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Research Paper

An Empirical Study on the Relationship between the Network and Firm Performance: Experience from Small and Medium-sized Firms in Vietnam

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ABSTRACT: *The existence of the network is very common in enterprises. Almost every enterprise has networks of different connections, including small and medium-sized enterprises (SMEs) in transition economies. In the past, most of the researches on the relationship between network and firm performance are based on the experience of developed economies, while the empirical researches on transition economies are relatively lacking. Thereby, this study employs the data of Vietnamese SMEs in 2013 to test the impact of network size on firm performance. The network data covers six aspects, including within-sector-network, across-sector-network, network with bank officials, network with politics and civil servants, other network and overall network. Finally, the research results indicate that in the SME networks, only the network scale with business people in other sectors has a statistically significant negative correlation with the profit margin of SMEs, and other networks have no effect on firm performance.*
KEYWORDS: *SMEs, Network, Firm Performance, Vietnam*

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I. INTRODUCTION

Economic reforms were widely implemented by the Vietnamese government throughout the country in 1986, providing small and medium-sized enterprises with a vigorous and active system and business environment. Since then, Vietnamese start-ups and SMEs have become an indispensable and important part of Vietnam's national economy. As of the end of 2019, SMEs accounted for 98% of the total number of enterprises in Vietnam, contributing 40% of Vietnam's GDP. In addition, in 2019, the contribution of Vietnamese SMEs to the national export amount reached 246.2 billion US dollars, accounting for 93.4% of the total export volume of Vietnam. It is undeniable that the small and medium-sized enterprises in Vietnam have made outstanding contributions to the rapid growth of Vietnam's economy. It is precisely because SMEs have this huge potential and space for accumulated capital to grow. Gradually, the development and growth of SMEs has become an important consideration factor for academics and investors to be interested in a representative emerging economy such as Vietnam.

At the same time, individuals and organizations living in the digital age are inseparable from private and external communication. The network is often seemed as a comprehensive platform that can provide collaboration, sharing, and interactive communication (Uzzi, 1996). A large network usually means that there are tangible or potential resources available for use, so the network is also regarded as an important asset and competitive advantage (Dyer&Singh, 1998). In daily life, people use the relationship network around them to complete transactions and keep warm communication activities, so as to expand the existing social circle and scope. Similarly, entrepreneurs are eager to obtain timely information, limited resources and key contacts from a wide range of social communication networks to help their business develop smoothly and achieve success, and thus obtain good profits and returns, which is their main goal of maintaining relationships and implementing long-term communication with many subjects, this is especially true for founders of SMEs or start-ups.

To this end, the main contribution of this research is to explore the value and role of multiple networks in transitional economic organizations by sketching out the specific network types and scales of Vietnamese SMEs. Specifically, the goal of this study is to better understand the use of specific social networks of SMEs and their contribution to the organization from the impact of the business environment, political and economic environment, and local ecosystems of emerging economies, and based on this, we will further test the extent to which the network of Vietnamese SMEs has a relationship with the performance of firms, so as to propose corresponding improved network strategies.

II. LITERATURE REVIEW

Understanding the network structure of enterprises and their interpretation of organizational phenomena has become the main field of interest in strategic research in recent decades and has become more and more popular(Cook, 1977; Gulati R, Nohria N, Zaheer A, 2000; Borgatti, Halgin, 2011). This has led to the formation of network theory, which advocates that the network relationship of organizational activities has an impact or has an explanatory effect on firm's results. Moreover, network theory provides another analytical perspective for organizational collaboration, communication ties, and performance.

However, the network effect and mechanism of firm performance are mixed. On the one hand, some studies reveal the positive contribution of network to firm performance. Starting from the company's cost data, Liu et al.(2021) provides evidence for the positive correlation between the company's social network maintenance cost and enterprise performance. Gronum et al.(2012) found in the data of SMEs that by promoting innovation, the network can have a positive impact on corporate performance. In addition, social networks have been proved that it is helpful for companies to expand their production scale, and bank-related links can provide firms with opportunities for financial financing capital, which is conducive to the growth of corporate finance (Le et al.,2013).

Meanwhile, under the premise of some specific industry fields or scenarios, inconsistent conclusions may result. Yang et al.(2018) has carried out a study in the field of venture capital and revealed that efficient social networks have significantly weakened the return performance of venture capital companies. In the context of nascent enterprises, it has been proved that when the business growth and capital return of such companies reach a certain degree, they will not increase synchronously due to the expansion of the network scale, but decrease, and it is meaningless to expand the network scale(Semrau&Werner, 2014). Yan and Chang's research(2018) further strengthened this claim, due to the independence of government agencies, political relations will harm the interests of enterprises. The same argument is that multiple network partnerships increase the company's operating costs, leading to management inefficiencies and negative economic performance(Goerzen,2007). Another result is that, Watson's empirical study(2007) proves that the network has no effect or influence on company performance as far as return on assets.

In the research on SMEs in transition economies and emerging economies, most of the results point to the positive impact of social networks on improving the performance of SMEs. First, the large network is regarded as an important source of resources for SMEs in emerging economies(Khayesi, George & Antonakis, 2014). Second, social networks in the form of relationships have been proved to have a positive intermediary role in the internationalization of China's transitional economy and corporate financial performance(Zhou et al., 2007). A study of Vietnamese SMEs in 2017 showed that the company's internal and external interactions (including the company's internal departments, political officials, etc.) have a positive performance effect(Pham, Runst & Bizer, 2017). Moreover, the experience of SMEs in Indonesia has also found that social capital networks rely on trust as a mediator to contribute to the company's good performance(Pratono, 2018). Similarly, the results of empirical research on India show that the scale of business networks contributes to development of performance in a firm(Aniruddha et al., 2018).

In general, most of the existing studies have shown the relationship between corporate social networks and corporate performance. The significance or relevance of these relationships depends on the industry selected in the research or the research objects of the social network, and the positive or negative effects are mostly different according to the variables or applicable scenarios. Previously, most anteceding studies only conducted surveys of large companies in developed economies. For emerging markets like Vietnam, empirical research on the scale of embedded social networks from inside to outside and the performance of SMEs is surprisingly limited, especially the multiple network relationship closely related to SMEs, For example, the management network within the company, the external partnership, political ties, etc., these specific network sizes are often ignored, but it has unparalleled importance in the overall network (Lechner et al., 2006). Therefore, this study aims to integrate the data of Vietnamese SMEs in 2013, from the perspective of social network theory, propose cross-environmental specific issues, and conduct empirical analysis on the relationship between the multiple network types size of Vietnamese SMEs and corporate performance, our research helps to fill the existing literature.

III. HYPOTHESES

Most of the existing literature indicates that the network of relationships surrounding corporate management and production activities affects the company's output and performance to varying degrees. And there is considerable evidence that this kind of social network based on the exchange of commercial interests is a catalyst for improving the performance of SMEs, and its benefits are outperform the disadvantages of the company's commercial network. Therefore, this study proposes the following hypotheses:

H1: The existence and size of overall social network have a positive effect on SMEs firm performance.

H2: There is a positive relationship between the existence and size of network with business people in the same sector and SMEs firm performance.

H3: There is a positive relationship between the existence and size of network with business people in other sectors and SMEs firm performance.

H4: There is a positive relationship between the existence and size of network with bank officials and SMEs firm performance.

H5: There is a positive relationship between the existence and size of network with politicians and civil servants and SMEs firm performance.

H6: There is a positive relationship between the existence and size of other network and SMEs firm performance.

IV. RESEARCH DESIGN

4.1 Sample

The sample comprised 290 SMEs in various sectors located in Vietnam, gathering information on network size inculding network with business people within the same sector, network with business people in other sectors, network with bank officials, network with politicians and civil servants, other networks, overall network and SMEs firm performance.

4.2 Independent variable

The independent variable of this paper is network. Corporate network is divided into six aspects: network with business people within same sector, network with business people in other sectors, network with bank officials, network with politicians and civil servants, others network and also overall corporate network. The number of people in each network is taken as the scale of each specific network.

4.3 Dependent variable

The dependent variable in this article is corporate performance. There are currently some methods to measure corporate performance, including accounting performance indicators such as Tobin's Q, market performance indicators such as return on assets, and content analysis indicators such as analytic hierarchy process. This study mainly adopts two typical financial indicators, profit margin and return on assets, as variables to measure corporate performance.

Profit margin refers to the degree to which a company or business activity makes money, and it represents the percentage of sales converted into profits. The data is in ratio scale.

Return on assets (ROA) refers to a measure of how much profit a company can generate from its total assets. The data is in ratio scale.

All variables in this paper are summarized in the table below.

Table 1 Variable summary

Variable types	Variable name
Independent variable	Network with business people within same sector
	Network with business people in other sectors
	Network with bank officials
	Network with politicians and civil servants
	Others network
	Overall corporate network
Dependent variable	Profit margin
	ROA

V. RESULTS OF SURVEY

This article uses SPSS to perform descriptive analysis, correlation analysis and regression analysis on the samples accordingly. Descriptive analysis aims to analyze the characteristics of variables, starting with a systematic statistical analysis of the state of networks and corporate performance, the average, median, minimum, maximum and standard deviation, etc., of each variable are obtained to summarize the overall characteristics and status of the samples. Secondly, Pearson correlation test is carried out to establish regression relationship among all variables and analyze the degree of correlation between variables. Finally, the regression analysis is used to test the relationship between network and firm performance.

First of all, the collected data of Vietnamese SMEs in 2013 are cleaned up. The title format of the original data is not standardized, and there are spaces, which do not meet the requirements of SPSS data analysis. Therefore, the first thing is to merge the original title of the data in the same row to form the column title. After data collation, it is concluded that these enterprises are from 16 different industries. Secondly, all variables were analyzed by SPSS, and the results are shown in the table below.

Table 2 Descriptive statistics of Variables

variable	N	Mean	Med	Std.	Min	Max	25Per	75Per
Business people within same sector	290	6.60	5.00	5.84	0	40	3	10
Business people in other sectors	290	18.30	15.00	13.54	0	100	8	26
Bank officials	290	1.13	1.00	1.57	0	10	0	2
Politicians and civil servants	290	1.51	1.00	1.83	0	16	0	2
Others network	290	4.97	2.00	8.67	0	70	0	7
Total network	290	32.51	28.00	20.31	0	135	18	43
Profit margin	290	0.21	0.20	0.10	0.01	0.6	0.14	0.27
Return on Assets	290	0.16	0.10	0.22	-0.09	2.43	0.05	0.18

As shown in the table above, on average, among Vietnamese SMEs' networks, the network with business personnel in other sectors is the largest (18.30), followed by the network with business personnel within the same sector is 6.60. The size of bank officials and political networks is quite limited, with an average of 1.13 and 1.51 people respectively. In general, the overall network size of a Vietnamese SME has to maintain contact with 32.51 people on average. The descriptive statistics of the two variables, profit margin and ROA, are mostly positive, indicating that Vietnamese SMEs have certain profitability.

5.1 Correlation analysis and regression analysis of each variable and profit margin

We use correlation analysis and regression analysis to test the relationship between the existence and size of corporate network size and profit margin, and the results are shown in the figure below.

Table 3 Effects of network size variables on profit margin

variable	Correlations	Profit margin	Business people within same sector	Business people in other sectors	Bank officials	Politicians and civil servants	Others network	Total network
Profit margin	Pearson Correlation							
	Sig.							
Business people within same sector	Pearson Correlation	0.059						
	Sig.	0.315						
Business people in other sectors	Pearson Correlation	-.248**	0.107					
	Sig.	0	0.069					
Bank officials	Pearson Correlation	-.125*	.280**	.213**				
	Sig.	0.034	0	0				
Politicians and civil servants	Pearson Correlation	-0.059	.351**	.183**	.353**			
	Sig.	0.316	0	0.002	0			
Others network	Pearson Correlation	-0.06	0.103	.168**	.156**	.323**		
	Sig.	0.305	0.081	0.004	0.008	0		
Total network	Pearson Correlation	-.189**	.456**	.802**	.399**	.478**	.610**	
	Sig.	0.001	0	0	0	0	0	

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

As shown in the table above, due to the correlation coefficient of network with business people within same sector is 0.059, and the P value=0.315>0.05, there is no statistical correlation between network with

business people within same sector and profit margin. Similarly, the P value of network with politicians and civil servants and others network>0.05, there is no correlation between them and profit margin. The P value of network with bank officials is 0.034 less than 0.05, indicating that there is a significant negative correlation between profit margin and network with bank officials. Finally, network with business people in other sectors and overall network are significantly correlated with profit margin at the level of 0.01, which indicates that there is a significant negative correlation between profit margin and network with business people in other sectors and overall network.

Table 4 Regression analysis

Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.263a	0.069	0.059	0.09402	1.828

a Predictors: (Constant), total network, bank officials network, network of business people in other sectors
b Dependent Variable: Profit margin

Table 5 Regression analysis

ANOVAa

Model		Sum of Square	df	Mean Square	F	Sig.
1	Regression	0.188	3	0.063	7.081	.000b
	Residual	2.528	286	0.009		
	Total	2.716	289			

a Dependent Variable: Profit margin
b Predictors: (Constant), total network, bank officials network, network of business people in other sectors

Table 6 Regression analysis

Coefficientsa

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
1	(Constant)	0.241	0.01		23.038	0		
	Business people in other sectors	-0.002	0.001	-0.299	-3.065	0.002	0.343	2.917
	Bank officials	-0.006	0.004	-0.097	-1.525	0.128	0.809	1.236
	Total network	0	0	0.089	0.861	0.39	0.302	3.31

a Dependent Variable: Profit margin

It can be seen from the above table that network with business people in other sectors, network with bank officials and overall network are used as independent variables, and profit margin is used as the dependent variable for linear regression analysis. From the results, the model formula is: Profit margin=0.241-0.002*network with business people in other sectors-0.006*network with bank officials + 0.000*overall network. The model R square value is 0.069, which means that network with business people in other sectors, network with bank officials, and overall network can explain the 6.9% change in profit margin. When performing the F test on the above model, we found that the model can pass the F test (F=7.081, p=0.000<0.05), which means that at least one of the three variables of network with business people in other sectors, network with bank officials, and overall network will affect the profit margin. In addition, we tested the multicollinearity of the model and certified that the VIF values in the model are all less than 5, which means that there is no collinearity problem, and the D-W value is near the number 2, thus proving that the model does not have auto-correlation and there is no correlation between variables, and this model is ideal.

In the end, according to the above results:

The regression coefficient of network with business people in other sectors is -0.002 (t=-3.065, p=0.002<0.01), which means that the existence and scale of network with business people in other sectors have a statistically negative impact on the profit margin of SMEs.

The regression coefficient of network with bank officials is -0.006 (t=-1.525, p=0.128>0.05), which means that network with bank officials will not affect the profit margin of SMEs.

The regression coefficient of overall network is 0.000 (t=0.861, p=0.390>0.05), which means that overall network will not affect the profit margin of SMEs.

It can be seen that only the size of network with business people in other sectors has a statistically significant negative correlation with the profit margin. Network with bank officials, overall network and other networks

have no relationship with the profit margin. The regression result overturns the H3 hypothesis, and the remaining assumptions are not supported.

6.2 Correlation analysis and regression analysis between variables and ROA

Table 7 Correlation analysis of various variables and ROA

variable	Pearson Correlation	Return on Assets	Business people within same sector	Business people in other sectors	Bank officials	Politicians and civil servants	Others network	Total network
Return on Assets	Pearson Correlation							
	Sig. (2-tailed)							
Business people within same sector	Pearson Correlation	-0.001						
	Sig. (2-tailed)	0.981						
Business people in other sectors	Pearson Correlation	-0.03	0.107					
	Sig. (2-tailed)	0.616	0.069					
Bank officials	Pearson Correlation	0.011	.280**	.213**				
	Sig. (2-tailed)	0.848	0	0				
Politicians and civil servants	Pearson Correlation	0.067	.351**	.183**	.353**			
	Sig. (2-tailed)	0.256	0	0.002	0			
Others network	Pearson Correlation	0.041	0.103	.168**	.156**	.323**		
	Sig. (2-tailed)	0.488	0.081	0.004	0.008	0		
Total network	Pearson Correlation	0.004	.456**	.802**	.399**	.478**	.610**	
	Sig. (2-tailed)	0.943	0	0	0	0	0	

** Correlation is significant at the 0.01 level (2-tailed).

As before, we use Pearson correlation coefficient to test the correlation between ROA and network, and use correlation analysis to study the correlation between ROA and network with business people within the same sector, network with business people in other sectors, network with bank officials, network with politics and civil servants, others network and total network.

As shown in the above table, the P values between ROA and the 6 network variables are all greater than 0.05. Therefore, there is no statistical correlation between ROA and the variables of the six SME networks, and there is no influence relationship.

VI. CONCLUSION

By analyzing the data of SMEs in Vietnam in 2013, this study finds that only the network scale of business people in other sectors has a statistically significant negative correlation with the profit margin of SMEs, and the remaining networks have no impact on SME performance. Accordingly, we are supposed to recognize and pay attention to the negative effect of the network of business personnel in other sectors in Vietnam's SMEs in weakening the company's performance. In order to improve and enhance the firm performance, the company's senior managers should be aware of controlling and appropriately reducing the size of the network of business personnel in other sectors when formulating organizational strategies or network strategies, and reduce unnecessary cross-sector communication, so as to reduce the network negative impact on firm performance.

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