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Research on the impact of data asset inclusion in financial statements on corporate innovation performance

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Abstract. Against the backdrop of the digital economy, the inclusion of data assets in financial statements has become an important institutional arrangement to unlock the value of data factors and empower enterprise innovation. Taking 1,197 A-share listed companies in 2024 as research samples, this paper empirically tests the effect and internal mechanism of data asset inclusion on enterprise innovation performance, and explores the heterogeneous roles of different types of data assets. The results show that the inclusion of data assets in financial statements significantly improves enterprise innovation performance. By raising corporate information transparency, data asset inclusion optimizes the allocation of innovation resources, thereby promoting the growth of enterprise innovation performance. Investor attention plays a positive moderating role: the higher the level of investor attention, the stronger the promoting effect of data asset inclusion on enterprise innovation performance. The heterogeneity test finds that data assets classified as development expenditures, which are embedded in the front end of R&D, have a significantly stronger promoting effect on innovation performance than intangible-asset data assets solidified in mature technologies. The conclusions provide practical reference for enterprises to optimize data asset management and improve innovation performance, and also offer policy basis for improving the data asset inclusion system and advancing the in-depth integration of the digital economy and the real economy.

Keywords: data asset inclusion in financial statements, innovation performance, information transparency, investor attention, heterogeneous assets

1. Introduction

Innovation is the core engine driving high-quality economic development and the fundamental driving force for the sustainable growth of enterprises. Although China's enterprise innovation practices have made considerable progress, they still face development bottlenecks such as weak independent innovation capacity and dependence on external sources for core technologies. There is an urgent need to explore new innovation-driven factors. Against the backdrop of the booming digital economy, data has become the fifth factor of production alongside land, capital, labor and technology. In August 2023, the Ministry of Finance issued the *Interim Provisions on Accounting Treatment of Enterprise Data Resources* (hereinafter referred to as the Interim Provisions), which was fully implemented on January 1, 2024. It clarifies the conditions and

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accounting methods for including data assets in financial statements, and provides a policy basis for transforming data resources into measurable and circulable standardized assets [1]. The 2024 annual reports show that only about 100 A-share listed companies disclosed information on data resource inclusion, involving a total amount of approximately 2.164 billion yuan, and the vast majority of enterprises still take a wait-and-see attitude [2]. This raises the question of what economic consequences data asset inclusion will bring. Especially under the innovation-driven development strategy, whether the capitalization and recognition of data as a new strategic resource can truly empower enterprise innovation and improve innovation performance carries research value. Existing studies have focused on issues such as data asset value evaluation, but few have explored how the act of data asset inclusion itself affects enterprise innovation performance through accounting governance and signal transmission. This paper attempts to fill this research gap.

2. Literature review and research hypotheses

2.1. Data asset inclusion in financial statements and enterprise innovation performance

The inclusion of data assets in financial statements is not only an adjustment of accounting subjects, but also an expansion of the resource boundary of enterprises. According to the Resource-Based View (RBV), heterogeneous resources are the source of sustainable competitive advantage for enterprises. Through right confirmation via statement inclusion, data assets transform originally expensed or off-balance-sheet data resources into quantifiable, pledgeable and tradable "explicit capital" [3]. On the one hand, standardized management of data assets helps enterprises improve their ability to integrate and utilize data factors, optimize R&D decisions, and reduce R&D trial-and-error costs [4]. On the other hand, the inclusion process compels enterprises to establish a standardized data governance system, optimize resource allocation, guide resources to high-value innovation projects, and improve innovation efficiency and output [5]. Accordingly, the following hypothesis is proposed:

H1: The inclusion of data assets in financial statements significantly promotes enterprise innovation performance.

2.2. The mediating role of information transparency

Based on the information asymmetry theory, data asset inclusion standardizes accounting recognition and statement disclosure, makes information such as the scale, value and changes of data assets transparent, transmits positive signals of enterprises' digital capabilities and future growth to the market, reduces the room for management to arbitrarily manipulate R&D-related information, and improves the quality of corporate information disclosure and information transparency [6]. Higher information transparency can reduce investors' valuation risk and corporate financing constraints, and provide stable financial support for innovation [7]. Meanwhile, it strengthens internal and external supervision, restrains managerial opportunistic behavior, and ensures the efficient allocation of innovation resources. Therefore, data asset inclusion can not only directly optimize enterprise data governance, but also improve the innovation environment and optimize the allocation of innovation resources by enhancing information transparency, ultimately driving the improvement of innovation performance [8]. Accordingly, the following hypothesis is proposed:

H2: The inclusion of data assets in financial statements promotes enterprise innovation performance by improving information transparency.

2.3. The moderating role of investor attention

The inclusion of data assets in financial statements itself releases incremental information about enterprises' data resource reserves and digital governance level to the market, significantly improving the decision-making usefulness of financial information. However, the market transmission efficiency of such incremental value signals depends on the degree of investors' attention and recognition [9]. Investor attention is a scarce cognitive resource. As emerging accounting information, data asset inclusion is more likely to attract the scrutiny and interpretation of highly attentive investors [10]. Under high investor attention, the value signal transmission and market interpretation of enterprise data assets are more sufficient, enterprises receive stronger supervision and financing support, and management is more motivated to maintain Research and Development (R&D) investment to gain market recognition, thereby amplifying the promoting effect of data asset inclusion on innovation [11]. When investor attention is insufficient, the incremental information of data assets is difficult to be effectively priced, policy value transmission is hindered, and the improvement effect of data asset inclusion on innovation is significantly weakened. Accordingly, the following hypothesis is proposed:

H3: Investor attention positively moderates the promoting effect of data asset inclusion in financial statements on enterprise innovation performance.

3. Research design

3.1. Sample selection and data sources

Taking A-share listed companies in 2024 as the initial research sample, this paper screens the samples according to the following criteria: (1) Excluding listed companies in the financial and insurance industries; (2) Excluding listed companies with abnormal operations such as ST, *ST and PT; (3) Excluding listed companies with missing basic data; (4) All continuous variables are winsorized bilaterally at the 1% and 99% quantiles to avoid the influence of extreme values. Finally, valid samples of 1,197 listed companies are obtained.

The data sources of this paper are as follows: data related to data assets, control variable data, and data related to information transparency are from the China Stock Market & Accounting Research Database (CSMAR); enterprise patent data and investor attention data are from the China Research Data Service Platform (CNRDS); the industry classification of companies is determined in accordance with the *Guidelines for Industry Classification of Listed Companies* issued by the China Securities Regulatory Commission in 2012.

3.2. Variable definitions

Explained variable: Enterprise innovation performance (ln_Inno). Existing studies mostly use indicators such as patent application volume, patent grant volume and R&D investment to measure enterprise innovation performance, and patent application volume can reflect the level of enterprise innovation output in a more timely manner [12]. This paper selects the natural logarithm of the total number of patents applied by enterprises in the current year as the core measurement indicator of enterprise innovation performance. In the robustness test, it is replaced by the natural logarithm of the total number of patents granted to enterprises in the current year (ln_Inno_2).

Explanatory variable: Data asset inclusion in financial statements (Digasset). Based on whether data resource-related accounts are listed in the enterprise's balance sheet, a dummy variable is constructed to

measure data asset inclusion [13]. If an enterprise includes data assets in financial statement accounting, it is assigned a value of 1; otherwise, it is assigned a value of 0. In the heterogeneity test, dummy variables for intangible-asset data assets (Digasset_intan) and development-expenditure data assets (Digasset_devel) are constructed respectively. If an enterprise includes data assets in the intangible assets account, Digasset_intan is assigned 1, otherwise 0; if included in the development expenditure account, Digasset_devel is assigned 1, otherwise 0.

Mediating variable: Information transparency (DA). The absolute value of discretionary accruals calculated by the modified Jones model is used as an inverse measure of information transparency. The larger the absolute value of discretionary accruals, the higher the degree of earnings manipulation of the enterprise and the lower the information transparency [14].

Moderating variable: Investor Attention (Attention). The natural logarithm of the online search index of listed companies is selected to measure investor attention. The higher the search index, the higher the investor attention [10].

Control variables: Drawing on existing studies, Enterprise Size (Size), Enterprise Age (Age), asset-liability ratio (Lev), Return on total Assets (ROA), ownership concentration (Top1), and Duality of chairman and general manager (Dual) are selected as control variables to exclude the influence of other factors on enterprise innovation performance. The specific definitions of each variable are shown in Table 1.

Table 1. Variable definition table

Variable Type	Variable Name	Variable Symbol	Variable Definition
Explained variable	Enterprise innovation performance	ln_Inno	Natural logarithm of the total number of patents applied by the enterprise in the current year
Explanatory variable	Data asset inclusion in financial statements	Digasset	Assigned 1 if data resources are listed under inventory, intangible assets and development expenditure items in the balance sheet (indicating inclusion), otherwise 0
	Intangible-asset data assets	Digasset_intan	1 if data assets are recorded under intangible assets, otherwise 0
	Development-expenditure data assets	Digasset_devel	1 if data assets are recorded under development expenditures, otherwise 0
Mediating variable	Information transparency	DA	Absolute value of discretionary accruals calculated by the modified Jones model
Moderating variable	Investor attention	Attention	Natural logarithm of Baidu search engine data plus 1
Control variable	Enterprise size	Size	Natural logarithm of the enterprise's total assets at year-end
	Enterprise age	Age	Natural logarithm of the enterprise's listing years
	Asset-liability ratio	Lev	Total liabilities / Total assets
	Return on total assets	ROA	Net profit / Average balance of total assets at the beginning and end of the period
	Ownership concentration	Top1	Shareholding ratio of the largest shareholder
	Duality of positions	Dual	1 if the chairman and general manager are the same person, otherwise 0

3.3. Research models

To test the research hypotheses, the following multiple linear regression models are constructed and estimated using the Generalized Least Squares (GLS) method to address the heteroscedasticity problem of cross-sectional data.

(1) The benchmark regression model is shown in Formula (1):

$$ln_Inno_i = \alpha + \beta Digasset_i + \gamma Controls_i + \varepsilon_{it} \quad (1)$$

where i represents the company, ln_Inno_i represents enterprise innovation performance, $Digasset_i$ represents the dummy variable of data asset inclusion in financial statements, $Controls_i$ represents a series of control variables, and ε_{it} is the random error term. If β is significantly positive, it indicates that data asset inclusion significantly improves enterprise innovation performance, and H1 holds.

(2) Mediating effect model

The "two-step method" of mediating effect is used to test the mediating role of information transparency, and the models are constructed as shown in Formulas (2) and (3):

$$DA_i = \alpha + \beta_1 Digasset_i + \gamma Controls_i + \varepsilon_{it} \quad (2)$$

$$ln_Inno_i = \alpha + \beta_1 Digasset_i + \beta_2 DA_i + \gamma Controls_i + \varepsilon_{it} \quad (3)$$

where DA_i is the mediating variable information transparency, and other variables are the same as those in Formula (1).

(3) Moderating effect model

By constructing the interaction term between data asset inclusion and investor attention, the moderating effect of investor attention is tested. The model is shown in Formula (4):

$$ln_Inno_i = \alpha + \beta_1 Digasset_i + \beta_2 Attention_i + \beta_3 Digasset_i * Attention_i + \gamma Controls_i + \varepsilon_{it} \quad (4)$$

where $Digasset_i$*$Attention_i$ is the interaction term. If β_3 is significantly positive, it indicates that investor attention has a positive moderating effect, and H3 holds.

4. Empirical analysis

4.1. Descriptive statistics

Table 2 shows the descriptive statistics of each variable. The mean value of enterprise innovation performance (ln_Inno) is 1.490, the median is 1.390, the standard deviation is 1.520, the maximum value is 8.140, and the minimum value is 0, indicating that there are significant differences in innovation output among different listed companies, and the overall distribution features more observations in the middle and fewer at both ends. The mean value of data asset inclusion (Digasset) is 0.0100, indicating that only 1% of sample enterprises completed data asset inclusion in 2024, reflecting that the practice of data asset inclusion is still in the preliminary stage. The mean value of information transparency (DA) is 0.0400, the median is 0.0300, and the standard deviation is small, indicating that the overall difference in information transparency among sample enterprises is not notable. The mean value of Investor Attention (Attention) is 10.16 and the median is 12.18, showing a left-skewed distribution, indicating that more than half of the enterprises have received high investor attention, but some enterprises have low investor attention. For control variables, the distribution of

indicators such as enterprise size, asset-liability ratio and ownership concentration conforms to the general characteristics of listed companies, and the data quality is sound.

Table 2. Descriptive statistics results

Variable	*N*	Mean	SD	Min	p50	Max
ln_Inno	1,197	1.490	1.520	0	1.390	8.140
Digasset	1,197	0.0100	0.110	0	0	1
Size	1,197	22.40	1.300	19.34	22.22	27.18
Age	1,197	2.270	1.040	0	2.710	3.400
Lev	1,197	0.380	0.200	0.0500	0.370	0.970
ROA	1,197	0.0300	0.0600	-0.280	0.0300	0.250
Top1	1,197	0.360	0.200	0.0400	0.310	0.960
Dual	1,197	0.350	0.470	0	0	1
DA	1,197	0.0400	0.0400	0	0.0300	0.210
Attention	1,197	10.16	4.530	0	12.18	14.80

4.2. Correlation analysis

Table 3. Correlation analysis results

	ln_Inno	Digasset	Size	Age	Lev	ROA	Top1	Dual	DA	Attention
ln_Inno	1									
Digasset	0.107***	1								
Size	0.133***	0.128***	1							
Age	-0.093***	-0.016	0.258***	1						
Lev	-0.000	0.026	0.375***	0.146***	1					
ROA	0.071**	-0.014	0.101***	-0.040	-0.332***	1				
Top1	0.006	0.027	0.055*	-0.033	-0.055*	0.064**	1			
Dual	0.009	0.087***	-0.168***	-0.174***	-0.088***	-0.008	-0.059**	1		
DA	-0.088***	-0.079***	-0.216***	-0.058**	0.008	-0.094***	-0.034	0.027	1	
Attention	-0.044	0.041	0.371***	0.315***	0.179***	-0.019	-0.108***	-0.126***	-0.096***	1

Note: *, **, *** indicate significance at the 10%, 5% and 1% levels respectively, the same below.

Table 3 shows the Pearson correlation analysis results of each variable. The correlation coefficient between data asset inclusion (Digasset) and enterprise innovation performance (ln_Inno) is 0.107, which is significantly positive at the 1% level, preliminarily indicating a positive association between data asset inclusion and enterprise innovation performance, and providing preliminary empirical evidence for H1. The correlation coefficient between information transparency (DA) and enterprise innovation performance (ln_Inno) is -0.088, which is significantly negative at the 1% level, indicating that higher information transparency corresponds to

better enterprise innovation performance. The correlation coefficient between Investor Attention (Attention) and data asset inclusion (Digasset) is 0.041, showing a positive correlation, which provides a preliminary basis for the moderating effect test. The correlation between each control variable and the explained variable also basically conforms to theoretical expectations, and the correlation coefficients between variables are all less than 0.5, indicating that there is no serious multicollinearity problem in the model.

4.3. Multicollinearity test

The Variance Inflation Factor (VIF) method is used to test the multicollinearity of the model, and the results are shown in Table 4. The VIF values of all variables are less than 2, and the mean VIF is 1.18, which is far below the empirical critical value of 10, indicating that there is no serious multicollinearity among the explanatory variables in the model, and the regression results are reliable.

Table 4. Variance inflation factor test results

Variable	VIF	1/VIF
Size	1.544	0.648
Lev	1.403	0.713
Attention	1.26	0.794
ROA	1.213	0.824
Age	1.164	0.859
Dual	1.067	0.937
DA	1.065	0.939
Digasset	1.037	0.965
Top1	1.035	0.966
Mean VIF	1.18	

4.4. Benchmark regression analysis

Table 5 shows the benchmark regression results of the impact of data asset inclusion on enterprise innovation performance. Column (1) does not include control variables, and columns (2) to (7) gradually add control variables. The results show that in the process of gradually adding control variables, the regression coefficient of data asset inclusion (Digasset) is always significantly positive at the 1% level. After all control variables are added in column (7), the regression coefficient of Digasset is 1.1295, indicating that data asset inclusion significantly improves enterprise innovation performance, and H1 is verified. For control variables, the regression coefficient of Enterprise Size (Size) is significantly positive, indicating that large enterprises achieve higher innovation performance by virtue of rich resource advantages. The regression coefficient of Enterprise Age (Age) is significantly negative, indicating that enterprises with longer listing years may have organizational inertia and relatively low innovation vitality. The regression coefficients of asset-liability ratio (Lev), Return on total Assets (ROA), ownership concentration (Top1) and duality of positions (Dual) do not pass the significance test, and their impacts on enterprise innovation performance are not significant.

Table 5. Benchmark regression analysis results

Variable	(1) ln_Inno	(2) ln_Inno	(3) ln_Inno	(4) ln_Inno	(5) ln_Inno	(6) ln_Inno	(7) ln_Inno
Digasset	1.4170***	1.2109***	1.1228***	1.1101***	1.1318***	1.1350***	1.1295***
	(3.4247)	(3.1421)	(2.7881)	(2.7341)	(2.7796)	(2.7754)	(2.7584)
Size		0.1416***	0.1823***	0.2030***	0.1896***	0.1910***	0.1916***
		(3.5392)	(4.4667)	(4.7641)	(4.2552)	(4.2719)	(4.2508)
Age			-0.1920***	-0.1884***	-0.1854***	-0.1863***	-0.1855***
			(-4.8758)	(-4.7746)	(-4.6965)	(-4.7078)	(-4.6571)
Lev				-0.3716*	-0.2370	-0.2446	-0.2439
				(-1.7043)	(-0.9905)	(-1.0197)	(-1.0148)
ROA					0.9700	0.9799	0.9801
					(1.3843)	(1.3943)	(1.3942)
Top1						-0.1076	-0.1058
						(-0.5058)	(-0.4971)
Dual							0.0128
							(0.1385)
Constant	1.4680***	-1.7003*	-2.1767**	-2.5061***	-2.2913**	-2.2803**	-2.3012**
	(33.3033)	(-1.9268)	(-2.4577)	(-2.7620)	(-2.4506)	(-2.4402)	(-2.4182)
Observations	1,197	1,197	1,197	1,197	1,197	1,197	1,197
R-squared	0.414	0.427	0.436	0.458	0.471	0.484	0.492

4.5. Mediating effect test

Table 6 shows the test results of the mediating effect of information transparency. Column (1) shows the regression result of data asset inclusion on information transparency, and column (2) shows the regression results of data asset inclusion and information transparency on enterprise innovation performance. The results in column (1) show that the regression coefficient of Digasset is -0.0187, which is significantly negative at the 1% level, indicating that data asset inclusion can significantly reduce the absolute value of enterprise discretionary accruals and improve information transparency. The results in column (2) show that the regression coefficient of DA is -1.9218, which is significantly negative at the 5% level, indicating that higher information transparency leads to better enterprise innovation performance. The regression coefficient of Digasset is 1.0937, which is significantly positive at the 1% level, and is smaller than the coefficient of 1.1295 in the benchmark regression model, indicating that information transparency plays a partial mediating role between data asset inclusion and enterprise innovation performance, and H2 is verified. By improving corporate information transparency, data asset inclusion alleviates information asymmetry between enterprises and external stakeholders, reduces corporate financing costs, optimizes the allocation of innovation resources, and thus promotes the improvement of innovation performance.

4.6. Moderating effect test

The test results of the moderating effect of investor attention in column (3) of Table 6 show that the regression coefficient of the interaction term (Dig_Att) between data asset inclusion and investor attention is 0.2302, which is significantly positive at the 1% level, indicating that investor attention has a positive moderating effect, and H3 is verified. The higher the investor attention, the stronger the promoting effect of data asset inclusion on enterprise innovation performance. High investor attention can strengthen the signal transmission

effect of data asset inclusion, making it easier for enterprises to attract external capital and provide financial support for innovation activities. Meanwhile, the external supervision pressure formed by high investor attention can compel enterprises to improve the efficiency of data asset management, give full play to the innovation-empowering role of data assets, and thereby amplify the promoting effect of data asset inclusion on innovation performance.

Table 6. Mediating effect and moderating effect test results

Variable	Mediating effect		Moderating effect
	(1) DA	(2) ln_Inno	(3) ln_Inno
Digasset	-0.0187***	1.0937***	0.7836**
	(-3.5976)	(2.6459)	(2.1565)
Attention			-0.0279***
			(-2.8705)
DA		-1.9218**	0.2302***
		(-2.2194)	(2.6886)
Size	-0.0075***	0.1772***	0.2162***
	(-7.4803)	(3.8522)	(4.6338)
Age	-0.0006	-0.1866***	-0.1593***
	(-0.4139)	(-4.7064)	(-3.9296)
Lev	0.0175**	-0.2102	-0.2344
	(2.3879)	(-0.8761)	(-0.9802)
ROA	-0.0284	0.9256	0.9364
	(-1.1827)	(1.3241)	(1.3326)
Top1	-0.0027	-0.1110	-0.1914
	(-0.4384)	(-0.5228)	(-0.8996)
Dual	-0.0004	0.0121	0.0002
	(-0.1395)	(0.1306)	(0.0023)
Constant	0.2094***	-1.8988*	-2.5954***
	(9.7948)	(-1.9296)	(-2.6785)
Observations	1,197	1,197	1,197
R-squared	0.457	0.463	0.472

4.7. Heterogeneity analysis

To test the heterogeneous impact of different types of data assets on enterprise innovation performance, data assets are divided into intangible-asset data assets (Digasset_intan) and development-expenditure data assets (Digasset_devel), and regressions are conducted respectively. The results are shown in Table 7. The results in column (1) show that the regression coefficient of Digasset_intan is 0.8481, which is significantly positive at the 10% level. The results in column (2) show that the regression coefficient of Digasset_devel is 1.3146, which is significantly positive at the 10% level, and the coefficient value is notably higher than that of Digasset_intan. This indicates that development-expenditure data assets have a significantly stronger promoting effect on enterprise innovation performance than intangible-asset data assets. Development-expenditure data assets are embedded in the front-end process of enterprise R&D, directly related to innovation activities, and can provide accurate data support for enterprise R&D decisions, reduce R&D trial-and-error costs, and improve innovation efficiency. By contrast, intangible-asset data assets are solidified in

mature technologies, mainly reflecting the recognition of existing technological achievements, and have a relatively weak supporting effect on breakthrough innovation.

Table 7. Heterogeneity analysis results

Variable	(1) ln_Inno	(2) ln_Inno
Digasset_intan	0.8481*	
	(1.5777)	
Digasset_devel		1.3146*
		(1.8463)
Size	0.2027***	0.1984***
	(4.4383)	(4.4272)
Age	-0.1887***	-0.1877***
	(-4.7310)	(-4.7016)
Lev	-0.2623	-0.2362
	(-1.0895)	(-0.9786)
ROA	0.8911	0.9831
	(1.2711)	(1.3949)
Top1	-0.1015	-0.0895
	(-0.4756)	(-0.4188)
Dual	0.0299	0.0276
	(0.3219)	(0.2999)
Constant	-2.5321***	-2.4550***
	(-2.6184)	(-2.5953)
Observations	1,197	1,197
R-squared	0.457	0.471

4.8. Robustness test

To verify the reliability of the benchmark regression results, the method of replacing the explained variable is adopted for the robustness test. Enterprise innovation performance is replaced by the natural logarithm of the total number of patents granted to the enterprise in the current year (ln_Inno_2), and the regression is re-conducted. The results are shown in Table 8. The results show that the regression coefficient of Digasset is 1.0087, which is significantly positive at the 5% level, consistent with the benchmark regression results. This indicates that the promoting effect of data asset inclusion on enterprise innovation performance is robust and the research conclusions are reliable.

Table 8. Robustness test results

Variable	ln_Inno_2
Digasset	1.0087**
	(2.3429)
Size	0.1753***
	(3.9006)

Table 8. Continued

Age	-0.2213*** (-5.6339)
Lev	-0.2947 (-1.2275)
ROA	1.2100* (1.7330)
Top1	-0.2580 (-1.2195)
Dual	0.0233 (0.2614)
Constant	-1.5489 (-1.6356)
Observations	1197
R-squared	0.483

5. Conclusion and suggestion

5.1. Research conclusions

Taking 1,197 A-share listed companies in 2024 as research samples, this paper empirically tests the effect, transmission mechanism and heterogeneous role of data asset inclusion in financial statements on enterprise innovation performance, and draws the following conclusions:

(1) The inclusion of data assets in financial statements significantly improves enterprise innovation performance. By recognizing data resources as formal assets of enterprises, data asset inclusion realizes the transformation of data resources from "hidden resources" to "explicit capital". Enterprises can systematically manage and utilize data assets, accurately identify innovation opportunities, optimize the allocation of innovation resources, and thus improve innovation performance.

(2) Information transparency plays a partial mediating role between data asset inclusion in financial statements and enterprise innovation performance. Through standardized accounting information disclosure, data asset inclusion improves corporate information transparency, alleviates information asymmetry between enterprises and external stakeholders, reduces corporate financing costs, optimizes the allocation of innovation resources, and thus promotes the improvement of innovation performance.

(3) Investor attention plays a positive moderating role. The higher the investor attention, the stronger the promoting effect of data asset inclusion on enterprise innovation performance. High investor attention strengthens the signal transmission effect of data asset inclusion, attracts more external capital to support enterprise innovation, and forms external supervision pressure at the same time, compelling enterprises to improve the efficiency of data asset management and amplifying the innovation-empowering effect of data asset inclusion.

(4) There is heterogeneity in the promoting effect of different types of data assets on enterprise innovation performance. Development-expenditure data assets have a significantly stronger promoting effect on innovation performance than intangible-asset data assets. Embedded in the front end of R&D and directly related to innovation activities, development-expenditure data assets have a stronger supporting effect on enterprises' breakthrough innovation; while intangible-asset data assets are solidified in mature technologies, with relatively weak innovation-empowering effects.

5.2. Policy suggestions

(1) Improve the institutional system of data asset inclusion in financial statements and promote the implementation of the system. Financial, taxation, industry and information technology departments should strengthen coordination, formulate detailed operational guidelines for data asset inclusion, clarify specific standards for data asset right confirmation, valuation and accounting treatment, and solve difficult problems such as ownership definition and value evaluation in enterprises' inclusion practice. Accelerate the development of the data asset evaluation industry, cultivate professional evaluation institutions, and improve the scientificity and accuracy of data asset valuation. Introduce supporting incentive policies for data asset inclusion, provide tax incentives, financial subsidies and other support to enterprises that have completed data asset inclusion, reduce enterprises' inclusion costs, and encourage more enterprises to carry out data asset inclusion practices.

(2) Strengthen the supervision of enterprise information disclosure and improve information transparency. Securities regulatory authorities should improve the rules for data asset information disclosure, require enterprises to disclose detailed information such as the scale, valuation methods, application scenarios and innovation contributions of data assets, and improve the standardization and transparency of data asset information disclosure. Strengthen the supervision and inspection of enterprise information disclosure, crack down on earnings manipulation, information fraud and other violations, and protect investors' right to information. Promote enterprises to establish and improve the data governance system, realize standardized management of data assets and timely and accurate disclosure of information, and give full play to the mediating role of information transparency.

(3) Guide the capital market to pay attention to the value of data assets and optimize the innovation financing environment. Strengthen market publicity and guidance on the value of data assets, raise investors' awareness of the data asset inclusion system, and guide investors to focus on the value and innovation potential of enterprises' data assets. Improve the capital market pricing mechanism, incorporate data assets into the enterprise value evaluation system, so that the value of enterprise data assets can be reasonably reflected, and attract more capital market resources for enterprises with data assets included in statements. Encourage venture capital, private equity and other capital to tilt toward enterprises with data asset inclusion, provide diversified financing support for enterprise innovation activities, and amplify the positive moderating effect of investor attention.

(4) Guide enterprises to allocate data assets in a differentiated manner and improve innovation empowerment efficiency. Guide enterprises to optimize their data asset structure in line with their own innovation strategies, increase investment in development-expenditure data assets, deeply embed data assets in the front-end R&D process, and give full play to their supporting role in breakthrough innovation. Encourage enterprises to establish a linkage mechanism between data assets and innovation activities, accurately identify market demand through data analysis, optimize R&D processes, reduce innovation trial-and-error costs, and improve the innovation empowerment efficiency of data assets. Promote enterprises to strengthen data

technology research and development and talent training, improve the ability of data asset integration, analysis and application, and turn the resource advantage of data assets into innovation performance advantage.

5.3. Research limitations and prospects

The research of this paper still has certain limitations. First, the timeliness of the sample is constrained. The data asset inclusion system was implemented in 2024, and only cross-sectional data of the first batch of implementing enterprises can be obtained, failing to examine its long-term dynamic effects. Second, the measurement method of data asset inclusion is relatively simplified, only using dummy variables to measure whether enterprises include data assets in statements, without considering the impact of dimensions such as the scale and quality of data assets.

Future research can be carried out from the following aspects. First, extend the research time window, use panel data to examine the long-term impact of data asset inclusion on enterprise innovation performance, as well as the effect of subsequent accounting treatments such as data asset amortization and impairment on innovation performance. Second, improve the measurement indicators of data asset inclusion, construct comprehensive indicators combined with dimensions such as the scale, valuation and application efficiency of data assets, to measure the level of data asset inclusion more accurately. Third, expand the research perspective, examine the heterogeneity of the impact of data asset inclusion on enterprise innovation performance under different property rights natures, industry characteristics and digitalization levels, as well as the moderating effects of factors such as digital technology and corporate governance, to further enrich the research system of data asset inclusion and enterprise innovation performance.

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