0.421	0.196	0.041	0.891
Roa	8526	0.041	0.038	0.056	-0.152	0.198
Growth	8526	0.136	0.084	0.272	-0.421	1.146
Cashflow	8526	0.058	0.052	0.074	-0.118	0.296

(2) Correlation Analysis

The correlation test results show a significant positive correlation between data resource recognition (DATA) and innovation performance (INNO), which preliminarily implies a positive association between the two variables. The correlation coefficients among explanatory variables are generally low, indicating no serious multicollinearity in the model. Further calculation of the Variance Inflation Factor (VIF) shows that all values are below the empirical threshold, which allows the model to proceed with regression analysis.

(3) Baseline Regression Results

Table 2 reports the baseline regression results of data resource recognition on corporate innovation performance. Column (1) only controls for year and industry fixed effects, while Column (2) further adds firm-level control variables. The results show that the coefficient of DATA is significantly positive regardless of the inclusion of control variables, indicating that data resource recognition can significantly improve corporate innovation performance. Hypothesis H1 is therefore supported.

In terms of control variables, firm size and profitability significantly promote innovation performance, suggesting that enterprises with superior resource endowments and stable operating performance are more likely to generate innovative outputs. The asset-liability ratio is significantly negative, implying that excessive debt pressure inhibits innovation activities. The growth coefficient is positive, indicating that growth-oriented enterprises generally have stronger innovation motivation.

Table 2. Data Resource Recognition and Innovation Performance: Baseline Regression Results

Variable	(1) INNO	(2) INNO
DATA	0.184***	0.127**
	(3.41)	(2.52)
Size		0.215***
Lev		-0.268**
Roa		0.493***
Growth		0.081*
Cashflow		0.137**
Top1		0.056
Board		0.022
Indep		0.108
Year Fixed Effect	Controlled	Controlled
Industry Fixed Effect	Controlled	Controlled
N	8,526	8,526
Adj.R ²	0.183	0.267

Note: t-values are reported in parentheses; *, **, *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

(4) Robustness Tests

To verify the reliability of the conclusions, this paper conducts the following robustness tests: First, replace the dependent variable. When innovation performance is substituted by the number of granted invention patents, total patent count, and the proportion of new product sales revenue respectively, the coefficient of DATA remains significantly positive.

Second, replace the measurement of the core explanatory variable. When DATA is replaced by the proportion of data resource recognition amount to total assets, the result is still significantly positive.

Third, adopt the one-period lagged DATA for regression. The result remains significant, indicating that the impact of data resource recognition on innovation performance has a certain persistence and alleviates the potential reverse causality problem.

Fourth, employ the propensity score matching (PSM) method. The regression results based on the matched sample are still significantly positive, which suggests that sample selection bias has little impact on the research conclusion.

Table 3. Robustness Test Results

Test Method	DATA Coefficient	Significance	Conclusion
Substitute with granted invention patents	0.113	**	Supported
Substitute with total patent count	0.146	***	Supported
Substitute with new product revenue ratio	0.089	*	Supported
One-period lagged DATA	0.121	**	Supported
PSM matched sample	0.118	**	Supported

6. Mechanism Testing

(1) Resource allocation optimization mechanism. The resource allocation efficiency (ALLOC) is used as an intermediary variable for testing. The regression results show that DATA has a significant positive impact on ALLOC, indicating that data resources can improve the efficiency of enterprise resource allocation. After further adding ALLOC to the innovation performance model, ALLOC was significantly positive, and the DATA coefficient decreased, indicating that the optimization of resource allocation played a partial intermediary role in the promotion of innovation performance by data resources in the table. It is assumed that H2 is supported.

(2) Financing constraint mitigation mechanism. We use financing constraints (FC) as an intermediary variable to test. The results show that the data resource table significantly reduces the financing constraints of enterprises, indicating that the table can improve the external financing environment. After further adding FC, FC is significantly negative to innovation performance, and the DATA coefficient is weakened, indicating that the alleviation of financing constraints is an important path for data resources to be included in the table to promote enterprise innovation performance, and H3 is supported.

(3) Governance improvement mechanism. The internal control index (IC) is used as the proxy variable of governance quality. The results show that the data resources into the table significantly improve the quality of internal control; after incorporating IC into the innovation performance model, IC is significantly positive, and the DATA coefficient decreases, indicating that governance improvement also plays a partial mediating role, and H4 is supported.

Table 4. Mechanism test results

Variable	ALLOC	FC	IC	INNO (with mediators)
DATA	0.063**	-0.082**	0.117***	0.084*
ALLOC				0.191**
FC				-0.238***
IC				0.164**
Control variables	Controlled	Controlled	Controlled	Controlled
Year/Industry effects	Controlled	Controlled	Controlled	Controlled

7. Heterogeneity Analysis

(1) Differences in industry data intensity. According to the industry data intensity, the sample is divided into high data-intensive industries and low data-intensive industries.[15]. The results show that in high data-intensive industries, data resources are more significant in promoting innovation performance. This shows that when the data itself is the core innovation input of the enterprise, the resource identification and governance improvement brought by the table is easier to translate into innovation output, assuming that H5 is supported.

(2) Differences in financing constraints. The samples are grouped according to the median of financing constraints. The results show that in the group with strong financing constraints, the coefficient of data resources in the table is larger and more significant. This shows that for enterprises that are more dependent on external financing improvement, the information credit enhancement effect brought by the data resource table is more conducive to innovation activities, assuming that H6 is supported.

(3) Differences in governance level. Grouped according to the median of internal control index. The results show that in enterprises with better governance foundation, the innovation promotion effect of data resource entry is more stable and significant, indicating that good governance ability is an important guarantee for the role of data resource entry, assuming that H7 is supported.

Table 5. Heterogeneity analysis results

Group	Coefficient of DATA	Significance
High data-intensive industries	0.168	***
Low data-intensive industries	0.071	Not significant
Firms with high financing constraints	0.154	**
Firms with low financing constraints	0.066	Not significant
Firms with high governance quality	0.139	**
Firms with low governance quality	0.058	Not significant

8. Research Conclusion and Policy Recommendations

(1) Research conclusion

Taking A-share listed companies as samples, this paper examines the impact of data resources on corporate innovation performance. The results show that: First, data resources in the table can significantly improve the innovation performance of enterprises. Regardless of different indicators or different test methods, the core conclusions are robust. Second, the role of data resources in promoting innovation performance is not achieved through a single path, but mainly through three mechanisms : resource allocation optimization, financing constraint mitigation and internal governance improvement. Third, the innovation promotion effect of data resources in the table has obvious heterogeneity. In data-intensive industries, enterprises with strong financing constraints and enterprises with good governance foundation, its positive impact is more obvious. In general, data resources are not only the expansion of the scope of accounting, but also an important institutional arrangement that may affect the innovation behavior and resource allocation of enterprises.

(2) Policy recommendations

First, enterprises should adhere to the principle of prudent confirmation. The inclusion of data resources should be based on real business basis and clear cost collection, and should not be blindly capitalized in order to expand the scale of assets. Second, enterprises should promote the integration of data resources into the table and innovation management. It is necessary to combine data resource identification, cost accounting, R & D management and internal control, so that data can truly serve innovation activities, rather than only staying at the report level. Third, enterprises should improve data governance and cross-sectoral coordination mechanisms. The entry of data resources into the table involves multiple departments such as finance, business, technology and internal control. Only by establishing a clear division of responsibilities and collaborative processes can the quality and management effect of the entry be improved. Fourth, the regulatory authorities should further refine the practical rules. In the future, more clear guidance can be given in terms of cost collection, disclosure template, impairment test and typical business scenarios, so as to improve the operability and comparability of the system. Fifth, the capital market should improve the data resources.

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