

## Chapter I

### Facilitating participation of SMEs in trade:

#### Financing and communications technology as key enablers <sup>15</sup>

### Introduction

Small and medium-sized enterprises (SMEs) are key contributors to economic development, both in developed and developing countries. Kushnir and others (2010) find that formal SMEs contribute up to 45 per cent of the world's employment on average; and up to 33 per cent of employment in developing countries. The fact that countries in higher income groups typically have higher SME employment highlights the need to support the development of such enterprises in lower income developing countries (figure 1).

Figure 1. SME employment and SMEs per 1,000 people by income group



Source: International Finance Corporation (online accessed in January 2014 at [www.ifc.org/wps/wcm/connect/Industry\\_EXT\\_Content/IFC\\_External\\_Corporate\\_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators](http://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators)).

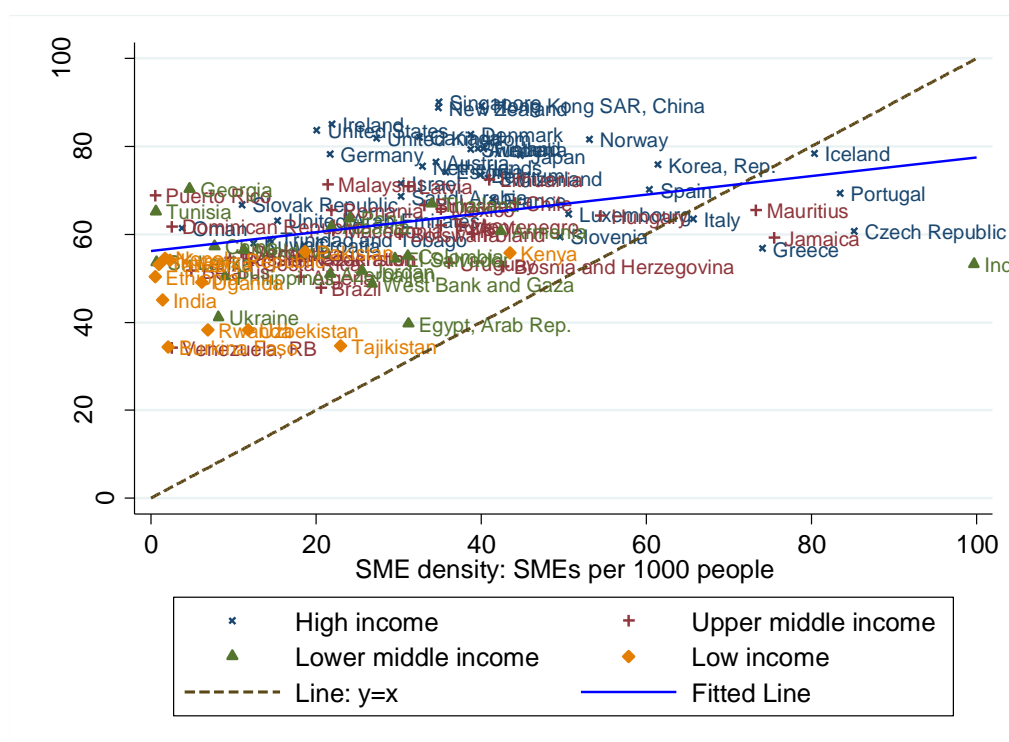
Note: Average of latest data available for each country is used; Low income: USD 975 or less; lower middle income: USD 976 to US\$ 3,855; upper-middle income: US\$ 3,856 to US\$ 11,905; high income: US\$ 11,906 or more.

<sup>15</sup> This chapter is a shortened, updated and edited version of Duval and Utoktham (2014). The full and original paper is available at: [www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14\\_1.pdf](http://www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14_1.pdf)

As shown in figure 2, a conducive domestic business environment – including easy access to business services (e.g., financial and information and communications technology services) as well as streamlined investment and business regulations and procedures (e.g., to start a business, pay taxes or hire employees) – is essential for SME development. In particular, as international trade remains an important engine of growth and development in most developing economies, facilitating the participation by networks (IPNs), has become one of the keys to achieving more inclusive and sustainable development in these economies.

In that context, the objective of the analysis presented here is to identify trade facilitation-related factors that affect the participation of SMEs in direct or indirect exporting, with particular attention given to the efficiency of trade procedures as well as the use of different sources of financing, modern information and communications technologies (ICTs) and the quality of the logistics infrastructure. The study also assesses how the importance of the various trade facilitation factors vary, depending on whether firms engage in international trade through direct exports or through a production network, and whether they are in the Asia-Pacific region.

**Figure 2. Ease of doing business and SME density, by income group**



Source: International Finance Corporation (accessed online in January 2014 at [www.ifc.org/wps/wcm/connect/Industry\\_EXT\\_Content/IFC\\_External\\_Corporate\\_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators](http://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators)) and Doing Business: Distance to Frontier (online: <http://www.doingbusiness.org/data/distance-to-frontier>)

Note: Latest data of SME density and doing business score in a corresponding year are used for scatterplot.

The definition of SMEs usually varies across countries as well as international organizations. This paper follows the World Bank's Enterprise Survey definition: (a) small enterprises are firms with 5 to 19 employees; (b) medium enterprises are firms with 20-99 employees; and (c) large enterprises are firms with 100 employees or more.<sup>16</sup> For the purpose of this study, participation by SMEs in IPN follows the definition by Wignaraja (2012), i.e., firms are considered members of a production network if they export directly or indirectly.

Following a brief review of the existing empirical economic literature on the determinants of SME participation in exporting (section A) and a brief review of obstacles to SME establishment and operations based on the most recent World Bank Enterprise Survey data (section B), empirical models of SME export participation are estimated and discussed in section C. Conclusion and policy recommendations that stem from the results are presented in section D.

## A. Review of the literature

Previous empirical literature has identified a relatively large number of factors that affect a firm's decision to export. These factors may be broadly categorized as firm characteristics, including measures of a firm's efficiency, and factors related to the external environment. A firm's characteristics that are often cited in the literature include size, foreign ownership, productivity, human capital and technological adoption. Other characteristics that have been studied for their impact on participation in exporting – and typically used to infer a firm's efficiency – include sourcing of input/raw materials for production, the business sector, access to knowledge and technology, capital stock, productivity and age of the firm.

External factors of importance to the participation of SMEs in trade typically relate to the quality of the domestic business climate, which may be referred to as behind-the-border factors from a trade facilitation perspective. Other external factors that are often referred to include access to finance, quality of institutions, transport connectivity, quality of technology and rate of adoption in the home country as well as the complexity of customs procedures. A summary of recent empirical studies of firms' participation in exporting is given in table 1.

Overall, while a relatively large number of studies have been conducted on determinants of export participation, few have focused explicitly on SMEs, particularly in developing countries. Unlike the study presented here, the past literature also does not distinguish between determinants of direct export and IPN participation, nor does it examine differences between firms globally and in the Asia-Pacific region. Finally, while access to finance is often highlighted as an important factor, the literature provides no analysis of the relative importance of different forms of financing. The importance of other trade facilitation-related factors included in the present study has also been largely ignored in previous studies.

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<sup>16</sup> Another widely-cited definition of SMEs (referred to as micro, small and medium-sized enterprises; MSMEs) is from that used by the European Commission ([http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index\\_en.htm](http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-definition/index_en.htm)). However, this study follows the definition of SMEs from the World Bank's Enterprise Survey to reflect more on the size in developing countries. For a country-specific SME definition, see IFC ([www.ifc.org/wps/wcm/connect/Industry\\_EXT\\_Content/IFC\\_External\\_Corporate\\_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators](http://www.ifc.org/wps/wcm/connect/Industry_EXT_Content/IFC_External_Corporate_Site/Industries/Financial+Markets/msme+finance/sme+banking/msme-countryindicators)).

**Table 1. Summary of recent empirical studies of firms' participation in exporting**

Research/study	Summary and findings related to SMEs, export participation, institutional arrangements, or inclusiveness
Amornkitvikai and others (2012). Factors affecting the export participation and performance of Thai manufacturing small and medium-sized enterprises.	The study used cross-sectional data (2007) on Thai manufacturing SMEs to identify factors affecting export participation. It found that government assistance, foreign ownership, municipal location, R&D and skilled labour have a significant positive effect on the participation by a firm in the export market. However, size of firm (small or medium), age and labour productivity had a mixed effect on export participation, depending on the models.
Amrouk and others (2013). The impact of commodity development projects on smallholders' market access in developing countries: Case studies of FAO/CFC projects.	The study found that extension services, provided credit as well as change in agricultural assets are crucial determinants of market access by smallholders. Smallholders with better wealth endowment and location tend to be those who gain access to markets. Improvement of credit support activities is essential in enabling market participation, particularly by poorer smallholders.
Bellone and others (2008).. Financial constraints as a barrier to export participation.	The study assessed the link between financial constraints and export participation of French manufacturing firms from 1996 to 2004. The results support the fact that financial constraints are barriers to export participation. Characteristics of firms – i.e., size, wage and productivity – have a positive effect on export participation. Firms with either domestic or foreign subsidiaries tend to export more. In addition, export starters do not exhibit ex ante financial advantages and there is no significant evidence that firms who become exporters will face fewer financial constraints.
Cardoza and others (2012).. Institutional determinants of Chinese SMEs' internationalization – the case of Jiangsu Province.	The study assessed factors affecting export intensity (ratio of international sales to total sales) in Jiangsu Province of China. Estimated using OLS, the model suggests that limited access to finance, domestic inefficiencies in logistics and distribution, costs of internationalization (including international transport costs and payment collection costs), and adverse regulatory frameworks affect decision to participate in export markets. Three other factors, i.e., government assistance, state participation, and public procurement, are not statistically significant.
Harvie and others (2010). Firm characteristic determinants of SME participation in production network.	This study identified determinants of participation in production network in 2009 in some ASEAN countries and China. Productivity, foreign ownership, financial characteristics, innovation efforts, and managerial/entrepreneurial attitudes are important firm characteristics in determining SME participation in the network. Firm size also matters.
Hessels and Terjesen (2007). SME choice of direct and indirect export modes: resource dependency and institutional theory perspectives.	The study examined participation in the export market in the Netherlands. It found that institutional theory (which describes how firms adopt legitimate business/industry practices) may be relevant in explaining choice of whether or not to export, whereas resource dependency theory (which describes how firms in the industry access resources) may be relevant in explaining the choice between becoming direct or indirect exporters.
Hoekman and Shepherd (2013). Who profits from trade facilitation	The study found that export time – as a measure of trade facilitation – size of firms and ownership are positively related to participation in direct export. Trade facilitation matters for all firm sizes.

initiatives?	
Li and Wilson (2009). Trade facilitation and expanding the benefits of trade: evidence from firm level data.	The study showed that improvement in trade facilitation tends to increase probability of SMEs to export. In particular, better ICT services, streamlined clearance and less transportation obstacles increase the chance of export participation.
Ottaviano and Martincus (2009). SMEs in Argentina: Who are the exporters?	The study examined the determinants of export participation in Argentina. It found that the number of employees, sourcing input from abroad, investment in product improvement and average productivity (measured by sales per employee) are associated with higher exporting probability.
Roberts and Tybout (1997). The decision to export in Colombia: an empirical model of entry with sunk costs.	The study found sunk costs (measured by past export participation), firm-specific characteristics (measured by industry dummy, ownership structure and location), efficiency of firms (measured by capital stock and age of firms) are significant factors determining current export participation.
Wignaraja (2012). Engaging Small and Medium-sized enterprises in production networks: Firm-level analysis of five ASEAN economies.	The study analysed the determinants of export participation in ASEAN. Firm size, foreign ownership and higher workers' education, obtaining international-agreed certificates (such as ISO) or foreign technology and having access to bank credit induces SMEs to participate in exporting. Firm age is negatively associated with the participation in exporting. Practices by competitors in informal sectors, political instability, and access to finance, tax rates and corruption were also found to be the top five obstacles in conducting SME business.

## B. Exporting SMEs: Preliminary insights derived from firm-level data

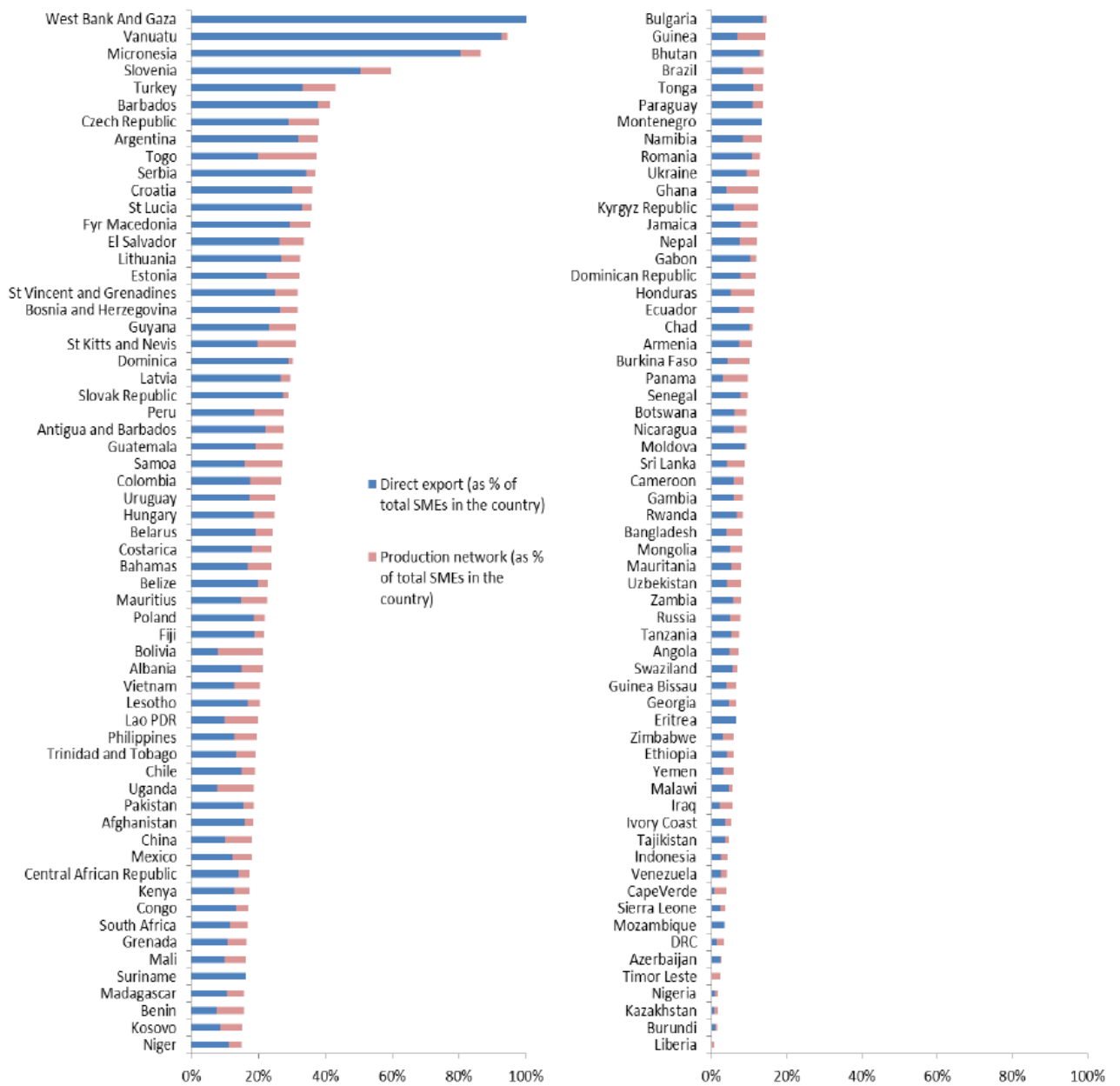
Given the global and regional scope of the analysis, this study relies on the standardized dataset of the World Bank Enterprise Surveys (2006-2014) on enterprises and their characteristics in 122 countries. Four of the Enterprise Surveys are firm-level surveys of a representative sample of an economy's private sector. Eighty per cent of the 53,500 firms included in the standardized dataset are SMEs. The demographic description of export participation by SMEs and large enterprises (LEs) in the dataset is provided in annex table 1(a).

An overwhelming majority of SMEs do not engage in either direct or indirect exporting. Those who do export, however, do so directly rather than indirectly.<sup>17</sup> Figure 3 illustrates the percentage of SME firms engaged in direct exporting or in an IPN (i.e., defined here as engaged in direct and/or indirect exporting) in each country included in the dataset. On average, only 14 per cent and 19 per cent of SMEs in the Enterprise Survey participate in direct exporting and IPN, respectively. These proportions are similar to those in the Asia-Pacific region.<sup>18</sup>

<sup>17</sup> This is also true for large enterprises see annex in full paper for details). Available at [www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14\\_1.pdf](http://www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14_1.pdf).

<sup>18</sup> See annex in full paper for details. Available at [www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14\\_1.pdf](http://www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14_1.pdf).

**Figure 3. Percentage of SMEs involved in direct exporting or IPNs**



Source: Authors' calculation based on World Bank Enterprise (Version 5, February 2014), Available at <http://www.enterprisesurveys.org/>

## 1. Obstacles to business operations

Table 2 shows the percentage of firms in the dataset that identified one of 15 obstacles as the most important in their business operations. Access to finance is the top obstacle (among 15) reported by SME exporter, both globally and in Asia and the Pacific, followed by obstacles of electricity and tax rates. An inadequately educated workforce ranks as one of the main obstacles for LEs – more so than for SMEs. Customs and trade regulations and transportation also feature among the top 10 main obstacles in exporters' operations.

Even though obstacles may not vary much among SMEs and large enterprises, an interesting finding is that SME exporters in Asia and the Pacific appear to be relatively more affected than LEs by political instability, transportation, tax administration and access to land, and to a lesser extent, by practices of the informal sector, customs and trade regulations, and tax rates. This differs somewhat from the global overall situation, where SME exporters appear to be relatively more affected than LEs by access to finance, corruption, and customs and trade regulations.

**Table 2. Most important obstacle in business operations\***

(Unit: Per cent)

		Access to finance		Electricity		Tax rates		Practices of the informal sector		Political instability	
	Export status	LEs	SMEs	LEs	SMEs	LEs	SMEs	LEs	SMEs	LEs	SMEs
Overall	Exporter	13.2	15.6	12.1	12.2	10.3	10.2	9.9	10.1	10.7	9.7
	Non- exporter	11.5	17.0	13.7	13.1	9.0	10.8	11.9	12.2	11.0	8.3
Asia-Pacific	Exporter	15.4	14.0	11.1	10.9	12.1	12.5	8.7	9.4	11.4	12.5
	Non- exporter	13.1	16.2	7.7	10.4	11.7	13.1	9.8	10.9	17.8	11.2
Others	Exporter	12.6	16.0	12.4	12.6	9.8	9.6	10.2	10.3	10.6	8.9
	Non- exporter	11.1	17.2	15.2	13.9	8.3	10.1	12.4	12.5	9.3	7.5
		Inadequately educated workforce		Corruption		Customs and trade regulations		Transportation		Crime, theft and disorder	
	Export status	LEs	SMEs	LEs	SMEs	LEs	SMEs	LEs	SMEs	LEs	SMEs
Overall	Exporter	12.6	8.2	5.3	6.6	4.3	5.9	5.5	5.1	2.9	3.4%
	Non- exporter	10.8	7.7	5.2	6.6	4.0	3.1	4.0	3.3	6.0	5.6%
Asia-Pacific	Exporter	9.7	8.6	9.5	7.9	4.2	4.6	5.3	6.8	1.7	2.0%
	Non- exporter	11.9	9.0	5.7	6.4	3.8	2.3	4.2	4.6	3.9	3.9%
Others	Exporter	13.4	8.1	4.1	6.3	4.4	6.3	5.6	4.6	3.2	3.8%
	Non- exporter	10.6	7.3	5.1	6.6	4.1	3.3	3.9	2.9	6.6	6.0%
		Tax administration		Access to land		Business licensing and permits		Labour regulations		Courts	
	Export status	LEs	SMEs	LEs	SMEs	LEs	SMEs	LEs	SMEs	LEs	SMEs
Overall	Exporter	3.5	3.3	2.4	3.0	2.4	2.8	4.0	2.7	0.8	1.1
	Non- exporter	3.2	3.2	2.9	3.3	2.0	2.5	3.4	2.5	1.4	1.0
Asia-Pacific	Exporter	1.8	2.8	1.4	3.0	3.5	2.1	4.2	2.7	0.2	0.1
	Non- exporter	2.2	3.1	3.5	3.3	1.4	3.1	2.9	1.8	0.3	0.5
Others	Exporter	4.0	3.5	2.7	3.0	2.2	3.0	4.0	2.7	0.9	1.4
	Non- exporter	3.5	3.2	2.7	3.2	2.1	2.3	3.5	2.7	1.7	1.2

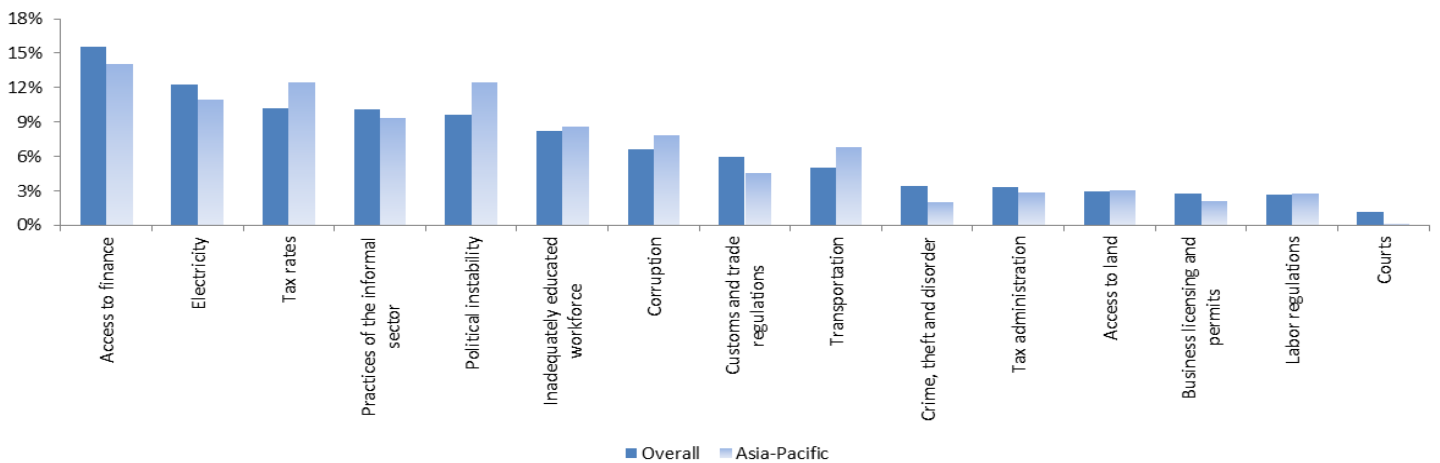
Source: Authors' calculation based on World Bank Enterprise Surveys (version 5, February 2014).

Available at [www.enterprisesurveys.org/CustomQuery](http://www.enterprisesurveys.org/CustomQuery).

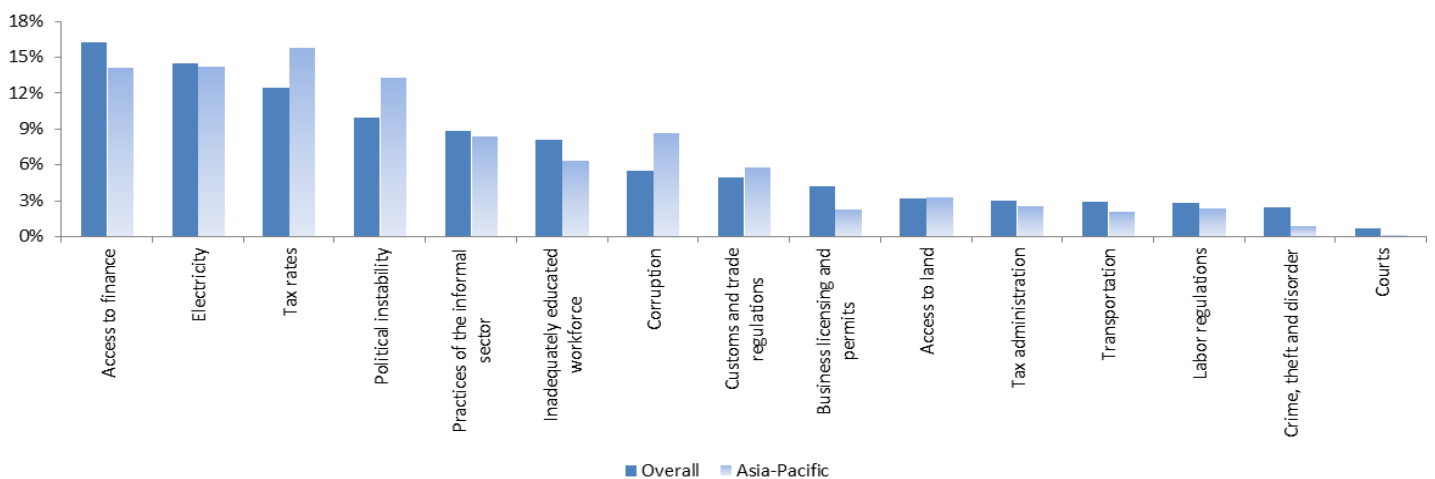
\* Each firm was asked which of 15 obstacles was most important to its operation.

Figures 4 and 5 list the obstacles that SME exporters identified as the most important in their business operations. On average, SME exporters reported similar obstacles regardless of whether all sectors are considered (including agriculture and services) or only the manufacturing sector: Access to finance, tax rates and electricity remain the top 3 obstacles at the global level. However, SME exporters in Asia and the Pacific appear to be relatively more concerned than others about tax rates, political instability and corruption, and relatively less so about access to finance and electricity.

**Figure 4. Most important obstacle in SME exporters' business operations (all sectors)\***



**Figure 5. Most important obstacle in SME exporters' business operations (manufacturing sector)\***



Source: Authors, calculated from Enterprise Surveys (Version 5, February 2014:

<http://www.enterprisesurveys.org/CustomQuery>)

\*Each firm was asked which of 15 obstacles was most important to its operation



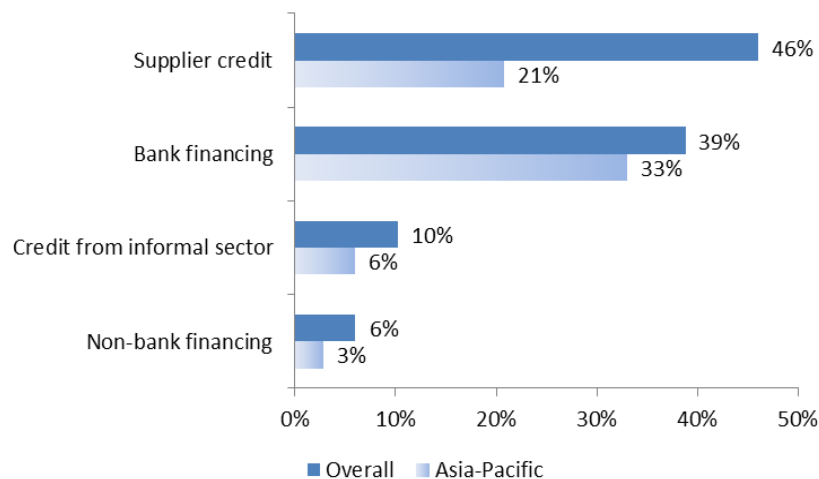
Asia-Pacific SME manufacturing exporters identified customs and trade regulations as a more important obstacle than transportation, although transportation was seen as more important than trade regulations when SME exporters from the agriculture and services sectors were included. This suggests that the transport infrastructure in rural areas and urban centres in Asia-Pacific may be relatively more underdeveloped than that available to manufacturing exporters – typically located in manufacturing zones and/or near major ports.

## 2. Sources of financing

Given that access to finance is the number one obstacle identified by SMEs, understanding how SME exporters finance their operations is important. Figures 6 and 7 depict the types of working capital used by SMEs engaged in direct exports or IPNs. Supply chain financing (supplier credit) is the most important source of financing for exporting SMEs (46 per cent), followed by bank financing. These two sources of financing account for about 80 per cent of exporting SMEs’ working capital at the global level. Reliance on non-bank financing (e.g., factoring companies) is very limited (6 per cent) and less than reliance on credit from the informal sector (10 per cent).

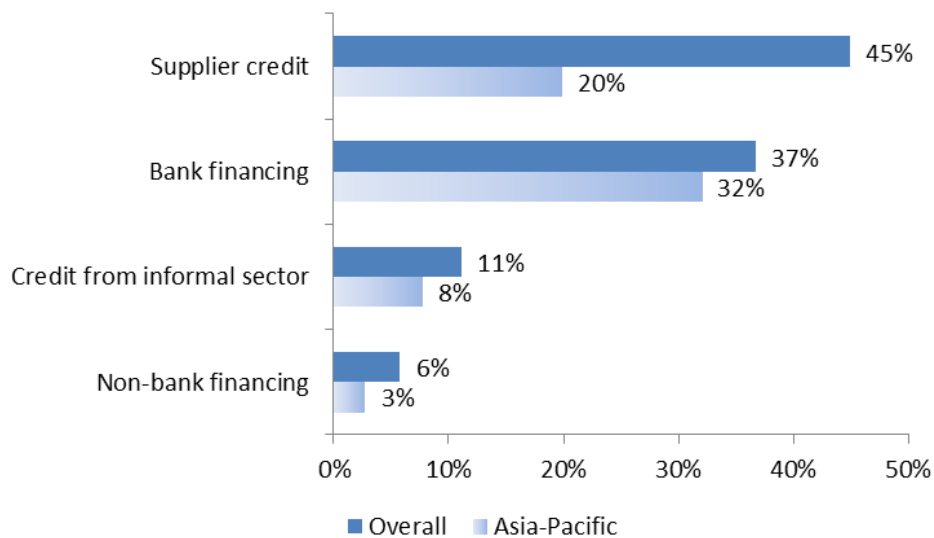
The available data suggest that, in contrast to the global situation in developing countries, exporting SMEs in Asia and the Pacific rely more on banks than on supplier credit to finance their operations. Almost 60 per cent of Asian and Pacific exporting SMEs rely exclusively on internal financing, while only 40 per cent do so globally.

**Figure 6. Sources of external financing for direct export SMEs**



Source: Authors’ calculation based on World Bank Enterprise Surveys (Version 5, February 2014 – [www.enterprisesurveys.org/CustomQuery](http://www.enterprisesurveys.org/CustomQuery))

**Figure 7. Sources of external financing for IPN SMEs**

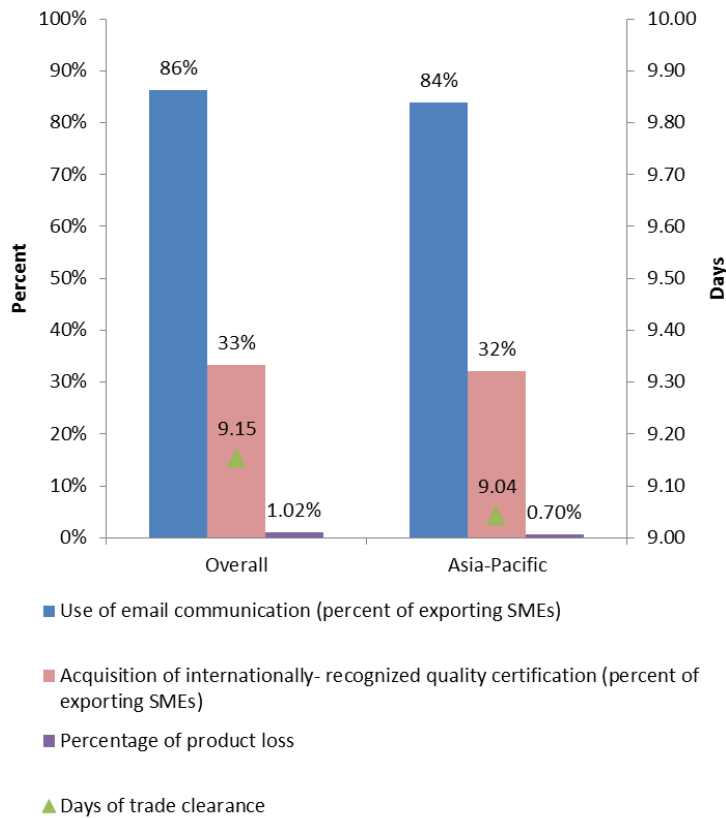


Source: Authors' calculation based on World Bank Enterprise Surveys (Version 5, February 2014 – [www.enterprisesurveys.org/CustomQuery](http://www.enterprisesurveys.org/CustomQuery)).

### **3. Trade facilitation and use of ICT**

Four indicators related to trade facilitation and use of ICT were identified in the firm-level dataset, i.e., internationally-recognized quality certification, percentage of product loss (as a proxy of logistics infrastructure quality), days of trade clearance and use of e-mail. The first three indicators provide indications of the ability of the firms in completing trade-related procedures in an efficient manner, while the last indicator is a proxy of exporting SMEs' use of modern ICT. Figure 8 provides an overview of these indicators for SMEs engaged direct exporting. The average levels for the use of e-mail communication, internationally recognized quality certification and percentage of product loss of exporting SMEs observed were found to be very similar at the global level and in Asia and the Pacific.

**Figure 8. Trade facilitation performance and ICT use of SMEs engaged in direct exporting**



Source: Authors' calculation based on World Bank Enterprise Surveys (Version 5, February 2014 [www.enterprisesurveys.org/CustomQuery](http://www.enterprisesurveys.org/CustomQuery)).

### C. Key factors in SME participation in exporting and IPNs

While the descriptive analysis of the World Bank Enterprise Survey data provides some preliminary insights of the obstacles faced by SMEs engaged in direct or indirect exporting, an empirical analysis is required to identify statistically significant characteristics and factors that distinguish SMEs participating in exporting and IPNs from those that do not. To formally estimate the relationship between various firm characteristics as well as trade facilitation and trade finance on the participation of firms in direct export and IPNs – in the manufacturing sector only – a series of regression models was used in the study.

The description of the variables used to specify various firm characteristics in the models of export and IPC participation are shown in Table 3- see annex 1 for technical details of the empirical model estimated. Econometric estimates of the models are reported in annex 2, from tables 2(a) to 2(d). More simply put, the impact of variables on SME participation in exports are listed in annex table 2(a) and IPNs in annex table 2(b) across firms of all sizes globally (model 1), SMEs globally (model 2), firms of all sizes within the Asia-Pacific subset

(model 3) and SMEs within the Asia-Pacific subset (model 4).<sup>19</sup> The marginal effects on SME participation in exports and IPNs are shown in annex tables 2(c) and 2(d), respectively.<sup>20</sup>

This study relied on the standardized World Bank Enterprise Survey data discussed above to estimate the models. As in Hoekman and Shepherd (2013), and to ensure that only the most reliable data were used, the dataset employed to estimate the models comprised only data from enterprise surveys for which survey administrators indicated that (a) questions in the survey were answered truthfully or somewhat truthfully, and (b) figures were taken directly from the record or estimates computed with some precision, i.e., data were dropped if either criterion was not satisfied. In addition, the dataset uses stratified random sampling based on size of firm, location and business sector.<sup>21</sup>

When considering the global dataset of SMEs (model 2), the importance of access to, and use of modern information and communications technology as well as international quality certification are found to be the key indicators to SME participation in exporting. Use of e-mail and international quality certification have the highest marginal effects of any other explanatory variables included in the models, with firms that either use e-mail or are certified being found at least 8 per cent more likely to be involved in exporting or IPN. The importance of modern information technology appears to be particularly crucial to participation in IPNs (as opposed to only direct exports), as the model suggests that firms using e-mail are 13 per cent more likely to be involved in such networks.

The results also confirm the importance of access to finance. Having access to formal external sources of working capital was also found to increase the probability of export participation on average for the global dataset, depending on the types of financing. Supply chain financing (supplier credit) was found to be highly significant, increasing the probability of SMEs participation in direct exporting and IPN participation probability by 2 per cent and 3.5 per cent, respectively. Non-bank financial institution credit is significant, both for SME direct exporting and IPN, and increases the probability of participation by 1.8 per cent and 3.1 per cent, respectively. Bank financing increases the probability of SME participation in direct export and IPN by 2.1 per cent and 4.4 per cent, respectively.<sup>22</sup> The results also highlight the importance of access to informal sources of financing (e.g., from family and friends), with those SMEs having such access being up to 2.7 per cent more likely to participate in IPNs – although apparently through indirect exports.

Logistics infrastructure and trade facilitation are found to be important factors affecting SME participation in export, with a 1 per cent increase in product loss during transit (a proxy for quality of infrastructure) reducing the likelihood that a firm would participate in direct export by approximately 0.3 per cent. A one day increase in the time taken to complete customs and related clearance processes also reduces the likelihood that a firm would participate in either direct export or IPNs by approximately 0.4 per cent.

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<sup>19</sup> See full paper annex for descriptive statistics of variables. The full working paper is available at [www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14\\_1.pdf](http://www.unescap.org/sites/default/files/Staff%20Working%20Paper%2003-14_1.pdf).

<sup>20</sup> Evaluation of marginal effects of explanatory variables is calculated at their means, i.e., they show how the dependent variable (e.g., direct export participation) changes as a result of a change of one given explanatory variable by one unit, holding all other variables at their average values.

<sup>21</sup> For more information on data stratification, see [www.enterprisesurveys.org//Methodology](http://www.enterprisesurveys.org//Methodology).

<sup>22</sup> All three formal sources of credit are significant when firms of all sizes are considered (model 1).

**Table 3 .Variable description and expected sign**

Variable	Unit	Expected signs	Source	Description
exporting_status	-		Author's calculation based on ESD <sup>23</sup>	Dummy variable indicating 1 if a firm participates in direct exporting; 0 otherwise.
pn_exporting_status	-		Author's calculation based on ESD	Dummy variable indicating 1 if a firm participates in IPN <sup>24</sup> ; 0 otherwise.
firm_age	Year	?	Author's calculation based on ESD	Age of a firm from its establishment to the year of survey.
foreign_ownership_pct	%	+	ESD	Percentage of foreign ownership.
unskilled2workers_pct	%	-	Author's calculation based on ESD	Percentage of unskilled labour to total labour.
dum_email	-	+	Author's calculation based on ESD	Dummy variable indicating 1 if a firm uses e-mail to communicate with clients/suppliers; 0 otherwise.
dum_qcert	-	+	Author's calculation based on ESD	Dummy variable indicating 1 if a firm obtains internationally-recognized quality certification; 0 otherwise
capu_pct	%	+	Author's calculation based on ESD	Capacity utilization.
dum_wk_bank_pct	-	+	Author's calculation based on ESD	Dummy variable indicating 1 if a firm has working capital financed by banks; 0 otherwise.
dum_wk_supp_pct	-	+	Author's calculation based on ESD	Dummy variable indicating 1 if a firm has working capital financed by supplier credit; 0 otherwise.
dum_wk_nonbank_pct	-	+	Author's calculation based on ESD	Dummy variable indicating 1 if a firm has working capital financed by non-bank financial institutions; 0 otherwise.
dum_wk_informal_pct	-	+	Author's calculation based on ESD	Dummy variable indicating 1 if a firm has working capital financed by informal sectors (e.g., Moneylenders, friends, relatives); 0 otherwise.
product_loss_pct	%	-	ESD	Percentage of products shipped to supply domestic markets lost due to breakage or spoilage.
days_tradeclearance	Day	-	Author's calculation based on ESD	Average number of days to clear imports and/or exports from customs; the country-average is used if firm-specific data are missing.

<sup>23</sup> ESD: Enterprise Survey Data. Available online at [www.enterprisesurveys.org/](http://www.enterprisesurveys.org/).

<sup>24</sup> Indication of a firm participating in a production network is when a firm participates in either direct or indirect exports or both, i.e., the sum of direct and indirect exports is greater than zero.

Foreign ownership was found to be statistically significant but its marginal effect on export participation was small. Other characteristics, such as firm age, the percentage of unskilled workers or capacity utilization, were generally not found to be significant in affecting SME participation in either direct or indirect exporting.

In comparing the marginal effects of the model estimates using firms of all sizes (model 1 and 3) rather than only SMEs (model 2 and 4), the time to complete customs and trade procedures was found to have a stronger effect on SME export participation than on large firms, providing further evidence of the importance of trade facilitation for SMEs.

In considering the estimates obtained using the Asia-Pacific SME dataset (model 4) as opposed to the Global SME dataset (model 2), the results remain broadly the same as those found for SMEs in developing countries globally. However, a few differences exist. The most striking one is the fact that the marginal effect of supplier credit on SME direct export participation is approximately twice that of the marginal effect of bank financing in Asia and the Pacific (3.2 per cent vs. 1.6 per cent), highlighting the importance of supply chain financing for the region. Access to informal finance was not found to be a significant determinant of either direct exporting or IPN participation for Asia-Pacific SMEs. The importance of international quality certification is relatively less important for Asia-Pacific SMEs, although it remains very significant. Finally, foreign ownership has a significant and positive, albeit minor, effect on export participation by Asia-Pacific SMEs.<sup>25</sup>

## **D. Conclusion and policy recommendations**

The objective of this study was to identify key firm characteristics as well as external factors affecting SME participation in direct exporting and IPNs. Enterprise level data from developing countries were analysed to identify the main obstacles to establishment and operation of direct and indirect small and medium-sized exporters. Models of SME exports and IPN participation were estimated, revealing the importance of several trade facilitation- and trade- related factors. Use of modern information and communication technology was found to be the most important factor in increasing the probability of participation by SMEs, both in direct exports and in IPNs, followed by international quality certification and access to finance. Poor logistic infrastructures as well as delays in customs and trade clearance were also found to significantly affect SME participation, both in direct and indirect exporting.

Looking specifically at Asia-Pacific SMEs, the analysis further highlighted the importance of supply chain financing in enabling SME participation in exports in that region, relative to other financing methods. In addition, comparing the marginal effects of various factors on SMEs and LEs, a reduction in customs and trade clearance times was found to increase the likelihood of participation by SMEs in exports or IPNs relatively greater than that of LEs.

With the aim of fostering more inclusive and sustainable development in the Asia-Pacific region, the following three main policy recommendations for developing national Governments and development partners can be drawn from the results of this study:

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<sup>25</sup> The robustness of the results was checked by re-estimating the models by alternatively dropping each of the factors, including trade clearance time. The results were found to be robust and still held both in the direct export and the IPN models. The results can be provided upon request.

- (a) Given the importance of ICT in enabling participation of SMEs in trade, prioritize efforts to provide affordable access to the Internet and related services, including building the capacity of SMEs and individuals in using the services;
- (b) Noting that (i) supplier credit was found to be at least as important an enabler of SME participation in exporting as is bank financing, and (ii) access to finance remains a key obstacle to SME development, encourage the further development of supply chain finance in partnership with the private sector in addition to the more traditional bank and non-bank financial services;
- (c) Recognizing that the streamlining of customs and trade procedures was found to be of particular benefits to SMEs, actively seek to simplify and increase transparency of the business environment in general, and trade procedures in particular, including through – but not limited to – implementation of measures included in the WTO trade facilitation agreements.

## Annex 1. Econometric model: Modelling export participation by SMEs

Following previous literature, binomial logit models were used to estimate the relationship between various firm characteristics as well as trade facilitation and trade finance on the participation of firms in direct export and IPNs. Country, year, sector, and firm-size fixed effects are included in the models. The models for direct export (D0) and IPN (P0) are:<sup>26</sup>

$$(D0): xifst = b_0 + b_1 (\text{firm\_ageifst}) + b_2 (\text{foreign\_ownership\_pctifst}) + b_3 (\text{unskilled2workers\_pctifst}) + b_4 (\text{dum\_emailifst}) + b_5 (\text{dum\_qcertifst}) + b_6 (\text{capu\_pctifst}) + b_7 (\text{dum\_wk\_bankifst}) + b_8 (\text{dum\_wk\_suppifst}) + b_9 (\text{dum\_wk\_nonbankifst}) + b_{10} (\text{dum\_wk\_informalifst}) + b_{11} (\text{product\_loss\_pctifst}) + b_{12} (\text{days\_tradedclearanceifst}) + \mu_i + \mu_f + \mu_s + \mu_t + \text{eifst}$$

$$(P0): pnifst = b_0 + b_1 (\text{firm\_ageifst}) + b_2 (\text{foreign\_ownership\_pctifst}) + b_3 (\text{unskilled2workers\_pctifst}) + b_4 (\text{dum\_emailifst}) + b_5 (\text{dum\_qcertifst}) + b_6 (\text{capu\_pctifst}) + b_7 (\text{dum\_wk\_bankifst}) + b_8 (\text{dum\_wk\_suppifst}) + b_9 (\text{dum\_wk\_nonbankifst}) + b_{10} (\text{dum\_wk\_informalifst}) + b_{11} (\text{product\_loss\_pctifst}) + b_{12} (\text{days\_tradedclearanceifst}) + \mu_i + \mu_f + \mu_s + \mu_t + \text{eifst}$$

for home country  $i$ , firm size  $f$ , sector  $s$ , at year  $t$  where,

$x$	denotes indicator variable of direct export participation: 1 if participating in direct export, 0 otherwise.
$pn$	denotes indicator variable IPN participation: 1 if participating in either direct or indirect export, 0 otherwise.
$\text{firm\_age}$	denotes years of formal operation of a firm (calculated by survey year minus year of formal establishment).
$\text{foreign\_ownership\_pct}$	denotes percentage of foreign ownership in a firm.
$\text{unskilled2workers\_pct}$	denotes percentage of unskilled labour to total workers.
$\text{dum\_email}$	denotes indicator variable of email communication: 1 if using e-mail to communicate with clients/suppliers, 0 otherwise.
$\text{dum\_qcert}$	denotes indicator variable of international-recognized quality certification: 1 if a firm obtains one(s), 0 otherwise.
$\text{capu\_pct}$	denotes percentage of capacity utilization.
$\text{dum\_wk\_bank}$	denotes indicator variable of access of working capital from banks: 1 if a firm obtains one(s), 0 otherwise.
$\text{dum\_wk\_supp}$	denotes indicator variable of access of working capital from supplier credits: 1 if a firm obtains one(s), 0 otherwise.
$\text{dum\_wk\_nonbank}$	denotes indicator variable of access of working capital from non-bank financial institutions: 1 if a firm obtains one(s), 0 otherwise.
$\text{dum\_wk\_informal}$	denotes indicator variable of access of working capital from informal sources: 1 if a firm obtains one(s), 0 otherwise.
$\text{product\_loss\_pct}$	denotes percentage of products shipped to supply domestic markets lost due to breakage or spoilage.
$\text{days\_tradedclearance}$	denotes Average number of days to clear imports and/or exports from customs.
$\mu_i / \mu_f / \mu_s / \mu_t$	denotes country, firm size, sector and year fixed effect, respectively.

<sup>26</sup> Data description and variable description and expected signs are given in annex tables 1 and 2.



## Annex 2

**Annex Table 1. Demographic description of export participation of SMEs and LEs**

### 1(a). Direct export participation of firms in the sample

Region	Export status	SMEs		LEs		Total	
		Number	% of total	Number	% of total	Number	% of total
Global	Exporter	5 115	9.6	4 409	8.2	9 524	17.8
	Non-exporter	37 650	70.4	6 326	11.8	43 976	82.2
	Total	42 765	79.9	10 735	20.1	53 500	100.0
Asia-Pacific	Exporter	1 386	2.6	1 448	2.7	2 834	5.3
	Non-exporter	12 047	22.5	2 421	4.5	14 468	27.0
	Total	13 433	25.1	3 869	7.2	17 302	32.3

### 1(b). International production network participation<sup>27</sup> of firms in the sample

Region	IPN status	SMEs		LEs		Total	
		Number	%	Number	%	Number	%
Global	IPN member	7 043	13.2	5 229	9.8	12 272	22.9
	Non-member	35 722	66.8	5 506	10.3	41 228	77.1
	Total	42 765	79.9	10 735	20.1	53 500	100.0
Asia-Pacific	IPN member	2 014	3.8	1 795	3.4	3 809	7.1
	Non-member	11 419	21.3	2 074	3.9	13 493	25.2
	Total	13 433	25.1	3 869	7.2	17 302	32.3

Source: Author's calculation from standardized dataset (2006-2014), Enterprise Surveys.

Note: Exporters are those firms whose direct exports are greater than zero; non-exporters are those firms whose direct exports equal zero. The definition is slightly different from the dataset where less than 10 per cent direct exports are considered to be non-exporters.

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<sup>27</sup> Indication of participation in a production network is when a firm participates in either direct or indirect exports or both, i.e., the sum of direct and indirect exports is greater than zero.

**Annex Table 2**

**2(a). Empirical result: Logit estimates of direct export participation**

<b>Variables</b>	<b>(1) All: Global</b>	<b>(2) SMEs</b>	<b>(3) Asia-Pacific</b>	<b>(4) Asia-Pacific SMEs</b>
firm_age	-0.000245* [-1.894]	-0.000146 [-0.829]	-0.000204 [-1.571]	-0.000138 [-0.738]
foreign_ownership_pct	0.0113*** [7.814]	0.0135*** [8.280]	0.0159*** [9.592]	0.0159*** [7.278]
unskilled2workers_pct	0.000602 [0.701]	0.00144 [1.498]	3.14e-05 [0.0113]	0.00159 [0.565]
dum_email	1.413*** [7.933]	1.711*** [11.70]	1.540*** [5.248]	1.844*** [7.565]
dum_qcert	0.890*** [9.852]	1.050*** [9.345]	0.559*** [3.227]	0.677*** [4.351]
modiv_capu_pct	0.000503 [0.408]	0.00221 [1.595]	0.000872 [0.504]	0.00358 [1.537]
dum_wk_bank_pct	0.323*** [7.314]	0.319*** [5.135]	0.349*** [6.207]	0.277*** [2.782]
dum_wk_supp_pct	0.356*** [4.927]	0.325*** [3.674]	0.524*** [3.505]	0.508*** [2.735]
dum_wk_nonbank_pct	0.261*** [2.816]	0.268*** [2.768]	0.254 [1.058]	0.372** [2.025]
dum_wk_informal_pct	0.0766 [0.911]	0.168* [1.846]	0.0207 [0.137]	-0.0306 [-0.221]
product_loss_pct	-0.0479*** [-3.702]	-0.0537*** [-2.651]	-0.0728** [-2.231]	-0.106** [-2.561]
days_tradeclearance	-0.0353*** [-6.807]	-0.0658*** [-5.198]	-0.0283*** [-2.873]	-0.0649* [-1.668]
size_dum_1	-1.959*** [-18.76]		-1.941*** [-13.13]	
size_dum_2	-1.093*** [-12.89]		-1.111*** [-7.796]	
Constant	-2.367*** [-9.008]	-4.594*** [-13.64]	-3.834*** [-3.921]	-3.483*** [-4.775]
Observations	18,517	13,858	6,382	4,490
Country FE	Yes	Yes	Yes	Yes
Clustered SE	Country	Country	Country	Country
Pseudo R-squared	0.307	0.223	0.269	0.167
*** p<0.01, ** p<0.05, * p<0.1 t-stat. in square brackets				

## 2(b). Empirical result: Logit estimates of IPN participation

Production network participation – logit estimates				
	(1)	(2)	(3)	(4)
	All: Global	SMEs	Asia-Pacific	Asia-Pacific SMEs
firm_age	- 0.000239** [-2.281]	- 0.000276* [-1.647]	- 0.000291*** [-3.855]	-0.000340*** [-3.130]
foreign_ownership_pct	0.0114*** [7.824]	0.0129*** [8.285]	0.0154*** [6.394]	0.0142*** [5.212]
unskilled2workers_pct	-0.000123 [-0.190]	0.000613 [0.649]	-0.000776 [-0.587]	0.000470 [0.308]
dum_email	1.106*** [7.968]	1.280*** [12.27]	1.292*** [5.763]	1.399*** [7.498]
dum_qcert	0.859*** [8.469]	0.962*** [8.045]	0.504*** [2.759]	0.558*** [3.505]
modiv_capu_pct	0.000212 [0.149]	0.00156 [0.980]	-0.000278 [-0.125]	0.00178 [0.623]
dum_wk_bank_pct	0.340*** [6.073]	0.363*** [5.724]	0.413*** [4.095]	0.384*** [3.092]
dum_wk_supp_pct	0.304*** [5.056]	0.301*** [4.571]	0.349*** [2.688]	0.400*** [3.130]
dum_wk_nonbank_pct	0.204** [2.194]	0.250** [2.210]	0.131 [1.195]	0.237 [1.182]
dum_wk_informal_pct	0.133* [1.786]	0.224*** [3.068]	0.178 [1.128]	0.219 [1.447]
product_loss_pct	-0.0326*** [-2.609]	-0.0289* [-1.866]	-0.0248 [-1.062]	-0.0284 [-1.065]
days_trade clearance	-0.0233*** [-5.755]	- 0.0337*** [-5.477]	-0.0210*** [-2.623]	-0.0395* [-1.821]
size_dum_1	-1.805*** [-18.27]		-1.880*** [-9.953]	
size_dum_2	-0.977*** [-9.874]		-0.950*** [-5.428]	
Constant	-1.574*** [-5.860]	-3.526*** [-10.05]	-2.512*** [-3.435]	-3.771*** [-2.812]
	18,517 Yes Country 0.277	13,858 Yes Country 0.184	6,450 Yes Country 0.250	4,563 Yes Country 0.139
***p<0.01; **p<0.05; *p<0.1. t-stat. in square brackets.				

**2(c). Empirical result: Logit estimates of direct export participation – marginal effects**

Direct export participation: logit estimates – marginal effect				
Variables	(1) All: Global	(2) SMEs	(3) Asia-Pacific	(4) Asia-Pacific SMEs
firm_age	-2.64e-05* [-1.882]	-8.94e-06 [-0.822]	-2.07e-05 [-1.543]	-7.47e-06 [-0.720]
foreign_ownership_pct	0.00122*** [7.121]	0.000829*** [7.839]	0.00161*** [6.480]	0.000864*** [5.228]
unskilled2workers_pct	6.48e-05 [0.703]	8.83e-05 [1.513]	3.18e-06 [0.0113]	8.61e-05 [0.576]
dum_email	0.124*** [12.32]	0.0912*** [16.13]	0.127*** [10.90]	0.0914*** [9.421]
dum_qcert	0.112*** [9.618]	0.0884*** [7.355]	0.0611*** [3.673]	0.0439*** [4.052]
modiv_capu_pct	5.42e-05 [0.408]	0.000135 [1.588]	8.85e-05 [0.501]	0.000194 [1.486]
dum_wk_bank_pct	0.0363*** [6.948]	0.0208*** [4.840]	0.0373*** [5.212]	0.0160** [2.488]
dum_wk_supp_pct	0.0393*** [4.745]	0.0204*** [3.584]	0.0608*** [3.113]	0.0321*** [2.613]
dum_wk_nonbank_pct	0.0308*** [2.611]	0.0183** [2.480]	0.0282 [1.007]	0.0235* [1.771]
dum_wk_informal_pct	0.00845 [0.887]	0.0109* [1.740]	0.00212 [0.136]	-0.00164 [-0.226]
product_loss_pct	- 0.00516*** [-3.765]	-0.00329*** [-2.664]	-0.00738** [-2.456]	-0.00577*** [-2.919]
days_tradeclearance	- 0.00380*** [-6.745]	-0.00403*** [-5.520]	- 0.00287*** [-2.851]	-0.00352* [-1.769]
size_dum_1	-0.188*** [-21.89]		-0.154*** [-12.58]	
size_dum_2	-0.108*** [-17.31]		-0.107*** [-12.80]	
Observations	18,517	13,858	6,382	4,490
Country FE	Yes	Yes	Yes	Yes
Clustered SE	Country	Country	Country	Country
***p<0.01; **p<0.05; *p<0.1. t-stat. in square brackets.				

**2(d). Empirical result: Logit estimates of IPN participation – marginal effects**

Production network participation: logit estimates – marginal effect				
Variables	(1) All: Global	(2) SMEs	(3) Asia-Pacific	(4) Asia-Pacific SMEs
firm_age	-3.98e-05** [-2.275]	-3.16e-05 [-1.634]	-4.65e-05*** [-3.957]	-3.64e-05*** [-3.009]
foreign_ownership_pct	0.00190*** [7.570]	0.00147*** [8.254]	0.00246*** [5.867]	0.00152*** [5.070]
unskilled2workers_pct	-2.05e-05 [-0.190]	7.01e-05 [0.651]	-0.000124 [-0.587]	5.04e-05 [0.309]
dum_email	0.159*** [10.44]	0.131*** [15.21]	0.177*** [8.574]	0.138*** [9.265]
dum_qcert	0.159*** [8.127]	0.138*** [6.945]	0.0847*** [2.790]	0.0675*** [3.241]
modiv_capu_pct	3.52e-05 [0.149]	0.000179 [0.977]	-4.44e-05 [-0.125]	0.000191 [0.621]
dum_wk_bank_pct	0.0585*** [5.832]	0.0441*** [5.399]	0.0692*** [3.672]	0.0442*** [2.848]
dum_wk_supp_pct	0.0513*** [4.974]	0.0351*** [4.516]	0.0596** [2.501]	0.0473*** [2.917]
dum_wk_nonbank_pct	0.0358** [2.085]	0.0310** [2.038]	0.0218 [1.160]	0.0276 [1.079]
dum_wk_informal_pct	0.0228* [1.719]	0.0274*** [2.868]	0.0298 [1.065]	0.0252 [1.328]
product_loss_pct	- 0.00542*** [-2.628]	-0.00331* [-1.875]	-0.00396 [-1.078]	-0.00305 [-1.077]
days_tradeclearance	- 0.00387*** [-5.756]	- 0.00385*** [-5.599]	- 0.00335*** [-2.612]	-0.00423* [-1.835]
size_dum_1	-0.266*** [-23.28]		-0.241*** [-15.71]	
size_dum_2	-0.151*** [-11.51]		-0.145*** [-6.537]	
Observations	18,517	13,858	6,450	4,563
Country FE	Yes	Yes	Yes	Yes
Clustered SE	Country	Country	Country	Country
*** p<0.01, ** p<0.05, * p<0.1 t-stat. in square brackets				