THE INFLUENCE OF STRUCTURAL CAPITAL ON FINANCIAL PERFORMANCE IN RETAIL ENTERPRISES LISTED ON VIETNAMESE STOCK EXCHANGES

MSc. Khuong Huyen Duc* - Assoc.Prof.PhD. Do Duc Tai**
Assoc.Prof.PhD. Nguyen Trong Than***

Abstract: ***This study investigates the impact of structural capital on the financial performance of retail companies listed on the Vietnamese stock market, based on a dataset of 421 observations from 55 companies over the period from 2016 to 2023. Using both Return on Assets (ROA) and Tobin's Q (ToQ) as measures of financial performance, the analysis reveals that structural capital (SCE) has a positive and statistically significant effect on both ROA and ToQ. The study finds that an increase in structural capital leads to improvements in financial performance, with the impact being similar across companies using standalone and consolidated financial statements. However, the effect on ToQ is slightly stronger in companies using consolidated financial statements, suggesting that the type of financial reporting can influence the magnitude of the impact of structural capital. Additionally, firm size (SIZE) was found to have a negative impact on ROA but a positive impact on ToQ, while financial leverage (DA) negatively affected ROA and positively influenced ToQ. The results highlight the importance of structural capital as a key driver of financial performance and suggest that investments in intangible assets, as well as the adoption of comprehensive financial reporting practices, can enhance operational efficiency and market value.***

• Keywords: *intellectual capital, stuctural capital, financial efficiency, accounting, finance.*

JEL codes: M40, M41, F65

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1. Introduction

The dynamic and evolving nature of the global economy has amplified the importance of intellectual capital, a concept encompassing human, relational, and structural dimensions. It forms the backbone of organizational efficiency, innovation, and resilience, particularly in competitive industries like retail. The Vietnamese retail sector, driven by rapid urbanization and a burgeoning consumer base, presents a fertile ground for examining how structural capital influences key performance indicators: Return on Assets (ROA) and Tobin's Q. These metrics, widely recognized in financial performance analysis, encapsulate operational efficiency, profitability, and market valuation, respectively.

Structural capital facilitates knowledge creation and transfer, enabling organizations to enhance their operational capabilities and strategic adaptability. In the retail context, where competition is intense, and consumer preferences are constantly shifting, structural capital serves as a pivotal determinant of sustainable growth and profitability. Studies have highlighted that firms with robust structural capital are better equipped to manage resources efficiently, innovate processes, and respond to market dynamics, thereby achieving superior financial outcomes (Kamukama, Ahiauzu, & Ntayi, 2011).

In the Vietnamese market, structural capital assumes heightened significance due to the unique challenges and opportunities within the country's retail sector. Factors such as rapid technological adoption, evolving consumer behaviors, and regulatory frameworks necessitate a strong structural foundation to maintain competitiveness. By leveraging structural capital, firms can streamline operations, optimize supply chains, and foster innovation, directly influencing metrics like ROA, which measure operational efficiency and shareholder returns.

** PhD candidate, Hanoi University of Industry, Vietnam; East Asia University of Technology, Vietnam; email: duckh@haui.edu.vn, duckh@eaut.edu.vn; Orcid: https://orcid.org/ 0009-0001-5058-3350*
*** Hanoi University of Industry, Vietnam; email: taiketoanquocte@gmail.com, taidd@haui.edu.vn; Orcid: https://orcid.org/0000-0003-2756-0692*
**** Academy of Finance, Vietnam; email: thansdh66@gmail.com; Orcid: https://orcid.org/0000-0003-0821-8285*

Furthermore, the market valuation of firms, often reflected in Tobin's Q, is significantly impacted by the perceived efficiency and innovation capabilities associated with structural capital (Phusavat et al., 2011).

ROA, and Tobin's Q are integral to assessing corporate performance. ROA indicates how effectively a company utilizes its assets to generate profits. Tobin's Q, calculated as the ratio of market value to the book value of assets, serves as an indicator of market expectations and growth potential (Yeh, Chung, & Liu, 2019). The interplay between structural capital and these metrics has been a focal point in academic research, with evidence suggesting a strong correlation between structural capital efficiency and improved financial performance.

In Vietnam, where the retail sector is characterized by high fragmentation and intense competition, these metrics provide valuable insights into how firms leverage structural capital to achieve performance objectives. The retail sector's reliance on consumer trust, technological integration, and supply chain efficiency amplifies the importance of structural capital in driving ROA, and Tobin's Q. Studies focusing on Vietnamese enterprises have demonstrated that firms with advanced structural capital frameworks exhibit superior financial performance, thereby reinforcing the significance of this intangible asset (Pham & Nguyen, 2021; Vu, 2020).

Empirical evidence underscores the impact of structural capital on firm performance in Vietnam. For example, Pham and Nguyen (2021) found that companies with well-developed structural capital, including advanced IT systems and streamlined operational processes, achieved higher ROA. Additionally, Vu (2020) highlighted the role of structural capital in enhancing supply chain efficiency, a critical factor in the retail sector, where timely delivery and inventory management are paramount. These findings align with global studies, such as those by Kamukama et al. (2011), which emphasize the universal applicability of structural capital in driving corporate success.

Despite its critical importance, the specific impact of structural capital on financial performance metrics like ROA, and Tobin's Q remains underexplored, particularly in the Vietnamese retail context. While global studies have provided valuable insights, the unique characteristics of Vietnam's economy and retail sector warrant a localized investigation. Factors such as rapid technological adoption, regulatory changes, and cultural nuances necessitate a context-specific analysis to uncover the intricate dynamics between structural capital and financial performance (Pham & Nguyen, 2021).

This study aims to bridge the existing research gap by examining the impact of structural capital on ROA, and Tobin's Q in Vietnamese retail companies listed on the stock exchange.

2. Literature review

This literature review examines the impact of structural capital on two key performance metrics - Return on Assets (ROA) and Tobin's Q - specifically within the context of retail companies listed on Vietnamese stock exchanges.

Structural capital is often viewed as the "skeleton" of an organization, encompassing the systems, structures, and processes that enable efficient operations. Nguyen and Phan (2020) emphasize the role of IT infrastructure, logistics systems, and customer relationship management (CRM) in retail firms as critical elements of structural capital. In the retail industry, structural capital facilitates supply chain management, enhances customer satisfaction, and drives innovation. Le and Phan (2017) underline the importance of process automation and inventory management systems in improving retail efficiency. Retail firms in Vietnam are increasingly adopting digital platforms and big data analytics to manage customer relationships and streamline operations, thus leveraging structural capital for competitive advantage.

Structural capital directly impacts a firm's ability to utilize its assets effectively. Studies by Nguyen and Nguyen (2018) and Abor (2005) demonstrate that investments in structural capital enhance operational efficiency, leading to higher ROA. For retail companies, advanced IT systems and logistics networks minimize waste and improve inventory turnover, thereby increasing asset returns. Nguyen and Phan (2020) analyzed the relationship between structural capital and ROA across non-financial firms in Vietnam, finding a positive correlation. Firms that invested heavily in infrastructure and technology reported higher profitability due to reduced operational costs and improved customer retention. Similarly, Mohammad et al. (2019) found that structural capital contributes significantly to profitability metrics, including ROA, in emerging markets. In the retail sector, structural capital investments often lead to

faster adaptation to market changes. For example, companies with robust e-commerce platforms and data-driven decision-making capabilities show higher ROA, as reported by Dang et al. (2019). These systems enable firms to anticipate consumer behavior and optimize pricing strategies.

Tobin's Q, which compares a firm's market valuation to its asset replacement cost, is heavily influenced by investors' perceptions of a company's intangible assets, including structural capital. Nguyen and Phan (2020) found that structural capital investments in IT systems, branding, and innovation significantly enhance market confidence, resulting in higher Tobin's Q values. Research by Sakr and Bedeir (2019) indicates that firms with strong structural capital often experience a market premium, as investors value their potential for sustained growth and innovation. In the Vietnamese retail sector, companies leveraging digital transformation and advanced supply chain technologies have reported higher Tobin's Q ratios, suggesting that the market recognizes the value of structural assets. Nguyen and Nguyen (2018) argue that the valuation of structural capital extends beyond its immediate financial returns. For example, retail firms with strong branding and customer loyalty programs, elements of structural capital, tend to have higher Tobin's Q due to perceived competitive advantages and future growth prospects.

Despite its benefits, structural capital investments involve significant initial costs and risks. Studies by Le and Phan (2017) emphasize the need for balanced financial strategies to fund these investments without undermining equity returns.

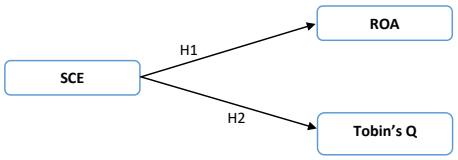
The research gap lies in understanding how structural capital impacts both ROA and Tobin's Q in the retail sector specifically, given the distinct economic and market dynamics in Vietnam. Further research could explore how retail companies in Vietnam, an emerging market with unique economic characteristics and market dynamics, leverage their structural capital to enhance financial performance.

3. Methodologies and result

3.1. Quantitative approaches

Empirical studies often use regression models to analyze the relationship between structural capital and financial performance. Le and Phan (2017) employed a panel data approach to assess the impact of structural capital on ROA and Tobin's Q, controlling for variables such as firm size and leverage. Similarly, Panda et al. (2021) used generalized least squares regression to address heteroscedasticity and autocorrelation issues. This study also uses regression models to analyze the collected data.

3.2. Research model



Independent Variables: SCE

Dependent Variables: ROA, Tobin's Q

Proposed regression model

To test the relationship between intellectual capital and financial performance, use linear regression models as follows:

$H1: ROA_i = \beta_0 + \beta_1 SCE_i + \epsilon_i$

$H2: Tobin's\,Q_i = \beta_0 + \beta_1 SCE + \epsilon i_i$

With:

β_0: Intercept coefficient.

β_1: Estimated coefficient, measuring the influence of Structural capital component.

ϵ_i: Error of the model.

3.3. Collect data

Secondary data: Financial data from annual reports of listed companies, including necessary information to calculate SCE and financial indicators (ROA, Tobin's Q).

Sample scope: Companies in the information and communication technology industry or knowledge-intensive industries.

3.4. Analytical method

Measuring intellectual capital: Use the VAIC (Value Added Intellectual Coefficient) model to calculate SCE indexes**.**

SCE = VA / HC Structural capital efficiency (VA: Added value, HC: Human capital, SC: Structural capital (Added Value - Human resources costs).

Hypothesis testing:

Test the relationship between each intellectual capital component and financial indicators using linear regression or multivariate regression.

Analyze model fit (R^2, F-test) and statistical significance level (ppp-value).

4. Result

4.1. Descriptive statistics

The dataset was collected from 55 retail companies listed on the Vietnamese stock market. Data were

obtained from audited financial statements and annual reports of these companies over eight years, from 2016 to 2023. To calculate Tobin's Q, a prerequisite was that the company must have a market value for its shares. Consequently, delisted companies and those not publicly listed were excluded from the study sample. After applying these criteria, the final dataset comprised 421 observations, including 168 from companies using standalone financial statements and 253 from those using consolidated financial statements (see Table 1).

Specifically, the average financial performance of the retail companies, measured by ROA, was 0.0441. There was no significant difference in ROA between the companies using consolidated financial statements and those using standalone financial statements. The average Tobin's Q across all companies in the sample was 1.146. However, the Tobin's Q for companies using consolidated financial statements (1.293) was higher than that of companies using standalone financial statements (0.926).

The average structural capital efficiency (SCE) across the sample was 0.458, with companies using standalone financial statements showing a higher SCE (0.541) compared to those using consolidated financial statements (0.447). In contrast, financial leverage (DA) for companies using consolidated financial statements was higher (0.549) than for those using standalone financial statements (0.485), with an overall average of 0.512 for the entire sample. Notably, some companies exhibited very high debt-to-asset ratios (>0.9), such as Vimedimex Pharmaceutical Company (VMD) from 2016 to 2021 and Phuong Nam Cultural Company (PNC) in 2017.

Additional detailed metrics for other variables in the study are presented in the table below.

Table 1: Description of variables included in the study sample

Index	ROA	Toq	SCE	SIZE	DA
Enterprises use single financial statements (n=168)					
Mean	0.0443	0.926	0.541	12.766	0.458
Sd	0.0643	0.656	0.673	0.928	0.229
Min	-0.087	0.020	-3.853	9.966	0.001
Max	0.654	4.670	2.987	15.365	0.891
Enterprises use consolidated financial statements (n=253)					
Mean	0.0440	1.293	0.447	14.588	0.549
Sd	0.0641	1.053	1.063	1.380	0.231
Min	-0.150	0.100	-5.986	11.270	0.013
Max	0.600	7.020	3.798	18.193	0.965
General samples (n=168)					
Mean	0.0441	1.146	0.485	13.861	0.512
Sd	0.0642	0.932	0.927	1.511	0.235
Min	-0.150	0.020	-5.986	9.966	0.001
Max	0.654	7.020	3.798	18.193	0.965

Source: Author compiled from STATA 14 software

4.2. Correlation and multicollinearity analysis

The correlation matrix illustrates the relationships between independent and dependent variables, as well as among the independent variables themselves. In this study, covariance was used to measure the relationships between structural capital efficiency (SCE) and financial performance indicators (ROA and Tobin's Q), alongside the correlations of control variables such as firm size (SIZE) and financial leverage (DA) with financial performance.

The analysis results (see Table 2) indicate that structural capital efficiency (SCE) is positively correlated with financial performance (ROA and Tobin's Q) at a statistically significant level. Control variables such as firm size (SIZE) and financial leverage (DA) exhibit statistically significant positive correlations with Tobin's Q. However, these control variables show negative correlations with ROA, although only the correlation between DA and ROA is statistically significant.

Moreover, the table reveals that the correlation coefficients among the independent and control variables are all below 0.6. This suggests a low likelihood of multicollinearity. Nevertheless, to confirm the absence of multicollinearity, the study employs the Variance Inflation Factor (VIF) for further verification during regression analysis.

Table 2: Results of correlation analysis

Variables	SCE	SIZE	DA
SCE	1		
SIZE	0.16**	1	
DA	-0.07	0.43***	1
ROA	0.55***	-0.03	-0.18***
ToQ	0.41***	0.37***	0.168***

*Note: * is significant at <0.05 level; **is significant at <0.01 level; *** is significant at the <0.001 level.*

Source: Author compiled from STATA 14 software

Measuring the impact of structural capital on financial performance

To evaluate the impact of structural capital on a firm's financial performance, the study employed three regression methods: Ordinary Least Squares (OLS), and two panel data analysis models - Fixed Effects Model (FEM) and Random Effects Model (REM). Additionally, diagnostic tests, such as tests for autocorrelation and heteroscedasticity, were conducted to assess the robustness of the models. In cases where these models exhibited deficiencies, the Generalized Least Squares (GLS) method was used as an alternative for more reliable estimation.

Regression analysis results using the OLS model

The analysis of the impact of structural capital on financial performance (ROA and Tobin's Q) using

the OLS method (see Table 3) revealed that the P(F) values for both models were less than 0.001, confirming the validity of the models. To ensure the reliability of the models, diagnostic tests were conducted. Multicollinearity was assessed using the Variance Inflation Factor (VIF), with results showing an average VIF ≤ 2. This indicates that the independent and control variables included in the model did not exhibit multicollinearity.

Heteroscedasticity was tested using the Breusch-Pagan test, which yielded P(chi²) values of less than 0.05 (at the 5% significance level) for both models. This result indicates the presence of heteroscedasticity in the OLS models. Consequently, the OLS estimation results are deemed unreliable and are not used for further estimation purposes.

Table 3: Summary of regression results using the OLS model

Independent Variables	ROA		ToQ	
	Coefficients	P.value	Coefficients	P.value
DA	-0.032	0.01	0.299	0.104
SIZE	-0.003	0.145	0.157	<0.001
SCE	0.038	<0.001	0.306	<0.001
Cons	0.081	0.001	-1.542	<0.001
N	421		421	
R2	0.325		0.271	
Adj R2	0.320		0.266	
F (p)	67.01	<0.001	51.68	<0.001
Multicollinearity (VIF)	1.19		1.19	
Heteroscedasticity *Breusch-Pagan: Chi2 (P)*	387.97	<0.001	115.68	<0.001

Source: Author compiled from STATA 14 software

Regression analysis results using FEM and REM models

To measure the impact of structural capital on the financial performance of enterprises, the study used two panel data regression models, FEM and REM, and also applied the Hausman test to select the appropriate model. If the test result shows a P.value <0.05, the fixed effects model (FEM) is selected. The results of the model selection test (see Table 4) show that the P.value in the Hausman test for the model with ROA as the dependent variable is 0.036 <0.05, so the FEM model was selected. Similarly, in the model with Tobin's Q as the dependent variable, the P.value in the Hausman test is <0.001, so the FEM model was chosen.

In addition, the diagnostic results for deficiencies such as heteroscedasticity and autocorrelation of the two selected models indicate: The model measuring the impact of structural capital on ROA (regression using FEM) does not exhibit autocorrelation but does show heteroscedasticity; the model measuring the impact of structural capital on Tobin's Q (regression using FEM) exhibits both autocorrelation and heteroscedasticity. Based on these results, the selected models do not ensure robustness for estimation. To overcome these deficiencies, the study used the generalized least squares (GLS) model for estimation.

Table 4: Regression results using FEM, REM models and tests

Independent Variables	ROA		ToQ	
	FEM	REM	FEM	REM
SCE	0.034***	0.036***	0.210***	0.251***
SIZE	-0.010*	-0.004	0.161*	0.186***
DA	0.002	-0.025	-0.202	-0.003
Cons	0.166*	0.092**	-1.085	-1.548**
N	421		421	
R2	0.259	0.255	0.924	0.910
F test/ Wald test (P)	<0.001	<0.001	<0.001	<0.001
Hausman test (P)	0.036		<0.001	
Heteroscedasticity *(P)*	<0.001		<0.001	
Autocorrelation (P)	0.719		<0.001	

*Note: * is significant at <0.05 level; **is significant at <0.01 level; *** is significant at the <0.001 level.*

Source: Author compiled from STATA 14 software

Estimation results of the impact of structural capital on financial performance

The results of measuring the impact of structural capital on the financial performance of retail enterprises were obtained using the GLS method. In this method, the model with the dependent variable ROA (1) applied a correction for heteroscedasticity, while the model with the dependent variable ToQ (2) applied corrections for both heteroscedasticity and autocorrelation. The estimated results of the two models are detailed in Table 5 and Table 6, where the Wald test results show p-values < 0.005, indicating that the estimated models are appropriate. The degree of impact of the factors on financial performance is as follows:

Impact of structural capital on ROA

Table 5: Estimation results using the GLS regression model with ROA

Independent Variables	ROA(1)		ROA(1a)		ROA(1b)	
	Coefficient β	P.value	Coefficient β	P.value	Coefficient β	P.value
SCE	0.038	<0.001	0.040	<0.001	0.039	<0.001
SIZE	-0.003	<0.001	-0.004	0.159	-0.009	<0.001
DA	-0.044	<0.001	-0.022	0.072	-0.048	<0.001
Cons	0.088	<0.001	0.078	0.01	0.190	<0.001
N	421		168		253	
Wald test (chi2/p)	453.80	<0.001	79.40	<0.001	470.29	<0.001

Note: a is a sample that includes businesses using single reports; b is a sample of businesses that use consolidated reporting.

Source: Author compiled from STATA 14 software

Impact of structural capital on ROA

For model (1), which examines the impact of structural capital on ROA, all variables included in the model have a statistically significant effect (P-value < 0.05) on ROA. Specifically, structural capital (SCE) has a positive effect, meaning that an increase in structural capital leads to an increase in ROA. Both firm size (SIZE) and financial leverage (DA) have a negative effect on ROA, meaning that an increase

in either firm size or financial leverage results in a decrease in ROA. Additionally, the estimation results by groups of enterprises using standalone financial statements (a) and consolidated financial statements (b) also show that the impact of SCE on ROA is statistically significant and positive in both groups. However, the magnitude of the effect of SCE on ROA is similar across the two groups, with the impact of SCE being 0.040 in group (a) and 0.039 in group (b). This suggests that the type of financial statement used does not significantly affect the magnitude of the impact of SCE on ROA.

Impact of structural capital on ToQ

Table 6: Estimation results using the GLS regression model with ToQ

Independent Variables	ToQ(2)		ToQ(2a)		ToQ(2b)	
	Coefficient β	P.value	Coefficient β	P.value	Coefficient β	P.value
SCE	0.212	<0.001	0.167	<0.001	0.245	<0.001
SIZE	0.139	<0.001	0.051	<0.001	0.099	0.003
DA	0.310	0.018	0.305	0.011	0.844	<0.001
Cons	-1.119	<0.001	0.000		-0.820	0.061
N	421		168		253	
Wald test (chi2/p)	152.02	<0.001	12200	<0.001	125.57	<0.001

Note: a is a sample that includes businesses using single reports; b is a sample of businesses that use consolidated reporting.

Source: Author compiled from STATA 14 software

Impact of structural capital on ToQ

For model (2), which examines the impact of structural capital on ToQ, variables such as structural capital (SCE), firm size (SIZE), and financial leverage (DA) all have a statistically significant positive effect (P-value < 0.05) on ToQ. This indicates that an increase in these variables leads to an increase in ToQ. Furthermore, the magnitude of the β coefficients for the variables SCE, SIZE, and DA in model (2) reflects the degree of their impact on ToQ. Additionally, the estimation results by groups of enterprises using standalone financial statements (a) and consolidated financial statements (b) show that the impact of SCE on ROA is statistically significant and positive in both groups. However, the impact of SCE on ToQ in group (b) is 0.245, which is larger than in group (a) (0.67). Based on this, we can conclude that the type of financial statement used may influence the magnitude of the impact of structural capital (SCE) on ToQ.

5. Conclusion and discussion

This study examined the impact of structural capital on the financial performance of retail companies listed on the Vietnamese stock market, using a dataset of 421 observations from 55 companies over an eight-year period (2016-2023). The results reveal that structural capital (SCE) positively influences financial performance, as measured by both Return on Assets (ROA) and Tobin's Q (ToQ). In particular, the findings suggest that an increase in structural capital leads to improvements in both ROA and ToQ. This conclusion is supported by the statistically significant positive coefficients for SCE in the Generalized Least Squares (GLS) regression models, highlighting its importance as a driver of financial performance.

Additionally, the study found that firm size (SIZE) negatively affects ROA but positively impacts ToQ, indicating that larger companies may experience diminishing returns on assets, while their market value could benefit from their scale. Financial leverage (DA) had a negative correlation with ROA, suggesting that higher debt levels might harm operational efficiency, but it showed a positive effect on ToQ, which may reflect a market perception that higher leverage can increase firm value through potential tax advantages or increased investment returns.

The diagnostic tests confirmed that the regression models were robust, with no significant multicollinearity detected, and the models appropriately accounted for heteroscedasticity and autocorrelation. The use of GLS estimation techniques further strengthened the reliability of the results.

In conclusion, the study highlights the critical role of structural capital in shaping the financial performance of retail companies in Vietnam. The findings suggest that companies should prioritize investments in intangible assets, such as systems, processes, and intellectual property, which can lead to improved operational efficiency and market valuation. Moreover, the impact of structural capital on financial performance may vary depending on the type of financial reporting used, emphasizing the importance of comprehensive and transparent reporting practices in enhancing the credibility and attractiveness of companies in the market.

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