

# Impact of Social Networks on Entrepreneurial Innovation and Business Performance in SMEs

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## Abstract

This study utilized the panel data of Small and Medium Enterprises Surveys (SMES: 2009-2015) and used the two-way fixed effects model to assess the relative association between social networks and entrepreneurial innovation and business performance in Vietnam. The results supported the hypotheses that social networks are positively associated with the likelihood of entrepreneurial innovation and business performance from the perspective of micro, small, and medium enterprises. A 1% increase in social networks was associated with an increase of 2.8 percentage points in incremental product innovation and 1.5 percentage points in process innovation. The more extensive social networks also helped enterprises perform their business better by increasing their real revenue, real profit, and rate of return on assets. In addition to contributing to the well documented literature of the role of social networks in entrepreneurial innovation and business performance, the novelty of the research was highlighting the relationship varied by ownership, organizational structure, and location. The local business association membership was also matter for entrepreneurial innovation and firm performance in the Vietnamese SMEs. The results were, therefore, informative for policymakers and SME entrepreneurs.

**JEL Classification:** O31, L25, L11.

## Keywords:

Social Networks;  
Entrepreneurial Innovation;  
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## 1- Introduction

Small and medium enterprises (SMEs) are primary engines of the structural transformation of the Vietnam economy [1]. In 2024, SMEs accounted for 98% of the total business enterprises, contributing more than 50% of the country's GDP and 55% of the total employment in the country. Despite having a crucial role in economic development, SMEs have faced many challenges that might prevent them from having profitable operations [2]. The SMEs are not only in the formal sector, many firms are household businesses, and own-account workers and micro-enterprises. These informal enterprises are facing more barriers to accessing government support and are slow to catch up with the market transformation [3–7]. One of the key factors that helps SMEs thrive in such conditions is social networks. Social networks played an important role in both formation and maintenance of business. Network resources stimulated entrepreneurship in the founding process while the entrepreneurs who received much supports from social networks were more successful in the process after founding [8]. The existing literature highlighted the positive association between social networks and business performance [9–13] and entrepreneurial innovation [8, 14]. Three different mechanisms were commonly identified as the social networks' functions. Social networks were, first, important channels

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for gaining access to information [14–16]. Information received from networking was often more useful and reliable than information received from formal sources [8]. Second, social networks gave access to customers and suppliers [17]. Finding enough customers and gaining insights into customer preferences determined the success of a new business. Social networks potentially broadened the financial basis of a firm [17–20]. Accessing finances helped SMEs perform better than those having certain issues accessing finances [21]. The existing literature also expressed that the role of social networks in entrepreneurial innovation and business performance depended on different factors. Due to the small scale of production, household firms were less likely to be considered as the sources of invention and innovation in the economy. It was risky and expensive for household firms to convert short-term revenues and profits to long-term investment through innovation [3, 6, 7]. Because of the scarce resources such as human capital, R&D, and professional management, micro-enterprises were less likely to allocate resources for innovation than big firms [4, 5].

In the context of Vietnam, very few papers investigated the association between social networks and business performance and entrepreneurial innovation. As an emerging country, social networks were not explicitly mentioned as a significant factor in explaining successful entrepreneurship in Vietnam [22, 23]. Within our knowledge, only five papers examined the association between social networks and entrepreneurial innovation and business performance. The existing studies supported the hypothesis that the social networks were positively associated with business performance [16, 22, 23], entrepreneurial innovation [16, 23], management environment [24], and export propensity [25]. However, most studies used a small sample collected in single year or a cross-sectional data of the SMEs survey to examine the relative association. In addition, it was crucial to generate a greater understanding of how business association affiliates diffuse entrepreneurial innovation and business performance through social networks [26, 27]. Examining the relationship between business association membership and entrepreneurial innovation and business performance was an alternative hole for this study. In order to provide insight into the research gaps, this study began building a theoretical framework of the direct relationship between social networks and entrepreneurial innovation and business performance. The model also included the role of business association membership in diffusing innovation and improving business performance. The empirical test involved the two-way fixed effects model and the 2009-2015 SMEs datasets on the observed variables that represented business performance, entrepreneurial innovation, social networks, business association affiliate status, and firms' characteristics among the small and medium enterprises in Vietnam.

Our paper, in particular, aimed to address three research questions: (i) *Are social networks associated with the entrepreneurial innovation of the manufacturing SMEs in Vietnam?* (ii) *Are social networks associated with the business performance of manufacturing SMEs in Vietnam?* (iii) *How are heterogeneous social networks associated with entrepreneurial innovation and business performance?*

Our study showed that social networks were significantly and positively associated with incremental innovation and process innovation. Social networks were also strongly associated with business market performance by increasing the business revenue, profitability, and rate of return on assets. The relationship between social networks and entrepreneurial innovation and business performance varied by ownership, firm location, and firm size. Our findings suggested that non-household, micro, and rural firms benefit more from their social networks. The study also provided evidence of the positive association between business associations membership and innovation diffusion.

This paper was expected to have two main contributions to the literature on social networks in Vietnam. Our study was the first one giving insight into the dynamic relationship between social networks and entrepreneurial innovation and business performance from the perspective of manufacturing SMEs in Vietnam. While the existing papers used one round of the SMEs survey or small sample collected in a specific region, this paper was ambitious in utilizing the SMEs unbalanced panel data (2009-2015). The longer timeline was expected to capture the dynamic relationship and comprehensive understanding how external resources contribute to business success. Furthermore, the study highlighted the role of business associations in promoting entrepreneurial innovation and business performance, which has not been investigated in the Vietnamese SMEs literature. The rest of the paper was organized as follows: section 2 provided a conceptual background, theoretical framework, and hypotheses; section 3 illustrated the data and identification strategy; section 4 presented the results and discussion; and section 5 concluded the paper.

## 2- Theoretical Background

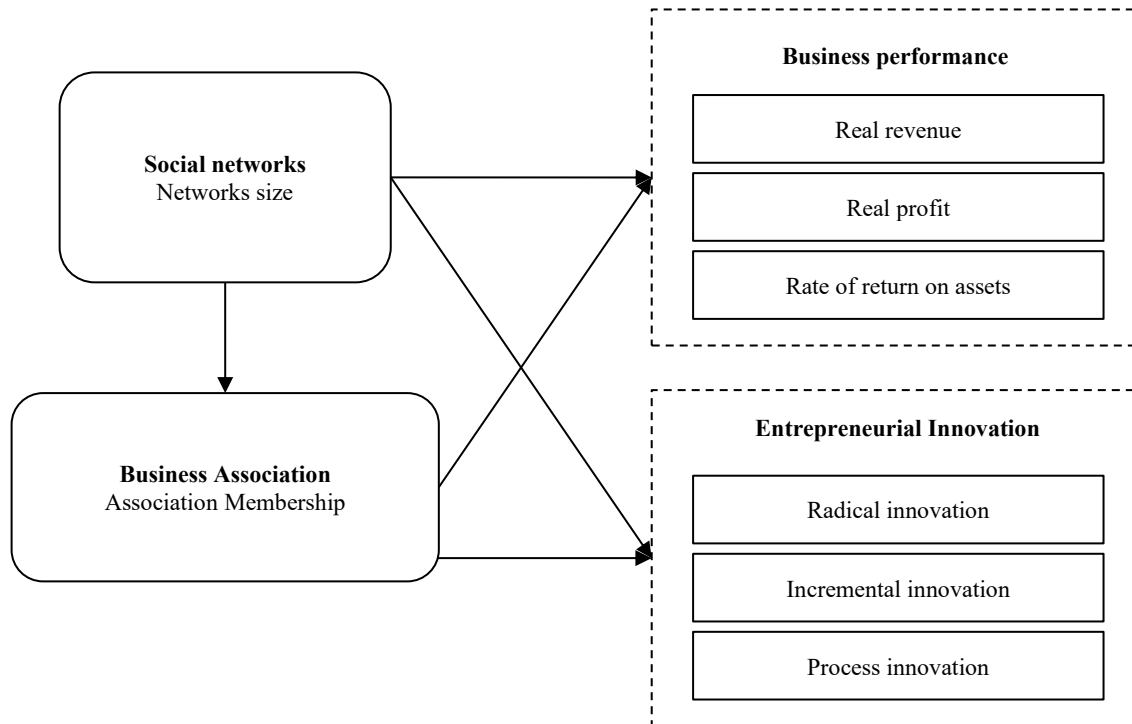
*Social networks:* Although social networks have attracted significant attention among scholars, the concept is still emerging, with different uses and connotations. Personal social networks are the aggregate of connections with other people [28]. Social networks were defined as knowledge-sharing communities through connecting with individuals of similar interests [29]. The complexity of social networks resulted from the various possible forms and types of interactions between individuals and groups [30].

*Social networks and entrepreneurial innovation:* Although innovation is a pervasive term, many organizations still find innovation elusive. Innovation was considered as a mindset, a process, and an outcome [31].\* In the context of entrepreneurial innovation, innovation included five different forms. These included a new good or a high-quality good

\* As a mindset, innovation fosters individual adoption of new ideas among members of the organization. As a process, innovation emphasizes innovative output, including product innovation, process innovation, and organizational innovation. As an outcome, innovation includes a new product development process and an overall innovation process.

introduction; a new production method introduction; the opening of a new market, regardless of market existence; the conquest of a new supply source of raw materials or half manufactured goods, regardless of the resource existence; and the carrying out of the new organization of any industry [32]. In Schumpeter's view, innovation was a function of entrepreneurs, and entrepreneurs needed to carry out innovation for development. The small firms that invested in innovation successfully would eventually become large enterprises.

Figure 1 presented the theoretical relationship model between social networks, business association membership, entrepreneurial innovation, and business performance. The size of social networks was measured by the number of networks that firms regularly contact. Entrepreneurial innovation was measured through radical, incremental, and process innovation. Business performance was measured through real revenue, real profit, and rate of return on assets.



**Figure 1. Theoretical model of the relationship between social networks, business association membership and entrepreneurial innovation, business performance**

Social networks could promote entrepreneurial innovation through three possible channels. First, social networks allowed firms to access a more comprehensive and reliable source of information at a lower cost. The networks reduced the transaction costs among the enterprises, as well as between firms and other actors - suppliers, customers, and political parties [33–36]. Second, social networks between firms and the other actors allowed firms to capture the development trends in technology, changes in customers and suppliers' preferences, and changes in economic structure, which were more effective for small firms and local enterprises [37–39]. Third, social networks facilitated the diffusion of ideas across individuals and firms. The diffusion of ideas could have a psychological effect on firms that might change their mindset on product innovation or technology adoption. Once firms recognized the importance of innovation, they might become more proactive and search for new opportunities to expand their business [23, 40, 41]. We, therefore, propose the hypothesis:

*H1: Social networks are positively associated with entrepreneurial innovation in SMEs.*

*Social networks and business performance:* Business performance was crucial for the effectiveness of firm management and served as the main provider of the firm's perceptual and organizational abilities. Due to the importance of business performance indicators, managers had to boost firm performance through new plans and procedures during the firm life cycle [42]. Although business performance had become a relevant concept in strategic management research, measuring business performance was critical for academic scholars and practicing managers [43]. There were countless ways to measure financial performance; in which, return on assets (ROA), profit margin, return on equity, and returns on sales were the most commonly used measurements [42].

Social networks played an essential role in supporting business performance. Enterprises that actively leveraged social networks often had a significant advantage [43–45]. Greater diversity and larger network size would increase the opportunity for collaborative exchange. In addition, stronger network relationships would increase micro-entrepreneurs motivation to engage in a collaborative exchange that would positively influence business performance [22, 24, 46].

Moreover, because of the actors' willingness to share information, social networks increased resource accessibility, which was expected to influence entrepreneurial success [24, 25, 47]. We, therefore, propose the hypothesis:

*H2: Social networks are positively associated with business performance in SMEs.*

*Social networks, business association membership and entrepreneurial innovation, business performance:*

Business associations were considered new information and diversified how they met membership demand [48]. Business membership was voluntary, and entrepreneurs would resign the organization when the membership cost outweighed the benefits [26, 27]. Theoretically, there were two general motives for the small and medium firms to become the business associations. First, companies could exert influence on political decision-making process by taking part in collective business associations. Firms primarily saw the association as presenting collective business interests. Second, companies may participate in business associations to improve their performance by utilizing the expertise and information offered [48]. Some business associations granted their members special status that could help them achieve specific benefits from association collective actions such as accredited trading standards, technical standards, customer guarantees, etc. These activities, in turn, helped members market to their customers and profitability [27, 49, 50]. Therefore, we propose the hypothesis:

*H3: SMEs who are members of business associations and have more extensive social networks are more likely to have better business performance outcomes.*

Small and medium firms generally needed more resources to pursue their innovation interests. The business association acted as a network platform for exchanging and integrating resources among the business members. Being a business association member enabled firms to access innovation infrastructures such as financial capital, scientific expertise, and updated technologies. Entrepreneurs affiliated with business associations innovated better than their unaffiliated counterparts [51–53]. We, therefore, propose the hypothesis:

*H4: SMEs that are members of business associations and have more extensive social networks are more likely to have better entrepreneurial innovation.*

### 3-Data and Identification Strategy

#### 3-1-Data

The Vietnam Small and Medium Enterprises Survey (SMES) carried out biennially between 2009 and 2015 was employed in this study. Each wave of the survey covered around 2,500 micro, small, and medium manufacturing firms in ten provinces of Vietnam, including Hanoi, Ha Tay, Hai Phong, Phu Tho, Nghe An, Quang Nam, Lam Dong, Khanh Hoa, Ho Chi Minh City, and Long An.\* Around half of the enterprises located in the main cities- Hanoi and Ho Chi Minh City, each of these cities accounted for a quarter of the sample. Around 13.65% of enterprises were in Nghe An, followed by 10.07% in Phu Tho. Appendix I provided detail definition of the essential variables in the paper.

#### 3-2-Identification strategy

In order to estimate the association between social networks and entrepreneurial innovation and business performance, we used the two-way fixed effects model. The estimation model was as follows:

$$Y_{ijt} = \beta_0 + \beta_1 \text{Socialnetworks}_{ijt} + \beta_2 \text{Socialnetworks}_{ijt} * \text{Membership}_{it} + \delta X_{ijt} + \alpha_i + \rho_j + \omega_t + \varepsilon_{ijt} \quad (1)$$

where  $Y_{ijt}$  are the outcomes of firm  $i$  in the industry  $j$  at year  $t$ . The outcomes are either entrepreneurial innovation or business performance.  $\text{SocialNetwork}_{ijt}$  is the number of social networks of firm  $i$  in industry  $j$  at year  $t$ ;  $\text{Membership}_{it}$  is the membership status of firm  $i$  at year  $t$ ;  $X_{ijt}$  are the control covariates of firm characteristics and owner characteristics of firm  $i$  in the industry  $j$  at year  $t$ ,  $\alpha_i$  are the firm fixed effects;  $\rho_j$  are the industry fixed effects, and  $\omega_t$  are the year fixed effects.  $\varepsilon_{ijt}$  is the error term. The robust standard errors are clustered at the district-by-year level to capture the heterogeneity and autocorrelation across districts and years.

### 4- Results and Discussion

#### 4-1-Descriptive Statistics

We used the median network size at 27 as a cut-off to compare the firm's characteristics, innovation, and business performance between large and small social network-sized firms. From Table 1, approximately 10,359 enterprises were in the pooled data (2009-2015), and 52% categorized into large social network-sized firms (LSF). Almost 64% of the small social network-sized firms (SSF) were owned by males. Only 8.82% of these firms were owned or managed by individuals completing college, university, or graduate education, which was considerably lower than the rate of 15.46%

\* <https://www.wider.unu.edu/database/viet-nam-sme-database>. Provinces were not selected randomly; the survey covered both the main urban cities and selected rural areas. The choice of rural provinces was driven by funding related issues.

in the SSF. Kinh owned 94.77% of the LSF, while this was only 91.9% among the SSF. 10.38% of the LSF were members of a business association, which was substantially higher than the rate of 6.22% in SSF. Large social network-sized firms were more likely to have internet access (39.91% vs. 27.55%). These firms were more likely to have a formal business license (78.38% vs. 70.43%) and be located in urban areas (47.28% vs. 39.88%). Large social network-sized firms were more likely to have export activity than the SSF (7.13% vs. 5.32%). Half of the LSF were household firms, which was considerably lower than the rate of 71.71% of the SSF. The large social networks-sized firms were more likely to be small and medium firms; only 66.81% of large social networks-sized firms were micro-firms, which was lower than the rate of 80.63% of the SSF.

One in ten SMEs was a member of business associations. Almost 21% of the owners of member SMEs completed college, university, or graduate education, which was higher than the rate of 11.5% of non-member SMEs. The owner of member SMEs was more likely to have experience as a waged employee than the owner of non-member SMEs (60% vs. 47%). Member SMEs were more likely to access the internet (66.9% vs. 30.9%) and have export activity (20.42% vs. 4.9%) than non-member counterparts. Almost 67% of non-member SMEs were household firms, and 77% of these firms were micro-firms.

**Table 1. Descriptive statistics**

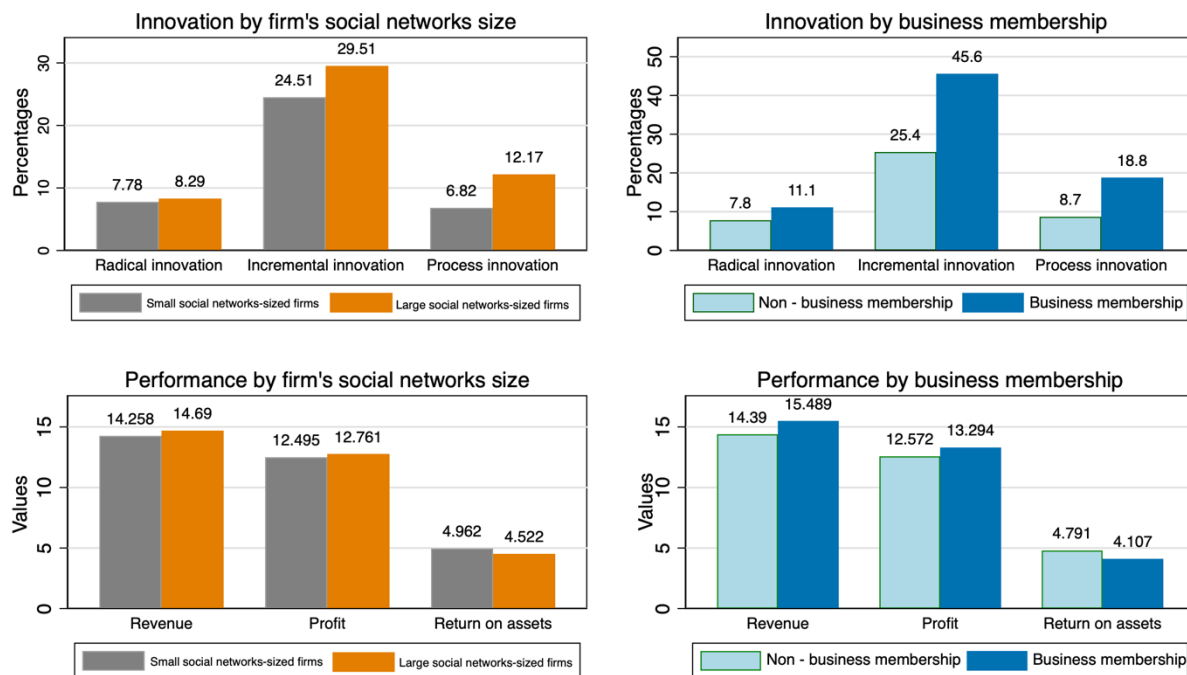
	Total	Large social networks-sized firms (LSF)	Small social networks-sized firms (SSF)	Business association membership	Business association non-membership
	N = 10,359	N = 5,357 (51.71%)	N = 5,002 (48.29%)	N = 867 (8.37)	N = 9,492 (91.63)
<i><b>Owner's characteristics</b></i>					
Male	6407 (61.85%)	3211 (59.94%)	3196 (63.89%)	523 (60.32%)	5,884 (61.99%)
Completing College/ University and graduate	1269 (12.25%)	828 (15.46%)	441 (8.82%)	179 (20.65%)	1,090 (11.48%)
Kinh	9674 (93.39%)	5077 (94.77%)	4597 (91.9%)	839 (96.77%)	8,835 (93.08%)
<i><b>Previous experience</b></i>					
As a waged employee	5028 (48.54%)	2704 (50.48%)	2324 (46.46%)	519 (59.86%)	4,509 (47.50%)
As a self-employed	2591 (25.01%)	1340 (25.01%)	1251 (25.01%)	179 (20.65%)	2,412 (25.41%)
As an own or collective farm	2740 (26.45%)	1313 (24.51%)	1427 (28.53%)	169 (19.49%)	2,571 (27.09%)
Age	49.6	49.43	49.78	51.19	49.45
<i><b>Firm's characteristics</b></i>					
Member of a business association	867 (8.37%)	556 (10.38%)	331 (6.22%)		
Internet access	3516 (33.94%)	2138 (39.91%)	1378 (27.55%)	580 (66.90%)	2,936 (30.93%)
Export	648 (6.26%)	382 (7.13%)	266 (5.32%)	177 (20.42%)	471 (4.96%)
Household firm	6607 (63.78%)	3020 (56.37%)	3587 (71.71%)	248 (28.60%)	6,359 (66.99%)
Firm has a formal business license	7722 (74.54%)	4199 (78.38%)	3523 (70.43%)	770 (88.81%)	6,952 (73.24%)
Firm has a land certificate	7673 (74.07%)	3778 (70.52%)	3895 (77.87%)	563 (64.94%)	7,110 (74.91%)
Firm is located in urban area	4528 (43.71%)	2533 (47.28%)	1995 (39.88%)	333 (38.41%)	4,195 (44.20%)
Firm is a micro-firm	7612 (73.48%)	3579 (66.81%)	4033 (80.63%)	322 (37.14%)	7,290 (76.80%)
Firm's age	26.01	25.61	26.45	26.58	25.96
Log of firm's size	2.02	2.19	1.83	2.95	1.94
Log of firm's asset	8.84	9.2	8.46	10.46	8.69

**Notes:** The table was summarized from the SMES 2009-2015. Large social network-sized firms included firms with 27 or above contacts; small social network-sized firms had under 27 contacts.

Figure 2 shows the distribution of entrepreneurial innovation and business performance by firm's social network size and business membership. On average, 8.04% of the SMEs had radical innovation activities, and 27.1% of firms had incremental innovation. Large social network-sized firms were more likely to invest in radical innovation (8.29% vs. 7.78%) and incremental innovation (29.51% vs. 24.51%) than the SSF. Large social network-sized firms were also more likely to introduce new technology in production than their counterparts (12.17% vs. 6.82%).

On average, member SMEs reported having better innovation activities and performance outcomes than their non-member counterparts. Around 11% of member SMEs had radical innovation, which was higher than the rate of 7.8% of non-member SMEs. The member SMEs were also more likely to have incremental innovation (45.56% vs. 25.41%) and process innovation (18.8% vs. 8.74%) than the non-member SMEs. The member SMEs also reported a higher logarithm value of real revenue (15.49 vs. 14.39) and higher logarithm value of real profit (13.29 vs. 12.57) than non-member firms.





**Notes:** Figures were summarized from the SMES 2009-2015. Large social network-sized firms (LSF) included firms with 27 or above contacts; small social network-sized firms (SSF) had under 27 contacts.

**Figure 2. Distribution of entrepreneurial innovation and business performance by firm's social network size and business membership**

## 4-2- Main Results

### 4-2-1- Relationship Between Social Networks and Entrepreneurial Innovation and Business Performance

The two-way fixed effects regression results from Table 2 indicated that social networks were positively associated with incremental and process innovations. Firms with larger social networks also had better business performance outcomes. In particular, a (1%) increase in social networks was associated with an increase in the probability of incremental innovation by 2.8 percentage points and an increase in the probability of process innovation by 1.5 percentage points. Regarding business performance, on average, a (1%) increase in social networks was associated with an increase of 19.8% in firms' real revenue, 14.2% in firms' real profit, and an increase of 5.2% in the rate of return on assets. Therefore, the hypotheses of H1 and H2 are supported. Consistent with the existing literature in Vietnam, our results highlighted the importance of social networks in driving organizational success. Through social networks, the business could leverage external knowledge and collaborate with external partners that might improve the existing products and process. Firms who had larger social networks were more likely to receive external supports, which, in turn, enhanced entrepreneurial innovation and business performance.

These findings suggested that while social networks were external, firms could optimize the benefits by integrating the resources into their strategic planning. This, in turn, enhanced firms' internal capabilities that encouraged entrepreneurial innovation and empowered business performance. In addition, our study revealed that through business associations, social networks diffused incremental and process innovation. Firms that were a member of business associations and had larger social networks had a higher chance of incremental innovation by 2.3 percentage points and process innovation by 1.4 percentage points. The H4 hypothesis is then supported in the study. There was no evidence of the correlation between the interaction of social networks and business association membership with business performance.\* Business associations were intermediates connecting firms to business experts, political parties, bankers, and suppliers [54]. By participating in business associations, firms were able to share resources for innovation, including patterns, advice, loans, and supplier or customer contacts [48]. Some business associations also helped SMEs membership establish a special status and access specific benefits such as accredited trading standards and technical standards. Establishing social networks and membership with business associations also comprised cooperation between firms that would enhance a firm's capabilities for innovation.

\* Appendix II summarized the test results of hypotheses.

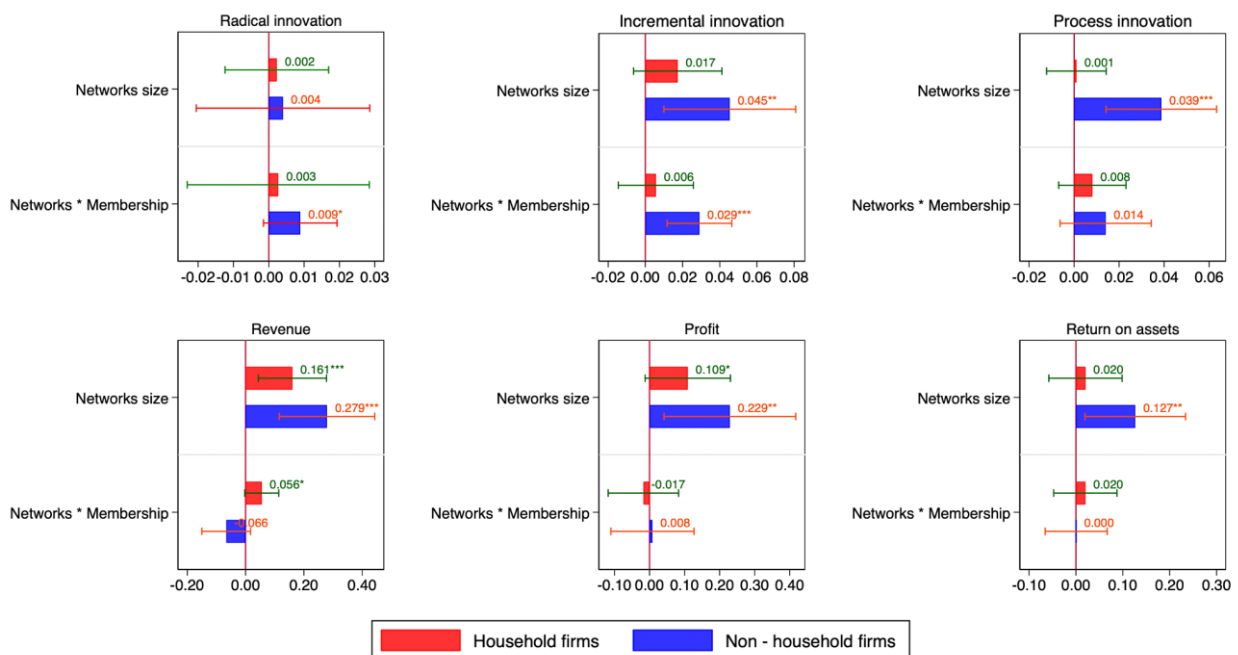
**Table 2. Relationship between social networks and entrepreneurial innovation, business performance**

	Radical innovation	Incremental innovation	Process innovation	Revenue	Profit	ROA
Total networks	0.003 (0.007)	0.028** (0.011)	0.015** (0.007)	0.198*** (0.047)	0.142*** (0.051)	0.052* (0.031)
Total networks * Business association membership	0.008 (0.005)	0.023*** (0.007)	0.014* (0.007)	-0.015 (0.029)	0.009 (0.043)	0.018 (0.026)
Internet access	0.014 (0.015)	0.052 (0.032)	0.021 (0.014)	-0.142 (0.128)	-0.080 (0.153)	-0.179** (0.081)
Constant	-1.883** (0.866)	-2.306 (1.494)	0.973* (0.581)	0.970 (5.380)	1.594 (5.551)	3.863 (4.769)
Observations	8,762	8,762	8,762	8,762	8,762	8,762
R-squared	0.444	0.463	0.393	0.767	0.692	0.887

**Notes:** Statistical significance level: \*10%, \*\*5%, \*\*\*1%. Each regression model controlled for firm and owner characteristics shown in Table 1. The regression also included year-fixed effects, industry-fixed effects, and firm-fixed effects. Robust standard errors were clustered at the district by year level and reported in parentheses.

#### 4-2-2- Heterogeneous Association Between Social Networks and Entrepreneurial Innovation and Business Performance

Our findings from Figure 3 showed that ownership characteristics matter to SMEs' innovation. The correlations between social networks and entrepreneurial innovation and business performance were found among non-household firms, whereas social networks only increased the revenue of household firms. In particular, a 1% increase in social networks was associated with an increase in the probability of incremental innovation by 4.5 percentage points and an increase in the probability of process innovation by 3.9 percentage points. Our results also showed that a 1% increase in social networks was associated with an increase of 27.9% in revenue, an increase of 22.9% in profit, and an increase of 12.7% in the rate of return on assets among non-household firms. Non-household members were more likely to invest in radical innovation. Social networks provided a low-cost way for non-household firms to build and maintain their brand presence. Through social networks, the firms could engage with customers directly. This could shape public perception, promote products, and build loyalty. Non-household firms could also use social networks to connect with potential business partners, suppliers, and investors that allowed businesses to expand their operations, collaborate, and innovate more quickly than they might otherwise be able to. In addition, social networks allowed non-household firms to gather feedback from customers, conduct surveys, or even see how their competitors were interacting with the market.



**Notes:** Statistical significance level: \*10%, \*\*5%, \*\*\*1%. Each regression model controlled for firm and owner characteristics shown in Table 1. The regression also included year-fixed effects, industry-fixed effects, and firm-fixed effects. Robust standard errors were clustered at the district by year level and reported in parentheses.

**Figure 3. Heterogeneous association between social networks and entrepreneurial innovation and business performance by firm ownership**

Figures A1 and A2 in Appendix II show the heterogeneous association between social networks and entrepreneurial innovation and business performance by location and firm size. By location, social networks had a significant and positive association with business performance among SMEs in urban areas. In contrast, social networks were more beneficial for rural SMEs' innovation and market performance. Because of geographical remoteness, rural SMEs often had a limited local base of resources. Social networks provided a powerful set of tools for rural firms to overcome geographical limitations, build relationships, and access valuable resources. First, social networks helped rural SMEs reach customers beyond their immediate geographic area and expand their potential market significantly. In addition, personal connections were traditionally highly valued in rural areas. Social networks allowed SMEs to empower business performance by building and maintaining relationships with their customers. Social networks also facilitated connections with suppliers, distributors, and other business partners who may be located far away, which was crucial for accessing necessary resources for innovation.

By size, social networks were positively associated with entrepreneurial innovation and performance in both micro-enterprises and small and medium enterprises. A larger association was found among the small and medium companies. Interestingly, social networks were positively associated with radical innovation in small and medium enterprises when they were a business association member. Business associations often provided insights into industry trends, emerging technologies, and best practices. The small and medium enterprises often had more advantages in internal resources than the micro-enterprises. Being affiliated with the business association, SMEs could catch up reliable information that helped businesses identify opportunities for innovation and stay ahead of the curve.

#### 4-3-Sensitivity Checks

We did two sensitivity checks by using the total contacts and the number of assistance times as the proxies of social networks. Total contacts were measured by the number of contacts among firms' social networks that had been connected in the past year. Firms were asked, "*Which is the number of contacts of your firm?*"\* The number of assistance times were measured by the question, "*How many times last year did the social networks assist in issues related to the operation of the firms?*" We used the logarithm transformation to normalize the values.

Table 3 showed strong correlations between total contacts and entrepreneurial innovation and business performance. In particular, a 1% increase in total regular contacts was associated with an increase in the probability of incremental innovation by 2.1 percentage points and an increase in the probability of process innovation by 1.1 percentage points. A 1% increase in total regular contacts was also associated with an increase of 16.7% in revenue and 14.5% in profit. The number of contacts was more beneficial to innovation activities among members of business associations. Member SMEs were more likely to improve their existing products by 2.1 percentage points and innovate the technology by 1.4 percentage points than non-member counterparts. We only found a small association between the number of assistance times and profit, but the assistance frequency reduced the likelihood of firms' radical innovation. The frequency of assistance times could reduce transaction and marketing costs, which helped firms reduce expenses and save time in their business contracts. However, the assistance from social networks could make firms less competitive and lose their innovative motivation for introducing new products.

**Table 3. Relationship between total contacts and the number of network assistance times and entrepreneurial innovation and business performance**

	Radial innovation	Incremental innovation	Process innovation	Revenue	Profit	ROA
<b>Number of contacts</b>						
Total contacts	-0.003 (0.007)	0.021** (0.010)	0.011* (0.006)	0.167*** (0.048)	0.145*** (0.051)	0.049 (0.033)
Total contacts* Business member	0.008 (0.005)	0.021*** (0.007)	0.014** (0.007)	-0.009 (0.028)	0.014 (0.040)	0.018 (0.025)
Adjusted R-squared	0.444	0.462	0.393	0.767	0.692	0.887
Observations	8,762	8,762	8,762	8,762	8,762	8,762
<b>Number of network assistance times</b>						
Total assistance times	-0.007** (0.003)	-0.002 (0.007)	0.002 (0.004)	0.022 (0.026)	0.054** (0.026)	0.019 (0.017)
Total of assistance times* Business member	0.003 (0.004)	0.010 (0.007)	0.009* (0.005)	-0.015 (0.024)	-0.008 (0.033)	0.007 (0.020)
Adjusted R-squared	0.445	0.461	0.392	0.766	0.691	0.887
Observations	8,762	8,762	8,762	8,762	8,762	8,762

*Notes:* Statistical significance level: \*10%, \*\*5%, \*\*\*1%. Each regression model controlled for firm and owner characteristics shown in Table 1. The regression also included year-fixed effects, industry-fixed effects, and firm-fixed effects. Robust standard errors were clustered at the district by year level and reported in parentheses.

\* The contacts could be either suppliers, customers, debtors, or creditors of the firms.



## 5- Conclusion

The study provided a theoretical model and empirical analysis of the critical association between network size and entrepreneurial innovation and business performance. In particular, findings from the pooled SMES panel data (2009-2015) and the two-way fixed effects model supported the hypotheses that social networks were positively associated with the likelihood of innovation and business performance of SMEs in Vietnam. Moreover, our study was the first one expressing the role of business association membership in promoting entrepreneurial innovation and business performance in Vietnam. The results were robust under different sensitivity checks. In addition, the relative association between social networks and entrepreneurial innovation and business performance varied by ownership, firm size, and location.

Although our study contributed to the rare literature on the importance of social networks in entrepreneurial innovation and business performance among SMEs in Vietnam, the study inevitably had limitations. First, this study only examined a single country; the findings' generalizability was minimal, given that each country's SMEs and social networks had unique characteristics. Cross-country studies were, therefore, needed in developing economies to evaluate the association between business performance, entrepreneurial innovation, and social networks. Second, due to the data limitation, the study could not observe the effect of social network characteristics such as degree of centrality, betweenness of social networks, strength of ties, and closeness of social networks on SMEs. Further study could examine how social network ties or connections to different parties could affect firm performance. Third, because of the time frame availability, our study only observed the dynamic social network associations from 2009 to 2015. The result might be differentiated at different periods. In particular, the COVID-19 pandemic might bring different perspectives on social networks to the SMEs. Despite the limitations, our study still provided important insights into the widely recognized yet little-researched association between social networks and entrepreneurial innovation and business performance in the context of Vietnam. Based on the results, practical implications for managers are drawn.

## 6- Declarations

### 6-1-Author Contributions

Conceptualization, B.L. and N.T.N.; methodology, B.L.; investigation, N.T.N.; resources, N.T.N.; data curation, B.L.; writing—original draft preparation, B.L.; writing—review and editing, B.L. and N.T.N.; visualization, B.L. All authors have read and agreed to the published version of the manuscript.

### 6-2-Data Availability Statement

The data presented in this study are available on request from the corresponding author.

### 6-3-Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

### 6-4-Institutional Review Board Statement

Not applicable.

### 6-5-Informed Consent Statement

Not applicable.

### 6-6-Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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## Appendix I: Formal Definition of the Essential Variables in This Paper

Our variables were divided into four essential categories: entrepreneurial innovation and business performance, social networks, managers' or owners' characteristics, and firms' characteristics.

### • *The entrepreneurial innovation and business performance outcomes*

We defined innovation activities in the firm measured by three different variables: radical innovation, incremental innovation, and process innovation.

*Radical innovation* refers to introducing a new product to the market, measured by the question, “*Has the firm introduced new product groups since the last survey?*” The variable was dichotomized into radical innovation corresponding to “Yes” and non-radical innovation corresponding to “No.”

*Incremental innovation* refers to the improvement of the existing products, measured by the question, “*Has the firm made any improvements to existing products or changed specifications since the last survey?*” The variable was dichotomized into incremental innovation corresponding to “Yes” and non-incremental innovation corresponding to “No.”

*Process innovation* refers to applying a new product process or technology, measured by the question, “*Has the firm introduced new production processes/ new technology since the last survey?*” The variable was dichotomized into process innovation corresponding to the answer “Yes,” and non-process innovation, corresponding to the answer “No.”

*The business performance outcomes* were defined by real revenue, real profit, and rate of return on assets or a ratio between before-tax profit over total asset (ROA). We used the logarithm transformation to normalize the variables.

### • *Social networks variables*

*Network size:* The variable was measured by the number of networks the firms regularly contact, including businesses in the same sector, businesses in different sectors, bank officials, politicians, and civil servants. For each type of network, the firm was asked, “*How many people do you currently have regular contact with?*” We used the logarithm transformation to normalize the variable.

*Member of business association:* The firm was asked whether they were participating in the business association by asking, “*Is your firm a member of one or more business associations?*” The variable was dichotomized into member “Yes” and non-member “No.”

### • *Owner or manager's characteristics*

*Age* was a continuous variable.

*Gender* was dichotomized into male and female.

*Education* was measured by the question, “*What was the highest professional education completed by the owner/ manager?*” The variable was dichotomized into higher education (College/ University and higher) and non-higher education.

*Race* was dichotomized into Kinh and non-Kinh (Hoa ethnicity/ Other).

*Previous working experience* was measured by the question, “*What is the previous main work status?*” The variable was categorized into self-employment (Self-employed in manufacturing construction/ Self-employed in trade/services), waged - employment (Wage employee in state enterprise/ Wage employee in non-state enterprise), and other (Own or collective farm/ Other).

### • *Firm's characteristics*

*Export* was measured by the question, “*Does your enterprise export (directly or indirectly)?*” The variable was dichotomized into export “Yes” and non-export “No.”

*Internet access:* The firm was asked, “*Does the firm have internet access?*” The variable was dichotomized into internet access “Yes” and non-internet access “No.”

*Household firm* was measured by the question, “*What is the form of ownership/legal status?*” The variable was dichotomized into household firms (Household establishment/ business) and non-household firms (Private/ Partnership/ Collective - Cooperative/ Limited liability company/ Joint stock company with state capital/ Joint stock company without state capital/ Joint venture with foreign capital/ State enterprise (central/ local)).

*The firm with a formal business license* was measured by the question, “*Was the firm formally registered when it began operations?*” The variable was dichotomized into having a formal business license “Yes” and not having a formal business license “No.”



*The firm has a land certificate, which* was measured by the question, “*Is the land housing the main production facility of the enterprise owned or rented?*” The variable was dichotomized into having a land certificate (the Enterprise owner has a Certificate of Land Use Right, either purchased or inherited) and not having a land certificate (the Enterprise owner has an informal arrangement to use the land/ Rented - Leased/ Other).

*Urban* was measured by the firm’s city address and dichotomized into urban (Ha Noi/ Hai Phong/ Ho Chi Minh City) and rural (other provinces: Ha Tay/ Long An/ Phu Tho/ Quang Nam/ Nghe An/ Khanh Hoa/ Lam Dong).

*Micro-firms* were measured by the industry and total revenue. If a firm is in agriculture, forestry, and fishing, or industry and construction and total revenue is under VND 3 billion, or a firm in trade and services and total revenue is under VND 10 billion.\*

*The firm’s age* was measured by the question, “*When did the firm start to operate as the current firm?*”

*The firm’s size* was measured by the question, “*What is the total workforce?*”

*A firm’s assets* were measured by the question “*What are the total assets (million VND)?*” including total physical and financial assets. We used the logarithm transformation to normalize the variables of the firm’s size and assets.

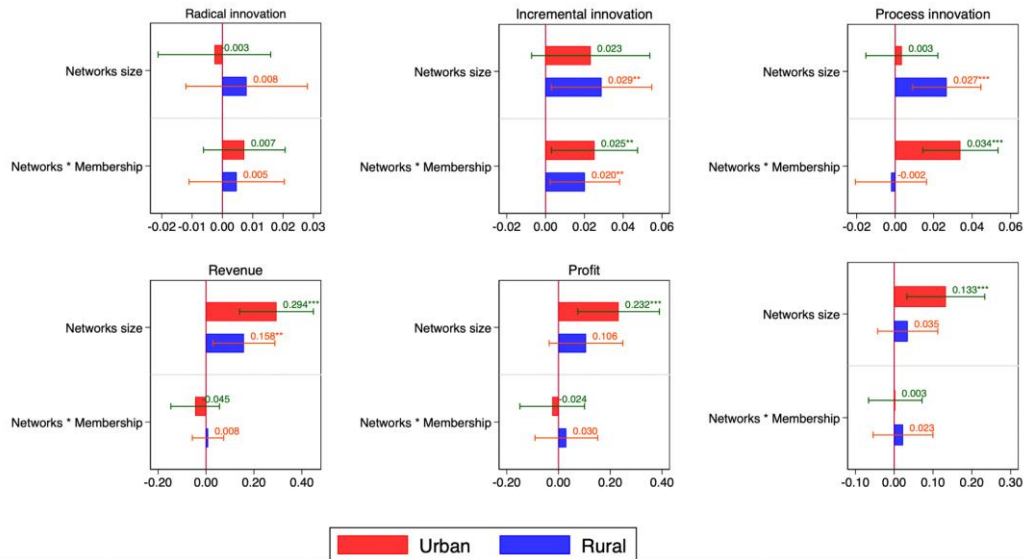
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\* Decree 39/2018/ND-CP on Detailed Guidance on Implementation of the SME Support Law.  
<https://drive.google.com/file/d/1pOaI7FrkZVrKJ4KbKp7mZJaReka1OdsR/view>

## Appendix II

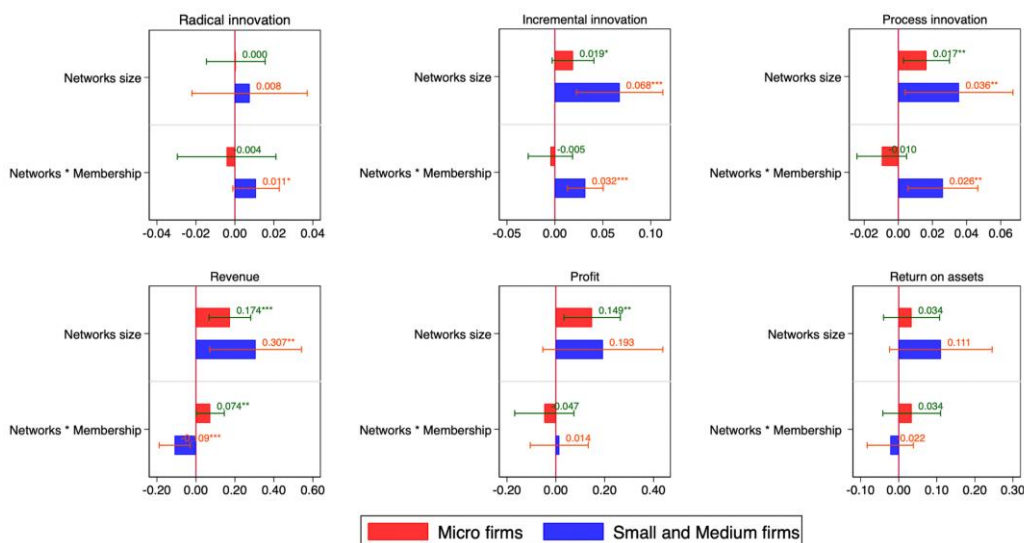
Table A1. Summary of Test Results by Hypothesis

Hypotheses	Content	Results
H1	Social networks are positively associated with entrepreneurial innovation in SMEs.	Supported
H2	Social networks are positively associated with business performance in SMEs.	Supported
H3	SMEs who are members of business associations and have more extensive social networks are more likely to have better business performance outcomes.	Not Supported
H4	SMEs who are members of business associations and have more extensive social networks are more likely to have better entrepreneurial innovation.	Supported



**Notes:** Statistical significance level: \*10%, \*\*5%, \*\*\*1%. Each regression model controlled for firm and owner characteristics shown in Table 1. The regression also included year-fixed effects, industry-fixed effects, and firm-fixed effects. Robust standard errors were clustered at the district by year level and reported in parentheses. A 1% increase in social networks was associated with an increase of 29.4% in firms' revenue, an increase of 23.2% in profit, and an increase of 13.3% in the rate of return on assets among urban SMEs. On the other hand, a 1% increase in social networks was associated with an increase of 2.9 percentage points in the probability of incremental innovation and an increase of 2.7 percentage points in the likelihood of process innovation among rural SMEs.

Figure A1. Heterogeneous association between social networks and entrepreneurial innovation and business performance by location



**Notes:** Statistical significance level: \*10%, \*\*5%, \*\*\*1%. Each regression model controlled for firm and owner characteristics shown in Table 1. The regression also included year-fixed effects, industry-fixed effects, and firm-fixed effects. Robust standard errors were clustered at the district by year level and reported in parentheses. Compared to non-member SMEs, a 1% increase in social networks was associated with an increase of 1.1 percentage points in the probability of radical innovation and an increase of 3.2 percentage points in the probability of incremental innovation among the member SMEs.

Figure A2. Heterogeneous association between social networks and entrepreneurial innovation and business performance by firm size