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Urban Amenities, Firm Performance, and the Probability of Exporting in the Lao PDR

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Abstract: *This paper examines the effects of urban amenities on the probability of firms exporting and firm productive performance in the Lao People's Democratic Republic (Lao PDR). A logit model was used, finding that urban amenities have a positive and statistically significant effect on firm productivity. However, the results do not indicate any impact on the probability of firms exporting. Based on these results, both the government and private sector should invest more in improving urban amenities to facilitate efficient business operations and to enhance firm competition in global markets. In addition, the government should invest more in human capital and production facilities, especially in information and communications technology, to increase firm performance as well as the probability that they will export.*

Keywords: productivity, urban amenities, exporting

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1. Introduction

The economy of the Lao People's Democratic Republic (Lao PDR) has been experiencing rapid economic growth for the past 2 decades. Recent trends indicate key challenges, however, as the domestic economy is heavily dependent on the resources sector (i.e. mining and hydropower). This dependence may not be sustainable in the long term due to the risk of 'Dutch disease'[1] or the 'resources curse' (Kyophilavong, 2016; Kyophilavong and Toyoda, 2012). There is little industrial diversification, and the mining and hydropower sectors receive the most foreign direct investment (FDI), especially from neighbouring countries (Kyophilavong, 2009). The Lao PDR also faces several challenges including access to finance, high costs of doing business, high taxes, poor infrastructure, and weak human capital development (Kyophilavong, Vanhnalat, Phonvisay, 2017).

Several studies have highlighted that urban development and cities with strong urban and sub-urban amenities attract quality FDI and skilled workers to promote the competitiveness of the services sector (Glaeser, Kerr, Kerr, 2015). Urban economic theory supports the positive impact of urban agglomeration on increased firm productivity (Fujita and Thisse, 2002; Duranton and Puga, 2004). There are very few empirical studies to support the reverse causality, from productivity to agglomeration, however (Eberts and McMillen, 1999; Rosenthal and Strange, 2004).

Improvements in urban amenities are thus priorities for the Government of the Lao PDR to promote FDI and to develop the services sector. Yet the relative costs and benefits of investment in urban amenities and the direct impact on firm productivity are not clear. This study seeks to identify industrial agglomeration and the impact of urban and rural amenities on firm productivity and the probability that they export in the Lao PDR. It examines the impact of urban amenities on the performance of both manufacturing and services firms. It accounts for domestic and foreign firms, ownership structures, and the educational background of entrepreneurs.

Section 2 discusses the data and methodology of the study. Section 3 provides the results. Policy is discussed in Section 4.

[1] 'Dutch disease' refers to an economic phenomenon in which the rapid growth of natural resources causes other industries to contract (Corden, 1984).

2. Methodology

To examine the impact of urban amenities[2] on the productivity and exporting activities of firms in the Lao PDR, the study used cross-sectional data from the *Economic Census* (2018/2019), *Lao Economic Census Survey 2012/2013* (2013), and *Lao Economic Census Survey 2018/2019* (2019), and some data from the Ministry of Information, Culture and Tourism. With a sample size of 45,178 firms, it covered 41,291 micro firms, 3,738 small firms, 83 medium-sized firms, and 66 large firms.

It adopted a measurement of total revenue to labour as firm productivity as well as the empirical models of Andersson and Loof (2011); Lin, Li, and Yang (2011); and Papadogonas and Voulgaris (2005). The models used are as follows:

$$Ln(FP_i) = \alpha + \beta[Ln(Cap_i)] + \sum_{J=1}^{8} \mu_J (AM_i) + \sum_{K=1}^{1} \lambda_K (ICT_i) + u_i \quad (1)$$

$$Ln(FP_i) = \alpha + \beta[Ln(Cap_i)] + \sum_{K=1}^{4} \lambda_K (ICT_i) + \sum_{m=1}^{6} \sigma_m (HC_i) + \sum_{n=1}^{1} \varphi_n (SE_i) + u_i \quad (2)$$

$$Ln(FP_i) = \alpha + \beta[Ln(Cap_i)] + \sum_{n=1}^{2} \varphi_n (SE_i) + \sum_{p=1}^{3} \delta_p (FS_i) + \sum_{q=1}^{5} \pi_q (OF_i) + u_i \quad (3)$$

where:

Ln (FP_i) denotes the natural logarithm of the productivity of firms as the dependent variable, which is calculated by dividing the revenue by the number of workers;

Ln (Cap_i) is the natural logarithm of capital per capita;

AM_i is a vector of urban amenities;

ICT_i is a vector of information and communications technology (ICT);

HC_i is a vector of human capital;

SE_i is a vector of firm sector;

FS_i is a vector of firm size;

OF_i is a vector of other factors;

α is the constant;

β, μ_J, λ_K, σ_m, φ_n, δ_p, and π_q are corresponding vectors of coefficients;

u_i is a normally distributed random error term; and

μ_J is used to measure the average impact of urban amenities on firm productivity.

The details of the variables for the regression are given in Table 1.

[2] Urban amenities in this study are given in terms of hotels, guesthouses, resorts, restaurants, airports, travel agencies, markets, road access, safe water, and hospitals.

Table 1: Variables and Definitions for Regression

Variables	Definition		Expected sign	Sources of variables
Dependent variable				
Ln(FLP)	Natural logarithm of Firms' labor Productivity, the firm's labor productivity is caculated from total revenue divide by total labor	index		
Independent variables				
Ln(Cap)	***Logarithm of capital ratio to labor (total capital divide by total staffs)***	index	Positive	Fallahi, Sojoodi and Aslaninia (2010)
Amenity (AM)				
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	index	Positive	
Airport	Province has the airport	1= yes; 0= otherwise	Positive	
Ln(Restaur)	Natural logarithmic of number of restaurants	index	Positive	
Ln(Travel)	Natural logarithmic of number of travel agents	index	Positive	
Ln(Market)	Natural logarithmic of number of village have the market	index	Positive	
Road access	Road access at all season to village	1= yes; 0= otherwise	Positive	
Ln(Water)	Natural logarithmic of number of village have safe water	index	Positive	
Ln(Hospital)	Natural logarithmic of number of village have the hospital	index	Positive	
Information communication technology (ICT)				
Internet	Firm has internet connection device	1 = yes; 0 = otherwise	Positive	Fallahi et al. (2010)
Computer	Firm has computer/tablet for runing bussiness	1 = yes; 0 = otherwise	Positive	Fallahi et al. (2010)
Server	Firm has equipment of ICT as server	1 = yes; 0 = otherwise	Positive	Authors
Account	Firm uses accounting system program, design program	1 = yes; 0 = otherwise	Positive	Authors
Bank apps	Firm uses electronic bank or bank apps for payment pattern	1 = yes; 0 = otherwise	Positive	Authors
Human Capital (HC)				
Educ_hb	The entrepreneur completed higher than bachelor	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_b	The entrepreneur completed bachelor	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_hd	The entrepreneur completed higher diploma	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_d	The entrepreneur completed diploma	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_v	The entrepreneur completed vocational/technical	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Foreign	The firm with foreign partnership/Foreign ownership of firm	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Sector of economic activity (SE)				
Trade_service	The firm as the services, and trade (wholesale and retail trade; repair of motor vehicles and motorcycles) sectors	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Manufactor	The firm as the manufacturing sector	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Agriculture	The firm as the agriculture, forestry and fishing sector	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Firm size (FS)				
Small	Small enterprises (6 - 50 staffs)	1= Yes; 0= otherwise	Positive	
Medium	Medium enterprises (51 - 99 staffs)	1= Yes; 0= otherwise	Positive	
Large	Large enterprises (100 staffs and above)	1= Yes; 0= otherwise	Positive	
Other factors (OF)				
Female	Gender of entrepreneur is female	1 = yes; 0 = otherwise	Positive	Authors
Firm_age	Number of year has run bussiness	year		
Finace	The firm access to finance by received loan for runing business	1= yes; 0= otherwise	Positive	Authors
Export	The firm export their products to abroad	1= yes; 0= otherwise	Positive	Authors
Urban	The firm located at urban area	1= yes; 0= otherwise	Positive	Authors

Source: Authors.

A logit model was applied to examine the impact of urban amenities on firm exports in the Lao PDR because it is designed to handle regressions involving a dichotomous dependent variable. This consideration is important since entrepreneurs were asked whether their firms export, taking a value of 1 when the firm does export and 0 otherwise; this is called the binary dependent variable. Therefore, a logit model examined the probability of urban amenities

affecting the probability of firms exporting following Sun, Yu, and Zhang (2018). The model is as follows:

$$\Pr ob(Exporting = 1) = \alpha + \beta\left[Ln(Cap_i)\right] + \sum_{J=1}^{7} \theta_J (AM_i) + \sum_{K=1}^{1} \lambda_K (ICT_i) + u_i \quad (4)$$

$$\Pr ob(Exporting = 1) = \alpha + \beta\left[Ln(Cap_i)\right] + \sum_{K=1}^{4} \lambda_K (ICT_i) + \sum_{m=1}^{6} \sigma_m (HC_i) + \sum_{n=1}^{1} \mu_n (SE_i) + u_i \quad (5)$$

$$\Pr ob(Exporting = 1) = \alpha + \beta\left[Ln(Cap_i)\right] + \sum_{n=1}^{2} \mu_n (SE_i) + \sum_{p=1}^{3} \pi_p (FS_i) + \sum_{q=1}^{5} \delta_q (OF_i) + u_i \quad (6)$$

where:

$\Pr ob$ is probability;

Exporting denotes firm exports, taking a value of 1 if the firm exports and 0 if otherwise;

$Ln(Cap_i)$ is the logarithm of the capital per capita;

AM_i is urban amenities;

ICT_i is a vector of ICT;

HC_i is a vector of human capital;

SE_i is a vector of firm sector;

FS_i is a vector of firm size;

OF_i is a vector of other factors;

α is the constant;

β, θ_J, λ_K, σ_m, μ_n, π_p, and δ_q are corresponding vectors of coefficients;

u_i is a normally distributed random error term; and

θ_J is used to measure the average impact of urban amenities on firm productivity.

The details of the variables for the regression are in Table 2.

Table 2: Variables and Definitions for the Logit Model

Variables	Definition		Expected sign	Sources of variables
Dependent variable				
Exporting	The firm export their products to abroad	1= yes; 0= otherwise	Positive	Authors
Independent variables				
Ln(Cap)	***Logarithm of capital ratio to labor (total capital divide by total staffs)***	Index	Positive	Fallahi, Sojoodi and Aslaninia (2010)
Amenity (AM)				
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	index	Positive	
Airport	Province has the airport	1= yes; 0= otherwise	Positive	
Ln(Restaur)	Natural logarithmic of number of restaurants	index	Positive	
Ln(Travel)	Natural logarithmic of number of travel agents	index	Positive	
Ln(Market)	Natural logarithmic of number of village have the market	index	Positive	
Ln(Water)	Natural logarithmic of number of village have safe water	index	Positive	
Ln(Hospital)	Natural logarithmic of number of village have the hospital	index	Positive	
Information communication technology (ICT)				
Internet	Firm has internet connection device	1 = yes; 0 = otherwise	Positive	Fallahi et al. (2010)
Computer	Firm has computer/tablet for runing bussiness	1 = yes; 0 = otherwise	Positive	Fallahi et al. (2010)
Server	Firm has equipment of ICT as server	1 = yes; 0 = otherwise	Positive	Authors
Account	Firm uses accounting system program, design program	1 = yes; 0 = otherwise	Positive	Authors
Bank apps	Firm uses electronic bank or bank apps for payment pattern	1 = yes; 0 = otherwise	Positive	Authors
Human Capital (HC)				
Educ_hb	The entrepreneur completed higher than bachelor	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_b	The entrepreneur completed bachelor	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_hd	The entrepreneur completed higher diploma	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_d	The entrepreneur completed diploma	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Educ_v	The entrepreneur completed vocational/technical	1 = yes; 0 = otherwise	Positive	Susilo (2013)
Foreign	The firm with foreign partnership/Foreign ownership of firm	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Sector of economic activity (SE)				
Trade_service	The firm as the services, and trade (wholesale and retail trade; repair of motor vehicles and motorcycles) sectors	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Manufactor	The firm as the manufacturing sector	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Agriculture	The firm as the agriculture, forestry and fishing sector	1 = yes; 0 = otherwise	Positive	Zemplinerová and Hromádková (2012)
Firm size (FS)				
Small	Small enterprises (6 - 50 staffs)	1= Yes; 0= otherwise	Positive	
Medium	Medium enterprises (51 - 99 staffs)	1= Yes; 0= otherwise	Positive	
Large	Large enterprises (100 staffs and above)	1= Yes; 0= otherwise	Positive	
Other factors (OF)				
Female	Gender of entrepreneur is female	1 = yes; 0 = otherwise	Positive	Authors
Firm_age	Number of year has run bussiness	year		
Finace	The firm access to finance by received loan for runing business	1= yes; 0= otherwise	Positive	Authors
Ln(FLP)	Natural logarithm of Firms' labor Productivity, the firm's labor productivity is caculated from total revenue divide by total labor	index	Positive	Authors
Urban	The firm located at urban area	1= yes; 0= otherwise	Positive	Authors

Source: Authors.

3. Empirical Results

3.1. Impact of Urban Amenities on Firm Productivity

The empirical estimation may have had several econometric problems such as multicollinearity, heteroskedasticity, and autocorrelation, which were addressed to establish the robustness of the results.

The results are given in Table 3, which shows that the capital per capita has a coefficient with the expected positive sign and is strongly significant for firm productivity in the Lao PDR. This can be explained by the fact that firms with more capital stock can invest more in production facilities, especially in new technology, innovation, and human capital to upgrade workers' knowledge as well as in research and development to increase productivity. These results are consistent with Fallahi, Sojoodi, and Aslaninia (2010), which found that capital intensity has a positive effect and is statistically significant on the productivity of Iranian manufacturing firms.

The results also show that most amenity variables have a positive effect and are highly statistically significant on firm productivity, except for safe water. Amenities are thus very important to improve firm productivity. ICT is a key factor in determining firm productivity as well. A firm's ICT adaption – such as using the internet and having servers, accounting programmes, and e-banking capabilities – has a positive and statistically significant effect on firm productivity. This suggests that investment in production or business facilities, especially regarding ICT, can increase firm productivity. Indeed, ICT equipment generally facilitates expansion of business networks and information transactions between managers and employees, leading to increased firm productivity. This is in line with Fallahi, Sojoodi, and Aslaninia (2010) as well.

Human capital is another important factor in promoting firm productivity. The educational attainment of businessowners has a statistically significant positive effect on firm productivity, indicating that entrepreneurs who achieved higher education levels help increase their firms' productivity, especially entrepreneurs who have a vocational degree or higher. Education assists businessowners in enhancing their skills to determine strategic planning and to find competitive advantages. Better-educated entrepreneurs have the ability to discern profitable innovations and to reduce uncertainty in investment decisions regarding new processes and products.

In addition, entrepreneurs who attained higher education levels have a better ability to adapt to technology changes, which leads to higher productivity for their firms. This result is

consistent with Susilo (2013) and Black and Lynch (1996), which found that education levels have a positive and significant effect on labour productivity. Therefore, the results support a finding that human capital contributes to firm productivity; this is consistent with Marimuthu, Arokiasamy, and Ismail (2009) and Seleim, Ashour and Bontis (2007), which found that human capital improves firm productivity.

This study additionally shows that foreign partnerships or ownership of a firm have a positive and statistically significant on firm productivity, as firms with foreign partnerships or ownership are more productive. This result is consistent with Zemplinerová and Hromádková (2012), and Ehrlich et al. (1994).

It finds that firms in the trade and services and agriculture sectors show higher productivity compared to those in the manufacturing sector and other industries. These results are consistent with Zemplinerová and Hromádková (2012), which found that manufacturing firms in the Czech Republic have lower productivity than those operating in trade and other industries. This study also found that firm size has a statistically significant positive effect on firm productivity, with coefficients of expected signs, including those for medium-sized and large enterprises. Based on the results of this study, firm size is an important factor affecting firm productivity, similar to findings by Biggs and Shah (2006), Watson (2007), and Kyophilavong (2008).

Since all variables have a significant positive effect on firm productivity, this implies that firms with female owners have higher productivity. Firm age –measured by the number of years to start operation – is also strongly positively impactful and is statistically significant on firm productivity. The number of years running a business also strongly positively impacts firm productivity; it is significant at a 99% confidence level.

Access to finance is very important to promote firms as engines of growth. Today, the government has a cooperation policy with various non-governmental organisations to create conditions for firms to access finance through low interest and long-term credit. This study finds that such access to finance has a positive and statistically significant impact on firm productivity; this implies that firms that obtained loans for expanding or running their operations ended up with higher productivity.

International firms are also an important factor to determine firm productivity. This has a coefficient with an expected positive sign on firm productivity, and it is statistically significant. Firms that export their products to the international market must improve the efficiency of production due to transport costs, marketing, and distribution. In other words, the extra cost of sales in export markets act as a barrier, preventing inefficient firms' entry. In

addition, firms that are trying to export and to compete with those in other countries can achieve a higher level of production knowledge through the learning-by-exporting process, improve their production technology, and increase their productivity more than firms that sell their products exclusively in the domestic market. Similar results were found by Papadogonas and Voulgaris (2005) in Greece and Fallahi, Sojoodi, and Aslaninia (2010) in Iran; their results showed that firm productivity for exporting firms is better than that for non-exporting firms.

An urban location has a positive impact and is statistically significant on firm productivity in the Lao PDR. This means that firms in urban areas have higher productivity, which is consistent with Nakamura (1985), which found that light industries in Japan obtained more productive advantages from urbanised economies than from localised economies.

Table 3: Impact of Amenities on Firm Productivity (Full Sample)

Independent Variables	Definition	Equation 1		Equation 2		Equation 3	
		Coefficient	t	Coefficient	t	Coefficient	t
Ln(Cap)	***Logarithm of capital ratio to labor***	0.3478 ***	72.77	0.3484 ***	72.21	0.3316 ***	71.08
Amenity (AM)							
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	0.0766 ***	3.52				
Airport	Province has the airport	0.1159 ***	5.63				
Ln(Restaur)	Natural logarithmic of number of restaurants	0.0425 ***	3.76				
Ln(Travel)	Natural logarithmic of number of travel agents	0.0270 ***	2.67				
Ln(Market)	Natural logarithmic of number of village have the market	0.1718 ***	10.37				
Road access	Road access at all season to village	0.7390 ***	15.01				
Ln(Water)	Natural logarithmic of number of village have safe water	0.0342	0.56				
Ln(Hospital)	Natural logarithmic of number of village have the hospital	0.1175 ***	4.77				
Information communication technology (ICT)							
Internet	Firm has internet connection device	0.6386 ***	21.54				
Computer	Firm has computer/tablet for runing bussiness			0.0542	0.98		
Server	Firm has equipment of ICT as server			0.1753 *	1.90		
Account	Firm uses accounting system program, design program			0.4884 ***	10.67		
Bank apps	Firm uses electronic bank or bank apps for payment pattern			0.1248 **	2.02		
Human Capital (HC)							
Educ_hb	The entrepreneur completed higher than bachelor			0.1932 ***	2.78		
Educ_b	The entrepreneur completed bachelor			0.2757 ***	8.18		
Educ_hd	The entrepreneur completed higher diploma			0.2351 ***	7.36		
Educ_d	The entrepreneur completed diploma			0.1752 ***	5.26		
Educ_v	The entrepreneur completed vocational/technical			0.2942 ***	7.98		
Foreign	The firm with foreign partnership/Foreign ownership of firm			0.3860 ***	11.90		
Sector of economic activity (SE)							
Trade_service	The firm as the services, and trade sectors			0.4804 ***	25.87		
Manufactor	The firm as the manufacturing sector					-0.4458 ***	-23.57
Agriculture	The firm as the agriculture, forestry and fishing sector					0.3132 ***	4.09
Firm size (FS)							
Small	Small enterprises (6 - 50 staffs)					-0.0143	-0.58
Medium	Medium enterprises (51 - 99 staffs)					0.3584 **	2.31
Large	Large enterprises (100 staffs and above)					0.8280 ***	4.73
Other factors (OF)							
Female	Gender of entrepreneur is female					0.1179 ***	8.62
Firm_age	Number of year has run bussiness					0.0140 ***	13.93
Finace	The firm access to finance by received loan for runing business					0.4555 ***	19.96
Export	The firm export their products to abroad					0.7634 ***	6.01
Urban	The firm located at urban area					0.6710 ***	48.08
Cons	***Constant***	8.7100 ***	40.46	10.3287 ***	122.82	10.6028 ***	132.34
	Number of observation	45,178		45,178		45,178	
	F-statistics	811.70		653.59		1,008.63	
	Prob > F	0.0000		0.0000		0.0000	
	R-squared	0.1523		0.1480		0.1972	

Note: The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values, and heteroskedasticity has been tested and corrected.

Source: Authors.

3.2. Impact of Urban Amenities on Firm Productivity in Trade and Services, Manufacturing, and Agriculture Sectors

Consequently, the impact of urban amenities on firm productivity in three sectors – trade and services, manufacturing, and agriculture – was estimated (Table 4). The capital per capita is an important factor contributing to firm productivity across sectors. This result supports Fallahi, Sojoodi, and Aslaninia (2010), which found that capital intensity has a positive effect and is statistically significant on manufacturing firm productivity in Iran.

Focussing on urban amenities, this study demonstrates that urban amenities – in terms of number of accommodations – has a positive effect and is statistically significant on firm productivity in the trade and services and agriculture sectors, but the accommodation variable has a negative impact and significance on firm productivity in the manufacturing sector. Airports contribute to increasing productivity in the trade and services and agriculture sectors; firms located in the province with the airport have higher productivity than those located elsewhere. The restaurant variable has a positive and statistically significant effect on firm productivity only in the manufacturing sector. Regarding travel agents and road access in all seasons to villages, these have a positive and significant effect on productivity only in the trade and services sector. Markets and hospitals are very important factors in improving firm productivity; these variables have a positive and significant on firm productivity, especially in the trade and services and manufacturing sectors.

ICT is another key factor affecting firm productivity. This study found that a firm's ICT adaption has a positive and statistically significant impact on firm productivity across sectors. The computer variable has a positive and significant impact on firm productivity only in the manufacturing sector; this implies that firms using computers have higher productivity. E-banking for payments has a positive and statistically significant effect on firm productivity only in the trade and services sector; firms that use e-banking there have higher productivity. This study thus suggests that investment in production or business facilities, especially in ICT, can increase firm productivity. These results are in line with Fallahi, Sojoodi, and Aslaninia (2010).

Human capital is an important factor for improving innovation and to increase firm performance. Overall, the education of businessowners has a statistically significant positive effect on firm productivity across sectors; this indicates that businessowners who achieve higher education levels help increase their firms' productivity. This result is consistent with Susilo (2013) and Black and Lynch (1996), which that found that education levels have a positive and significant effect on labour productivity.

This study also demonstrates that foreign partnerships or ownership have a positive and statistically significant impact on firm productivity in the trade and services and manufacturing sectors; that for the agriculture sector is insignificant. This result is in line with Zemplinerová and Hromádková (2012).

Firm size – measured by the number of staff members – has a statistically significant effect on firm productivity, especially for small firms, as these have higher productivity than others in the manufacturing and agriculture sectors. It does, however, have a negative and significant effect on small firms in the trade and services sector. Medium-sized firms with coefficients of expected signs show significance in productivity only in the manufacturing sector; this means that medium-sized firms in the manufacturing sector have higher productivity than those in other sectors. Large firms in the trade and services sector have higher productivity than those in other sectors. Thus, the size of firms seems to be an important factor affecting firm productivity, similar to finding by Biggs and Shah (2006), Watson (2007), and Kyophilavong (2008).

This study also found a negative relationship between a businessowner's sex and productivity; it is statistically significant in the manufacturing and agriculture sectors. In the trade and services sector, it has a positive and significant on productivity. These results demonstrate that firms with female businessowners have lower productivity in the manufacturing and agriculture sectors but higher productivity in the trade and services sector. The age of firm has a positive impact and is statistically significant on firm productivity. It is significant at a 99% confidence level. Further, this study found that receiving loans from financial institutions for operations has a positive effect and is statistically significant on firm productivity across sectors; firms that received loans for various business operations show higher productivity.

Firms involved in international business or exporting their products abroad have a coefficient with an expected positive sign on firm productivity, and it is statistically significant in across sectors. Similar positive results were found by Papadogonas and Voulgaris (2005) and Fallahi, Sojoodi, and Aslaninia (2010), which showed that the productivity of firms that export is higher than that of non-exporting firms. Moreover, urban locations show a positive impact and are statistically significant on firm productivity across sectors. This means that firms in urban areas are more productive, consistent with Nakamura (1985).

Table 4: Impact of Urban Amenities on Firm Productivity by Sector

Independent Variables	Trade and Services Sectors			Manufacturing Sector			Agriculture Sector		
	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3	Equation 1	Equation 2	Equation 3
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Ln(Cap)	0.3404 ***	0.3405 ***	0.3214 ***	0.4157 ***	0.4042 ***	0.3934 ***	0.5278 ***	0.5311 ***	0.5610 ***
Amenity (AM)									
Ln(HGR)	0.1376 ***			-0.1694 ***			0.7163 ***		
Airport	0.1007 ***			0.1333 ***			-0.2353		
Ln(Restaur)	0.0127			0.1090 ***			-0.0562		
Ln(Travel)	0.0317 ***			-0.0074			0.0204		
Ln(Market)	0.1428 ***			0.2197 ***			-0.3300 *		
Road access	0.8458 ***			0.1789			0.2879		
Ln(Water)	0.0805			-0.0721			-0.4619		
Ln(Hospital)	0.1034 ***			0.2601 ***			-0.2065		
Information communication technology (ICT)									
Internet	0.5579 ***			0.8914 ***			1.3263 ***		
Computer		-0.0151			0.3002 *			0.7233	
Server		0.0761			0.1134			-0.4216	
Account		0.4992 ***			0.4825 ***			0.6479 **	
Bank apps		0.1290 *			0.0052			-0.6554	
Human Capital (HC)									
Educ_hb		0.1274			0.2912			1.1757 **	
Educ_b		0.2486 ***			0.4429 ***			0.5798 ***	
Educ_hd		0.1839 ***			0.5004 ***			-0.9115 ***	
Educ_d		0.1423 ***			0.4051 ***			-0.1482	
Educ_v		0.2466 ***			0.5727 ***			0.5338	
Foreign		0.3668 ***			0.5023 ***			-0.1403	
Firm size (FS)									
Small			-0.1323 ***			0.1562 ***			0.4254 **
Medium			0.2844			0.5016 ***			0.3752
Large			1.1052 ***			0.4957			0.4887
Other factors (OF)									
Female			0.1949 ***			-0.2275 ***			-0.3287 *
Firm_age			0.0205 ***			-0.0018			0.0206
Finace			0.4056 ***			0.6103 ***			0.3961 **
Export			0.4561 *			0.6269 ***			1.1025 **
Urban			0.6449 ***			0.6888 ***			0.3491 **
Cons	8.4389 ***	10.9547 ***	10.7178 ***	9.0939 ***	9.2955 ***	9.3439 ***	5.6182 **	7.1969 ***	6.4562 ***
Number of obs	37,859	37,859	37,859	6,525	6,525	6,525	358	358	358
F-statistics	302.34	177.67	573.90	66.05	58.92	150.85	19.64	149.52	20.83
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-squared	0.1457	0.1237	0.1800	0.2031	0.1965	0.2537	0.4132	0.4194	0.3986

Note: The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values, and heteroskedasticity has been tested and corrected.

Source: Authors.

3.3. Impact of Urban Amenities on Firms' Probability of Exporting

A logit model was used to assess the impact of urban amenities on the probability of firms exporting through the maximum likelihood method, and the marginal effect was calculated for every factor based on explanatory variables (Table 5). It shows that the capital per capita has a positive and significant impact on the probability of firms exporting. The urban

amenities indicators – hotels, guesthouses, resorts, restaurants, airports, travel agencies, markets, road access, safe water, and hospitals – show that most amenity variables are statistically insignificant on a firm's probability of exporting. However, markets have a negative effect and are strongly significant. This result indicates that villages with more markets decrease the probability of firms exporting, because those firms may be able to sell their products on the domestic market exclusively.

ICT is a very important factor contributing to firms' probability of exporting. ICT equipment has a positive and strongly statistically significant effect. This study suggests that investment in ICT in terms of internet for business activities can increase the probability of a firm exporting, in line with Contractor and Mudambi (2008).

Human capital is another important factor affecting a firm's probability of exporting. In addition, there is a positive and strongly statistically significant relationship between firms with foreign partnerships or ownership and their probability of exporting. This result implies that the firms with foreign ownership and partnerships have a higher probability of exporting, because they may have more experience in international business and have wider networks, making entry into the international market easier. Thus, this study confirms that the probability of a firm exporting is increased by human capital, consistent with Siddique, Mahmood, and Noureen (2016), which found that investment in human capital is significant for both goods and services exports in Asia and developed countries.

The sector of economic activities is an important factor affecting the decision of firms to enter the international market. This study shows that the manufacturing sector has a positive effect and is statistically significant on the probability of a firm exporting. This implies that firms in the manufacturing sector have a higher probability of exporting compared to firms in other sectors. This result contrasts with Gashi (2014), which found that the sector of economic activities has no significant effect on small and medium-sized enterprises' probability of exporting.

Firm size has a positive effect and is statistically significant on whether firms enter the international market, including small and large enterprises. A large firm size has the largest positive effect on a firm's probability of exporting. This indicates that the size of firm is an important factor affecting a firm's export performance, consistent with Vos et al. (2007) and Titman and Wessels (1988).

The study also finds two of the five indicators to be statistically significant on firms' probability of exporting. Firm productivity has a positive and significant effect on the probability of exporting. This means that firms with higher productivity increase their

probability of exporting, because these firms generally want to enter the international market and must improve the efficiency of production to compete with other countries. This finding is similar to Deshmukh and Pyne (2013), which found that increased productivity grew export intensity at the firm level for the major exporting industries in India. Urban locations of firms have a negative effect and are significant to the probability of a firm exporting. This means that firms in urban areas are less likely to export than those in rural areas, as most heavy industries are not in urban settings.

Table 5: Impact of Urban Amenities on Firms' Probability of Exporting

Independent variables	Definition	Equation 1		Equation 2		Equation 3	
		dy/dx	z	dy/dx	z	dy/dx	z
Ln(Cap)	***Logarithm of capital ratio to labor***	0.0007 ***	6.96	0.00021 ***	3.18	0.00010 *	1.68
Amenity (AM)							
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	-0.0002	-0.27				
Airport	Province has the airport	0.0006	1.13				
Ln(Restaur)	Natural logarithmic of number of restaurants	-0.0004	-1.15				
Ln(Travel)	Natural logarithmic of number of travel agents	0.0003	0.95				
Ln(Market)	Natural logarithmic of number of village have the market	-0.0013 ***	-2.80				
Ln(Water)	Natural logarithmic of number of village have safe water	-0.0013	-0.73				
Ln(Hospital)	Natural logarithmic of number of village have the hospital	0.0011	1.46				
Information communication technology (ICT)							
Internet	Firm has internet connection device	0.0045 ***	3.22				
Computer	Firm has computer/tablet for runing bussiness			0.0018	1.22		
Server	Firm has equipment of ICT as server			-0.0005 *	-1.62		
Account	Firm uses accounting system program, design program			0.0004	0.63		
Bank apps	Firm uses electronic bank or bank apps for payment pattern			-0.0003	-0.80		
Human Capital (HC)							
Educ_hb	The entrepreneur completed higher than bachelor			0.0003	0.47		
Educ_b	The entrepreneur completed bachelor			0.0004	0.77		
Educ_hd	The entrepreneur completed higher diploma			-0.0003	-0.83		
Educ_d	The entrepreneur completed diploma			0.0012 *	1.62		
Educ_v	The entrepreneur completed vocational/technical			-0.0005	-1.27		
Foreign	The firm with foreign partnership/Foreign ownership of firm			0.0032 ***	2.95		
Sector of economic activity (SE)							
Trade_service	The firm as the services, and trade sectors			-0.0088 ***	-7.72		
Manufactor	The firm as the manufacturing sector					0.00529 ***	5.64
Agriculture	The firm as the agriculture, forestry and fishing sector					0.00022	0.46
Firm size (FS)							
Small	Small enterprises (6 - 50 staffs)					0.00395 ***	4.10
Medium	Medium enterprises (51 - 99 staffs)					0.00717	1.37
Large	Large enterprises (100 staffs and above)					0.01563 **	2.07
Other factors (OF)							
Female	Gender of entrepreneur is female					-0.00030	-1.43
Firm_age	Number of year has run bussiness					0.00000	0.17
Finace	The firm access to finance by received loan for runing business					0.00003	0.13
Ln(FLP)	Natural logarithm of Firms' labor Productivity					0.00026 ***	3.87
Urban	The firm located at urban area					-0.00050 **	-2.31
Y	***Marginal effects after logit = Pr(export) (predict) =***	0.0021		0.0011		0.0010	
Number of obs	=	45,178		45178		45178	
LR chi2(30)	=	94.24		312.19		367.60	
Prob > chi2	=	0.0000		0.0000		0.0000	
Pseudo R2	=	0.0544		0.1800		0.2120	

Note: The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values.
Source: Authors.

4. Conclusion and Recommendations

Urban amenities are important to improving the productivity and export activities in developed and developing countries. This study examined their impact on firm productivity and their probability of exporting. Overall, it found that urban amenities have a positive impact and are statistically significant on firm productivity across the country for the trade and services, manufacturing, and agriculture sectors. It concludes that urban amenities are very important factors to improve firm productivity in the Lao PDR.

It also found most urban amenity indicators are statistically insignificant on a firm's probability of exporting, except that markets have a negative effect and are strongly significant. Firm productivity, however, has a positive effect and is significant to a firm's probability of exporting.

This study suggests that policymakers and the private sector should invest more in improving urban amenities to facilitate enterprises increasing their productivity and enhancing their ability to compete in international markets. In addition, the government and private sector should invest more in human capital and production facilities, especially in ICT, to increase firm productivity, leading to an increased probability of exporting.

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Appendix

Table A1: Summary Statistics of Variables for Regression Model

Variable	Full sample					Trade and Services					Manufacturing					Agriculture				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Ln(FLP)	45,178	16.79	1.57	0.00	25.41	37,859	16.87	1.56	0.00	25.41	6,525	16.29	1.49	0.00	24.59	358	16.80	1.61	10.82	22.70
Ln(Cap)	45,178	17.12	1.45	0.00	29.93	37,859	17.11	1.44	0.00	29.93	6,525	17.04	1.34	0.00	26.47	358	17.88	1.56	13.17	23.10
Ln(HGR)	45,178	5.93	0.53	4.16	6.42	37,859	5.93	0.54	4.16	6.42	6,525	5.96	0.48	4.16	6.42	358	5.88	0.46	4.16	6.42
Airport	45,178	0.74	0.44	0.00	1.00	37,859	0.74	0.44	0.00	1.00	6,525	0.75	0.43	0.00	1.00	358	0.61	0.49	0.00	1.00
Ln(Restaur)	45,178	2.41	1.03	0.00	4.19	37,859	2.43	1.02	0.00	4.19	6,525	2.26	1.11	0.00	4.19	358	2.39	1.02	0.00	4.19
Ln(Travel)	45,178	2.97	1.58	0.00	5.76	37,859	2.98	1.59	0.00	5.76	6,525	2.87	1.50	0.00	5.76	358	2.66	1.21	0.00	5.76
Ln(Market)	45,178	1.86	0.57	0.00	2.56	37,859	1.87	0.57	0.00	2.56	6,525	1.80	0.54	0.00	2.56	358	1.88	0.59	0.00	2.56
Road access	45,178	0.98	0.14	0.00	1.00	37,859	0.98	0.14	0.00	1.00	6,525	0.99	0.11	0.00	1.00	358	0.99	0.11	0.00	1.00
Ln(Water)	45,178	3.50	0.19	2.83	3.74	37,859	3.50	0.20	2.83	3.74	6,525	3.50	0.17	2.83	3.74	358	3.51	0.15	2.83	3.74
Ln(Hospital)	45,178	1.76	0.40	1.10	2.56	37,859	1.76	0.39	1.10	2.56	6,525	1.73	0.43	1.10	2.56	358	1.86	0.41	1.10	2.56
Internet	45,178	0.06	0.23	0.00	1.00	37,859	0.06	0.23	0.00	1.00	6,525	0.04	0.19	0.00	1.00	358	0.07	0.26	0.00	1.00
Computer	45,178	0.04	0.20	0.00	1.00	37,859	0.04	0.20	0.00	1.00	6,525	0.03	0.17	0.00	1.00	358	0.06	0.23	0.00	1.00
Server	45,178	0.01	0.08	0.00	1.00	37,859	0.01	0.08	0.00	1.00	6,525	0.00	0.07	0.00	1.00	358	0.01	0.07	0.00	1.00
Account	45,178	0.06	0.23	0.00	1.00	37,859	0.06	0.23	0.00	1.00	6,525	0.04	0.19	0.00	1.00	358	0.07	0.26	0.00	1.00
Bank apps	45,178	0.02	0.13	0.00	1.00	37,859	0.02	0.13	0.00	1.00	6,525	0.01	0.10	0.00	1.00	358	0.02	0.15	0.00	1.00
Educ_hb	45,178	0.01	0.10	0.00	1.00	37,859	0.01	0.10	0.00	1.00	6,525	0.01	0.09	0.00	1.00	358	0.03	0.17	0.00	1.00
Educ_b	45,178	0.05	0.21	0.00	1.00	37,859	0.05	0.21	0.00	1.00	6,525	0.03	0.18	0.00	1.00	358	0.07	0.26	0.00	1.00
Educ_hd	45,178	0.05	0.22	0.00	1.00	37,859	0.05	0.22	0.00	1.00	6,525	0.04	0.20	0.00	1.00	358	0.04	0.20	0.00	1.00
Educ_d	45,178	0.04	0.21	0.00	1.00	37,859	0.05	0.21	0.00	1.00	6,525	0.04	0.19	0.00	1.00	358	0.03	0.18	0.00	1.00
Educ_v	45,178	0.04	0.19	0.00	1.00	37,859	0.04	0.19	0.00	1.00	6,525	0.03	0.17	0.00	1.00	358	0.02	0.13	0.00	1.00
Foreign	45,178	0.05	0.21	0.00	1.00	37,859	0.05	0.22	0.00	1.00	6,525	0.02	0.15	0.00	1.00	358	0.06	0.25	0.00	1.00
Trade_service	45,178	0.84	0.37	0.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manufactor	45,178	0.16	0.37	0.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Agriculture	45,178	0.01	0.09	0.00	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Small	45,178	0.08	0.28	0.00	1.00	37,859	0.07	0.25	0.00	1.00	6,525	0.14	0.35	0.00	1.00	358	0.14	0.35	0.00	1.00
Medium	45,178	0.00	0.04	0.00	1.00	37,859	0.00	0.04	0.00	1.00	6,525	0.00	0.06	0.00	1.00	358	0.01	0.07	0.00	1.00
Large	45,178	0.00	0.04	0.00	1.00	37,859	0.00	0.02	0.00	1.00	6,525	0.00	0.07	0.00	1.00	358	0.02	0.14	0.00	1.00
Female	45,178	0.55	0.50	0.00	1.00	37,859	0.57	0.50	0.00	1.00	6,525	0.50	0.50	0.00	1.00	358	0.19	0.39	0.00	1.00
Firm_age	45,178	7.02	6.71	1.00	44.00	37,859	6.66	6.32	1.00	44.00	6,525	9.12	8.38	1.00	44.00	358	5.78	5.38	1.00	39.00
Finace	45,178	0.10	0.29	0.00	1.00	37,859	0.09	0.29	0.00	1.00	6,525	0.10	0.29	0.00	1.00	358	0.13	0.33	0.00	1.00
Export	45,178	0.00	0.05	0.00	1.00	37,859	0.00	0.03	0.00	1.00	6,525	0.01	0.11	0.00	1.00	358	0.02	0.15	0.00	1.00
Urban	45,178	0.55	0.50	0.00	1.00	37,859	0.58	0.49	0.00	1.00	6,525	0.42	0.49	0.00	1.00	358	0.31	0.46	0.00	1.00

Source: Authors.

Table A2: Multicollinearity Detected for Independent Variables for Equation 1

		(A)	(B)	('C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
Ln(Cap)	(A)	1.00									
Ln(HGR)	(B)	0.01	1.00								
Airport	(C)	-0.01	0.35	1.00							
Ln(Restaur)	(D)	0.04	0.35	-0.25	1.00						
Ln(Travel)	(E)	0.04	0.71	0.23	0.62	1.00					
Ln(Market)	(F)	0.09	0.52	0.11	0.27	0.58	1.00				
Road access	(G)	0.03	-0.03	-0.04	0.04	0.01	0.04	1.00			
Ln(Water)	(H)	-0.02	0.70	0.24	0.36	0.74	0.30	0.00	1.00		
Ln(Hospital)	(I)	0.02	0.35	-0.31	0.65	0.45	0.31	0.04	0.35	1.00	
Internet	(J)	0.14	0.04	0.03	0.02	0.04	0.05	0.01	0.04	0.03	1.00

Source: Authors.

Table A3: Multicollinearity Detected for Independent Variables for Equation 2

		(A)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)
Ln(Cap)	(A)	1.00											
Computer	(K)	0.16	1.00										
Server	(L)	0.09	0.34	1.00									
Account	(M)	0.13	0.76	0.25	1.00								
Bank apps	(N)	0.12	0.53	0.28	0.47	1.00							
Educ_hb	(O)	0.09	0.17	0.17	0.13	0.14	1.00						
Educ_b	(P)	0.10	0.22	0.12	0.17	0.15	-0.02	1.00					
Educ_hd	(Q)	0.05	0.09	0.02	0.07	0.06	-0.02	-0.05	1.00				
Educ_d	(R)	0.02	0.03	0.00	0.03	0.02	-0.02	-0.05	-0.05	1.00			
Educ_v	(S)	0.02	-0.01	-0.01	-0.01	0.00	-0.02	-0.04	-0.04	-0.04	1.00		
Foreign	(T)	0.09	0.07	0.06	0.06	0.04	0.04	0.04	0.03	0.00	0.03	1.00	
Trade_service	(U)	-0.02	-0.01	-0.01	0.01	-0.01	-0.01	0.00	0.00	0.01	0.01	0.04	1.00

Source: Authors.

Table A4: Multicollinearity Detected for Independent Variables for Equation 3

		(A)	(V)	(W)	(X)	(Y)	(Z)	(AA)	(AB)	(AC)	(AD)	(AE)
Ln(Cap)	(A)	1.00										
Manufactor	(V)	0.02	1.00									
Agriculture	(W)	0.05	0.20	1.00								
Small	(X)	0.04	0.13	0.02	1.00							
Medium	(Y)	0.05	0.02	0.01	-0.01	1.00						
Large	(Z)	0.04	0.06	0.04	-0.01	0.00	1.00					
Female	(AA)	-0.04	-0.07	-0.07	-0.09	-0.03	-0.03	1.00				
Firm_age	(AB)	0.01	0.12	-0.02	0.03	0.01	0.03	0.07	1.00			
Finace	(AC)	0.11	0.02	0.01	0.09	0.04	0.03	-0.03	0.01	1.00		
Export	(AD)	0.04	0.08	0.03	0.07	0.03	0.09	-0.02	0.01	0.02	1.00	
Urban	(AE)	0.13	-0.11	-0.04	0.09	0.03	0.02	0.16	0.10	0.08	-0.01	1.00

Source: Authors.

Table A5: Multicollinearity Detected for Independent Variables for Regression Model

		(A)	(B)	('C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)	(N)	(O)	(P)	(Q)	(R)	(S)	(T)	(U)	(V)	(W)	(X)	(Y)	(Z)	(AA)	(AB)	(AC)	(AD)	(AE)
Ln(Cap)	(A)	1.00																														
Ln(HGR)	(B)	0.01	1.00																													
Airport	('C)	-0.01	0.35	1.00																												
Ln(Restaur)	(D)	0.04	0.35	-0.25	1.00																											
Ln(Travel)	(E)	0.04	0.71	0.23	0.62	1.00																										
Ln(Market)	(F)	0.09	0.52	0.11	0.27	0.58	1.00																									
Road access	(G)	0.03	-0.03	-0.04	0.04	0.01	0.04	1.00																								
Ln(Water)	(H)	-0.02	0.70	0.24	0.36	0.74	0.30	0.00	1.00																							
Ln(Hospital)	(I)	0.02	0.35	-0.31	0.65	0.45	0.31	0.04	0.35	1.00																						
Internet	(J)	0.14	0.04	0.03	0.02	0.04	0.05	0.01	0.04	0.03	1.00																					
Computer	(K)	0.16	0.04	0.04	0.02	0.06	0.05	0.02	0.05	0.02	0.77	1.00																				
Server	(L)	0.09	0.02	0.02	0.03	0.05	0.04	0.01	0.03	0.01	0.31	0.34	1.00																			
Account	(M)	0.13	0.03	0.02	0.01	0.03	0.04	0.01	0.03	0.03	0.91	0.76	0.25	1.00																		
Bank apps	(N)	0.12	0.04	0.03	0.03	0.06	0.05	0.01	0.04	0.03	0.52	0.53	0.28	0.47	1.00																	
Educ_hb	(O)	0.09	0.03	0.02	0.05	0.07	0.05	0.01	0.05	0.02	0.14	0.17	0.17	0.13	0.14	1.00																
Educ_b	(P)	0.10	0.04	0.04	0.06	0.11	0.09	0.03	0.07	0.02	0.18	0.22	0.12	0.17	0.15	-0.02	1.00															
Educ_hd	(Q)	0.05	0.00	0.01	0.01	0.03	0.02	0.02	0.00	0.00	0.08	0.09	0.02	0.07	0.06	-0.02	-0.05	1.00														
Educ_d	(R)	0.02	0.00	-0.01	0.05	0.03	0.01	0.01	0.02	0.03	0.03	0.03	0.00	0.03	0.02	-0.02	-0.05	-0.05	1.00													
Educ_v	(S)	0.02	0.01	0.00	0.01	0.03	0.03	0.02	0.02	0.01	-0.01	-0.01	-0.01	-0.01	0.00	-0.02	-0.04	-0.04	-0.04	1.00												
Foreign	(T)	0.09	-0.05	0.04	-0.05	-0.03	-0.03	0.02	-0.02	-0.02	0.07	0.07	0.06	0.06	0.04	0.04	0.04	0.03	0.00	0.03	1.00											
Trade_service	(U)	-0.02	-0.02	-0.01	0.05	0.02	0.04	-0.02	-0.01	0.02	0.01	-0.01	-0.01	0.01	-0.01	-0.01	0.00	0.00	0.01	0.01	0.04	1.00										
Manufactor	(V)	0.02	0.02	0.01	-0.05	-0.02	-0.04	0.02	0.01	-0.02	-0.01	0.01	0.01	-0.01	0.01	0.01	0.00	0.00	-0.01	-0.01	-0.04	-1.00	1.00									
Agriculture	(W)	0.05	-0.01	-0.03	0.00	-0.02	0.00	0.01	0.01	0.02	0.00	0.01	0.00	0.01	0.00	0.02	0.01	0.00	0.00	-0.01	0.01	-0.20	0.20	1.00								
Small	(X)	0.04	0.04	0.04	0.04	0.09	0.07	0.03	0.08	0.02	0.22	0.25	0.13	0.20	0.19	0.09	0.16	0.07	0.02	0.01	0.11	-0.13	0.13	0.02	1.00							
Medium	(Y)	0.05	0.02	0.02	0.02	0.04	0.02	0.01	0.03	0.01	0.11	0.13	0.14	0.10	0.11	0.09	0.06	0.02	0.00	0.00	0.05	-0.02	0.02	0.01	-0.01	1.00						
Large	(Z)	0.04	0.01	0.02	0.02	0.03	0.02	0.01	0.03	0.01	0.10	0.12	0.16	0.10	0.08	0.14	0.06	0.00	0.00	0.00	0.08	-0.06	0.06	0.04	-0.01	0.00	1.00					
Female	(AA)	-0.04	0.06	0.01	0.03	0.07	0.08	0.06	0.03	0.01	-0.05	-0.06	-0.04	-0.04	-0.04	-0.06	-0.06	-0.06	-0.04	-0.02	-0.09	0.07	-0.07	-0.07	-0.09	-0.03	-0.03	1.00				
Firm_age	(AB)	0.01	0.11	0.03	0.07	0.11	0.05	0.02	0.10	0.06	0.01	0.01	0.01	0.01	0.02	0.01	-0.02	-0.03	0.02	0.03	-0.04	-0.12	0.12	-0.02	0.03	0.01	0.03	0.07	1.00			
Finace	(AC)	0.11	-0.05	0.01	-0.02	-0.04	0.00	0.01	-0.08	-0.02	0.10	0.09	0.04	0.10	0.07	0.02	0.03	0.01	0.01	0.01	-0.04	-0.02	0.02	0.01	0.09	0.04	0.03	-0.03	0.01	1.00		
Export	(AD)	0.04	0.00	0.01	0.00	0.00	-0.01	0.01	0.00	0.00	0.04	0.05	0.02	0.04	0.02	0.02	0.03	0.00	0.01	-0.01	0.04	-0.08	0.08	0.03	0.07	0.03	0.09	-0.02	0.01	0.02	1.00	
Urban	(AE)	0.13	0.06	0.07	0.11	0.18	0.21	0.16	0.07	0.04	0.14	0.13	0.06	0.12	0.10	0.06	0.13	0.08	0.06	0.06	0.07	0.11	-0.11	-0.04	0.09	0.03	0.02	0.16	0.10	0.08	-0.01	1.00

Source: Authors.

Table A6: Heteroskedasticity Detected for Regression Model (for full sample)

* For equation 1	* For equation 2	* For equation 3
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 1556.26 Prob > chi2 = 0.0000	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 1648.21 Prob > chi2 = 0.0000	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 822.60 Prob > chi2 = 0.0000

Source: Authors.

Table A7: Heteroskedasticity Detected for Regression Model (for trade and services sector)

* For equation 1	* For equation 2	* For equation 3
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 1195.48 Prob > chi2 = 0.0000	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 1802.89 Prob > chi2 = 0.0000	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 668.69 Prob > chi2 = 0.0000

Source*:* Authors.

Table A8: Heteroskedasticity Detected for Regression Model (for manufacturing sector)

* For equation 1	* For equation 2	* For equation 3
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 527.73 Prob > chi2 = 0.0000	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 312.65 Prob > chi2 = 0.0000	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 238.31 Prob > chi2 = 0.0000

Source: Authors.

Table A9: Heteroskedasticity Detected for Regression Model (for agriculture sector)

* For equation 1	* For equation 2	* For equation 3
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 2.19 Prob > chi2 = 0.1393	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 0.48 Prob > chi2 = 0.4872	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity Ho: Constant variance Variables: fitted values of ln_flp chi2(1) = 2.62 Prob > chi2 = 0.1053

Source: Authors.

Table A10: Impact of Amenities on Firm Performance in Trade and Services Sector

Independent Variables	Definition	Equation 1		Equation 2		Equation 3	
		Coefficient	t	Coefficient	t	Coefficient	t
Ln(Cap)	***Logarithm of capital ratio to labor***	0.3404 ***	27.32	0.3405 ***	26.95	0.3214 ***	26.57
Amenity (AM)							
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	0.1376 ***	6.11				
Airport	Province has the airport	0.1007 ***	4.63				
Ln(Restaur)	Natural logarithmic of number of restaurants	0.0127	1.06				
Ln(Travel)	Natural logarithmic of number of travel agents	0.0317 ***	2.90				
Ln(Market)	Natural logarithmic of number of village have the market	0.1428 ***	8.01				
Road access	Road access at all season to village	0.8458 ***	18.28				
Ln(Water)	Natural logarithmic of number of village have safe water	0.0805	1.20				
Ln(Hospital)	Natural logarithmic of number of village have the hospital	0.1034 ***	4.07				
Information communication technology (ICT)							
Internet	Firm has internet connection device	0.5579 ***	16.10				
Computer	Firm has computer/tablet for runing bussiness			-0.0151	-0.24		
Server	Firm has equipment of ICT as server			0.0761	0.58		
Account	Firm uses accounting system program, design program			0.4992 ***	10.16		
Bank apps	Firm uses electronic bank or bank apps for payment pattern			0.1290 *	1.77		
Human Capital (HC)							
Educ_hb	The entrepreneur completed higher than bachelor			0.1274	1.25		
Educ_b	The entrepreneur completed bachelor			0.2486 ***	6.60		
Educ_hd	The entrepreneur completed higher diploma			0.1839 ***	5.19		
Educ_d	The entrepreneur completed diploma			0.1423 ***	3.97		
Educ_v	The entrepreneur completed vocational/technical			0.2466 ***	6.25		
Foreign	The firm with foreign partnership/Foreign ownership of firm			0.3668 ***	11.45		
Firm size (FS)							
Small	Small enterprises (6 - 50 staffs)					-0.1323 ***	-4.07
Medium	Medium enterprises (51 - 99 staffs)					0.2844	0.94
Large	Large enterprises (100 staffs and above)					1.1052 ***	2.56
Other factors (OF)							
Female	Gender of entrepreneur is female					0.1949 ***	12.92
Firm_age	Number of year has run bussiness					0.0205 ***	16.93
Finace	The firm access to finance by received loan for runing business					0.4056 ***	16.45
Export	The firm export their products to abroad					0.4561 *	1.77
Urban	The firm located at urban area					0.6449 ***	40.44
Cons	***Constant***	8.4389 ***	27.93	10.9547 ***	50.72	10.7178 ***	51.92
	Number of observation	37,859		37,859		37,859	
	F-statistics	302.34		177.67		573.90	
	Prob > F	0.0000		0.0000		0.0000	
	R-squared	0.1457		0.1237		0.1800	

Note: The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values, and heteroskedasticity has been tested and corrected.

Source: Authors.

Table A11: Impact of Amenities on Firm Performance in the Manufacturing Sector

Independent Variables	Definition	Equation 1		Equation 2		Equation 3	
		Coefficient	t	Coefficient	t	Coefficient	t
Ln(Cap)	***Logarithm of capital ratio to labor***	0.4157 ***	11.16	0.4042 ***	11.00	0.3934 ***	10.96
Amenity (AM)							
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	-0.1694 ***	-2.97				
Airport	Province has the airport	0.1333 ***	2.59				
Ln(Restaur)	Natural logarithmic of number of restaurants	0.1090 ***	3.98				
Ln(Travel)	Natural logarithmic of number of travel agents	-0.0074	-0.27				
Ln(Market)	Natural logarithmic of number of village have the market	0.2197 ***	5.40				
Road access	Road access at all season to village	0.1789	1.36				
Ln(Water)	Natural logarithmic of number of village have safe water	-0.0721	-0.45				
Ln(Hospital)	Natural logarithmic of number of village have the hospital	0.2601 ***	4.25				
Information communication technology (ICT)							
Internet	Firm has internet connection device	0.8914 ***	8.87				
Computer	Firm has computer/tablet for runing bussiness			0.3002 *	1.63		
Server	Firm has equipment of ICT as server			0.1134	0.30		
Account	Firm uses accounting system program, design program			0.4825 ***	3.76		
Bank apps	Firm uses electronic bank or bank apps for payment pattern			0.0052	0.02		
Human Capital (HC)							
Educ_hb	The entrepreneur completed higher than bachelor			0.2912	1.35		
Educ_b	The entrepreneur completed bachelor			0.4429 ***	3.39		
Educ_hd	The entrepreneur completed higher diploma			0.5004 ***	5.83		
Educ_d	The entrepreneur completed diploma			0.4051 ***	4.70		
Educ_v	The entrepreneur completed vocational/technical			0.5727 ***	6.90		
Foreign	The firm with foreign partnership/Foreign ownership of firm			0.5023 ***	3.67		
Firm size (FS)							
Small	Small enterprises (6 - 50 staffs)					0.1562 ***	2.96
Medium	Medium enterprises (51 - 99 staffs)					0.5016 ***	0.83
Large	Large enterprises (100 staffs and above)					0.4957	1.56
Other factors (OF)							
Female	Gender of entrepreneur is female					-0.2275 ***	-6.97
Firm_age	Number of year has run bussiness					-0.0018	-0.96
Finace	The firm access to finance by received loan for runing business					0.6103 ***	10.71
Export	The firm export their products to abroad					0.6269 ***	4.19
Urban	The firm located at urban area					0.6888 ***	19.87
Cons	***Constant***	9.0939 ***	10.07	9.2955 ***	14.90	9.3439 ***	15.15
	Number of observation	6,525		6,525		6,525	
	F-statistics	66.05		58.92		150.85	
	Prob > F	0.0000		0.0000		0.0000	
	R-squared	0.2031		0.1965		0.2537	

Note: The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values, and heteroskedasticity has been tested and corrected.

Source: Authors.

Table A12: Impact of Amenities on Firm Performance in the Agriculture Sector

Independent Variables	Definition	Equation 1		Equation 2		Equation 3	
		Coefficient	t	Coefficient	t	Coefficient	t
Ln(Cap)	***Logarithm of capital ratio to labor***	0.5278 ***	10.17	0.5311 ***	10.75	0.5610 ***	11.47
Amenity (AM)							
Ln(HGR)	Natural logarithmic of number of hotels, guesthouses and resorts	0.7163 ***	3.12				
Airport	Province has the airport	-0.2353	-0.86				
Ln(Restaur)	Natural logarithmic of number of restaurants	-0.0562	-0.40				
Ln(Travel)	Natural logarithmic of number of travel agents	0.0204	0.17				
Ln(Market)	Natural logarithmic of number of village have the market	-0.3300 *	-1.92				
Road access	Road access at all season to village	0.2879	0.46				
Ln(Water)	Natural logarithmic of number of village have safe water	-0.4619	-0.78				
Ln(Hospital)	Natural logarithmic of number of village have the hospital	-0.2065	-0.60				
Information communication technology (ICT)							
Internet	Firm has internet connection device	1.3263 ***	4.05				
Computer	Firm has computer/tablet for runing bussiness			0.7233	1.31		
Server	Firm has equipment of ICT as server			-0.4216	-0.58		
Account	Firm uses accounting system program, design program			0.6479 **	2.23		
Bank apps	Firm uses electronic bank or bank apps for payment pattern			-0.6554	-0.95		
Human Capital (HC)							
Educ_hb	The entrepreneur completed higher than bachelor			1.1757 **	2.20		
Educ_b	The entrepreneur completed bachelor			0.5798 ***	2.53		
Educ_hd	The entrepreneur completed higher diploma			-0.9115 ***	-3.13		
Educ_d	The entrepreneur completed diploma			-0.1482	-0.62		
Educ_v	The entrepreneur completed vocational/technical			0.5338	1.13		
Foreign	The firm with foreign partnership/Foreign ownership of firm			-0.1403	-0.36		
Firm size (FS)							
Small	Small enterprises (6 - 50 staffs)					0.4254 **	2.02
Medium	Medium enterprises (51 - 99 staffs)					0.3752	0.38
Large	Large enterprises (100 staffs and above)					0.4887	0.60
Other factors (OF)							
Female	Gender of entrepreneur is female					-0.3287 *	-1.80
Firm_age	Number of year has run bussiness					0.0206	1.57
Finace	The firm access to finance by received loan for runing business					0.3961 **	1.95
Export	The firm export their products to abroad					1.1025 **	2.15
Urban	The firm located at urban area					0.3491 **	2.18
Cons	***Constant***	5.6182 **	2.15	7.1969 ***	8.22	6.4562 ***	7.35
	Number of observation	358		358		358	
	F-statistics	19.64		149.52		20.83	
	Prob > F	0.0000		0.0000		0.0000	
	R-squared	0.4132		0.4194		0.3986	

Note: The superscripts ***, **, and * denote rejection at 1%, 5%, and 10% critical values, and heteroskedasticity has been tested and corrected.

Source: Authors.

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