

Ownership feature and firm performance via corporate innovation performance

Ownership
feature
and firm
performance

Does it really matter for Vietnamese SMEs?

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Abstract

Purpose – The purpose of this paper is to investigate the simultaneous relationship among ownership concentration, innovation and firm performance of the small- and medium-sized enterprises (SMEs) in Vietnam during the 2011–2015. By employing a Conditional Mixed Process (CMP) model, the findings show that: there is no impact of ownership concentration on innovation, but it has a positive impact on sales growth; innovation positively affects firm performance; and there exists a positively reverse causality from sales growth to innovation.

Design/methodology/approach – In this study, the authors propose the adaption of CMP model (Roodman, 2011). The nature of the first stage dependent variable – Innovation – is a binary one while the dependent variable Performance is continuous. Therefore, a model that can adapt the binary nature of the dependent variable and perform the estimation of a system of equations such as CMP model is preferred. The CMP framework is substantially that of seemingly unrelated regression, but with application in a larger scope. This approach is based on a “simulated maximum likelihood method” suggested by Geweke–Hajivassiliou–Keane algorithm.

Findings – By applying CMP method, this study examines the simultaneous relationship among ownership concentration, innovation and firm performance of the SMEs in Vietnam from 2011 to 2015. The findings indicate that: there is no impact of ownership concentration on innovation, but it has a positive impact on sales growth; innovation positively affects firm performance; and there exists a positively reverse causality from sales growth to innovation.

Research limitations/implications – In spite of the efforts to explore the simultaneous relationship among ownership concentration, innovation and firm performance of the SMEs in Vietnam, the study still has some limitations which are promising further research directions. First, the SME surveys by Central Institute for Economic Management do not have much information about other types of ownership including state-owned and foreign ownership. Therefore, possible further studies with richer data sets may explore the impacts of different types of ownership on firm innovation and performance. Second, other types of innovation such as organizational innovation, marketing innovation can also be investigated in further studies in a richer data set for the case of Vietnam SMEs.

Originality/value – The findings show that: there is no impact of ownership concentration on innovation, but it has a positive impact on sales growth; innovation positively affects firm performance; and there exists a positively reverse causality from sales growth to innovation. The policy implications insist on facilitating SMEs with easier access to capital via loans with preferred interest or trust loans without collateral, training programs for the labor force and SME leaders, and reduction of unnecessary administrative procedure.

Keywords Innovation, Firm performance, Ownership concentration

Paper type Research paper



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1. Introduction

The Vietnamese economy is making a progress toward a more knowledge-intensive type and toward the fourth industrial revolution. The engine of this process largely depends on millions of enterprises, mostly small- and medium-sized enterprises (SMEs), adding up to a total of 396,809 (December 31, 2014) and accounting for approximately 98.63 percent of the total number of enterprises in Vietnam (GSO, 2016a, b). SMEs play an important role in the Vietnamese economy by creating jobs and contributing significantly to GDP growth. However, SMEs usually encounter problems of low productivity, low profitability and so on (Ministry of Planning and Investment, 2014). To enhance competitiveness of SMEs, one potential solution is to boost innovation in both products and processes to gain the market place, and SMEs are also perceived with their central role in innovation such as the case of start-ups in Silicon Valley in the USA (Audretsch, 2002; Love and Roper, 2015).

There has been a large body of literature on the topic innovation at firm level. Many studies concentrate on the impact of innovation on firm performance (Goedhuys and Veugelers, 2012; Hölzl and Friesenbichler, 2010; Kannebley *et al.*, 2010). Other studies examine the role of ownership features in corporate innovation (Belloc, 2012; Chen *et al.*, 2011; Choi *et al.*, 2011, 2012; Song *et al.*, 2015). However, to the best of our knowledge, there is hardly any research on the three-party relationship: innovation, firm performance and ownership characteristics. Thus, to fill the research gap, the specific objectives of this study are to: examine whether there is an impact from ownership concentration to innovation, or to firm performance; investigate the impact of innovation on firm performance; and explore whether there is a reverse causality from firm performance to innovation.

This study makes some contribution to the literature on corporate innovation in three aspects. First, there are few studies on the relationship among three agents: innovation, firm performance and ownership concentration; therefore, this study contributes to the literature as one of the few focusing extensively on this issue. Second, the study is also the first in this research direction in the context of a developing country, particularly Vietnam, which will possibly enrich the literature on the heterogeneity of innovation activities in developing nations compared to developed ones. Third, with regard to research method, the study makes a major contribution by using Conditional Mixed Process (CMP) model (Roodman, 2011). The advantage of CMP model is that it includes “Mixed process” which suggests that the types of dependent variables can vary in different equations, giving more flexibility in model specification.

The remaining of the study is organized as follows. Section 2 contains the literature review on the definition and the nexus among innovation, firm performance, ownership characteristics and some background on Vietnam SMEs with respect to these areas. Section 3 describes the empirical strategy and data sources. In Section 4, we discuss main estimation results. Finally, conclusions and policy implications are presented in Section 5.

2. Literature review and background

2.1 The concept of innovation

Innovation at firm level is a widely discussed topic in the literature, especially in recent years when there is growing concern of the world economy toward the knowledge economy (Chen *et al.*, 2014; Choi *et al.*, 2012; Rodil *et al.*, 2015). Innovation at firm level can be defined in various ways, but the most popular definition is based on OECD (2005) which classifies two kinds of innovation: product innovation and process innovation. Product innovation is “the implementation/commercialisation of a product with improved performance characteristics such as to deliver objectively new or improved services to the consumer”. Process innovation is “the implementation/adoption of new or significantly improved production or delivery methods. It may involve changes in equipment, human resources,

working methods or a combination of these.” The definition highlights the creation of something new in terms of firms’ products, services or adaptation of new operation procedure. Moreover, innovation at firm level can be classified into two groups: innovation input and innovation output. Innovation input, usually measured by R&D expenditure, refers to the resources for innovation activities to take place while innovation output (new products/new processes) refers to the outcome of this process (Coad *et al.*, 2016; Deschryvere, 2014; Rodil *et al.*, 2015). In this study, both innovation input and innovation output are covered to explore the entire nature of innovation.

2.2 Overview of performance, innovation and ownership of Vietnamese SMEs

Most Vietnam SMEs are characterized by low value added, labor intensiveness, limited capital and inferior technology (MPI, 2014). However, there are some positive signs of innovation development of SMEs in recent years. Innovation is considered a form of diversification which enhances the possibility of SME survival and the driving force of firm dynamics in severe competition market (CIEM, 2016). The survey result by CIEM (2016) shows that the percentage of SMEs introducing a new product increased fast between the period 2011 and 2015, with the innovation rate being about 4 percent in 2011 and 23.8 percent in 2015. In terms of ownership, the majority of SMEs are domestic non-state enterprises; as of 31 December 2014, the total number of domestic non-state enterprises is 385,586 SMEs, accounting for 97.2 percent of total SMEs in Vietnam, compared to 0.5 and 2.3 percent of SMEs being state owned and foreign owned, respectively (GSO, 2016b). Moreover, according to CIEM (2016) and VCCI (2016), most domestic non-state enterprises are actually household businesses, which have the characteristics of ownership concentration belonging to some family members. Therefore, uncovering the relationship among ownership characteristics, firm innovation and performance is an interesting course of investigation to be wholly conducted in this study.

Moreover, a large proportion of SMEs have to face difficulties with growth. According to the survey result of CIEM (2016), in 2015, 83 percent of interviewed companies experienced challenges when doing business. The most important challenges for SMEs are the shortage of capital and difficulty in accessing finance. The second largest constraint is the lack of demand for current products, and the third one is too much competition. In the same survey, the most popular constraint on introducing a new product is the lack of capital, followed by insufficient technology and skilled labor, respectively. In the meantime, the report by VCCI (2016) also highlights the obstacles about inspection burden of state agencies and troublesome administrative procedures, which are threatening to slow down SME development.

2.3 Ownership concentration and corporate innovation

According to the agency theory, there are common issues of different goals and interests as well as conflicting risk preferences between two parties: principal (owner) and agent (managers). In more details, shareholders pay more attention to the long-term growth of the business, so they want to maximize the effectiveness of their investment. Managers, on the other hand, focus more on short-term personal benefits and prestige (Jensen and Meckling, 1976). Furthermore, shareholders tend to be risk-neutral due to their ability to diversify their investment into a basket of firms while managers may be more risk-averse to secure their position and income because they usually work for a single firm. Due to the difference in two parties’ objectives, there are diverging ideas on firms’ strategic directions in general, and in innovation activities in particular (Hoskisson *et al.*, 2000; Song *et al.*, 2015). Therefore, a more concentrated ownership may be crucial for corporate innovation since it allows shareholders to influence the firm’s management more effectively by using their voting control.

Several empirical studies have found evidence in support of the positive association between ownership concentration and innovation performance (Chen *et al.*, 2014; Song *et al.*, 2015). Song *et al.* (2015), using data from 242 publicly traded companies in China, found that high ratio of ownership concentration, which may allow shareholders to carefully monitor the management behavior, may boost innovation performance. Chen *et al.* (2014), employing data of 487 Chinese-listed firms in 2004–2005 and 475 ones in 2005–2006, revealed that the nexus between ownership concentration and innovation follows an inverted U-shape with innovation initially rising and then falling when ownership concentration rises.

Nevertheless, other studies suggest a negative association between the two concerned variables. This is due to the conflict between dominant shareholders and small ones when controlling ones may tend to exploit and extract firm benefit. For instance, they have the tendency to assign their family members or acquaintances to top managing positions, participate into self-beneficial trades possibly harmful to firms, or conduct personal and political activities which bring no benefits to firms. Consequently, the shortage of resources will deprive the innovation capacities (Chen and Huang, 2006; Minetti *et al.*, 2015; Morck *et al.*, 2005; Young *et al.*, 2008). Chen and Huang (2006) examined the impact of employee stock ownership on R&D expenditures of Taiwanese information-technology firms in 1996–2001. The findings show that there is a positive relationship between the application of employee stock ownership (which means a decentralized ownership concentration) and R&D expenses. Minetti *et al.* (2015), employing four waves of survey in 1997, 2000, 2003 and 2006 of 20,000 Italian firms, found that there is a negative impact of ownership concentration on innovation, especially by reducing R&D expenditures. Morck *et al.* (2005) also found that a few families owning a large domination of firm assets may lower the rate of innovation.

Several studies found that there is no impact of ownership concentration on innovation performance (Choi *et al.*, 2011, 2012). Choi *et al.* (2011), using data from 548 Chinese firms, established that ownership concentration does not affect managers' behavior in innovation performance. The explanation is probably due to the fact that many listed Chinese firms are commonly immensely concentrated, and the market appears to be insensitive to differentiate firms with respect to ownership concentration. Choi *et al.* (2012), employing the data set of 301 Korean firms, also found that there is no significant impact of ownership concentration on firm innovation.

2.4 *The impact of firm innovation on performance*

Evolving as one of the most indispensable factors of firm growth, innovation has been regarded as the priority strategy for corporate development and long-term progress. In terms of strategic vision, innovation can be considered the valuable, and efficient instrument for a firm to achieve sustainable development, maintain competitiveness and gain access into new markets (Becheikh *et al.*, 2006).

Research on the impact of firm's innovation on firm growth is rich and diverse (Goedhuys and Veugelers, 2012; Hölzl and Friesenbichler, 2010; Kannebley *et al.*, 2010; Raffo *et al.*, 2008; Santi and Santoleri, 2016). In the case of SMEs, according to Subrahmanya (2011), SMEs are regarded as the “driving forces” of the economy due to their extensive contributions with respect to technological innovation, export enhancement and job creation. They are the engine of technological progress and innovation activities (Acs and Audretsch, 1988). Acs *et al.* suggested that SMEs have more innovation activities than large ones because they are more flexible and easily adapt to adverse economic situations.

Empirical evidence on the impact of firm innovation on SMEs' performance is rich with the majority of studies finding evidence of the positive association between innovation and SMEs' performance (Acs and Audretsch, 1987, 1988; Hall *et al.*, 2009; Jefferson *et al.*, 2006; Kasseeah, 2013). Hall *et al.* (2009), using data of Italian SMEs from the “Survey on

Manufacturing Firms” during the period 1995–2003, found that process and product innovation both affect positively firm’s productivity, notably the case of process innovation. Jefferson *et al.* examined the impact of R&D intensity on new product sales using the knowledge production function and panel data of China’s large and medium-sized manufacturing enterprises which have intensive R&D expenditures. The results show that more expenses on R&D activities lead to more new product sales, especially in the pharmaceutical and telecommunications equipment industries. Kasseeah (2013) investigated the linkage between innovation and corporate performance in SMEs in Mauritius. The results reveal that innovation positively affects firm performance. Therefore, the government should support SMEs to invest more on innovation activities which may lead to productivity improvement and diversification.

2.5 The impact of firm performance on innovation

The impact of firm performance on innovation has also been investigated as one of the popular determinants of firm innovation (Adeyeye *et al.*, 2016; Bhattacharya and Bloch, 2004; Choi *et al.*, 2012; Chuluun *et al.*, 2017; Rogers, 2004; Schubert and Andersson, 2015). According to Mueller (1967), when a firm’s sales rise, it will have more confidence and ability to invest in uncertain R&D projects; it will also have more patience to wait for the benefit that these projects may bring about. Thus, firm growth is possibly contributory to innovation activities. However, empirical evidence about the role of firm performance on innovation is rather fragmented. Some studies found the positive impact of firm growth on innovation activities (Choi *et al.*, 2012; Chuluun *et al.*, 2017; Rogers, 2004). Rogers (2004), using the sample of manufacturing firms with more than 100 employees in Australia, established that there is a positive influence of sales growth on innovation. Choi *et al.* (2012) also found evidence in support of this relationship with the data set of 301 Korean firms. Likewise, Chuluun *et al.* (2017) found that R&D expenditure is associated with higher previous sales growth with the sample of 3,838 companies in the S&P 1,500 Index during the period 1996–2013.

Other studies did not find evidence of this relationship (Adeyeye *et al.*, 2016; Bhattacharya and Bloch, 2004; Schubert and Andersson, 2015). Bhattacharya and Bloch (2004) did not find evidence of the influence of sales growth on innovation in the case of Australian manufacturing SMEs in the 1997–1998 period. Similarly, Schubert and Andersson (2015), using data from three rounds of Swedish Community Innovation Survey in the period from 2004 to 2008, reported that sales growth has no impact on innovation. Adeyeye *et al.* (2016), based on the data collected in the Nigerian Innovation Survey 2008, also suggested that firm turnover does not contribute to the innovative performance.

3. Research method and data

3.1 Research method

To explore the possible linkages among ownership, innovation and firm performance: the impact of ownership concentration on corporate innovative performance; the contribution from innovative activities to corporate performance; and the reverse causality from performance to innovation, we propose the following system of equations (Choi *et al.*, 2012; Coad *et al.*, 2016; Love *et al.*, 2009):

$$\begin{aligned} Performance_{it} = & \alpha_{1it} + \beta_{11}Innovation_{it} + \beta_{12}Ownership_concentration_{it} \\ & + \beta_{13}Control_{it} + \beta_{14}Industry_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} Innovation_{it} = & \alpha_{2it} + \beta_{21}Performance_{it-1} + \beta_{22}Ownership_concentration_{it} \\ & + \beta_{23}Control_{it} + \beta_{24}Industry_{it} + \varepsilon_{it} \end{aligned} \quad (2)$$

where *Performance* is the log of real revenue from sales (adjusted for inflation) of firm *i* in year *t*. α is a constant term. *Innovation* is a dummy variable indicating whether innovative activities take place at firm *i* at time *t* or not. Innovation activities include both innovation input (R&D expenditure) and innovation output (product innovation and process innovation). Regarding innovation input, we use R&D expenditure information obtained from the question “How much was actually invested (million VND) in Research and development (R&D)?” With respect to product innovation, we use the information obtained from the question “Has the firm introduced new product groups since last survey?” and “Has the firm made any improvements of existing products since last survey?” For process innovation, information is gathered from the question “Has the firm introduced new production processes/new technology since last survey?”

Ownership concentration refers to the concentration of ownership, measured by the percentage of ownership of the largest owner/shareholder which is derived from the question “If the firm has multiple ownership, what is the ownership percentage of the largest owner/shareholder?” Our source of data, SME surveys by Central Institute for Economic Management (CIEM), covers mainly non-state domestic enterprises (including “Private, Partnership, Collective/Cooperative, Limited liability company, and Joint stock company without state capital”). The information about other types of ownership such as state-owned and foreign ownership is too limited for economic modeling, which leaves room for further research with a richer data set.

Control is the vector of firm characteristics including firm age, total employees, the network of an SME which represents its social capital and the government assistance for the SME (Coad *et al.*, 2016; Kasseeah, 2013; Santi and Santoleri, 2016). We also include the lagged log of real revenue from sales to account for the time lag of innovation in response to the growth of sales, and also as a way to partially explore the reverse causality from growth of sales to innovation. Finally, *Industry* is the sector dummies for each two-digit sector of the manufacturing industry that the SME belongs to (Kasseeah, 2013; Santi and Santoleri, 2016). Detailed definition and measurement of all variables are presented in Table A1.

In the proposed systems of equations, the coefficient β_{22} captures the impact of ownership concentration on corporate innovative performance, the coefficient β_{11} captures the contribution from innovative activities to corporate performance, and the coefficient β_{21} captures the reverse causality from performance to innovation; we account for the reverse causality of performance to innovation also as a means to control for possible endogeneity issue arising from potential reverse causality from performance to innovation.

In this study, we propose the adaption of CMP model (Roodman, 2011). The nature of the dependent variable *Innovation* is a binary one while the dependent variable *Performance* is continuous. Therefore, a model that can adapt the binary nature of the dependent variable and perform the estimation of a system of equations such as CMP model is preferred. The CMP framework is substantially that of seemingly unrelated regression (SUR), but with application in a larger scope. This approach is based on a “simulated maximum likelihood method” suggested by Geweke–Hajivassiliou–Keane algorithm. The advantage of CMP model is that it includes “Mixed process” which suggests that the types of dependent variables can vary in different equations, giving more flexibility in model specification. In particular, 2SLS, IV-Tobit, IV-probit, probit with Heckman selection, SUR, etc., and different combination of them are entirely feasibly estimated using the CMP model (Roodman, 2011). So, we specify the dependent variable *Performance* as continuous in Equation (1) and *Innovation* as a binary dependent variable in Equation (2) estimated by probit model. In Stata, we can use the user-written command CMP to estimate the CMP model.

3.2 Data

The study will explore the relationship among three agents including ownership feature, corporate innovation and firm performance during the period from 2011 to 2015 based on data from the small and medium enterprise (SME) survey conducted by CIEM of the Ministry of Planning and Investment (MPI) and other organizations in Vietnam in collaboration with University of Copenhagen and The United Nations University World Institute for Development Economics Research. This survey is conducted every two years from 2005. It is tempting to extend the time coverage of the sample; however, only from the year 2011 can we obtain detailed information about ownership concentration from the questionnaire. Therefore, we construct a panel only for the period from 2011 to 2015. Moreover, we construct a balanced panel of entirely manufacturing SMEs. In particular, only SMEs belonging to manufacturing sectors are included, and firms having data for all three waves of survey from 2011 to 2015 are selected.

Table AII presents the correlation matrix of main variables. We can find that there is no strong correlation among variables, which implies we can estimate the full model without much concern about the problem of multicollinearity.

4. Findings and discussion

Table I presents the summary statistics. Over the 2011–2015 period, there are nearly 44 percent of SMEs performed innovation activities including having R&D expenditure or introduction of new products/improvement of existing products or new production processes/new technology. The ratio indicates the dynamic of SMEs in their business to compete in an increasingly competitive market. The mean percentage of ownership of the largest owner/shareholder is approximately 59 percent, which reveals a relatively high level of concentration. A typical SME has an average of 16 years in business and the mean number of 15 employees. Only 8 percent of SMEs participates into at least one business association, which partially indicates the low degree of social capital. Moreover, only approximately 11 percent receive government assistance.

Table II shows the CMP estimation of the simultaneous relationship among ownership concentration, innovation and firm performance. There are three major findings.

First, the results indicate that there is no impact from ownership concentration to innovation, but it has a positive impact on sales growth. The findings are in line with previous studies by Choi *et al.* (2011, 2012) which also found that concentrated ownership does not play any role in affecting the management's decision to undertake innovation activities. The possible explanation may be that larger shareholders may have other concerns rather than firm innovation activities; they tend to focus on firm sales growth to gain instant benefit (shown by a significantly positive impact on sales growth).

Second, there is a positive impact of innovation on firm growth, indicated by the positively statistically significant coefficient of innovation variable in the sales growth regression.

Variables	Observations	Mean	SD	Min.	Max.
Sales growth (log)	5,052	13.698	1.613	8.155	22.836
Innovation	5,054	0.437	0.496	0	1
Ownership concentration	777	58.650	17.044	1	99
Firm age	5,054	16.006	9.585	2	61
Firm age (log)	5,054	2.608	0.591	0.693	4.111
Firm size	5,054	14.935	29.353	1	300
Firm size (log)	5,054	1.887	1.133	0	5.704
Network	5,054	0.083	0.277	0	1
Government assistance	5,054	0.112	0.316	0	1

Table I.
Summary statistics

The findings are consistent with the majority of previous studies such as Hall *et al.* (2009), Jefferson *et al.* (2006) and Kasseeah (2013). The results confirm the significant role of innovation as an engine of growth in the case of Vietnamese manufacturing SMEs. Innovation supports SMEs' efforts in diversification; as a result, they can enhance their competitiveness.

Third, there exists positively reverse causality from sales growth to innovation. The findings are consistent with previous studies by Choi *et al.* (2012), Chuluun *et al.* (2017) and Rogers (2004). The positive impact of lagged sales growth on innovation performance may suggest that firm growth would accumulate more resources for innovation activities to carry out because the nature of innovation is a kind of capital-intensive activity. To some extent, the above results support the argument of the vicious circle: SMEs with poor performance tend to have inadequate resources for innovation activities, which in turn leads to poor firm performance, and weak firm performance will lead to weak innovation in the future. SMEs getting stuck in the vicious circle results in less productive operation and poor competition in the market.

Regarding control variables, there are negative impacts of firm age and size on innovation performance, which means that smaller and younger SMEs have more innovation activities than older and larger ones. The findings indicate the activeness of smaller and younger SMEs. Compared to larger and older ones, newly established SMEs have the tendency to create new products to gain the market; moreover, these new start-ups often display more enthusiasm and commitment to carrying out innovation activities.

In the sales growth equation, firm size is found to be positively associated with firm sales growth, which indicates that bigger SMEs tend to growth faster. Vietnamese SMEs usually concentrate on traditional and long-time customers to do business with. Therefore, bigger enterprises have a large enough market to sustain better growth record compared to smaller ones which have to compete in a crowded market. The result may also imply that the economy of scale plays an important role in this setting; larger SMEs can reduce cost to gain the cost advantage when increasing output, which in turn helps raise sales growth. This finding is in line with previous studies by Santi and Santoleri (2016) in the case of Chilean firms or Kasseeah (2013) in the context of Mauritius.

Firm network and government assistance both contribute positively to innovation performance. Participation in a network can help SMEs access information and technology which helps enhance their innovation outcome. Furthermore, to carry out an innovation activity, within the situation of SMEs characterized by the lack of capital, technology and human resources, they need a lot of support from the government. This study shows that firms with any government assistance (financial, technical assistance or other types of government assistance) have more innovation activities than the unsupported ones.

Table II.
CMP estimation of the
simultaneous
relationship among
ownership
concentration,
innovation and firm
performance

Variables	Innovation	Sales growth (log)
Innovation		0.799*** (0.124)
Lagged Sales growth (log)	0.327*** (0.059)	
Ownership concentration	-0.004 (0.003)	0.010*** (0.002)
Firm age (log)	-0.258** (0.121)	0.012 (0.065)
Firm size (log)	-0.224*** (0.082)	1.013*** (0.035)
Network	0.388*** (0.145)	-0.054 (0.087)
Government assistance	0.720*** (0.159)	-0.140 (0.092)
Industry (dummies)	Yes	Yes
Cons.	-3.625*** (1.177)	10.900*** (0.703)
LR χ^2		799.14
Prob > χ^2		0.0000
Number of observations		776

Notes: Standard errors are in parentheses. *, **, ***Significant at 10, 5 and 1 percent, respectively

5. Conclusions and policy implications

By applying CMP method, this study examines the simultaneous relationship among ownership concentration, innovation and firm performance of the SMEs in Vietnam from 2011 to 2015. The findings indicate that: there is no impact of ownership concentration on innovation, but it has a positive impact on sales growth; innovation positively affects firm performance; and there exists a positively reverse causality from sales growth to innovation.

Given the empirical results and the Vietnam SME context, we propose that the government should support SMEs' innovation and manufacturing activities to enhance their performance and innovation outcome by focusing on solving the most severe constraints. In particular, SMEs should be given easier access to capital via loans with preferred interest or trust loans without collateral to improve technology and carry out more innovation activities. Moreover, to solve the problem of shortage of skilled labor force, there should be training programs for the labor force tailored for SMEs as well as training programs for SME leaders about management, quality and technology improvement programs at SMEs. Finally, the reduction of unnecessary administrative procedure should be the authority's priority in the set of measures to support SME development.

6. Limitation and further studies

In spite of our efforts to explore the simultaneous relationship among ownership concentration, innovation and firm performance of the SMEs in Vietnam, the study still has some limitations which are promising further research directions. First, the SME surveys by CIEM do not have much information about other types of ownership including state-owned and foreign ownership. Therefore, possible further studies with richer data sets may explore the impacts of different types of ownership on firm innovation and performance. Second, other types of innovation such as organizational innovation, marketing innovation can also be investigated in further studies in a richer data set for the case of Vietnam SMEs.

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Table AI.
Variable definitions
and summary
statistics

Appendix

Variables	Definitions
<i>Dependent variable</i>	
Sales growth (log)	Log of real revenue from sales (adjusted for inflation)
Innovation	Dummy variable, = 1 if the SME had R&D expenditure, or introduced new products/ made improvements of existing products, or introduced new production processes/new technology. The information is obtained from the following questions of the questionnaire: R&D expenditure: "How much was actually invested (million VND) in Research and development (R&D)" Product innovation: "Has the firm introduced new product groups since last survey? Answer: Yes (1), No (2)" "Has the firm made any improvements of existing products since last survey? Answer: Yes (1), No (2)" Process innovation: "Has the firm introduced new production processes/new technology since last survey? Answer: Yes (1), No (2)"
<i>Independent variables</i>	
Ownership concentration	Percentage of ownership of the largest owner/shareholder. The information is obtained from the following question of the questionnaire: "If the firm has multiple ownership, what is the ownership percentage of the largest owner/shareholder?"
Firm age (log)	Log of total years of the SME in operation
Firm size (log)	Log of total employees of the SME
Network	Dummy variable, = 1 if the SME participates into at least 1 business association
Government assistance	Dummy variable, = 1 if the SME receives any government assistance (financial, technical assistance, or other types of government assistance)
Industry	The sector dummies for each two-digit sector of the manufacturing industry that the SME belongs to

Table AII.
Correlation matrix

	Sales growth (log)	Innovation	Ownership concentration	Firm age (log)	Firm size (log)	Network	Government assistance
Sales growth (log)	1						
Innovation	0.171	1					
Ownership concentration	0.079	-0.013	1				
Firm age (log)	0.027	-0.069	-0.131	1			
Firm size (log)	0.749	0.132	-0.037	0.081	1		
Network	0.117	0.112	-0.042	0.112	0.157	1	
Government assistance	0.083	0.183	-0.047	0.029	0.106	0.111	1

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