The Impact of Human Capital Factors on the Financial Performance and Market Value of Real Estate Enterprises

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Abstract: *Against the backdrop of high-quality economic and social development, human capital has increasingly become a critical strategic factor driving corporate value creation. How to effectively transform talent resources into economic value and promote high-quality development has emerged as an important issue in both policy and practice. Using Chinese A-share listed real estate firms from 2010 to 2022 as the research sample, this study constructs a multiple regression model based on firms' financial statement data to empirically examine the impact of human capital investment and human capital efficiency on corporate financial performance and market value. The results show that human capital investment significantly affects both financial performance and market value, while human capital efficiency is significantly negatively associated with market value. This finding reflects a stage-specific mismatch between human resource allocation efficiency and market growth expectations during the industry's shift from scale expansion to quality-oriented adjustment. From the perspective of human capital value transformation, this study reveals the mechanism through which talent factors contribute to corporate value creation, and provides empirical evidence for optimizing human resource allocation and improving talent evaluation and incentive systems.*

Keywords: *Human capital investment; Human capital efficiency; Financial performance; Market value; Multiple regression analysis*

1. Introduction

For decades, traditional production factors such as land, capital, and labor have played a vital role in driving economic growth. As China's economy enters a high-quality development phase, enterprises are increasingly shifting from traditional factor-driven growth to innovation- and talent-driven development [1]. Under the impetus of national five-year strategic planning, the continuous advancement of economic restructuring and industrial

upgrading has rendered the development model that relies solely on capital expansion and resource input unsustainable, and human capital has gradually become a key production factor driving corporate value creation and economic growth [2]. National strategic guidelines have explicitly called for deepening the implementation of the talent-strengthened development strategy, emphasizing that talent is the foremost resource for achieving high-quality development. This provides important policy orientation for enterprises seeking to optimize talent allocation and improve organizational efficiency in the new development stage [3]. Against the backdrop of switching from old to new growth drivers, how to enhance organizational performance through improved human resource allocation and effectively transform talent into economic value has become a focal topic in human resource research [4]. At the firm level, human capital is reflected not only in headcount and compensation, but also in employees' knowledge, professional skills, and innovation capability—comprehensive factors that play an increasingly important role in resource allocation, technological innovation, and managerial operations. As market competition intensifies, inter-firm competition has gradually shifted from capital competition toward talent and knowledge competition.

As a pillar industry of China's national economy, real estate has long exhibited typical capital-intensive characteristics, with competitive advantage largely depending on land reserves, financing capacity, and capital operations [5]. However, as the real estate market transitions from rapid expansion toward adjustment and transformation, the industry environment has undergone profound changes. A growth model that relies purely on capital input is no longer viable, and firms are gradually shifting from "scale expansion" toward "quality and efficiency" [6]. Throughout this process, human capital, as an important factor underpinning strategic transformation, resource allocation efficiency, and core competitiveness, plays an increasingly prominent role [7].

Based on human capital theory and the resource-based view, this paper constructs multiple regression models linking human capital factors to financial and market performance. The research aims to make progress in two areas: (i) filling the gap regarding the relationship between human capital factors and real estate firm development; and (ii) revealing the value-transformation mechanism of human capital factors, providing theoretical references and practical evidence for deepening human resource management and personnel system reform.

2. Theoretical Foundation and Research Hypotheses

2.1 Human Capital Theory

Human capital theory provides a key theoretical foundation for explaining the relationship between human resource investment and firm performance. It was first proposed by Schultz [8], who argued that investments in education, training, and health are not merely consumption but capital-like investments expected to generate future returns. He pointed out that human capital accumulation is a primary driver of economic growth and productivity improvement. Becker [9] further developed human capital theory in *Human Capital*, arguing that education and on-the-job training are forms of capital investment similar to physical capital and distinguishing between general and firm-specific training, while emphasizing the role of firm-level investment in improving labor productivity and organizational returns. Mincer [10] used the "human capital earnings function" to empirically analyze the impact of education and work experience on wage differentials, revealing the quantitative link between human capital accumulation and productive efficiency.

Within the human capital framework, firm investments in employee compensation, training, and capability development can be regarded as forward-looking strategic investments aimed at enhancing employees' knowledge, skills, and innovation capability, thereby improving overall productivity and profitability. Human capital affects not only current performance but also long-term growth through learning effects and knowledge spillovers [11]. Lucas [12], in his endogenous growth model, noted that human capital accumulation exhibits externalities and is a key driver of long-run economic growth.

Thus, from a human capital perspective, enhancing employees' productivity, optimizing resource allocation, and strengthening innovation capability promote market performance and value creation. On this basis, the following hypothesis is proposed:

H1: Human capital investment positively affects the firm's return on assets (ROA).

2.2 Resource-Based View

The Resource-Based View (RBV) is a central theory explaining the sources of competitive advantage. Penrose [13], in *The Theory of the Growth of the Firm*, first argued that firm growth depends on internal resource allocation capability, laying the groundwork for analyses of resource heterogeneity. Wernerfelt [14] formally introduced the "resource-based view," emphasizing that strategy should be formulated from a resource perspective rather than a product perspective. Barney [15] further argued that only resources that are valuable, rare,

inimitable, and non-substitutable (the VRIN attributes) can generate sustainable competitive advantage. Within the human capital research field, human capital is regarded as a key intangible resource characterized by high specificity and path dependence. Knowledge and skills are among the most important strategic resources, and the firm's ability to integrate and apply them determines performance [16]. Peteraf [17] further noted that resource heterogeneity and immobility are preconditions for earning above-normal returns. Compared with tangible assets, human capital is more tacit and harder to imitate, making it more likely to serve as a source of sustainable competitive advantage.

In the real estate industry, firms rely not only on land reserves and capital but also on professional management teams, project development capability, and market judgment—all of which are human capital factors. Particularly amid tightened regulation and intensified competition, human capital efficiency directly affects resource allocation, project operation quality, and risk control. Some studies emphasize that the formation of a firm's core competitiveness depends on the effective integration and utilization of strategic resources [18], and that the efficiency of human capital input determines a firm's value-creation capability [19]. Therefore, from an RBV perspective, human capital efficiency reflects internal resource allocation and is also a key strategic variable affecting profitability and long-term performance of listed real estate firms. Based on the above discussion, the following hypothesis is proposed:

H2: Human capital investment positively affects firm market performance (Tobin's Q).

2.3 Intellectual Capital and Efficiency Theory

Intellectual capital theory has emerged as an important framework in the context of the knowledge economy, providing a new analytical perspective on the role of intangible assets in value creation. Edvinsson and Malone [20] defined intellectual capital as the sum of a firm's knowledge-based resources that create value, comprising human capital, structural capital, and relational capital. Bontis [21] further argued that human capital is the core component of the intellectual capital system and an important source of organizational innovation and sustained competitive advantage.

During the real estate industry's transformation, human capital is no longer merely a cost factor but a key knowledge carrier affecting project operation efficiency, risk management, and strategic execution. As competition intensifies and market uncertainty rises, effective utilization of human resources has drawn increasing attention. Theoretically, improving human capital efficiency means creating greater value increments at lower cost, thereby boosting profitability and capital market valuation [22]. However, the relationship between human capital efficiency and market value may be complex across different development stages and institutional environments [23]. Therefore, intellectual capital and efficiency

theories must be jointly applied to analyze the mechanism through which human capital efficiency affects the financial performance and market value of listed real estate firms. Based on these foundations, the following hypotheses are proposed:

H3: Human capital efficiency is significantly related to ROA.

H4: Human capital efficiency is negatively related to Tobin's Q.

3. Research Design

3.1 Sample Selection and Data Sources

To ensure scientific rigor and representativeness, this study selects A-share listed real estate firms in China as the sample. Given data availability and continuity, the research period spans 2010–2022, covering both the period of rapid expansion combined with policy regulation and recent years of structural adjustment and strategic transformation, providing strong real-world relevance and analytical value. The sample selection procedure is as follows. First, financial data, industry classifications, and related macroeconomic variables for continuously listed real estate firms during the sample period were extracted from the China Stock Market & Accounting Research (CSMAR) database. Second, firms experiencing major asset restructuring, delisting, or ST/*ST status during the sample period were excluded to mitigate the impact of abnormal operations. Third, all continuous variables were winsorized at the 1% level to reduce the influence of extreme observations.

The final sample comprises approximately 61 listed real estate firms with 7,060 valid observations, providing broad coverage and reflecting the financial characteristics of Chinese listed real estate firms. The main data include corporate financial statement data (income statements, balance sheets, and cash flow statements) and firm-level characteristics. In addition to CSMAR data, industry volatility indicators are constructed from national real estate sales data from 2009 to 2022, and firms' Tobin's Q values are computed from annual report financial data and manually verified against publicly available sources to improve measurement accuracy.

3.2 Variable Definitions

To systematically analyze the impact of human capital factors on the financial performance of real estate enterprises, the main variables are defined based on prior literature and the industry's characteristics as follows.

1. Dependent Variables

Firm performance is typically measured along two dimensions: market performance and

financial performance. Market performance is commonly captured by Tobin's Q and stock returns, while financial performance is measured by ROA, ROE, or ROI. This study uses ROA and Tobin's Q as dependent variables in the multiple regression model.

2. Core Explanatory Variables

Human Capital Investment (HCI): Refers to a firm's resource inputs aimed at improving employees' knowledge, skills, and organizational management capabilities, including compensation, training expenses, social security expenditures, and spending related to talent acquisition and development. From a human capital perspective, such investment has clear investment attributes, intended to enhance future earnings through productivity and capability improvements. Within the RBV framework, sustained human capital investment strengthens core competitiveness and value creation. Given the real estate industry's reliance on professional teams in project development, capital operations, risk management, and marketing, this study uses the share of human resource expenditures in operating revenue as a proxy for HCI to eliminate scale effects on measurement. The indicator objectively reflects the intensity of human resource allocation and provides a quantitative basis for analyzing the impact of human capital factors on financial performance and market value.

Human Capital Efficiency (HCE): Measures the firm's value-creation capability per unit of human capital input. Drawing on Pulic's (1998) VAIC methodology, HCE is defined as the ratio of value added (VA) to human capital input (HC), i.e., HCE = VA/HC. Value added equals operating revenue minus operating costs (operating costs, selling expenses, and administrative expenses) excluding employee compensation; HC is measured by the total compensation paid to employees in the current period, including wages, bonuses, and benefits. A higher HCE indicates stronger value-creation capability from human capital input and higher allocation efficiency.

3. Control Variables

To ensure robust regression results, the model includes several controls for firm characteristics and the external environment: firm size (FirmSize), financial leverage (Lev), industry volatility (Volatility), cash flow (CashFlow), firm age since IPO (Age), and ownership type (ShareHolder, state-owned vs. non-state-owned). Industry volatility, measured by the annual growth rate of national commercial housing sales area, effectively reflects market sentiment and industry fluctuations. Firm age captures differences in operating experience and organizational maturity. Ownership type is coded as 1 for state-owned and 0 otherwise. The full variable definitions are summarized below.

Type	Variable	Symbol	Description
Dependent	Profitability	ROA	Net income / total assets
Dependent	Market value	Tobin	Market value / total assets
Independent	Human capital investment	HCI	Cash paid to/for employees / operating revenue
Independent	Human capital efficiency	HCE	(Operating revenue − operating costs − selling expenses − administrative expenses) / employee compensation
Control	Firm size	FirmSize	Natural log of total assets
Control	Financial leverage	Lev	Debt-to-asset ratio
Control	Industry volatility	Volatility	Annual growth rate of housing sales area
Control	Cash flow	CashFlow	Operating cash flow / total assets
Control	Years since listing	Age	Firm age since IPO
Control	Ownership type	Shareholder	State-owned or non-state-owned

3.3 Multiple Regression Model Specification

To analyze the relationship between human capital factors and firm performance, this study constructs the following baseline regressions using HCI, HCE, firm size, industry volatility, leverage, age, cash flow, and ownership type.

1. Financial Performance Model:

$$ROA_{it} = \beta_0 + \beta_1 HCI_{i,t-1} + \beta_2 HCE_{i,t-1} + \beta_3 FirmSize_{it} + \beta_4 Lev_{it} + \beta_5 Volatility_{it} + \beta_6 CashFlow_{it} + \beta_7 ShareHolder_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

2. Market Value Model:

$$Tobin_{it} = \beta_0 + \beta_1 HCI_{i,t-1} + \beta_2 HCE_{i,t-1} + \beta_3 FirmSize_{it} + \beta_4 Lev_{it} + \beta_5 Volatility_{it} + \beta_6 CashFlow_{it} + \beta_7 ShareHolder_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

Here, i indexes firms and t indexes years from 2010 to 2022. Human capital variables are lagged one period, i.e., the current year's input affects next year's financial and market performance.

4. Empirical Results and Analysis

4.1 Descriptive Statistics

Tables 1 and 2 report descriptive statistics and correlations for the main variables. The mean ROA is 2.2%, indicating reasonable profitability of Chinese listed real estate firms during 2010–2022. The mean Tobin's Q is 1.209, suggesting relatively strong market valuation.

Table 1. Descriptive Statistics and Correlations for ROA

	Mean	SD	ROA	HCI	HCE	Firm Size	Lev	Volatility	Cash Flow	Age	SH
ROA	0.0221	0.0383	1								
HCI	0.0602	0.0521	-0.097***	1							
HCE	3.5473	1.5588	0.127***	-0.49***	1						
Firm Size	24.118	1.408	-0.091***	-0.223***	0.031	1					
Lev	0.6850	0.1586	-0.354***	-0.211***	0.053	0.501***	1				
Volatility	0.1535	0.00386	-0.152***	0.036	-0.057	0.095***	-0.017	1			
Cash Flow	0.0045	0.1139	0.043	0.081**	-0.103***	-0.031	-0.1***	0.035	1		

	Mean	SD	ROA	HCI	HCE	Firm Size	Lev	Volatility	Cash Flow	Age	SH
Age	18.913	5.963	-0.049	0.058	-0.166***	0.211***	-0.073**	0.259***	0.092***	1	
Shareholder	0.526	0.4997	0.039	-0.083**	-0.061*	0.124***	0.127***	0.017	-0.097***	0.147***	1

Note: ***, **, * denote significance at the 1%, 5%, and 10% levels.

Table 2. Descriptive Statistics and Correlations for Tobin's Q

	Mean	SD	Tobin	HCI	HCE	Firm Size	Lev	Volatility	Cash Flow	Age	SH
Tobin	1.209	0.449	1								
HCI	0.0595	0.05148	0.1957***	1							
HCE	3.5998	1.5621	-0.0967***	-0.497***	1						
Firm Size	24.087	1.399	-0.5337***	-0.223***	0.031	1					
Lev	0.6868	0.15654	-0.3717***	-0.211***	0.0537**	0.5017***	1				
Volatility	0.1535	0.00398	-0.0687**	0.036	-0.0577**	0.0957**	-0.017	1			

	Mean	SD	Tobin	HCI	HCE	Firm Size	Lev	Volatility	Cash Flow	Age	SH
Cash Flow	0.0038	0.11633	0.0787***	0.0817**	-0.1037***	-0.031	-0.17***	0.035	1		
Age	18.482	5.775	-0.1477***	0.0587*	-0.1667***	0.211***	-0.073**	0.2597***	0.0927***	1	
Shareholder	0.5198	0.5	-0.0617*	-0.0837**	-0.0617*	0.1247***	0.127***	0.017	-0.0977***	0.147***	1

Note: ***, **, * denote significance at the 1%, 5%, and 10% levels.

4.2 Regression Results

Regressions of Models (1) and (2) were estimated using Minitab. Table 3 presents the results. HCI and HCE exhibit significant effects in Model (1); HCE shows a significant effect in Model (2).

Table 3. Regression Results

	Model (1)	Model (2)
HCI	-0.0818 (0.0299)***	0.358 (0.327)
HCE	0.0020 (0.0009)**	-0.0181 (0.0106)*
FirmSize	0.0036 (0.00113)***	-0.1378 (0.0123)***
Lev	-0.1128 (0.00098)***	-0.427 (0.108)***
Volatility	-1.426 (0.336)***	-1.73 (3.68)
CashFlow	0.0126 (0.0113)	0.198 (0.123)*
Age	-0.00046 (0.000246)**	0.0066 (0.0027)***
ShareHolder	0.00712 (0.00266)***	0.0253 (0.0291)

	Model (1)	Model (2)
N	706	706
F-test	22.43***	39.83***
R^2	20.47%	31.37%

Note: Standard errors in parentheses. ***, **, * denote $p < 0.01$, $p < 0.05$, $p < 0.10$.

1. ROA Model

The dependent variable in Model (1) is ROA. The estimated regression equation is:

$$ROA = 0.2349 - 0.0818\,HCI + 0.002\,HCE + 0.0036\,FirmSize - 0.1128\,Lev - 1.426\,Volatility + 0.00126\,CashFlow - 0.000458\,Age + 0.00712\,ShareHolder$$

The results show that HCI is significantly negatively related to ROA, which likely reflects industry-specific features. First, in rapid expansion phases, real estate firms typically scale up compensation and headcount, and these inputs do not translate into profit growth in the short term, depressing per-capita output and ROA. Second, higher HCI may coincide with organizational expansion and managerial complexity, raising operating costs and suppressing short-run financial returns. This is consistent with the capital-intensive, land-driven nature of the industry, where human capital investment is more an expansion signal than an immediate profit contributor. In contrast, HCE is significantly positively associated with ROA, indicating that the value-creation capability per unit of human capital cost directly enhances profitability. Because HCE excludes operating and management costs, it reflects the firm's ability to improve output while controlling human-resource costs. Although high investment may bring short-term cost pressure, optimizing allocation and improving efficiency can deliver higher future profitability.

Among the controls, leverage is significantly and negatively related to ROA, suggesting that high-leverage firms face interest burdens and financial pressure that constrain short-term profitability. Industry volatility is negatively correlated with ROA, possibly reflecting unstable sales and cash flows during market fluctuations. The ownership coefficient is positive, indicating that state-owned firms may enjoy advantages in management stability, financing access, and policy support, yielding stronger short-run ROA than private or mixed-ownership counterparts.

The results of Model (1) suggest that human capital efficiency positively contributes to real estate firms' profitability, while excessive HCI may pressure short-term results. Firms should aim to enhance human resource allocation efficiency within the constraints of industry volatility and leverage.

2. Market Value Model

The dependent variable in Model (2) is Tobin's Q. The estimated regression equation is:

$$\begin{aligned} Tobin = {} & 5.238 + 0.358\ HCI - 0.0181\ HCE - 0.1378\ FirmSize - 0.427\ Lev \\ & - 1.73\ Volatility + 0.198\ CashFlow + 0.0066\ Age \\ & + 0.0253\ ShareHolder \end{aligned}$$

The results show that HCI is positively associated with Tobin's Q, indicating that the capital market interprets expansion of human capital as a signal of future growth potential. In real estate, increased compensation and headcount often signal expansion of projects, land reserves, and development capability—factors viewed as growth potential. Even if short-term costs rise, the market emphasizes positive expectations regarding future value. Conversely, HCE is significantly negatively associated with Tobin's Q, reflecting industry features and capital market focus. Higher efficiency typically indicates leaner operations or conservative strategies, which markets may interpret as weaker growth potential, leading to lower valuations. Furthermore, efficiency improvements may run counter to growth expectations: optimizing efficiency can come at the cost of expansion and future growth space.

Ownership is not significant in Model (2), suggesting that the capital market focuses more on actual operating capability, talent input, and resource allocation than on institutional ownership type. It is also possible that the human capital variables absorb some information on management and talent strategies that differentiates state-owned and private firms, reducing the significance of ownership. Industry-wide regulatory convergence may further narrow the differences in growth potential between state-owned and private firms.

In sum, capital markets price human capital allocation in real estate firms strongly, treating HCI as a signal of expansion and growth, while short-term improvements in HCE may be perceived as conservative management and depress Tobin's Q. Real estate firms should therefore balance short-term efficiency with long-term growth strategies to maximize value.

5. Conclusions and Future Research

5.1 Conclusions

Based on financial data from Chinese A-share listed real estate firms during 2010–2022, this paper applies multiple regression analysis to examine how human capital factors affect corporate value creation along both financial performance and market value dimensions. The results show that HCI and HCE exhibit different transmission paths in the value-transformation process. The main conclusions are as follows.

First, in the financial performance dimension, HCI is significantly negatively related to ROA,

while HCE is significantly positively related to ROA. Under the capital-intensive nature of the real estate industry, human capital investment often manifests as cost expenditure in the short run; increasing compensation and headcount can raise operating costs and compress current profitability. However, when firms effectively improve human capital allocation—optimizing talent structure and enhancing employee output and management efficiency—profitability rises significantly. Human capital efficiency therefore serves as an important mediating mechanism transforming human capital investment into financial performance.

Second, in the market value dimension, HCI is positively related to Tobin's Q, while HCE is negatively related to Tobin's Q. The capital market emphasizes future growth and expansion capacity when valuing real estate firms; HCI signals expansion and development capability, raising valuations. By contrast, efficiency improvements may be interpreted as entering a contraction or conservative phase, signaling weaker growth and reducing valuation.

5.2 Policy and Managerial Implications

The empirical results suggest that human capital factors strongly influence value creation in real estate firms, but their effects on financial performance and market value differ. Against the backdrop of industry transformation and high-quality development, both macro-level policies and firm-level HR practices should further optimize human capital allocation mechanisms and strengthen the role of talent in supporting firm development.

At the macro-policy level, improving talent development and human resource management policies for the real estate industry can guide firms from "scale-based" to "efficiency-based" workforce management. Regulators should accelerate reforms in talent evaluation, build occupational capability standards for urban renewal, property management, green building, and digital management, and encourage firms to strengthen talent cultivation and capability upgrading, thereby improving overall human resource allocation efficiency. During periods of industry adjustment or market turbulence, talent mobility and training systems should be enhanced to facilitate reasonable flows of talent into emerging fields such as urban renewal, property management, green building, and digital management, achieving structural optimization and value enhancement of human capital.

At the firm-level HR practice level, real estate enterprises should pay greater attention to the quality and efficiency of human capital investment. On one hand, talent decisions should not focus only on headcount expansion for growth but also emphasize building core talent teams that strengthen capabilities in project development, marketing, risk management, and capital operations. On the other hand, scientifically designed performance evaluation and incentive systems should enhance employee productivity and creativity, ensuring that human capital investment is effectively transformed into operating performance. Digital HR management should also be strengthened to optimize allocation and improve organizational efficiency.

5.3 Limitations and Future Research

Although this paper provides empirical evidence on how HCI and HCE affect financial performance and market value, several limitations remain. First, regarding variable measurement, this study mainly relies on financial-statement data, with HCI proxied by the share of cash paid to/for employees in operating revenue and HCE by value added divided by employee compensation. While reasonable, these measures cannot fully capture deeper attributes such as talent quality, skills, organizational capability, and innovation. Future research could incorporate micro-survey data, HR structure data, or executive-background indicators for more refined measurement.

Second, regarding the sample, this paper focuses on Chinese A-share listed real estate firms. Although representative, real estate is capital-intensive with notable entry barriers, and the mechanisms of human capital may differ from those in manufacturing, high-tech, or services. Future studies could expand the sample to multiple industries for comparative analysis, enhancing generalizability.

Finally, as the real estate industry enters a phase of structural adjustment and high-quality development, the role of human capital in firm transformation will become more prominent. Future research can explore the dynamic mechanism through which human capital factors affect long-term value creation from the perspectives of strategic transformation, digital management, and organizational innovation, offering more systematic theoretical and practical guidance for talent management and corporate governance in the real estate industry.

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