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A Study of Determinants of Intellectual Capital Performance in Firms: The Vietnamese Case

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Abstract. *This research examines determinants of intellectual capital (IC) performance in firms in Vietnam during the period 2007–2022 through employing the system generalized method of moments (SGMM) and the structural equation model (SEM). Our findings show that market capitalization (MC), sales growth, profitability, leverage, FDI, inflation and GDP significantly affect IC performance. Global crises influence it negatively and have a moderating effect on IC performance through MC, sales growth, and return on asset. This research contributes to the existing literature by examining IC performance with a consideration of the effect of the global crises and analyzing the moderating effect of the crises on IC performance. It also contributes to the literature by adding and examining the effect of MC on IC performance.*

Keywords: *IC performance, listed firms, global crises, determinants, Vietnam*

1. Introduction

IC plays a very important role in economic activities of firms in the knowledge economy. The resource-based view theory indicates that intangible and tangible assets, which are internal and external resources, may generate the core competitiveness for firms.

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IC is defined as the different forms of knowledge, intellectual property, information, and firm experience. IC includes human capital (HC), structural capital (SC), and relational capital (RC). IC is considered as the most important factor affecting firm performance (Mendoza, 2017). IC can assist firms in creating new ideas and innovations. The new ideas and innovations can be transformed into products and services, thus improving firm performance (Nashier et al., 2020). IC conforms to the three main features of resources highlighted in the resource-based view theory. Companies consider IC as an income generator and major source of information showing firm abilities (Xu et al., 2023). Firms can understand the general state of their divisions and maximize their value thanks to IC. Intellectual capital can establish HC and employee skills (Dashtbayaz et al., 2020). It can also establish a long-term customer relationship. Therefore, IC is very important to firms. Market capitalization, sales growth, profitability, financial leverage, FDI, inflation, and GDP strongly affect IC performance.

MC refers to the total value of firm outstanding shares and is considered the main factor affecting IC performance (Farooq et al., 2022). Bigger firms with higher MC normally have more financial resources to invest in HC, SC, RC and innovation that improve IC performance (Chatterjee et al., 2023). Sales growth can enhance market reach and customer base, and hence contribute to RC (Xu et al., 2021). Profitability offers firms the financial capability to invest in IC (Babajee, 2021). Financial leverage has a two way effect on IC performance. Leverage can provide financial resources to IC development (Atena & Mehdi, 2017), but excessive debt burdens can constrain their ability to allocate financial resources to investment in IC (Bbajee, 2021). At the macro level, FDI can positively affect IC performance since it can go with knowledge and technology transfer. Inflation can reduce IC investment because high inflation might increase costs, while GDP can expand business activities and IC.

The 2007–2008 financial crisis, which originated from America, is the worst economic depression since stock exchange crash in 1929 (Andries & Ursu, 2016). The COVID-19 pandemic was detected in Wuhan, China, in December 2019 and rapidly spread across the world (Rana et al., 2022). Although Petrylė (2022) showed that its effect on Lithuania's export structure is not significant, Bae and Chang (2021) claim that COVID-19 caused the worst disaster of the world economy since World War II. Vietnam recorded the first case of COVID-19 in late January 2020. COVID-19 rapidly devastated the Vietnamese economy since Vietnam implemented travel restrictions, lockdowns and border closures. The economic devastation has encouraged many researchers such as Notta and Vlachvei (2014), Ahmad et al. (2023), Ngo and Duong (2023), and Almustafa et al. (2023) to examine the impact of the financial crisis and the COVID-19 pandemic on firm profitability. Notta and Vlachvei (2014) evidenced that the crisis affects firm profit. Ahmad et al. (2023) studied the case of UK and concluded that firm profit is lower during the financial crisis. Ngo and Duong (2023) explored the effect of COVID-19 on firm performance in different industries and showed that COVID-19 hurts firms through sales and expense channels. Almustafa et al. (2023)

showeded that COVID-19 is negatively correlated with firm performance. However, the study about the impact of the financial crisis and COVID-19 on IC performance is still limited. As to the financial crisis, the only study by El-Bannany (2012) examined the impact of the financial crisis on IC performance and evidenced that the crisis has a significant effect on IC performance. The only research into COVID-19 conducted by Xu et al. (2023) assesses IC performance of banks during the COVID-19 pandemic and shows that COVID-19 affects IC performance in the case of China and does not influence IC performance in the case of Pakistan.

Previous scholars have investigated factors affecting IC performance, but there persist considerable research gaps in the existing literature. Although there has been extensive research about the role of IC on firm performance, studies on determinants of IC performance are still limited (Babajee, 2021). Most of studies such as Kamnath (2017) and Seng et al. (2018) have paid attention to the factors affecting IC disclosure, a few papers like El-Bannany (2012) and Babajee (2021) have examined determinants of IC performance. These few papers mainly concentrate on developed countries and the banking industry (Aziz & Hashim, 2017; Babajee, 2021). Furthermore, few papers have analyzed the impact of COVID-19 or the effect of financial crisis on IC performance. It is the first paper which explains the effect of COVID-19 on IC performance of the banking sector (Xu et al., 2023). There has been no paper which analyzes simultaneously both the impact of the financial crisis and COVID-19 on IC performance. The moderating impact of the global crises on IC performance has not been analyzed. MC, a very important factor, is not considered in the previous models in the existing literature. Thus, the research aims to answer the following research questions: What determines IC performance? Do the global crises have the moderating effect?

Answering these research questions, this research provides the following contributions. First, this research is the first research analyzing the impact of the financial crisis and COVID-19 on IC performance, which expands the existing IC literature. Our study examines the effect of the financial crisis and Covid-19 simultaneously, which has not been done before. It adds the original aspect to the literature, enabling comparisons and profounder understanding into the role of different sorts of crises, and provides novel insights into how internal and external factors affect IC performance. By incorporating the impact of both crises, this research offers a broad investigation of the similarities and differences in their impacts on IC performance. This dual-crisis methodology provides a more comprehensive understanding of how worldwide disturbances outline IC performance. Second, our research is one of the very first few papers which examine the determinants of IC performance. The incorporation of MC, which is a new factor included in the research model, is another contribution. There is no research about this issue in Vietnam. This research classifies the main determinants of IC performance in the Vietnamese context, especially in the global crisis context. Third, we consider the moderating effect of the financial crisis and the COVID-19 pandemic on IC performance. Understanding this moderating impact adds more depth to the existing IC

theories. This study provides practical understanding for firms on how to manage and protect IC in the crisis period. Finally, our findings can help firms improve IC performance by efficiently distributing IC resources during the global crises.

The rest of the paper is structured as follows. Section 2 provides the theoretical framework, Section 3 presents literature review and hypotheses development. Data and methodology are described in Section 4. Section 5 shows the research results. Discussion is provided in Section 6. Implications are presented in Section 7. Conclusion and research limitations are presented in the last section.

2. Theoretical Framework

Oliveira et al. (2020) point out that IC components include HC, SC, and RC. IC is intangible property that is the main content of Wernerfelt (1984) and Barney's (1991) resource-based view theory (RBV) widely used for research about IC. The main idea of this theory is that firms can use intangible and tangible assets to combine outside market opportunities to enhance firm efficiency (Tran et al., 2022). Firms can use intangible assets, IC, to improve service quality, HC and generate human resources (Vasudevan, 2021), leading to better IC performance. Spence's signaling theory (1973) implies that MC can affect IC performance by sending essential signals to investors about the company value and IC which investors can invest in more/less, allowing firms to invest more/less in R&D, HC and technologies. The stakeholder theory (Freeman, 1984) indicates that return might enhance relationships, leading to higher RC. Contingency theory (Fiedler, 1967) reveals that firms ought to familiarize their IC to stay alive, and institutional theory (Meyer & Rowan, 1977) states that firms are obliged to rearrange practices which influence IC amid the crises. Human capital (HC) theory (Becker, 1964) posits that economic positions impact investment in employee development, and resource dependency (RD) theory (Pfeffer & Salancik, 1978) proposes that macroeconomic alterations affect organization's resources which influence IC performance. These theories propose that MC, profitability, financial leverage, sales growth, international shocks like the financial crisis and the COVID-19 pandemic, and macroeconomic conditions affect IC performance. Therefore, these theories are employed in our research.

3. Literature Review and Hypotheses Development

Intellectual capital measurement

IC is defined as an intangible asset which workers might gain from experience, skills, and customer relations (Smriti & Das, 2018). The value added intellectual coefficient (VAIC) proposed by Public (2000) is widely used to assess IC performance. The IC is made up of three components. The first is the HC efficiency (HCE), which is generated

by worker skills, experience, and competencies (Minh & Nguyen, 2024). It measures how effectively human resources contribute to value generation. The second is the SC efficiency (SCE), where SC is formed by firm system, firm structure, and firm processes. It assesses the firm's ability to leverage its structural resources. The last is the capital employed efficiency (CEE), which denotes the efficiency of the firm's physical and financial assets. It is argued that VAIC has a shortcoming since VAIC does not measure RC. Previous scholars include RC in the VAIC model. Spending on marketing, selling, promotion and donations are used to measure RC. Consequently, VAIC becomes the modified VAIC (MVAIC) (Ali et al., 2022). Therefore, MVAIC is employed in our study.

Determinants of IC performance

MC and IC performance

MC is defined as the total value of outstanding shares calculated by multiplying the current stock price by the total volume of outstanding shares. Theoretical frameworks like RBV theory and signaling theory imply that MC affects IC. Signaling theory indicates that MC might send vital signals to investors about firm value, including IC. Higher MC encourages investors to invest more thus allowing firms to enhance IC through investing in R&D, human resources and technologies. RBV theory suggests that a higher IC level assists firms in attracting more capital. Higher MC enhances firms' investment in R&D, staff development, and innovation, leading to higher IC. Access to capital, talent attraction, brand and reputation, mergers and acquisitions (M&A), and investor confidence are key mechanisms through which MC affects IC. First, firms can invest more in research and development, innovation and technology (Dass et al., 2021) if they have higher MC because they can mobilize funds via equity financing. They can invest more in IC to sustain and improve their market position (Chatterjee et al., 2023). This investment can generate new patents, knowledge and technologies that can improve IC. Second, firms with higher MC can attract and keep top talents which might enhance HC since they have higher firm value and higher financial position in the marketplace. Third, higher MC can improve firm brand, reputation and market value (Habib & Mourad, 2023) that might increase consumer loyalty and firm development, thereby improving IC. Fourth, IC can be enhanced by MC since higher MC assists firms in M&A, thereby obtaining IC such as patents, expertise, and other IC from other firms. Fifth, higher MC makes investors more confident in firm development and, in turn, they invest more. Firms then have more resources for R&D, innovation and intangible assets, leading to higher IC.

Empirically, MC is considered as a firm size (Babajee, 2021), and Hatane et al. (2020) indicate that market-based performance benefits IC disclosure. Setiawanta et al. (2020) posit that financial performance affects firm value. Higher firm value can attract more investment in R&D, staff development, and firm infrastructure, thereby enhanc-

ing IC. When firms become larger, relationship between managers and shareholders also becomes more complicated, leading to a bigger conflict between them. This would lead to higher agency costs, and firms are more willing to disclose the information of IC performance. Larger firms have higher IC performance since they have a better management system and more financial resources which can generate more innovations, improve all relations and employee skills (Maressa, 2016). Firms can get more external resources such as funding and government support when they become bigger. They then can employ better employees and attract more investors (El-Bannany, 2012). This helps firms enhance their IC performance. Babajee (2021) and Xu et al. (2023) evidence that firm size has a positive influence on IC performance, while Hidayah and Adityawarman (2017) indicate that firm size has no effect on IC performance. Stock exchange can provide more capital for firms through issuing shares. This helps firms have more investment in IC. Although MC is one of the most important factors affecting IC performance, there have been no papers examining this factor. Therefore, based on these arguments, we have the following hypothesis:

H1: *MC positively affects IC performance.*

Profitability and IC performance

Profitability refers to the firm ability to create profits from its economic activities at a given period. Theoretical frameworks such as RBV theory and stakeholder theory point out that profitability impacts IC. RBV theory implies that profitability provides firms opportunities to invest in IC, and stakeholder theory reveals that profitability improves relationships, leading to higher RC. Profitability affects IC through the following mechanisms. First, larger profits offer firms more opportunities to invest in R&D, which might lead to new technologies, innovative goods and patents, thereby increasing SC. Najm and Alfaqih (2021) indicate that organizational intelligence positively affects new products, and financial market efficiency drives better investment decisions (Hidayat et al., 2023), thus increasing IC. Second, higher profits encourage firms to attract top talents because they can provide higher salaries and benefits for employees, leading to higher HC and IC. Third, firms can invest in training and professional development to increase employees' expertise, knowledge and skills which improve HC, and hence increase IC. Fourth, firms can obtain patents, knowledge assets and other IC assets from others by acquiring M&A if they have higher profits. Finally, they can build their brand name and reputation, innovation, encouraging RC via customer relationships and trust, and finally IC.

Empirically, previous scholars evidence that profitability determines IC performance because profitable firms are likely to invest more in research and development, and other activities that can generate more IC (Babajee, 2021). These firms are happy to motivate, train, carry out research and development, and encourage employees to innovate their activities, leading to higher IC performance (Sefidgar et al., 2015). Firms with losses might focus on dealing with the losses, they are likely to invest less or stop

investing in innovating or undertaking research and development. Firm managers may spend more time identifying causes of losses, they would spend less time on value adding IC activities (Soheili & Pakdel, 2021). Employees are not encouraged to innovate and perform better since their managers do not have enough time to motivate them (Meressa, 2016). Thus, profitable firms may have better IC performance than firms with losses. While Habib and Dalwai's (2024) findings show the importance of IC in firm performance and Shahwan and Habib's (2020) findings present the negative effect of IC efficiency on financial distress, Babajee (2021) reveals that profitability is positively correlated with IC performance. Therefore, based on these arguments, we propose the following hypothesis:

H2: *Profitability has a positive effect on IC performance.*

Financial leverage and IC performance

Financial leverage is defined as the utilization of the borrowed money to enhance the potential return on investment. Theoretical frameworks such as RBV theory suggest that financial leverage can affect IC. It affects IC through the following mechanisms. First, firms can invest more in R&D to obtain innovation, patent and staff development thanks to financial leverage. Second, IC can be better used to maximize firm profitability arising from leverage. Debt obligations force firms to foster knowledge sharing, improve process and employee skills to optimize their efficiency. Third, financial leverage might force firms to limit their resources available for investment in R&D, staff training, which lowers IC. Last, financial leverage might help firms obtain M&A and gain IC from other firms.

Empirically, previous studies posit that firm leverage can be used to predict IC performance (Babajee, 2021). The agency theory states that leverage becomes larger, agency costs can increase due to higher monitoring costs which can arise from the risk of wealth transfer from debt-holders to shareholders. Firms are willing to disclose more information about IC performance. This disclosure might lead to better IC performance. Santosa (2020) points out that firm size affects financial leverage, while White et al. (2007) and Atena and Mehdi (2017) evidence that financial leverage is a vitally positive determinant of IC performance in the case of Australia. Aziz and Hashim (2017) studied the case of Islamic banks to find out a negative effect of leverage and concluded that leverage plays an important role in determining IC performance. However, Babajee (2021) reports that financial leverage has a negative influence on IC performance in the case of Mauritius. Therefore, based on these arguments, we have the following hypothesis:

H3: *Financial leverage positively influences IC performance.*

Sales growth and IC performance

Sales growth is referred to as the rise in sales revenue over a given period, revealing a firm's ability to extend its market presence and improve its financial performance. Theo-

ries like RBV theory indicate that sales growth can provide more resources for firms to invest in IC; meanwhile, dynamic capabilities theory emphasizes that sales growth encourages innovation and IC. Sales growth affects IC through the following mechanisms: First, IC can be improved through sales growth since firms have more revenue for investment for R&D, staff training and technologies. Second, firms can employ and retain talents because they have more opportunities to pay competitive salaries and benefits thanks to higher sales growth. They can also provide training programs and thus increase employee skills and expertise, hence enhancing IC base. Third, firms with higher sales growth can invest more in systems which encourage knowledge sharing, cooperation, innovation, and knowledge management, leading to higher IC. Reddy et al. (2023) suggest that innovation enhances competitive advantage. Finally, firms with higher sales growth can innovate to obtain new products and processes, which might increase IC.

Empirically, Nkambule et al. (2021) evidence that sales growth enhances HC because firms can invest more in staff training and recruiting skilled employees. They reveal that this investment can enhance innovation, technology and processes, thereby increasing IC. Lee et al. (2023) indicate that sales growth can help firms improve internal processes, databases and systems, leading to higher SC. Xu et al. (2021) posit that higher sales growth can increase customer relationships, thereby enhancing RC. Therefore, based on these arguments, we have the following hypothesis:

H4: *Sales growth positively affects IC performance.*

Global crises and IC performance

Global crises have an enormous effect on the world economy. Contingency theory points out that firms have to adapt their IC to survive, and institutional theory indicates that firms have to restructure practices which affect IC during the crises. Most of previous scholars indicate that crises have a strongly negative effect on firm economic activities. Regarding the financial crisis, it changes financing and investing decisions. Investment and capital technology innovations are reduced by the financial crisis, leading to lower IC performance (Cerra et al., 2021). Investment declines both in the short run and the long run during the financial crisis because of a shock in credit demand and supply (Juca & Fhislow, 2021). Firms also try to decrease operating costs and capital spending due to the financial crisis. Commercial banks reduce their lending thus reducing corporate investment (Chen et al., 2021). El-Bannany (2012) examined the case of UAE banks and concluded that the financial crisis has a significant effect on IC performance. Therefore, the financial crisis reduces corporate investment in innovations, research and development, and lowers IC performance.

With regard to the COVID-19 pandemic, although Monga et al. (2023) show the efficiency of Indian stock market during the pandemic, COVID-19 has the largest effect on all activities around the world. It sharply devastated the world economy (Aifuwa et al., 2020). Sethi et al. (2021) evidence that Covid-19 has an asymmetric impact on ex-

change rate. Arman et al. (2024) posit that capital-intensive companies are more likely to recover better than others, while Tran et al. (2021) indicate that corporate investment can be decreased due to the business risk aversion resulting from COVID-19. A reduction in corporate investment may lead to a lower level of innovations, technology change, and hence a lower IC performance. Although COVID-19 has no influence in the case of Pakistan, Xu et al. (2023) evidence that COVID-19 has a negative effect on IC performance in the case of China. Furthermore, the financial crisis and COVID-19 create an environmental turbulence. This turbulence can have a moderating effect of the crises on IC performance (Zambon et al., 2020). Nguyen (2023), Minh and Nguyen (2024) evidence that COVID-19 has a moderating effect on return intention and investment decisions. Nguyen (2024a, b, c, d and e) posits that the global crisis has the moderating impact on profitability, firm performance, investment decisions and bank risk-taking. However, the moderating impact of the global crises on IC performance has not been analyzed in the existing literature. Therefore, we have the following hypotheses:

H5a: *Global crises have a negative effect on IC performance.*

H5b: *Global crises have a moderating effect on IC performance.*

Macroeconomic factors and IC performance

Theoretical background such as HC theory and RD theory suggest that macroeconomic factors affect IC. HC theory implies that economic situations affect investment in staff development, and RD theory indicates that macroeconomic shifts influence company's resources, which affects IC. A rise in inflation can place more pressure on firms to reduce their investment. By contrast, a higher level of inflation can increase corporate investment because higher values of goods and services might encourage investors to invest more (Farooq et al., 2022). Studies produced varied results about the relationship between inflation and investment (Azimli, 2022). When the economy becomes stronger, firms have more opportunities to invest and obtain better performance. Economic booming increases demand for goods and services, leading to higher level of corporate investment (Choi, 2020). Firms invest more in innovations, research and development, improving their system, infrastructure, relations and employee skills when the economy goes well and inflation becomes reasonable and vice versa. This investment might improve IC performance. In addition, FDI is also a very important source of investment, especially in developing countries like Vietnam. Therefore, higher FDI might lead to higher IC performance. However, macroeconomic factors such as foreign direct investment (FDI), inflation and economic growth are not mentioned in the existing literature but they might have a strong impact on IC performance. Thus, we have the following hypothesis:

H6: *Macroeconomic factors affect IC performance.*

4. Data and Methodology

Industrialization, increasing FDI and globalization have rapidly improved Vietnam's economy. IC plays an important role in improving company performance and competitiveness when Vietnam moves to a more knowledge-based economy. Domestic conditions, international economic changes and reforms affect a dynamic environment where Vietnam's listed firms operate, but there is limited research on determinants of IC performance in this context. Therefore, this research examines key economic factors with a consideration of global crises influencing IC performance of the listed firms in Vietnam.

The quantitative research methodology is employed to investigate determinants of IC performance of Vietnam's listed companies. Factors such as MC, profitability, leverage, sales growth, FDI, GDP and global crises are the primary variables which are modelled and carried out as follows.

Data collection

The dataset of 687 listed firms was collected on the stock exchange in Vietnam between 2007 and 2022. The period 2007–2022 is the period where the dataset is available and the most robust. These listed firms are collected from the website of Vietstock. We rely on the financial reports of these firms to obtain observations. Because some listed companies had missing data for several years, our sample size has 7,608 observations. Macroeconomic data is collected from the General Statistics Office of Vietnam (GSOV).

Model and variable measurement

Based on the estimation models of Xu et al. (2023), MC, financial crisis (CRISIS), the COVID-19 pandemic, sales growth, inflation and GDP are added to obtain the following models:

Model 1:

$$MVAIC_{it} = \beta_0 + \beta_1 MVAIC_{it-1} + \beta_2 MC_{it} + \beta_3 MC_{it-1} + \beta_4 SGR_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 CRISIS_t + \beta_8 COVID\text{-}19_t + \beta_9 INF_t + \beta_{10} GDP_t + \varepsilon_{it} \quad (1)$$

Model 2:

$$HCE_{it} = \beta_0 + \beta_1 HCE_{it-1} + \beta_2 MC_{it} + \beta_3 MC_{it-1} + \beta_4 SGR_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 CRISIS_t + \beta_8 COVID\text{-}19_t + \beta_9 INF_t + \beta_{10} GDP_t + \varepsilon_{it} \quad (2)$$

Model 3:

$$SCE_{it} = \beta_0 + \beta_1 SCE_{it-1} + \beta_2 MC_{it} + \beta_3 MC_{it-1} + \beta_4 SGR_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 CRISIS_t + \beta_8 COVID\text{-}19_t + \beta_9 INF_t + \beta_{10} GDP_t + \varepsilon_{it} \quad (3)$$

Model 4:

$$CEE_{it} = \beta_0 + \beta_1 CEE_{it-1} + \beta_2 MC_{it} + \beta_3 MC_{it-1} + \beta_4 SGR_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 CRISIS_t + \beta_8 COVID\text{-}19_t + \beta_9 INF_t + \beta_{10} GDP_t + \varepsilon_{it} \quad (4)$$

Model 5:

$$RCE_{it} = \beta_0 + \beta_1 RCE_{it-1} + \beta_2 MC_{it} + \beta_3 MC_{it-1} + \beta_4 SGR_{it} + \beta_5 ROA_{it} + \beta_6 LEV_{it} + \beta_7 CRISIS_t + \beta_8 COVID\text{-}19_t + \beta_9 INF_t + \beta_{10} GDP_t + \varepsilon_{it} \quad (5)$$

where the dependent variables are $MVAIC_{it}$, MC_{it}, HCE_{it}, SCE_{it}, and CEE_{it} in the current year. The independent variables of firm investment indicators of the previous year are: $VAIC_{it-1}$, MC_{it-1}, HCE_{it-1}, SCE_{it-1}, CEE_{it-1} and SGR_{it}, $SIZE_{it}$, LEV_{it}, $CRISIS_t$, $COVID\text{-}19_t$, INF_t, GDP_t of the current year. ε_{it} is the error term i, at current time period t.

The dependent variables and independent variables are defined and measured as shown in Table 1.

Table 1

Definition of Variables Used and their Measurement

Variables	Definition	Measurement	Expected Sign	Data Source
Dependent variables				
MVAIC	Value-added intellectual capital efficiency	HCE+SCE+CEE + RCE		Vietstock
HCE	Human capital efficiency	Value added/human capital		Vietstock
SCE	Structural capital efficiency	Structural capital/Value added		Vietstock
CEE	Capital employed efficiency	Value added/capital employed		Vietstock
RCE	Relational capital efficiency	Expenses on relationship/Value added		Vietstock
Independent variables				
MC	Market capitalization	Log (market value of outstanding shares)	+	Vietstock
SGR	Sales growth rate	Percentage increment in total sales	+	Vietstock
ROA	Return on assets	EBIT/total assets	+	Vietstock
LEV	Financial leverage	Total debt/total asset	+	Vietstock
CRISIS	Financial crisis between 2008 and 2009	1 for financial crisis and 0 otherwise	-	GSOV
COVID-19	The Covid-19 pandemic between 2020 and 2021	1 for the Covid-19 pandemic and 0 otherwise	-	GSOV
FDI	Foreign direct investment	Log (FDI)	+	GSOV
INF	Inflation	Percentage change in CPI	-	GSOV
GDP	Gross domestic product	Log (GDP)	+	GSOV

Note. Structural capital = value added – human capital. Intellectual capital efficiency = HCE + SCE. Intellectual capital (VAIC) = HCE + SCE + CEE + RCE. Value added (VA) = total revenue – all costs of purchasing goods and services from the market. HC = salaries and wages. CE = total assets – intangible assets. RC = expenses on marketing, selling, promotion and donations.

We employ IC performance of the previous year as an independent variable because IC assets such as skills, processes and relationships are constructed over time. Investment in HC, SC, and RC in the past can contribute to ongoing performance and provide a strong foundation for the future growth and development of IC. Knowledge, experience, relationships, other IC assets offer sustained benefits over multiple periods. The IC performance in the past, therefore, can establish a base of IC assets to generate a foundation, continue to support and enhance IC performance in the current year.

Regression methods

We use the SGMM and SEM regression technique to estimate our models. The GMM technique can solve the problem of heteroscedasticity, multicollinearity and endogeneity. This method is argued to be the best regression technique for the panel data (Smriti & Das, 2018). Dahir et al. (2017) indicate that the SGMM is better than the GMM because it provides effective and consistent estimators. When dataset is a small number of groups, the DGMM is better utilized to estimate the model. Our regressed results show that the number of instruments is less than the number of groups. Furthermore, Dahir et al. (2017) point out that the SGMM predictors are better than those of the DGMM because the SGMM uses a system which combines regressions of levels and first differences. Therefore, the SGMM is utilized in our research. In addition, the SEM model is used to test the moderating effect of global crises on IC performance. Stata 15 is employed to run our regression equations.

5. Research Results

Descriptive statistics

Table 2 presents the mean, standard deviation, minimum, and maximum value of variables for 7,608 observations. The mean of MVAIC is 7.9493 with its standard deviation of 26.9597. The minimum value is -117.3436, and the maximum value is 179.7481. The MVAIC mean reveals that listed firms in Vietnam have a moderate capability to create market value via IC. The negative MVAIC reflects the fact that some firms struggle to connect their IC effectively. For the components of IC, the mean value of HCE is 12.5272 with its standard deviation of 17.7205. The maximum value of HCE is 178.5473, and the minimum value is -53.2050. These results indicate that these listed companies offer moderate capability to generate HC but better findings than those of Farooq et al. (2022). These also show that there are differences among these firms in innovation, training and staff management. The minimum value of SCE is -118.0761, and the maximum value is 138.7843. The mean value of SCE is -5.0081, which is much worse than found by Farooq et al. (2022) , with its standard deviation of 16.2207. This negative mean value indicates that listed companies might not use systems, processes, and organizational culture well. This suggests that these firms should improve SC to increase their performance and competitiveness. The mean value of CEE is 0.1833, which is similar to the findings of Farooq et al. (2022), with its standard deviation of 0.1663. The CEE has the maximum value of 1.2705 and the minimum value of -5.2743. The CEE mean reflects that listed firms generate relatively low effectiveness from their capital investment. The negative minimum value posits that some firms manage capital badly. The mean value of RCE is 0.2411 with its standard deviation of 0.9516. RCE has a minimum value of -44.2234 and maximum value of 59.4248. The relatively low

positive mean value expresses a moderate effectiveness in using RC. Some listed firms face serious inefficiencies arising from the negative minimum value, signaling a crucial requirement for enhancing the stakeholder engagement approaches.

Table 2

Descriptive Statistics

Variable	Observations	Mean	SD	Minimum	Maximum
MVAIC	7,608	7.9493	26.9579	-117.3436	179.7481
MC	7,608	2.4473	0.0678	2.2594	2.6797
HCE	7,608	12.5272	17.7205	-53.2050	178.5473
SCE	7,599	-5.0081	16.2207	-118.0761	138.7843
CEE	7,608	0.1833	0.1663	-5.2743	1.2705
RCE	7,608	0.2411	0.9516	-44.2234	59.4248
SGR	7.595	0.8393	31.9825	-1	2.1140
ROA	7,608	0.0617	0.0806	-1.5874	0.7837
LEV	7,608	0.4911	0.2263	0.0027	1.2945
CRISIS	7,608	0.0664	0.2490	0	1
COVID-19	7,608	0.1710	0.3765	0	1
FDI	7,608	17.3854	7.9697	7.7	60.3
INF	7,608	0.0560	0.0498	0.0063	0.1989
GDP	7,608	5.5144	0.4036	4.3491	6.0132

Table 3 shows the results of the correlation matrix of Vietnam's listed companies. The correlation among variables is smaller than 0.5, except INF and GDP. This result indicates that there is no problem of multicollinearity.

Table 3

Correlation Matrix

	MVAIC	MC	HCE	SCE	CEE	RCE	SGR	ROA	LEV	CRISIS	COVID-19	FDI	INF	GDP
MVAIC	1													
MC	0.02	1												
HCE	0.81	0.07	1											
SCE	0.77	-0.05	0.26	1										
CEE	0.10	-0.07	0.12	0.01	1									
RCE	0.03	0.03	0.0003	-0.01	0.06	1								
SGR	0.01	0.02	0.01	0.004	-0.01	-0.005	1							
ROA	0.09	0.14	0.14	-0.003	0.57	-0.01	0.01	1						
LEV	0.03	0.09	-0.02	0.08	-0.24	0.03	0.01	-0.38	1					
CRISIS	0.04	-0.06	0.03	0.02	0.05	-0.01	-0.005	0.10	0.005	1				
COVID-19	-0.02	0.15	-0.03	-0.001	-0.07	-0.002	-0.01	-0.05	-0.001	-0.21	1			
FDI	0.03	-0.02	0.03	0.02	0.03	-0.01	0.002	0.03	-0.02	0.57	-0.17	1		
INF	0.05	-0.17	0.05	0.02	0.07	-0.01	0.02	0.07	0.02	0.36	-0.28	0.31	1	
GDP	-0.05	0.17	-0.05	-0.02	-0.09	0.01	-0.05	-0.13	-0.02	-0.58	0.41	-0.23	-0.76	1

Diagnostic test, robustness check and validity of estimated results

The research results illustrated in Table 4 show that the Sargan test and the Hansen test fluctuate between 0.166 and 0.992. The number of groups is bigger than the number of instruments. These results indicate that all instrumental variables are valid. In addition, AR (2) test p-values lie between 0.101 and 0.398, revealing that there is no problem of autocorrelation. Furthermore, the results in Table 4 show that the mean VIF is slightly more than 5. This confirms that there is no problem of multicollinearity, revealing that our dataset is robust.

Regression results

Table 4 shows that almost all estimated coefficients are significant, and our validity of the models and findings are thus supported. For the result of Model 1, most of regressed coefficients are positively significant and hence these factors are positively related to IC performance. IC of the previous period (β=0.4178, p=0.000), MC (β=9.1989, p=0.047), return on asset (β=190.7702, p=0.000), firm leverage (β=19.5347, p=0.094), FDI (β=0.1709, p=0.041), inflation (β=33.6299, p=0.068), and GDP (β=8.5453, p=0.066) are positively significant, and they have a positive effect on IC performance. By contrast, COVID-19 (β=-2.2005, p=0.050) is negatively significant, and it has thus an inverse relationship with IC performance. When the logarithm of MVAIC is employed, all estimated coefficients are significant. However, the number of significant variables is less in the results of IC components than in the IC. For Model 2, sales growth (β=1.0664, p=0.002) and financial crisis (β=2.1703, p=0.030) encourage HC, while MC of the previous year (β=-2.8712, p=0.000) erodes it. For Model 3, SC of the previous period (β=0.3174, p=0.000), return on asset (β=6.8135, p=0.001), leverage (β=3.6268, p=0.000), and FDI (β=0.0159, p=0.010) enhance SC. For Model 4, capital employed in the last year (β=0.3616, p=0.042), FDI (β=0.0019, p=0.013), inflation (β=0.4185, p=0.053), and GDP (β=0.0793, p=0.002) promote capital employed; meanwhile, MC of the previous period (β=-0.1577, p=0.067) erodes it. For Model 5, RC from the last year (β=-0.2877, p=0.000), MC of the last year (β=-0.1912, p=0.000), return on asset (β=-1.9379, p=0.000), leverage (β=-0.1695, p=0.000), and COVID-19 (β=-0.0339, p=0.000) decrease RC but MC (β=0.1798, p=0.000), sales growth (β=0.0926, p=0.000), inflation (β=0.3285, p=0.000), and GDP (β=0.0356, p=0.086) increase RC.

Table 5 presents that financial crisis (β=-0.0123, p=0.000) is negatively significant with MC, as it positively affects return on asset (β=0.0261, p=0.000). Covid-19 (β=00263, p=0.000) positively influences MC, while Covid-19 (β=-0.8050, p=0.097 for sales growth; β=-0.0085, p=0.000 for return on asset) discourages sales growth and profit. These results reveal that financial crisis and COVID-19 have a moderating effect.

Table 4

Empirical Results

Variable	MVAIC (1)	LMVAIC (1)	HCE (2)	SCE (3)	CEE (4)	RCE (5)
$MVAIC_{t-1}$	0.4178***(0.000)	0.5706***(0.000)				
HCE_{t-1}			0.3380***(0.000)			
SCE_{t-1}				0.3174***(0.000)		
CEE_{t-1}					0.3616**(0.042)	
RCE_{t-1}						-0.2877***(0.000)
MC	9.1989**(0.047)	0.1908****(0.000)	3.3776***(0.000)	-0.1783 (0.681)	0.1030 (0.349)	0.1798***(0.000)
MC_{t-1}	-10.0843 (0.178)	-0.3463***(0.000)	-2.8712***(0.000)	-0.3099 (0.280)	-0.1577*(0.067)	-0.1912***(0.000)
SGR	1.3689 (0.751)	0.1289***(0.000)	1.0664***(0.002)	0.1240 (0.608)	0.0893(0.272)	0.0926***(0.000)
ROA	190.7702***(0.000)	5.0853***(0.000)	15.1189***(0.000)	6.8135***(0.001)	1.2038 (0.253)	-1.9379***(0.000)
LEV	19.5347*(0.094)	1.0897***(0.000)	8.4342***(0.000)	3.6268***(0.000)	0.1355 (0.576)	-0.1695***(0.001)
CRISIS	-1.0472 (0.622)	-0.0976**(0.024)	2.1703**(0.030)	0.0040 (0.990)	-0.0095 (0.507)	-0.0118 (0.579)
COVID-19	-2.2005**(0.050)	-0.0440***(0.000)	-1.3731***(0.000)	0.0736 (0.516)	-0.0355 (0.143)	-0.0339***(0.000)
FDI	0.1709**(0.041)	0.0110***(0.000)	0.0214 (0.230)	0.0159***(0.010)	0.0019**(0.013)	0.0007 (0.156)
INF	33.6299*(0.068)	0.4575***(0.030)	17.7878*** (0.000)	-1.2089 (0.308)	0.4185*(0.053)	0.3285***(0.000)
GDP	8.5453*(0.066)	0.2983***(0.000)	2.7679***(0.000)	-0.0771 (0.802)	0.0793***(0.002)	0.0356*(0.086)
Constant	-58.6772 (0.205)	0.0998 (0.766)	-20.2932***(0.002)	1.8424 (0.697)	0.1031 (0.864)	0.3706 (0.151)
Number of observations	6,794	5,141	6,794	6,783	6,794	6,794
AR(2) test	0.398	0.236	0.300	0.101	0.126	0.309
Sargan test	0.991	0.166	0.801	0.664	0.992	0.834
Number of instruments	26	71	76	80	15	80
Number of groups	687	542	687	686	687	687
Mean VIF	5.26	5.77	5.26	5.29	5.31	5.26

Note. * significant at 0.10, ** significant at 0.05, *** significant at 0.01. The p-value is in brackets.

Table 5

Moderating Effect – the SEM Model

Relationship	MWAIC	HCE	SCE	CEE	RCE
Financial crisis → Market capitalization	-0.0123*** (0.000)	-0.0123*** (0.000)	-0.0123*** (0.000)	-0.0123*** (0.000)	-0.0123*** (0.000)
COVID-19 pandemic → Market capitalization	0.0263*** (0.000)	0.0262*** (0.000)	0.0262*** (0.000)	0.0262*** (0.000)	0.0262*** (0.000)
Financial crisis → Sales growth	-0.7622 (0.114)	-0.7622 (0.114)	-0.7622 (0.114)	-0.7622 (0.114)	-0.7622 (0.114)
COVID-19 pandemic → Sales growth	-0.8050* (0.097)	-0.8050* (0.097)	-0.8050* (0.097)	-0.8050* (0.097)	-0.8050* (0.097)
Financial crisis → Return on asset	0.0261*** (0.000)	0.0259*** (0.000)	0.0259*** (0.000)	0.0259*** (0.000)	0.0259*** (0.000)
COVID-19 pandemic → Return on asset	-0.0085*** (0.000)	-0.0084*** (0.000)	-0.0084*** (0.000)	-0.0084*** (0.000)	-0.0084*** (0.000)
Financial crisis → Leverage	0.0046 (0.658)	0.0048 (0.643)	0.0048 (0.643)	0.0048 (0.643)	0.0048 (0.643)
COVID-19 pandemic → Leverage	0.00004 (0.995)	-0.0001 (0.984)	-0.0001 (0.984)	-0.0001 (0.984)	-0.0001 (0.984)
Market capitalization → Intellectual capital	1.6439 (0.737)	16.8245*** (0.000)	-15.7866*** (0.000)	-0.3653*** (0.000)	0.6106*** (0.000)
Sales growth → Intellectual capital	0.00406 (0.143)	0.0027 (0.236)	0.0021 (0.112)	-0.00004** (0.011)	-0.0002*** (0.000)
Return on asset → Intellectual capital	37.16*** (0.000)	28.7256*** (0.000)	9.0109*** (0.003)	1.1759*** (0.000)	-0.5493 (0.242)
Leverage → Intellectual capital	8.5294*** (0.000)	1.6589* (0.099)	7.0484*** (0.000)	-0.0110 (0.484)	0.0420 (0.682)
Financial crisis → Intellectual capital	1.2607 (0.540)	0.4312 (0.773)	0.8579 (0.427)	-0.0095 (0.235)	-0.0084 (0.732)
COVID-19 pandemic → Intellectual capital	-0.3233 (0.731)	-0.8735 (0.152)	0.5927 (0.305)	-0.0076* (0.089)	-0.0271 (0.649)
FDI → Intellectual capital	0.0396 (0.451)	0.0216 (0.565)	0.0182 (0.518)	0.0004* (0.093)	-0.0006 (0.351)
Inflation → Intellectual capital	19.9652* (0.064)	18.0004** (0.014)	2.0616 (0.745)	0.0340 (0.447)	0.1171 (0.444)
GDP → Intellectual capital	0.5389 (0.744)	0.3276 (0.772)	0.2505 (0.789)	0.0069 (0.390)	0.0114 (0.701)

Note. * significant at 0.10, ** significant at 0.05, *** significant at 0.01. The p-value is in brackets with a standard error.

6. Discussion

The objective of this research is to examine the factors affecting IC performance in the case of Vietnam's listed firms over the period 2007–2022 by using the SGMM and SEM. Our findings show that IC of previous year affects IC of the current year because of the long-run nature of IC assets. This is because investment in HC can contribute to

IC development over time. Listed firms with significant business networks and consumer relationships can boost ongoing partnerships and market advantages. SC such as effective processes or infrastructure developed earlier can improve IC performance this year. Therefore, the lagged IC performance provides a vital foundation for sustaining competitive advantage and enhancing IC performance yearly. This result indicates that the SGMM is appropriately employed.

Previous researchers indicate that profitability is one of determinants of IC performance (Babajee, 2021). Firms with a higher level of profit can invest in innovative activities, research and development. Directors/owners are willing to carry out useful activities like training, motivating, doing research and development, promoting employees to innovate if they realize a higher profitability. This, in turn, promotes IC performance (Sefidgar et al., 2015). Our findings show that return on asset has the strongest positive effect on IC performance (H2). This result suggests that listed companies with a higher profitability in Vietnam have more resources to invest in improving their relations, system, structure, processes, employee skills, experience, and competencies. Firm profitability plays a motivational role for employers and employees to work harder. This also encourages employees to provide a higher quality customer services, do more research and development, and to enhance firm image. The higher ROA suggests that Vietnam's listed firms are better at utilizing their resources to create revenue. This return enables these firms to invest more in HC, R&D, renovation, processes, technology infrastructure and relationships which can increase IC. This result supports RBV theory that listed firms with profitability might encourage their financial strength to fascinate top talents, boost a culture of learning and innovation, and improve IC. This finding reflects the appropriate situation of the listed firms in Vietnam, where traditional industries are transitioning to more knowledge-based economies. This higher profitability allows these firms to adapt to international shifts through investing in innovation and IC assets. Therefore, profitable companies have better IC performance than those which have a lower profitability and losses. This result is consistent with Meressa (2016) and Babajee (2021). By contrast, firms with higher profits pay less attention to investing in relationships with their customers, suppliers and partners. This result does not support H2.

The firm sales growth, by contrast, has the least influence on IC performance. This reflects that Vietnam's listed firms with higher sales growth have more revenue and higher profit, in turn improving IC performance, supporting H4. They might gain better IC because they have more resources for investment in R&D, technology and employee development thanks to sales growth. They could employ better skilled employees since sales growth helps them pay higher salaries and wages. They promote knowledge sharing, collaboration, novelty, relationships, databases and systems, leading to higher IC. As RBV theory points out, the companies with superior IC can perform better than their rivals. Vietnamese listed companies with constant sales growth might invest in the inimitable resources which are hard to replicate, strengthening their IC performance.

Listed companies can create more financial resources which might be used to invest in IC development when sales grow. These companies allocate additional funds to staff development, innovations in their processes, systems, technologies, relationships and networks, leading to higher HC, SC and RC. This finding is in line with Nkambule et al. (2021) and Lee et al. (2023).

Babajee (2021) indicates that the agency theory is also employed to examine IC performance. The agency costs can increase, resulting from a rise in firm financial leverage (Berger & Patti, 2006). Disclosing more information can reduce agency costs, and thus shareholders encourage firms to disclose information. Prior studies found those companies that have better IC performance tend to disclose more IC information (Babajee, 2021). Atena and Mehdi (2017) evidence that firms with higher leverage can obtain higher IC performance. Our findings show that among the estimated coefficients of firm characteristics, financial leverage has the second strongest positive effect on IC performance (H3). This result indicates that firms with high debt in their capital structure have higher IC performance. By borrowing money, Vietnam's listed firms invest more in R&D to achieve innovation, employee development and other IC assets. They boost knowledge sharing and enhance their processes, staff knowledge and skills. They also acquire IC from other firms through M&A. This result is consistent with Atena and Mehdi (2017). However, our result also shows that financial leverage has a negative influence on RC efficiency. This means that higher debt can discourage firm relationships with customers, suppliers and others, and thus decrease IC performance. This result shows that financial leverage limits firms' resources for investment in relationships. This result does not support H3 but is in line with Babajee (2021), Hidayah and Adityawarman (2017).

Scholars indicate that firm size has an influence on IC performance (Babajee, 2021). They argue that firms with a larger size have a better internal management system and are likely to have better ability to disclose the information about their IC performance since they are well diversified. Bigger companies might have more financial resources to create both product and process innovations and hence improve IC performance (Meressa, 2016). Our finding shows that MC, measuring the firm size, has a positive impact on IC performance (H1). This result evidences that bigger market value has better IC performance. This reflects the fact that the listed firms with a bigger market value in Vietnam have more resources for investing in IC and improving firm growth and profit. Listed firms with higher IC can adopt new innovations and improve the process of learning by doing. These companies can adopt and imitate knowledge generated by other firms easily, leading to better firm growth and profit. This reflects the fact that higher MC can help these firms obtain more funds from stock exchange and invest in IC, leading to higher IC performance. Our findings also show that MC can encourage firms to invest in HC and RC. Listed companies with higher MC have better resources and visibility, enabling them to invest in main intangible properties which can improve HC, SC, and RC. In the context of RBV theory and signaling theory, higher MC encour-

ages Vietnam's listed firms to invest and develop their IC and foster their competitive capacity. Listed firms with higher MC can attract talent, enhance databases, processes and technologies, and construct good relationships with customers and partners, leading to higher IC. In addition, this positive signal assists these firms in attracting skilled labor, investors and partners, innovation, thereby increasing IC performance. However, MC from the previous period discourages IC performance.

Researchers point out that global crises such as the financial crisis and the COVID-19 pandemic affect financial markets and IC performance (Xu et al., 2023). Most of scholars like Corbet et al. (2020) and Elnahass et al. (2021) indicate that global crises have a negative effect on financial markets and IC. Similarly, our findings show that the financial crisis and the COVID-19 pandemic are negatively correlated with IC performance (H5a). This reflects the fact that Vietnam's government did provide support policies (Nguyen, 2024c). It carried out an expansion of monetary policy, decreased and deferred taxes for companies, and supported firms to invest in technology and innovations during the financial crisis between 2008 and 2009 (Nam, 2020), but firms can only improve HC. Vietnamese firms also made their big efforts to overcome the crisis by investing more in innovations and technology and thus improving employee performance. Similarly, the Vietnamese government also provided a supported policy for firms during the COVID-19 pandemic (Nguyen, 2024c). COVID-19 forced Vietnamese firms to invest much more in employing technology, innovations, and improving firm structure, system and process. Companies also provided training courses for improving their employee skills and competencies. They also asked their employees to learn and adopt digital technology for working. However, the negative impact of the crises outweighs the positive effect made by the government supporting policy. Therefore, IC is lower during the financial crisis and the COVID-19 pandemic. Based on the context of contingency theory, the listed firms have to adapt their strategies established on global circumstances. The crisis generates turbulent environments for firms, during which they have to reduce their spending on training, R&D innovation, thereby reducing IC performance. In the context of institutional theory, the listed firms also rely on regulatory organizations and investors to adapt rapidly to new conditions, which might reduce IC performance.

Furthermore, Table 5 shows that the financial crisis and COVID-19 have a moderating effect through sales growth, return on asset, and firm size (H5b). However, the COVID-19 pandemic and financial crisis affect listed companies differently. The global crises hinder sales growth through customer spending and investment reduction. Financial markets collapse during the crises, leading to extensive uncertainty, forcing firms to reduce operations. Similarly, international supply chains and customer demand are disrupted by COVID-19, leading to lower sales growth. Concerning ROA, the financial crisis positively affects ROA because firms manage to enhance asset utilization and obtain government support. Conversely, the COVID-19 pandemic negatively influences ROA because of sudden shutdowns and lower ability to use firm assets efficiently during

economic constraints and health-linked concerns. With regard to the firm size (MC), the financial crisis negatively affects MC because of share market crash and lower investor confidence. In contrast, COVID-19 encourages firms to adopt significantly digital technology and health solutions, leading to higher MC. In addition, during the COVID-19 pandemic, people have less investment choices. They can invest in real estate market and share market. Many investors in Vietnam had invested a huge amount of money in share market, leading to a significantly high MC level during the pandemic. These results are consistent with Nguyen (2023) and Nguyen (2024a, b, c, d and e).

Macroeconomic factors like FDI, GDP and inflation have a positive influence on IC performance (H6). GDP and inflation encourage HC, CE and RC, while FDI enhances firm system, structure, processes and physical assets. A higher inflation and GDP force firms to invest their resources to improve employee skills, experiences, competencies, physical assets and firm relations. In the context of HC theory, FDI promotes the transfer of technology, knowledge, skills, and management know-how to Vietnamese listed firms, hence enhancing their IC performance. Higher GDP provides investment opportunities to these firms in R&D and HC management, allows them to allocate their additional resources to innovation, thereby improving their IC performance via processes, new product development. In the context of RD theory, FDI offers external financial sources and knowledge for the listed firms. Inflation forces the listed firms to optimize their resource usage and enhance innovation to sustain their profits in an unstable market which HC, technological capacities and processes are invested to adapt the economic condition changes, leading to higher IC performance.

7. Implications

Theoretical implications

This research provides the following theoretical implications. First, our finding contributes to the existing literature in the Vietnamese context by examining determinants of IC performance with a consideration of global crises. This is because there is no research examining simultaneously the effect of global crises on IC performance. The research assists in clarifying the concept of IC performance, RBV theory, signaling theory, stakeholder theory, contingency theory, institutional theory, human capital theory, and resource dependency theory, explaining the role of firm specific character and external factors affecting IC performance. Second, analyzing factors affecting IC performance helps firms improve their performance. This research is important since it can help firms avoid under-utilizing an enormous IC potential which is considered as a vital driver of financial performance. Finally, the moderating effect of global crises has not been investigated. From our findings, firms can improve their IC performance through allocating resources such as MC and profitability efficiently during the global crisis periods.

Practical implications

This research has a number of practical implications. First, the strongest positive effect of ROA implies that efficient asset management can generate profitability, and then listed firms reinvest profits into IC initiatives like employee development, innovation and technological advancements. This implies that asset management and improved operational efficiency play a vital role in boosting IC performance for firms. Managers should pay attention to their intangible assets which can generate value. Firms should employ competent employees and educate current workers to obtain HC. Consequently, they can provide good services which are friendly, effective and professional, leading to the customer satisfaction and firm growth. Second, the positive influence of leverage on IC performance indicates that the moderate levels of leverage might offer the necessary capital for IC investment because too little leverage can bound possible development. However, firms should keep the optimal debt to avoid financial risk and improve IC performance with financial stability. Third, firms with higher MC can have more market confidence and access to capital. They should invest more to attract top talents, increase innovation and expand their knowledge base, and thus upgrade IC performance. Fourth, higher sales promote IC performance, and firms should thus invest in innovation and improve the quality of products. This can bring more sales and additional resources for IC investment. Fifth, the global crises with a negative effect suggest that firms should focus on adaptive strategies like digital transformation and remote work innovations during the crisis time to reduce the negative effect. They should pay attention to IC investment by establishing an appropriate working mechanism during the global crises (Xu et al., 2023). In addition, firms should pay attention to the moderating effect of the crises to minimize the adverse effect and maximize the benefits via MC, sales, and return on asset. Sixth, the government should encourage more FDI since it brings not only capital but also advanced technologies, management practices, skilled labor, and enhances IC performance. The government should also keep reasonable inflation and promote economic growth to maximize benefits and drive sustained growth in IC. Finally, investors and creditors also get benefit from this research because they can understand vital factors affecting firm value before their investment decision is made (Babajee, 2021).

8. Conclusion and Research Limitations

This research examines empirically the factors affecting IC performance for 687 listed firms in Vietnam for the period 2007–2022 by using the SGMM and SEM regression technique. The research results show that MC, sales growth, return on asset, financial leverage, global crises, foreign direct investment, inflation and gross domestic product are key factors affecting IC performance. Global crises have a negative effect and a moderating effect on IC performance because they have direct effect and indirect impact

on IC performance through MC, sales growth, and ROA. Firms face competitive pressures, they invest in technology and innovations as well as improve employee skills, experience and competencies. They also improve their relations, system, structure, and working processes, which leads to better IC performance.

Vietnam has progressively integrated into the world economy via FDI and international trade agreements, which also led to international shocks like the financial crisis and Covid-19 which strongly affect the economy of Vietnam. Vietnam, also considered as an emerging economy, provides perceptions that might be generalized to other transitional or developing countries. Vietnam's crisis experience might offer prized comparative visions. An analysis of Vietnamese response to the crises might enable us to compare with more advanced economies and assist other emerging markets in obtaining lessons. Additionally, Vietnam has become a fast-growing emerging economy with robust international economic connections. Therefore, the study of determinants of IC performance in the Vietnam context is appropriate, and lessons learned from Vietnam can spread over other economies with similar growth paths or those similarly affected by international crises.

This research has several limitations. Firstly, our sample is only 687 listed firms which might not fully represent the 895,876 firms in Vietnam. Further study should collect more data and employ a larger sample of companies operating in Vietnam. Secondly, our research has not analyzed IC performance across industries. Further research should examine the performance with the industry comparison. Thirdly, our study is the case of a single country and hence our findings may not be generalized for all nations. Further study should be implemented for regional nations such as ASEAN countries. Our research does not include other factors affecting IC performance like human resources intensity and barriers to entry. This is because human resources intensity can directly increase IC. A highly skilled and well-supported workforce enhances HC, encourages innovation, and reinforces firm knowledge, thereby donating to IC performance. High startup costs, patents, and licenses are barriers to entry which can defend a firm's IC by restraining competition. Companies can use these barriers to put more money into R&D, novelty, and gift improvement, which can enhance IC. Further research should include these factors into the research model. Habib and Mourad (2023) constructed a measurement of IC efficiency and analyzed it across firms, sectors and countries, but we have not done this. Further research should consider this issue.

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