

The digital economy, GVCs and SMEs

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ABSTRACT

Although small and medium-sized enterprises (SMEs) represent the vast majority of firms worldwide, their participation in international trade remains limited relative to their share of overall economic activity and employment as compared to large firms. The rise of the digital economy could, however, open a range of new opportunities for small firms to play a more active role in global value chains (GVCs). This chapter reviews evidence of SME participation in international trade and production networks and looks at how the digitalization of our economies is already affecting, or could affect future, SME contributions to GVCs. New research by Lanz *et al.* (2018) finds evidence that digitally-connected SMEs in developing countries tend to import a higher share of their inputs than non-digitally-connected firms. Additionally, it is shown

that this positive digital effect is greater for SMEs than it is for large firms. The chapter reviews the various opportunities that the digital economy opens for SMEs, especially in terms of cost reductions and the emergence of new business models, but also discusses policy measures that could be taken to promote SME participation in GVCs. Indeed, significant challenges remain for SMEs to enter GVCs, some of which are exacerbated by the new digital economy. A holistic approach that combines investment in ICT infrastructure and human capital with trade policy measures and measures to improve the business environment, access to finance and logistics, and promote innovation and R&D is necessary. Improving the availability of data would also help to better understand and integrate SMEs in GVCs.

- Although small and medium-sized enterprises (SMEs) represent the vast majority of firms worldwide, their participation in international trade remains limited relative to their share of overall economic activity and employment as compared to large firms.
- The rise of the digital economy could, however, open a range of new opportunities for small firms to play a more active role in global value chains (GVCs).
- New research finds that when a manufacturing SME has a website, this facilitates its participation in GVCs and trade. In particular, such SMEs are more likely to use foreign inputs for production and export their output. Further, information and communication technology (ICT) connectivity is found to be more important for small firms than for large ones in whether or not a firm participates in trade.
- However, SMEs continue to face important challenges when integrating into GVCs. A holistic approach that combines investment in ICT infrastructure and human capital with trade policy measures and with measures to improve the business environment and access to finance and logistics, and promote innovation and R&D, is necessary.
- Improving the availability of data would also help to better understand and integrate SMEs in GVCs.

1. Introduction

Global value chains (GVCs) are often considered the lead story of trade in the modern world, with an estimated 80 per cent of global trade taking place through them (UNCTAD, 2013). At the same time, a growing understanding of the importance of small and medium-sized enterprises (SMEs) to the global economy, and their roles within the digital economy, has been emerging. However, SMEs have been shown to participate less in international trade, including GVC trade, than large businesses despite being the largest firm segment by numbers in the world. Given the substantial changes that the internet and digital technologies that leverage the internet to store and process data (sometimes referred to as Industry 4.0) have made or are making to the global economy, the following questions arise: how has the digital economy changed the landscape for SMEs? What are the new opportunities and challenges they face when it comes to participating in GVCs in the digital era? And what policy changes could be made to support these firms?

SMEs are estimated to account for between 80-99 per cent of firms in any given country as well as between 60-70 per cent of global employment (WTO, 2016; IFC, 2013). They also have a higher rate of sales growth than large firms (Cusolito *et al.*, 2016). This implies a substantial share of any nation's economy is supported by SMEs. However, a more precise estimate of SMEs' contribution to GDP is hampered by the lack of a standard definition for what, exactly, constitutes an SME. Definitions for small firms range from those solely based on number of employees and revenue generated (the European Union defines SMEs as firms with up to 250 employees and turnover of no more than 50 million euros), to one dependent on the industry of operation (in China, SMEs can include firms of up to 3,000 employees and total revenues up to 300 million yen, depending on the industry).¹ These differences in definition make certain comparisons more challenging and must be considered when drawing conclusions.

Regardless of the nebulous way SMEs are defined, they are not well represented in international trade and GVCs (WTO, 2016). This is in spite of the fact that the international fragmentation of production would seem to have increased the opportunities for SMEs, given that production is broken into smaller, more specialized pieces. Yet SMEs face a number of size-related constraints, from limitations related to quantity of production, to in-house administrative resources, that prevent many of them from achieving the full potential of GVC participation (Cusolito *et al.*, 2016).

Given the positive effects GVCs have been shown to bring, it is worth considering how to include more small firms in global production networks. For example, participation in GVCs is associated with increased productivity, the export of more sophisticated (and frequently higher value) products, and a more diversified national export basket. Additionally, GVCs have been demonstrated to be a pathway for economic development for countries (Kowalski *et al.*, 2015).

The internet and digital technologies that leverage the internet to collect, store and process data, such as artificial intelligence (AI), the Internet of Things (IOT) and blockchain, open new opportunities for SMEs, not only for market entry, but also for participation in GVCs and international trade (WTO, 2018). This is particularly true in the services sector where SMEs are most likely to engage in trade (ABAC, 2018).

Given the pervasiveness of SMEs throughout the global economy, the substantial role of GVCs for international trade and the changes ICT is bringing through the new digital economy, further consideration ought to be given to how digital technology could be altering SME GVC participation. Firms of all sizes inherently seek to maximize profits, be it through the use of digital technology or sales via international exports. Given the potential for digital technology to reduce fixed trade costs, it is important to understand how technological change affects SME decision-making with regards to both imports and exports. This chapter explores SME participation, and lack thereof, in international trade, including GVCs; discusses how digital technologies can help SMEs integrate into GVCs; considers the various constraints that restrict SMEs' ability to embrace new technologies and participate in global production networks; investigates how the digital economy has re-shaped international trade for SMEs as well as its potential effects on SMEs in GVCs; and lastly looks into ways the policy environment could be changed to better support SME access to GVCs in the context of the digital economy.

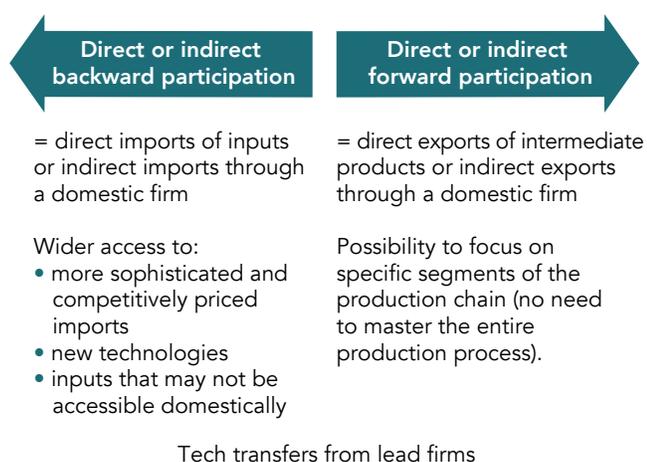
2. SME participation in international trade and GVCs

In theory, global value chains open new prospects for SMEs to participate in international trade. The international fragmentation of production increases the opportunities for SMEs to specialize in niche markets and narrow activities at various stages of the production chain. Nevertheless, in spite of the key economic role played by SMEs in terms of economic output, participation of SMEs in global value chains remains low compared to that of large firms.

2.1 SMEs, international trade and GVCs: direct vs. indirect participation

SMEs can join global value chains by exporting intermediate goods or services directly (direct forward participation) or by supplying inputs to a local firm or multinational company – indirect exports (indirect forward participation). These forms of integration into GVCs are not necessarily exclusive. Some SMEs export both directly and indirectly, highlighting the potential complementarity of these foreign market entry modes (Nguyen *et al.*, 2012). SMEs can also participate in GVCs by importing products as inputs into their own production processes (direct backward participation) or sourcing products from local firms that use imported inputs (see Figure 6.1).² Forward linkages represent the seller's perspective, or supply side, while backward linkages represent the buyer's perspective, or sourcing side, of GVCs.

FIGURE 6.1 How SMEs can benefit from GVCs



Source: Adapted from López González (2017).

The extent to which SMEs participate in GVCs is, however, difficult to assess thoroughly. The availability of international trade data by enterprise size remains limited, making analysis rather difficult and often partial. Most studies rely on a mix of enterprise surveys, case studies, and administrative data, with all the compromises that such approaches entail in terms of incomplete country coverage, different time series, inconsistent definitions

of SMEs, etc. In addition, while GVC trade is usually understood as trade in intermediates, available data sets do not necessarily distinguish between direct exports of final products and direct exports of intermediates. An analysis of data on gross direct exports can, however, provide some indication of SME forward participation in global value chains as such exports, which cover both final and intermediate products, necessarily represent an upper bound.

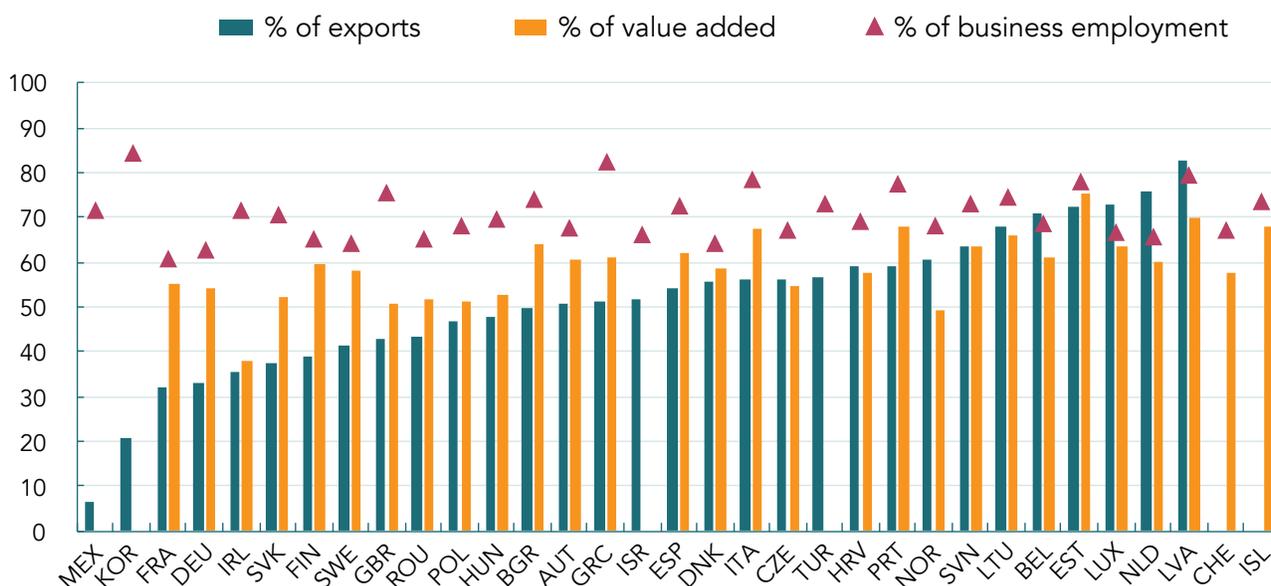
Keeping these limitations in mind, firm-level evidence reveals that despite SMEs making up the vast majority of firms in both developed and developing countries, SME direct and indirect participation in GVCs remains limited relative to their share of overall activity and employment compared to large firms.

Direct participation in GVCs: a “big firm story”?

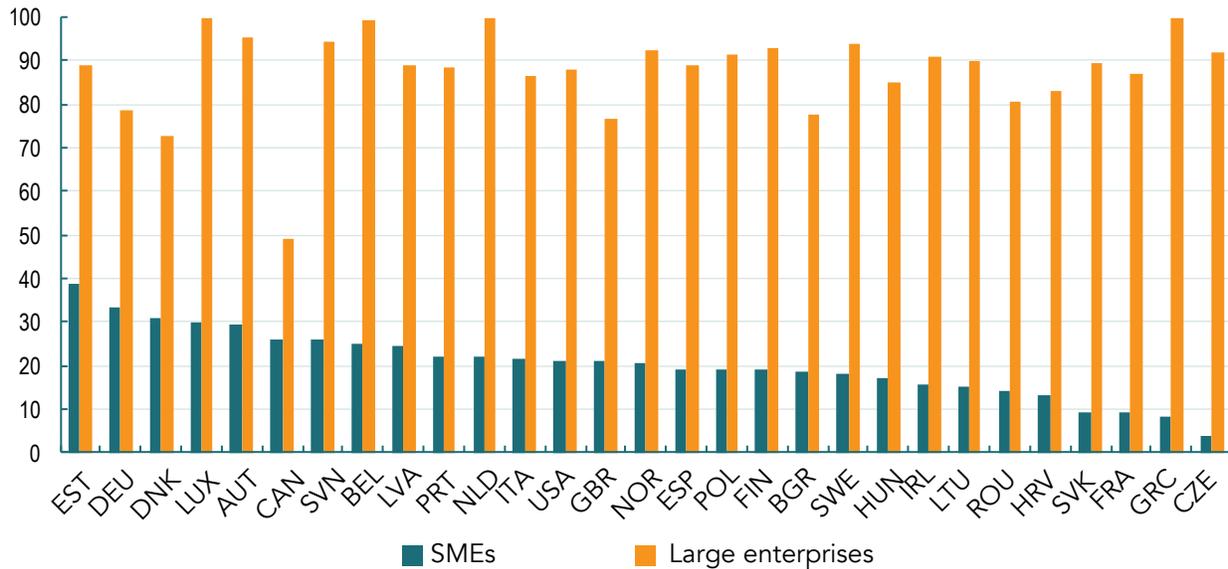
While in most OECD economies SMEs account for 99 per cent of all firms, around two-thirds of total employment and over half of business sector value-added, their contribution to overall exports is much lower than their economic weight in terms of value creation and employment, with only a handful of exceptions (OECD, 2018c) (see Figure 6.2). In countries such as France, Germany, Slovakia and Sweden, SMEs account for only 30 to 40 per cent of gross exports, well below their contribution to value creation and employment. Not only is SME participation in direct exports low compared to their economic weight, only a fraction of SMEs export at all. This is a distinct difference between large and small firms, given that the majority of large businesses are also international exporters. Evidence from OECD countries shows that only 5 to 40 per cent of SMEs export, while more

FIGURE 6.2 SME export activity, value added and employment shares (2015 or latest available year, as a percentage)

(Percentage)



Source: Figure 1.20 of OECD (2018c).

FIGURE 6.3 Industrial firms engaged in exports (2015 or latest available year, as a percentage of total firm size by size class)

Source: Figure 1.21 of OECD (2018c).

than 80 per cent of large firms do (see Figure 6.3). Other studies confirm these numbers. Mayer and Ottaviano (2007) showed, for example, that 1, 5, and 10 per cent of companies account for no less than 40, 70, and 80 per cent, respectively, of Europe's aggregate exports. These numbers would tend to support the view that direct insertion into GVCs via exports is "a big firm story" (Cusolito et al., 2016).

However, these numbers hide considerable heterogeneity across firm size classes. The smaller the company, the less export-oriented it is (see Figure 6.4). Only a marginal number of micro companies export, while the participation of medium-sized companies in exports and imports approaches that of large businesses. Participation in exports remains, to a large extent, a big firm story in developed economies, except in some niche markets.³

The situation is not much different in developing economies, with rough estimates of SME contribution to GDP significantly larger than their relative contribution to international trade, and estimates of SME contribution to international trade being only a fraction of large firms' contribution. SMEs in developing countries are thought to provide about 45 per cent on average of a country's GDP (WTO, 2016), but SMEs' exports represent on average just 7.6 per cent of total manufacturing sales, compared to 14.1 per cent in the case of large manufacturing firms (WTO, 2016).⁴ Recent World Bank micro firm surveys in selected least developed countries (LDCs) confirm the low level of participation of micro firms (i.e., firms of less than five employees) in international trade. Micro firms engaged in exports represented only 6 per cent of surveyed firms in Congo in 2013, around 3 per cent in Ethiopia (2011 data), and less than one per cent in Myanmar (2014 data).

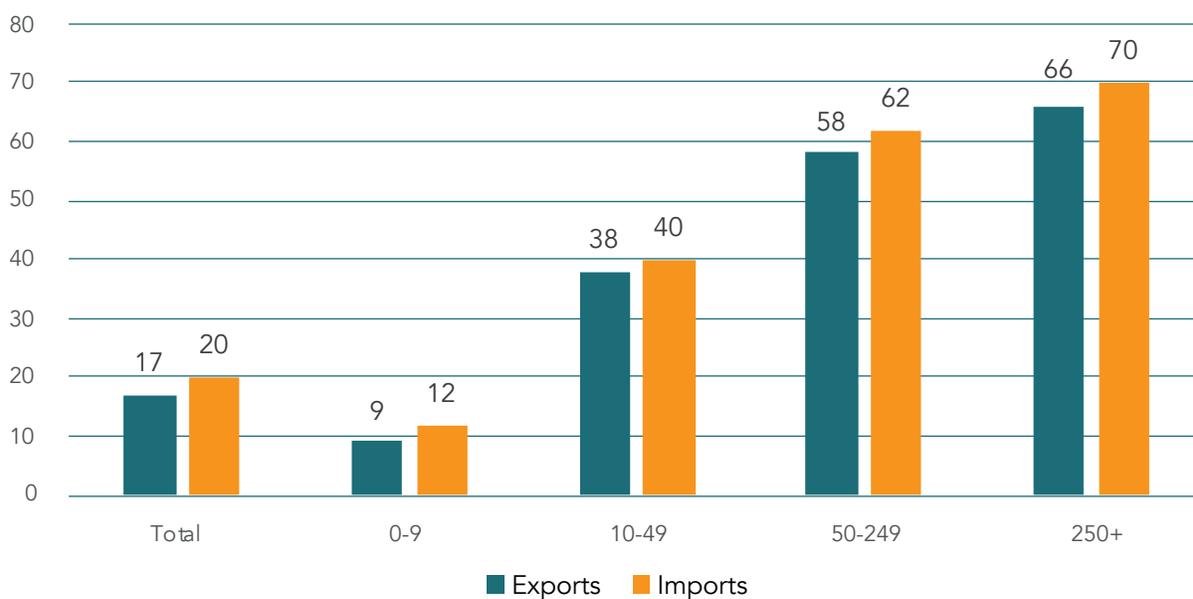
SMEs' contribution to GDP and exports also varies significantly across developing regions. Although SME contribution to GDP is estimated to be relatively high throughout the world,

ranging from an estimated 22 per cent in the Middle East to 70 per cent in some African countries (ITC, 2015a), SMEs' exports are significantly less. For example, SME exports account for 28 per cent of overall exports in developing Europe, 16 per cent in the Middle East, 8.7 per cent in developing Asia, and only 3 per cent in Africa. As in the case of developed economies, big firms account for the bulk of exports. Cebeci et al. (2012) find that the top 5 per cent of firms account, on average, for 80 per cent of exports in low-income countries.

However, while GVC direct participation would seem to be above all a big firm story when considering gross exports, studies that examine exports of intermediates seem to show a more nuanced picture. Evidence from Southeast Asia reveals, for example, that SME exports of intermediates in Thailand represent a bigger share of their overall exports than for large firms – 16 per cent of SME exports are sold to firms abroad for further processing, while only 6 per cent of large firms' exports are (López González, 2017). This finding reflects the opportunities that global value chains open for SMEs to integrate into the global economy by specializing in segments of production and supply of intermediates, rather than having to master the entire production process of finished products. Opportunities in this respect might be even bigger in the services sector. In Viet Nam, for example, the share of SME exports used by other countries to produce other exports increases from 5 per cent when only manufacturing is considered, to 26 per cent when service firms are included (López González, 2017). While these numbers cannot be generalized, they provide an interesting new perspective on SME GVC participation in Southeast Asia.

Another way for SMEs to benefit from GVCs is through imports of intermediate goods (backward participation), which matter for competitiveness (Lopez-Gonzalez, 2016 and 2017). It

FIGURE 6.4 Percentage of industrial firms that are exporting and importing by enterprise size (number of employees), 2013 or latest year



Source: WTO (2016).

has been shown that firms that use more imported products are more productive as they can draw on cheaper and more sophisticated inputs as well as benefit from innovation and new technologies embodied in imports (Bas and Strauss-Kahn, 2014 and 2015). According to WTO estimates, GVC participation by SMEs in the manufacturing sector in developing countries is mainly driven by upstream links (backward participation), with SMEs importing inputs needed in their manufacturing process from abroad (Lanz *et al.*, 2018; WTO, 2016). This is particularly true in countries where companies engage extensively in processing trade. Processing trade allows a firm to conduct intermediate stages of production and assembly on behalf of a foreign party. The firm receives the blueprints and imports all, or part of, the raw and auxiliary materials, parts and components, accessories, and packaging materials from abroad, and re-exports the finished products after processing or assembly. Engaging in processing trade requires less technological know-how and working capital needs – although it may require having certain automated processes in place to ensure quality control and supply reliability, which may or may not be borne by the foreign party. Evidence from China shows that processing trade allows less productive and financially constrained firms to participate in GVCs when they would not have been able to otherwise (Manova and Yu, 2016). Such firms tend to be SMEs.

Among the factors often put forward to explain why SMEs' direct participation in GVCs is lower compared to that of large firms is the fact that engaging in international markets can be costly. Lacking economies of scale, SMEs face higher fixed costs than larger companies and are disproportionately affected by costs associated with the import and export process (WTO,

2016). A simpler route for SMEs to engage in GVCs is often to start by exporting indirectly, through a local firm.

2.2 Indirect participation in GVCs

Smaller firms often participate in global value chains indirectly by supplying intermediates to other local firms – domestic or foreign-owned – that export (indirect forward participation). The enterprise then behaves like an “indirect exporter” by contributing to the production of goods and services exported by other domestic companies. Likewise, the fixed costs associated with direct importing may lead many SMEs to source inputs from local enterprises that use imported products (indirect backward participation). Evidence on indirect participation of SMEs in GVCs is scarce and difficult to collect due to lack of data on value-added at the firm level. Only a few studies have examined SME indirect participation in GVCs, either as suppliers (forward participation) or as importers of inputs (backward participation).

Studies that analyze the role of SMEs as suppliers reveal that focusing only on direct exports significantly underestimates the role played by SMEs in GVCs. In an often-quoted study, Slaughter (2013) showed, for example, that US multinational companies typically purchase more than US\$3 billion in inputs a year from more than 6,000 U.S. SMEs, which represents almost 25 per cent of the total inputs purchased by those firms. Other estimates from the US International Trade Commission (USITC) (2010) find that in 2007 the export share of US SMEs rose from 28 per cent (in gross exports) to more than 40 per cent (in value-added terms) when indirect exports were considered. Calculations using the TiVA database

developed by the OECD and the World Trade Organization show that including the contribution of upstream SME suppliers significantly increases the share of SMEs in total exports of domestic value added. In the Slovak Republic, for example, SMEs account for only 34 per cent of gross domestic exports, but for 56 per cent of the total value added in the country's exports when upstream suppliers are considered (OECD, 2018c) (see Figure 6.5).

Indirect exports of SMEs are particularly significant in sectors where GVCs play an important role and where scale matters, such as in the automobile and transport equipment manufacturing sector (OECD, 2018b; WTO, 2016), and for independent SMEs (i.e., those not owned by a larger domestic firm or foreign firm – OECD, 2018c). Evidence shows that SMEs tend to channel their indirect exports through large firms rather than through other SMEs (Cusolito *et al.*, 2016).

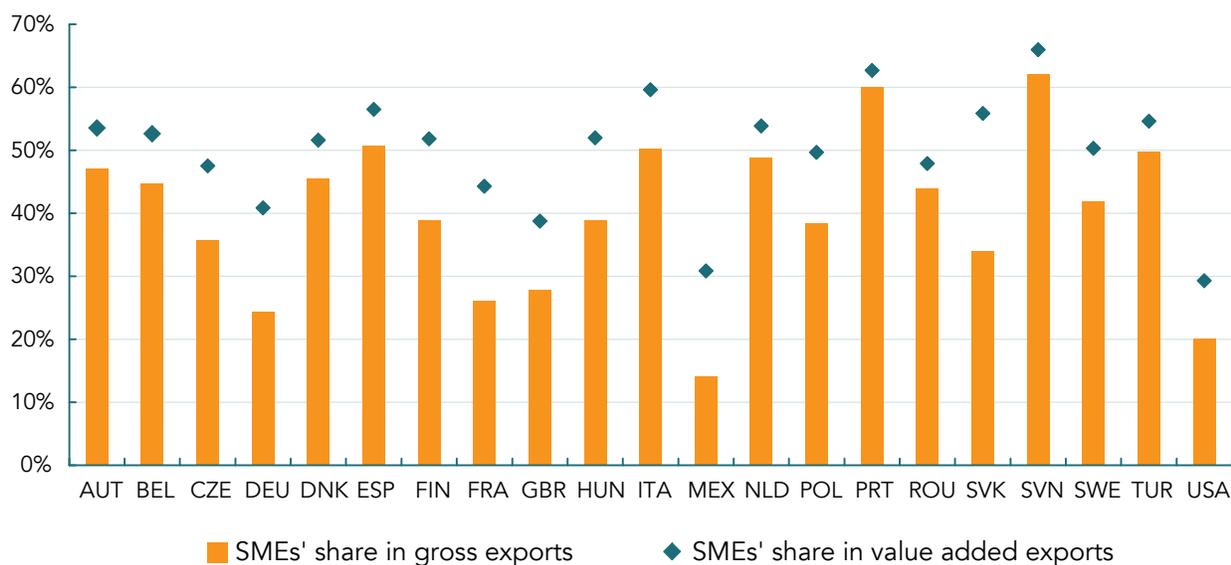
While evidence based on indirect exports shows a higher level of integration of SMEs in GVCs in OECD countries, indirect exports appear to play a lesser role in developing countries. Using data from World Bank Enterprise Surveys, the WTO estimated that indirect exports of manufacturing SMEs from developing countries were 2.4 per cent of total sales on average, or one-third the estimated share of direct exports. Such results, however, hide significant differences across regions, within regions, and at the product level. While SME indirect participation in exports is estimated at more than 9 per cent of total sales in developing Europe, it accounts for 2.4 per cent in the Middle East and only 1 per cent in Africa (WTO, 2016). At the country level, a recent study carried out in Chile reveals that three times as many SMEs engage in indirect exports compared

to direct exports (6.5 per cent vs 2.2 per cent). However, despite there being more SMEs that engage in indirect exports, overall SME participation in GVCs is small and they remain largely dominated by large companies. In the case of Chile, the gap is striking: more than 46 per cent of large companies engage in direct exports, while only 9 per cent of SMEs export, including both direct and indirect exports. The situation at the product level varies, however. Indeed, the share of indirect exports of SMEs in total sales outpaces that of large firms in some specific sectors, such as certain types of machinery, publishing and printing, and in paper and paper products manufacturing (WTO, 2016). Services SMEs were also found to participate more in indirect exports than direct exports. Overall, however, backward and forward GVC participation of SMEs in developing countries remains low (see Figure 6.6).

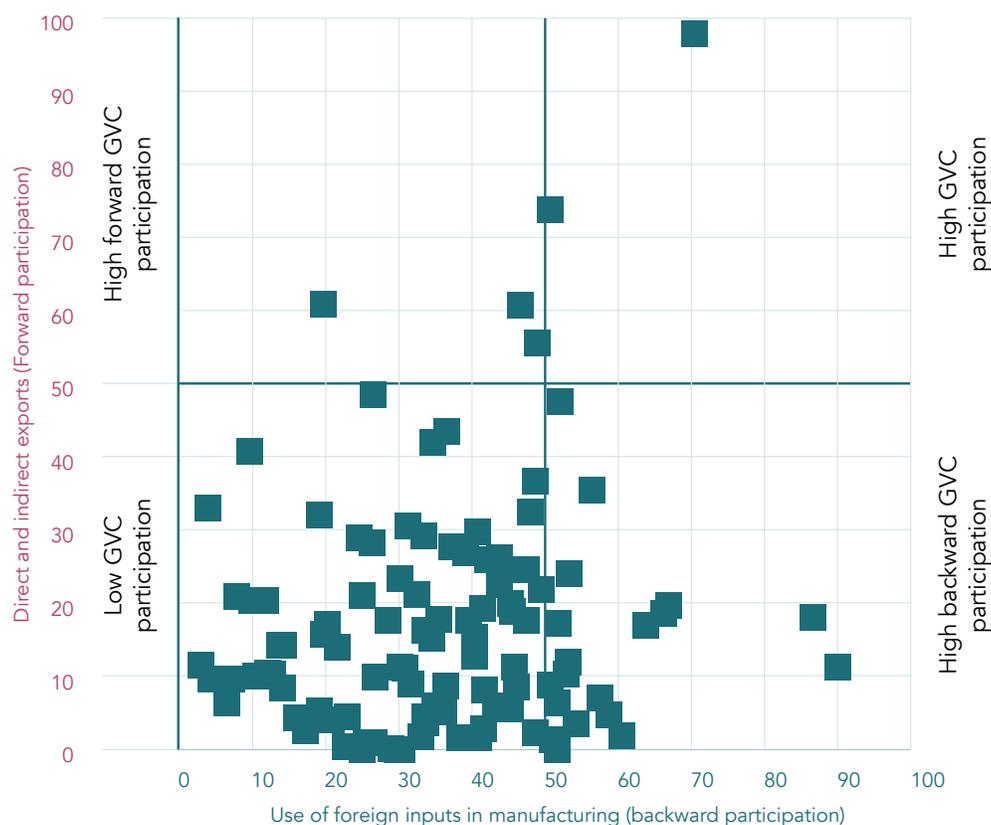
The role played by indirect forward participation of SMEs, especially in developed countries, would tend to suggest that indirect participation serves to a certain extent as a substitute for direct participation in GVCs. The question then arises as to whether such indirect participation benefits firms and impacts their performance in the same way as direct participation. Assessing the relative impact of direct versus indirect participation on firms' performance is an issue that requires further attention from researchers. Likewise, studies that distinguish between direct and indirect participation usually focus on exports. It would be equally interesting to examine SMEs' participation in GVCs through indirect backward participation. Indeed, like in the case of direct exports, the high fixed costs associated with direct imports may lead many SMEs to source inputs from local companies that use imported intermediates rather than to import directly.

FIGURE 6.5 Direct and indirect exporting activity of SMEs in OECD countries, 2014

As a percentage of gross export



Source: OECD (2018a).

FIGURE 6.6 SMEs in developing economies: backward and forward participation in GVCs

Note: Each square represents the average GVC participation of SMEs in a given developing country.

Source: WTO estimates based on World Bank Enterprise Surveys (Figure B.19 of WTO (2016)).

2.3 Constraints on SME participation in global value chains

Two key challenges persist in limiting SME GVC integration: the challenge of informality⁵ and the relative resource advantage that large firms have over SMEs.

Global value chains operate in the formal sector, but it is estimated that around 80 to 90 per cent of SMEs worldwide are informal (IFC, 2012). Informality is pervasive in the developing world. The majority of firms in many developing countries are informal (Andrade *et al.* 2015; Bruhn and McKenzie 2014; Cusolito *et al.* 2016). In Brazil, for example, nearly two-thirds of businesses, 40 per cent of GDP and 35 per cent of employees are informal (Ulyseay, 2015). Similarly, in Sri Lanka only one-fifth of firms operating without paid workers are registered and even among firms employing paid workers, more than half are unregistered with one or more pertinent agencies (de Mel, McKenzie, and Woodruff 2013). Overall, the ILO estimates that the informal economy comprises more than half of the global labor force (ILO website⁶), with most informal workers in developing countries being women.⁷ Informal firms tend to be much smaller than formal firms (La Porta and Shleifer, 2014). In fact, the large majority of informal firms – up to 90 per cent in Sri Lanka for example – are small, subsistence enterprises with no paid employees.

Various factors have been found to play a determining role in explaining the size of the informal sector, including the tax burden (e.g. Cebula, 1997; Giles and Tedds, 2002); financial market development (Straub, 2005); and institutional quality, regulatory burden and quality of the legal system (Friedman *et al.*, 2000; Johnson *et al.* 2000; Botero *et al.*, 2004; Dabla-Norris *et al.*, 2005).

High levels of informality can affect growth and productivity of a country and hold back inclusion into GVCs. Informality can generate inefficiencies in the production process, as informal firms may choose to limit their growth to avoid detection (Farazi, 2014) and tend to use less advanced production technologies (Perry *et al.*, 2007). Corruption is also often a side-effect of informality, and even where it is not, recent work looking at Chinese firms has shown corruption to have a larger negative impact on the productivity of SMEs than on the productivity of large firms (Lu *et al.*, 2018). Informal firms also face greater difficulties accessing finance, which can result in sub-optimal levels of investment in research and development, physical capital, and training (Farazi, 2014). Informality is a binding constraint to integrating into global value chains, but it is also a constraint for firms operating in the formal sector. A study by the Independent

Evaluation Group, a World Bank institution, finds that about 32 per cent of formal firms with 10–99 employees in a sample of developing countries report informality as one of the top five constraints they face in doing business (cited in Cusolito *et al.*, 2016).

Other factors commonly cited to explain the difficulties faced by SMEs, in particular those from developing countries, to integrate in global value chains range from limited resources and access to finance, to the difficulty some SMEs face in meeting product and quality standards. Noted constraints that affect SMEs include lack of knowledge about foreign markets as well as missing in-house skills such as marketing; insufficient knowledge of cumbersome trade regulations and border procedures; and poor physical and ICT infrastructure that limits distribution and operational support (ADB, 2015; Cusolito *et al.*, 2016; ITC, 2015b; WTO, 2016).

Can the rise of technologies based on the internet and the remodeling of economic activity that accompanies it open new opportunities for smaller firms to more actively participate in global production networks? Can the digital economy help small traders integrate into global value chains? Evidence suggests that the potential could be significant.

3. Digital technologies can boost SME trade and GVC participation

Digital technologies continue to make substantial changes to the economy with cascading implications for international trade. For small firms, the internet has increased access to international markets, with the WTO finding that on average 97 per cent of internet-enabled small businesses export (WTO, 2016). Companies also acknowledge the importance of new internet-enabled technologies. For example, a study of 600 European SMEs found that more than 70 per cent of those surveyed not only consider that they benefit from the ongoing process of digitalization, but also that digitalization makes it easier to integrate foreign customers and suppliers into their own value chains (Abel-Koch, 2016). Additionally, a joint OECD and World Bank study (Cusolito *et al.*, 2016) finds that the use of the internet reduces SME exporting costs, thereby increasing export participation, and that SMEs are more likely to be involved in technologically-enabled trade than traditional trade. At the same time, there are also many factors limiting SME participation in GVCs in the context of the digital economy. For example, it has become clear that internet access is now often a requirement for joining many GVCs (ADB, 2015) and that the ICT level of operation is one of the key attributes that multinational corporations assess when they want to enter a business relationship with SMEs (APEC, 2014). However, few studies have looked directly at the impact the new digitally-based economy is having on SME participation in GVCs.

3.1 The impact of digital connectivity on SME GVC participation

Recent work by Lanz *et al.* (2018) has looked more closely into the differences between ICT-enabled SMEs and large firms in developing countries with regards to trade, as well as the relationship of

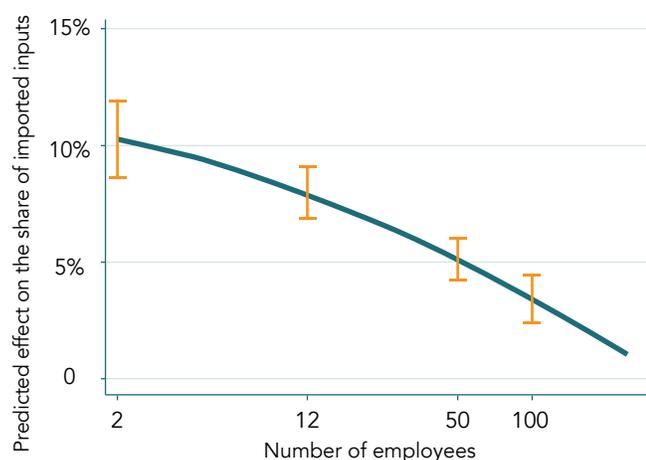
being digitally connected with GVC participation. Evidence backs the theory that these digital changes can support SME participation in GVCs, particularly import-based (backward-linked) GVCs. This is an important insight given that limited SME participation in GVCs continues to restrain participation in international trade. However, the importance of the divide between firms with access to the internet and those without is underscored by this research.

Using World Bank Enterprise Survey data, the authors demonstrate that, for firms, having a website (a proxy for being ICT-enabled) in a developing country has a larger predicted impact on both an SME's share of imported inputs for production and on an SME's share of direct exports, than it does for large firms. An ICT-enabled small firm of 2 employees would have a predicted share of imported inputs that is 10 percentage points higher than a firm of the same size that is not ICT-enabled. Similarly, a firm of 12 employees would have a predicted share 8 percentage points higher. This is significantly greater than the estimated difference for larger firms. In the case of firms of 50 employees, the predicted effect of being ICT-enabled on the share of imported inputs, versus for firms that are not connected, is only 5 percentage points and for firms of 100 employees it is only 3 percentage points (see Figure 6.7). For total exports, the effect of being ICT-enabled is highest for firms with between 15 and 25 employees, with a steep decline as the number of employees grows (see Figure 6.8). In both cases, being ICT-enabled shows a stronger result for SMEs' participation in trade than for large firms, meaning the impact of being digitally-enabled is significantly greater for small firms than for large ones. This is in line with evidence that small businesses with a website were almost four times more likely to export than those without (Oxford Economics, 2017).

The study also considers country-level digital connectivity and its effects on participation in trade by firm size. Using the number of fixed broadband subscriptions in a country to proxy digital connectedness, the paper again demonstrates that for developing countries, increased digital connectivity seems to increase small firms' share of imported inputs used for production more than for large firms. Or, in other words, a small firm's participation in backward-linked GVCs will benefit more than a large firm's if a country has better digital connectivity. Similarly, for total exports, the findings suggest that more broadband subscriptions at the country level leads to a greater positive effect on SME exports than for large firms. These findings imply that large firms have established other non-ICT enabled means of communication with overseas suppliers and customers, such as analogue telephones or in-person traveling, that might not be so easily available to SMEs.

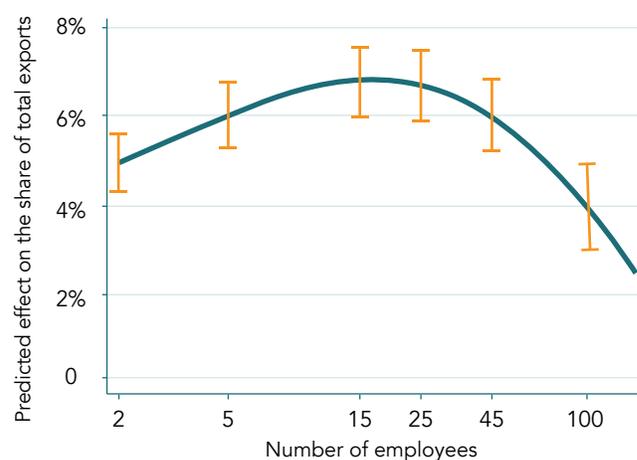
3.2 How can digital technology support SME trade?

There are many reasons why access to digital technologies can increase SMEs' participation in trade. Internet access can reduce barriers and costs to trade for all firms (but especially for services SMEs (Cusolito *et al.*, 2016)) as well as increase access to foreign markets through online sales and e-commerce. The rise of smartphones has also allowed leapfrogging of some capital- and/or infrastructure-intensive technology, especially by firms in developing countries. Additionally, the digital economy itself

FIGURE 6.7 Effect of being ICT-enabled on the predicted share of imported inputs for production

Note: Figure marks represent the estimated range for the predicted effect of being ICT-enabled on a firm's imports for inputs.

Source: WTO estimates based on WB Enterprise Survey Data.

FIGURE 6.8 Effect of being ICT-enabled on the predicted share of exports out of total sales

Note: Figure marks represent the estimated range for the predicted effect of being ICT-enabled on a firm's total exports.

Source: WTO estimates based on WB Enterprise Survey Data.

is creating new opportunities by increasing the number of participants in international trade, as well as creating new business models that affect the structure of supply chains, including being "born global." For example, there are new services on offer, including programming or logistics, that require only the necessary technical skills and being ICT-enabled (ITC, 2015a). Online sales are also making smaller "just-in-time" purchases more common than large advanced orders, a development that could benefit SMEs (AliResearch, 2017). Only SMEs with resources and managers willing to adopt these new technologies are in the position to take advantage of these opportunities (ITC, 2015a). All of these topics will be explored further in this section.

Cost-reducing properties of digital technology

Entering international markets is difficult and costly, disproportionately affecting small firms that face a host of constraints as discussed earlier, including higher relative fixed costs than larger companies, insufficient R&D and skills training, and insufficient knowledge of foreign markets and regulations. However, digital technologies can ease a number of these constraints and reduce SME expenditures in a range of areas, from market research to operational support (see Figure 6.9). New websites and digital processing tools can bring services to SMEs that were formerly unaffordable. The following will look more closely at the ways digital technology supports SMEs.

In terms of market research and general marketing, the internet provides access to a wide variety of information, including information related to potential consumers or national regulatory compliance and how to trade across borders. Online marketing has also been shown to be important for SMEs, with digital access reducing estimated marketing costs by 57 per cent according

to AMTC (2018). Online reviews can also be a powerful tool to attract potential customers from anywhere in the world (Oxford Economics, 2017) and new adwords, or other targeted advertising, can help firms with limited resources reach new consumers (AMTC, 2018). In fact, marketing for both SME manufacturing and services firms is projected to have the largest savings in export related costs in a digital environment (AMTC, 2018).

Additionally, online and mobile banking or finance (which may even be provided through e-commerce platforms), as well as new financing tools like online crowdfunding, can supplement traditional finance for SMEs. For example, services such as Alibaba's e-Credit Line, or IndiaMart's Payment Protection insurance, can be important trade finance resources for small companies. Blockchain could also open new opportunities for SMEs to access trade finance by making it easier for small companies to build a credit history as well as by opening up the possibility for small firms and producers to make transactions on a peer-to-peer basis without the need to secure traditional trade finance or even to go through banks (Ganne, 2018).

Besides reducing financial costs, online access to information also has significant time saving benefits by reducing the need for some in-person interactions, such as with banking. This has been shown to save SMEs up to 29 per cent of the time previously required (AMTC, 2018). Related to time saving, regional SME networking platforms have also been created to bring information together in one place and to facilitate networking among SME suppliers (see Box 6.1). To expand these benefits, the World SME Forum has proposed plans to create eWSF,⁸ a global equivalent to regional networks such as ConnectAmericas. This can result in significant savings related to export activities and benefit SMEs in the international market.

FIGURE 6.9 Ways the digital economy can reduce SME business costs

Export value chain		Impact of digital	
	Details	Traditional scenario	Digital scenario
Market research	<ul style="list-style-type: none"> • Identification and quantification of foreign business opportunities • Obtaining information and a rigorous understanding of the target market 	<ul style="list-style-type: none"> • Labour intensive: dedicated staff, market research agency, potential field trip • Potential travel to market 	<ul style="list-style-type: none"> • Desktop research • Digital market research tools (e.g. online surveys) • Reduced need for travel
Marketing	<ul style="list-style-type: none"> • Targeting of customers in the foreign market through advertising • Dissemination of promotional material through various advertising channels 	<ul style="list-style-type: none"> • Procurement of local advertising space in foreign market (e.g. newspaper, radio & TV ads) 	<ul style="list-style-type: none"> • Digital advertising channels (search engine optimisation, display, social, video) • Leveraging market platforms
Insurance and financing	<ul style="list-style-type: none"> • Access to product shipment insurance for and securing funding for export ventures • Obtaining information on and procuring to insurance and securing loans 	<ul style="list-style-type: none"> • Limited transparency • Time intensive paper based approach • Dedicated brokers 	<ul style="list-style-type: none"> • Product comparison sites • Single window view into market • Digital financial products
Regulatory compliance	<ul style="list-style-type: none"> • Regulation, rules and laws in the foreign market the MSME has to comply with • Costs of complying with foreign regulation such as filing documents and legal costs 	<ul style="list-style-type: none"> • Time intensive paper based approach • Dedicated consultant 	<ul style="list-style-type: none"> • National single window
Distribution	<ul style="list-style-type: none"> • Physical delivery of goods to the foreign market • Product delivery and channels through which sales occur 	<ul style="list-style-type: none"> • Manual management of supply chains • Limited information on causes of inefficiencies 	<ul style="list-style-type: none"> • Automated and digitalised supply chain management (e.g. Internet of Things)
Operational support	<ul style="list-style-type: none"> • Day to day operations of the business e.g. processing orders, back offices tasks • IT heavy tasks such as database management, accounting, communication 	<ul style="list-style-type: none"> • Special IT equipment (e.g. servers, office software) • Communication services • Dedicated travel agents 	<ul style="list-style-type: none"> • Cloud computing and software • Voice over IP • Online travel services

Source: Alphabeta framework (from AMTC, 2018).

BOX 6.1

ConnectAmericas, an online network for businesses in the Americas

Online networks for businesses are an important tool provided through the internet for SMEs to connect to international markets. ConnectAmericas, a business network initiative by the Inter-American Development Bank (IDB) with the support of Google, DHL, Visa and Alibaba, seeks to promote international trade and investment by SMEs in the Americas through its platform. Two examples illustrate its usefulness to small digital businesses working to enter international markets. The first is Rodrigo Olivares and his online engineering training services and the second is GlamST, a virtual makeup application founded by Carolina Bañales and Augustina Sartori.

After registering on ConnectAmericas, Mr. Olivares quickly received verification of his company by ConnectAmericas. Mr. Olivares next indicated his desire to expand his training services beyond his Chilean base. Within a short amount of time he was contacted online by his now

partner from Curaçao regarding a potential business relationship. Following a Skype conversation, they agreed to work together, with the new partner in Curaçao using his established business to actively promote and advertise Mr. Olivares' training services.

GlamST was created by two telematics engineers, Carolina Bañales and Augustina Sartori, to enhance the customer experience, both online and in-store, for retail cosmetics brands through a virtual makeup application they developed. ConnectAmericas provided GlamST with a way to research and verify potential business clients for the app. Further, Ms. Bañales noted that ConnectAmericas provides resources via their platform for accessing start-up capital as well as client and product development tools.

Source: <https://connectamericas.com/video/rodrigo-olivares-did-business-3-days-thanks-connectamericas>

Digital technologies can also help reduce regulatory compliance costs by making information available online. For example, government tax compliance regulations or export requirements can now often be found on the internet and necessary information can sometimes be submitted via e-documentation. This is important for SMEs, a majority of which were found to outsource customs-related regulatory compliance in a recent ITC survey (ITC, 2017a). Recognizing the potential for the internet to facilitate SMEs' access to information for international trade, the ITC with the WTO and UNCTAD has developed the Global Trade Helpdesk (GTH) as a one-stop shop (see Box 6.2). New technologies like blockchain can also contribute to greater transparency, making it easier to trace supply chains and prove product origins (Ganne, 2018). It is estimated that manufacturing SMEs can see as much as a 40 per cent reduction in compliance costs and a halving of the time required to comply thanks to digital technologies, while services SMEs can see the costs eliminated entirely (AMTC, 2018).

Other cost reducing services are available as well, particularly with regard to distribution services. Digital logistics that leverage IoT and artificial intelligence now permit much closer tracking of shipments and inventory, allowing firms to better assess their production and demand (AMTC, 2018; WTR, 2018. See also chapter 5). Additionally, recruitment websites make it easier to list and fill vacancies and price comparison sites can significantly reduce firm expenditures on their required goods and services. Cloud technologies can also reduce a firm's expenses on hardware, software, web hosting and the associated administrative costs (AMTC, 2018). These services are used by "lean start-ups" to lower their fixed costs, thereby increasing competitiveness in the fast-changing digital environment (OECD, 2017a).

Related to distribution services, studies have also shown that small and financially constrained firms rely heavily on intermediation services (Ahn, 2011; Chan, 2015) and often do not have direct export market access (Felbermayr, 2011). This is especially true when market access costs are high, leading to trade intermediation services taking a larger revenue share from exporters than would be predicted by standard trade models (Schroder, 2003). Digital technology can work to reduce the distortion posed by

intermediaries by reducing the costs of international trade, especially with regards to logistics services.

At a basic level, digital technology has been crucial in lowering the cost of operational support needed for business generally, but especially for cross-border initiatives. Email, voice over internet protocol (VOIP) systems and online video conferencing now mean that firms can be in touch at reasonable cost, especially internationally. Further, the use of machine learning to provide real-time translation is also bringing down language barriers.

Altogether, these reduced business and trade costs have the potential to be relatively more beneficial for SMEs, especially SMEs in the services sector, than for large firms with regards to international markets. This is even more true for SMEs in developing countries where the relative burden has been noted to be the highest (WTO, 2018). In fact, it is estimated that digital technologies can lower SME export costs by as much as 82 per cent and reduce foreign market operating costs by up to 59 per cent (AMTC, 2018). Digital technologies have lowered the cost to internationalize, thereby widening the scope for SME participation in international trade and GVCs (OECD, 2018b; WTO, 2018). It is estimated that the rise of digital technologies such as IoT, artificial intelligence, 3D printing and blockchain could lower trade costs by another 10.5 per cent over the next 15 years, with such decline especially benefiting SMEs and firms from developing countries, provided appropriate complementary policies are put in place (WTR, 2018).

E-commerce as an enabler or alternative to GVC participation

Access to online sales platforms has been a very important development for SMEs, especially as it relates to GVCs and international supply. Lendle *et al.* (2014) shows, in a sample of 18 countries, that between 88 to 100 per cent of eBay sellers are merchandise exporters, compared to only ten per cent of small firms operating through traditional non-platform methods. Further, SMEs participating in e-commerce tend to remain exporters longer than those in purely traditional markets (ITC, 2016) and growth of e-commerce yields productivity gains of 6 to 15 per cent for SMEs (ABAC, 2018). Although SMEs with access to

BOX 6.2

The Global Trade Helpdesk, international trade information in one location

The Global Trade Helpdesk (GTH) is a joint ITC, UNCTAD, WTO initiative that aims to improve the quality, transparency and accessibility of trade-related information by providing a unique entry point to existing trade-related information. The GTH specifically targets SMEs who often do not have the resources to access fee-based information.

The beta version of the GTH was launched at the 11th WTO Ministerial Conference in 2017. The GTH integrates comprehensive information from various sources on market requirements, including customs tariffs, taxes, rules of origin,

non-tariff measures, and notifications of WTO Members; export/import procedures (e.g. pre-shipment formalities, certification and inspection processes, transport documents); business opportunities (market prices, company directory, upcoming events); and policy outlook (trade statistics, export potential analysis, trade agreements).

In the coming years, the GTH will be translated to all six official United Nations languages to be accessible to people around the world.

Source: www.helpmetrade.org

e-commerce may not immediately participate in GVCs, SMEs often enter international trade and supply chains as e-commerce importers before becoming exporters and suppliers themselves (cited in Lanz *et al.*, 2018).

In general, small firms that use e-commerce also have more access to international markets and supply chain demand. For example, SMEs are able to reach 30 different economies on average using online platforms (ARTNeT, 2018). On top of this, e-commerce has changed supply chains more fundamentally via the noted trend for firms to retain a reduced inventory and instead purchase high frequency, small volume shipments online (see chapter 5 and AliResearch, 2017). SMEs might be able to take advantage of this change given their potential for greater business agility and the evolving need for smaller quantities.

An estimated 90 per cent of e-commerce transactions are B2B (ITC, 2017a), thereby implying underlying value chain transactions. Although the majority of e-commerce consists of domestic transactions, cross-border retail e-commerce is expected to grow at twice the rate of domestic e-commerce, potentially boosting international trade (ARTNeT, 2018). E-commerce and digital platforms have also been crucial for facilitating international trade by SMEs, and e-commerce in general is becoming increasingly international (ITC, 2017a). Thus, e-commerce can be an alternative to participation in GVCs by SMEs through multinational companies. Depending on the business model employed by a given producer or manufacturer, SMEs may search online for inputs meeting their criteria rather than having a formal agreement with a supplier, thereby creating potential opportunities for firms of any size.

Online sales platforms, and e-commerce generally, have also been shown to provide more inclusive environments for SMEs through anonymity given that firms might otherwise be discriminated against based on size or ownership if operating in a traditional market (WTO, 2016; WTO, 2018). For example, women-owned businesses are frequently better represented in online platforms than offline, with the share of women-owned online firms double the share of offline firms (ITC, 2017a). In China, 49.4 per cent of Alibaba's active online storeowners are female, and Etsy reports that more than 80 per cent of its retailers are women (AliResearch, 2017; TechCo, 2015; additionally, see Box 3.1 in Chapter 3). However, despite the possibility for e-commerce to open new doors for SMEs, large firms conduct the vast majority of e-commerce transactions (see Figure 6.10).

New business structures and opportunities

Digital technologies can indirectly increase SME trade by ways other than reducing costs. The scaling up of small firms, including the “born global” phenomenon, sometimes referred to as “micromultinationals” (Cusolito *et al.*, 2016), is one important way that SMEs can enter international markets and value chains. Micromultinationals achieve scale without mass, which has typically been required to expand abroad in the past (OECD, 2017a). Although born global firms can start from any size, given the short time span for expansion they frequently are SMEs.

Separately, fully digital products and their creation services, such as electronic games, smartphone applications, or even software

generally are also areas that SMEs can take advantage of. SMEs can join GVCs as independent service contractors for digital products that may be exported indirectly over the web. Besides online and mobile apps, online content creators in general have also sprung up as ways small businesses, even individuals, are employed. The employment share of SMEs in the ICT sector in OECD countries grew from 3.8 per cent to 4.7 per cent between 2010 and 2016, and SMEs' share of value added in this sector increased in nearly all OECD countries, with the most substantial increases in publishing activities and telecommunications (OECD, 2018c).

The opportunities opened by digital technologies are multifaceted, and some studies estimate that digitalizing MSMEs is the largest contributor to kick-starting virtuous cycles, especially for firms engaging in cross-border trade (ABAC, 2018).

3.3 Digital challenges for SMEs to enter GVCs

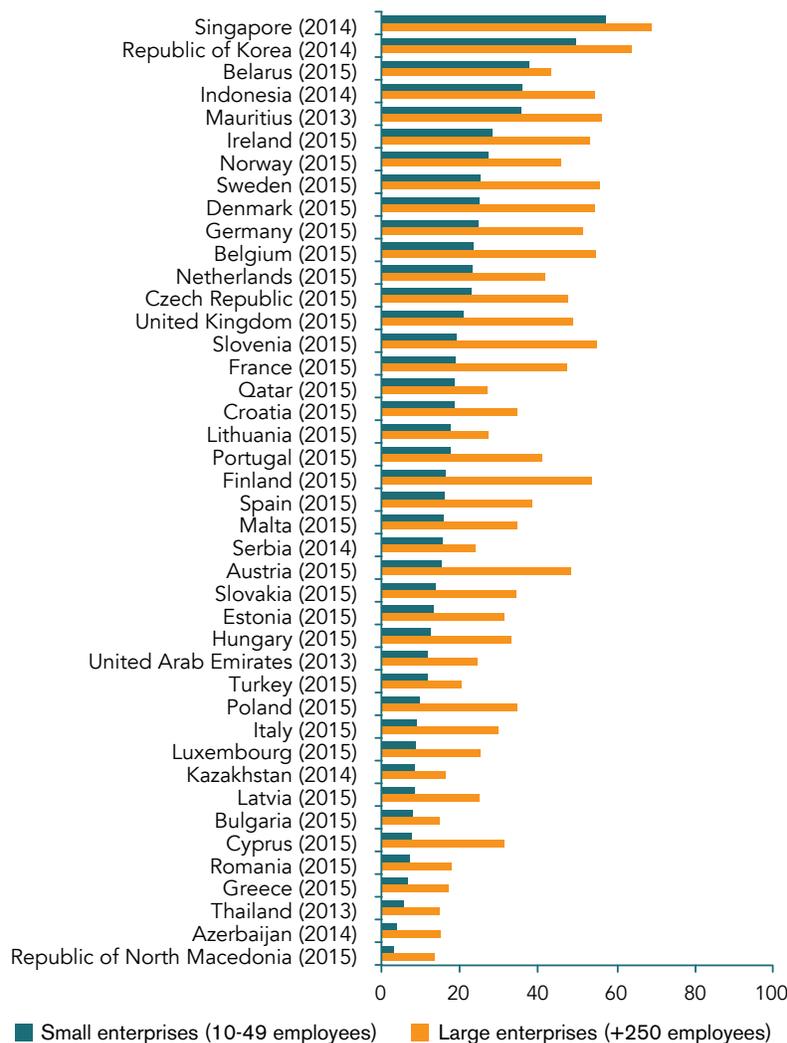
The digital economy, and ICT generally, are significant enablers for SME participation in GVCs. However, challenges related to SME participation remain. SMEs lag in terms of digital technology adoption for a variety of reasons, from cost of implementation to management (OECD, 2017a). Moreover, large firms have implemented a wide range of technologies with a diverse set of requirements (see chapter 5 for a discussion on company use of advanced supply management techniques). As a result, the ability to interact effectively with these technologies has now frequently become a precondition in big industries for other firms to become suppliers, thereby becoming a requirement for certain types of GVC participation and potentially excluding some suppliers (see Box 6.3). Without the required capital and skills, firms can be left farther and farther behind when it comes to GVC participation.

In addition to the difference between small and large firm adoption of digital technologies, the “digital divide” between developed and developing countries is also a prominent issue for the new digital economy. Developing countries often have a lower level of internet access, and the internet that is available may have a lower bandwidth than that in developed countries. Because of this reduced accessibility, there is also often a deficit of internet and related technical skills, posing additional barriers for SMEs. LDCs in particular often lack the necessary infrastructure for their SMEs to access the internet. Additionally, e-commerce platforms may not have expanded to certain developing countries, especially LDCs, given low demand, lack of online financial infrastructure, and liability concerns (Lanz *et al.*, 2018). Lastly, an issue that affects all online firms, but developing country firms, is visibility. Although a firm may have a website, if the firm lacks the skills required to market the business both online and offline, potential customers will not know of the service or product's availability (AMTC, 2018).

Even with digital capabilities, firms still face significant barriers to participate in the digital economy, such as with access to payment systems and online sales platforms (AMTC, 2018). Further, e-commerce platform requirements can often be challenging for SMEs to comply with and are sometimes labelled as “gatekeepers.” These barriers include membership requirements, such as the use of specific logistics suppliers; the requirement to deliver products to purchasers within tight timeframes; and a return policy that

FIGURE 6.10 Proportion of small and big firms selling online in 2014 and 2015

(Per cent)



Source: (UNCTAD, 2017) based on World Bank data.

is often more accommodating than the seller's default (ARTNeT, 2018). Additionally, developing country firms in particular note the high costs associated with many of these platforms, including sales commission charges that range from 15 to 40 per cent of the sale depending on the seller's location (WTO, 2018). A new technology, blockchain, could help to remedy some of these challenges. The technology is already being used to implement peer-to-peer marketplaces that operate without the need for a central actor (such as OpenBazaar). However, such initiatives remain, for the time being, very limited in scope, and it is difficult to tell whether they will offer real benefits compared to existing platforms (Ganne, 2018).

Separately, a recent study by the OECD (2017) also notes that the digital economy has led to increased complexity, changes in required skills and business models, and a "winner-take-all" environment whereby the leading player can often dominate a market at the global level. Firms may be locked out of markets by the "instant upscale" effect of winner-take-all firms that seize the market.

As with all change, the digital economy has had, and will continue to have, significant disruptive effects on traditional markets. All of these issues have implications for SMEs and their participation in digitally facilitated trade and changing GVCs.

4. How to promote SME participation in GVCs?

Reaping the benefits of digital trade is not automatic. While the rise of the internet has opened new opportunities for SMEs to participate in global value chains, challenges remain that relate both to access and use of digital technologies, and to the broader ecosystem in which SMEs evolve. SMEs continue to face significant constraints in terms of connectivity and level of digital skills, especially in developing countries, and market barriers and inefficiencies in the business environment continue to disproportionately affect them. Increasing SME participation in

BOX 6.3**Connecting SMEs to the digital supply chain – challenges for the European automotive industry**

A challenge for SMEs to integrate as suppliers into the European automotive industry in the digital economy arose with the industry's adoption of automated electronic data interchange (EDI) systems (see chapter 5 for a more in-depth description of EDI). Large automobile manufacturers insisted on compliance with their selected EDI standards to avoid complications and errors. However, these systems often required large upfront investment that acted as barriers to entry for SMEs. The development of WebEDI, a method of conducting EDI through an internet browser rather than

specific EDI software reduced the ICT burden for suppliers, but there were hidden costs related to data entry errors and employee time requirements on the part of the supplier.

Although the digital economy has created many opportunities for SMEs to become suppliers, issues relating to integration and specification requirements – not only of the manufactured product but also with the delivery systems themselves – will continue to pose challenges for SMEs that tend to have relatively smaller resources for compliance.

Source: EC (2012).

global value chains requires more than simply the technology. It requires a conducive business environment that allows SMEs to seize the opportunities that the digital economy opens.

4.1 Improving SMEs' access and use of digital technologies

SMEs' access and use of digital technologies remains constrained by various factors ranging from the most basic, such as access to a steady supply of electricity in many developing countries, to the more complex, such as a lack of high speed internet cables (ITC, 2016; Darsinouei, 2017; Lanz *et al.*, 2018). The development of an efficient ICT infrastructure is essential to access global markets (BIAC *et al.*, 2016; OECD, 2017a; OECD, 2017b), and when it comes to e-commerce, the most important technological requirement remains basic access to the internet. E-commerce can only develop if the internet is present (Fernandes *et al.*, 2017). It is therefore vital that governments provide their business sector, and in particular SMEs, with affordable, high-quality internet infrastructure. Mobile technology is also very important for businesses, in particular in developing countries, and government should support both mobile infrastructure and efforts to create mobile-friendly, paperless e-government systems (ABAC, 2018). Key policy aspects include the mobilization of investment in ICT infrastructure, both public and private, as well as the creation of a regulatory environment that provides for sound competition in the telecommunications sector (Lanz *et al.*, 2018).

However, improving access to the internet and mobile technology is, on its own, not sufficient to support integration of SMEs in international production networks if they are not aware of the opportunities that the digital economy opens and if they lack the digital skills required to participate in such networks. Awareness among SMEs of how to participate in the digital economy, and how to benefit from the opportunities that digital technologies offer, remains relatively limited (OECD, 2018c). In middle-income countries, many SMEs have internet access but they often have limited understanding or capability to leverage the internet as part of their business plan (Cusolito *et al.*, 2016). Further, the gap in technological adoption by SMEs relative to large firms remains in part because of other missing components such as insufficient R&D, human resources, and organizational and process innovation (OECD, 2018c). The lack of technical digital skills

is regularly pointed out as one of the key impediments to SME participation in e-commerce activities and global value chains more generally. In a recent ITC survey of 2,200 SMEs in 111 countries, the lack of technical skills was ranked second out of all reported challenges for e-commerce participation, behind online visibility. In fact, insufficient knowledge of online marketing tools, or technical skills, was one of the key reasons put forward to explain the lack of online visibility for these firms. Improving online visibility requires more than simply having a webpage or access to an online platform; it requires specific digital skills to master online marketing techniques (ITC, 2017a).

To promote SME participation in global value chains, policy makers need to ensure that SMEs and workers have the digital skills and knowledge to use ICT technologies efficiently in the different business functions involved in international trade, from market research, to product development, sourcing, production, sale, and after-sale services, and actively support the development of ICT (and mobile) infrastructure.

4.2 Other policy measures to support SME trade and integration into GVCs

Even when connected online, SMEs face a host of other barriers that can prevent them from joining GVCs or participating in international trade in the new digital economy. Many of these are ongoing obstacles, such as informality or access to finance and logistics. However, some have become even more relevant in the digital age. For example, de minimis import thresholds are particularly important given the increase in small shipments that has come with e-commerce. Closer inspection of these peripheral issues can provide an indication of ways to improve SME participation in GVCs and international trade.

Trade policy

Trade policy can have important simplifying effects on cross-border trade, which can increase the use of GVCs. For example, de minimis policies that set thresholds under which shipments are not required to pay duties can reduce the tariff accumulating impact on trade, or, in other words, reduce the effect of adding the tariff cost of every border crossing to the final product price (ITC, 2017a). This not only makes it less expensive to import intermediate products, but

also can make exports more competitive by reducing the final mark-up price required for profitability. *De minimis* thresholds vary considerably from one country to another, ranging from none (meaning all imports require a customs duty regardless of value) to 1,000 USD.¹⁰ Low *de minimis* thresholds pose particular barriers for SMEs involved in ecommerce, which may have frequent low volume shipments of sometimes low-value articles that still might be required to pay customs duties (Suominen, 2017). Import tariffs in general apply a cost to GVC participation, and areas with low average import tariffs, such as Southeast Asia, are much more integrated in manufacturing GVCs compared with areas that have high average import tariffs, such as South Asia. Greater use of foreign inputs has been shown to have a positive impact on the level of sophistication and diversification of exports. This suggests that policies that reduce import tariffs and facilitate border procedures are likely to help SME integration into GVCs (Cusolito *et al.*, 2016). Indeed, complicated customs procedures have been shown to be especially harmful to SMEs (WTO, 2016).

Beyond tariff reductions and trade facilitation measures, deepening trade integration is positively correlated with value chain activity. In a recent study, the ITC finds that increasing the number of trade provisions covered by trade agreements leads to more value chain integration between firms of all sizes in the participating countries, with small firms benefiting the most (ITC, 2017a). Integrating investment provisions in a preferential trade agreement rather than in a separate bilateral investment treaty was also found to increase the level of domestic value added in exports (ITC, 2017b).

Finally, significant barriers remain in the services sector, which affects SMEs disproportionately (WTO, 2016). Further liberalization of trade in services, in particular of services that allow companies to connect to global value chains, such as ICT and logistics, could act as important enablers of SME GVC participation.

Logistics and cost of delivery

For physical goods, a key issue for trade participation by SMEs is the cost of delivery. In a survey conducted by the ITC (2017a), SME respondents noted their main trade challenges were costly postal and courier delivery services. Other logistics difficulties for SMEs include the costs of shipment warehousing. These issues are particularly important for developing countries where the share of logistics costs in final prices is estimated at 26 per cent, almost twice the share for developed countries (ITC, 2017a). While some of these issues can be addressed at a regulatory level by further opening services sectors, others require proactive investment measures. Indeed, a large part of the logistics challenge faced by SMEs is linked to infrastructure. Without developed ports, roads, and cargo-handling facilities, shipping costs are more expensive (Cusolito *et al.*, 2016). For example, it has been estimated that it is cheaper to ship goods across the Pacific or Atlantic oceans than it is to ship within the ASEAN region (ARTNeT, 2018).

Promoting innovation and R&D

Participation in international trade and innovation are closely linked. Firms that innovate tend to engage more actively in international trade (Tian *et al.*, 2017) and firms that participate

in international trade have been found to be more innovative (WTO, 2016). Promoting participation in international trade and innovation are two sides of the same coin that should be pursued in tandem. Although few SMEs have the resources to invest in R&D, those that do can contribute significantly to innovation (ADB, 2015). Firm R&D spending is closely linked with manager's education and experience (Gao, 2015; OECD, 2007) and can be supported by investment in areas such as technical skills or protection of IP. Further, as previously mentioned, SME participation can be limited by system incompatibility or lack of R&D (OECD, 2007), all of which supports the idea that more R&D by SMEs can contribute to greater internationalization and GVC participation.

Improving the business environment

Inconsistencies and uncertainties in regulation are detrimental to businesses, whatever their size, but they affect SMEs more than large businesses. Indeed, SMEs' limited resources make it more difficult for them to follow and deal with regulatory changes. As a result, they often incur relatively higher costs to gain market share (OECD, 2017a). A complex, inconsistent and unstable regulatory environment can hold SMEs back (see Box 6.4). Regulatory costs and administrative burdens can also prevent SMEs from participating in formal sector activities, thereby also preventing them from expanding their operations internationally (OECD, 2017a).

When it comes to digital trade, particular consideration ought to be given to laws and regulations that relate to the flow of data, consumer protection, and the recognition of digital documents and signatures. Although countries may unilaterally enact many reforms to improve the trading environment, especially in the area of digital trade, other measures related to data privacy rules and standards, data movement, and recognition of e-contracts may require international cooperation (ARTNeT, 2018; Lanz *et al.*, 2018).

Finally, there is no sound business environment without sound competition. The rise of the internet has raised new issues in this respect. The "network effect" has enabled some internet companies to expand rapidly, often using a subsidized fee model whereby they price user access below their own business costs to gain market share. As a result, smaller firms cannot compete in, or may be priced out of, the market entirely (ITC, 2017a).

Improving access to finance

It is well-established that SMEs are less able to access finance than large firms, be it for trade or other costs. In fact, it is estimated that the gap in available credit for formal SMEs is around 1 trillion US dollars, and more than half of formal SMEs in emerging markets do not have adequate access to financial institutions (Salman *et al.*, 2017). For trade finance in particular, the WTO has found that over half of SME requests are rejected, compared to only 7 per cent of large firm requests (WTO, 2018). Much of SMEs' lack of access to trade finance stems from the cost of SME evaluation by established lenders using traditional means like credit histories. However, new technologies such as Blockchain that enhance traceability (Ganne, 2018) or Alibaba's e-Credit Line that takes advantage of its large store of transactions history to determine credit-worthiness, could help SMEs access trade finance.

BOX 6.4**Regulation can hold SMEs back**

Regulatory standardization not only benefits cross-border goods trade, but also international trade in digital services. Pegaxis, a Singapore-based property management service platform that connects property managers with providers of services such as landscaping or building maintenance, has encountered difficulties expanding to new markets in the region. For example, Pegaxis is concerned at potential data server localization requirements. These would impose costly burdens on the firm, which already has a cloud-based business model using servers across the globe. Server localization requires switching to a new provider with potentially less experience in the

business of cloud computing, uncertain quality and reliability, and different operating procedures and infrastructure that may require changes within Pegaxis. Additionally, proposals by countries like Indonesia to require within-country incorporation reduce the geographical benefits of an online business model and impose time and financial costs. Uncertainties about liability are also a concern for Pegaxis, such as regarding who would be considered at fault for defamatory reviews left on their website. This highlights how regulatory consistency, especially in the digital age, can benefit SMEs seeking to operate internationally.

Source: EC (2012).

Further, lack of finance is the primary barrier to SME formalization in developing countries (OECD, 2017a). Without access to finance, SMEs are constrained not only in their ability to export, but also to increase their business generally, thereby making GVC access and even formalization substantially more difficult.

Improving the quality of data

As the previous sections have shown, lack of data and information about SME operations represents an important barrier to better understanding and integrating SMEs into GVCs. Without good information on SMEs, it is difficult to know where to target policies, or whether a particular action has been effective. In this vein, efforts are being made to develop the Trade in Value Added (TiVA) database for improved GVC analysis, with initiatives to include firm size breakouts in future editions. However, the number of economies it contains are still limited, and developing countries, particularly low-income countries, are not well represented. In general, efforts are underway to sensitize countries to break down their statistical information by firm size, as recommended by the OECD Expert Group on Extended Supply-Use tables that was created in 2014 (see chapter 8). Overall, better information on firm operations within a country, including the size of the firms, the industries they participate in, and the value and volume of trade they conduct (including whether the trade is direct or indirect) are all crucial pieces of information to understand the basics of SMEs and value chain participation.

5. Conclusions

The international fragmentation of production that has remodeled international trade over the last decades should have made it easier for small companies to participate in global supply chains, by allowing them to focus on niche markets and narrow segments of international production chains. However, evidence suggests that participation of SMEs in global value chains remains limited relative to their share of overall economic activity and employment, especially in developing countries.

This could be changing, however, as the rise of the digital economy is reducing information search costs, facilitating exchanges, and providing new marketing, finance and networking opportunities. New research by Lanz *et al.* (2018) reveals that in developing countries, access to digital technology appears to have a positive effect on SME participation in backward-linked GVCs as well as on total exports by SMEs. This is in line with other research that has shown the cost-reducing effects that digital technology can have on business operations, such as improved access to information or access to online services. Additionally, e-commerce provides new ways for firms of all sizes to access global markets, both for buying and selling intermediate or final products. Lastly, the digital economy has created new business structures that make it possible for small firms to scale up in ways previously unattainable, such as the “born global” phenomenon, which can lead to increased SME international trade and GVC participation.

Despite new avenues, such as online platforms that SMEs can now use to access international markets and GVCs via the digital economy, barriers continue to hinder SME access. There are a number of ways policies, and the trading environment, can be changed to better support SMEs in the new digital economy. If internet access is available then an online purchase may be made, but without appropriate shipping logistics, straightforward customs formalities and processes, a favorable business and regulatory environment and access to finance a firm will be unable to complete the transaction.

Overall, reducing barriers to digital trade will require a holistic approach. Even though digital technologies can facilitate SMEs’ integration into GVCs, they are only one element of the ecosystem required for an SME to reach full trading potential and the development of coherent national strategies is essential. On a policy level, better data is also required in order to understand where the trading difficulties are in a given economy. Availability of data by firm size is critical to allow policy makers to better target their actions and effectively support SMEs’ integration into GVCs. Increased availability and quality of data, and further analysis of direct vs indirect backward participation and of the impact of direct versus indirect participation on firms’ performance would help to better understand and integrate SMEs into GVCs.

Notes

1. <http://blogs.worldbank.org/psd/a-universal-definition-of-small-enterprise-a-procrustean-bed-for-smes>
2. The terms forward and backward participation are also often referred to as “forward linkages” and “backward linkages”.
3. In Germany, for example, SMEs hold between 70 and 90 per cent of global market shares in some specialized manufacturing segments, and SME merchandise exports in textile, apparel and wood manufacturing represented more than 60 per cent of total exports across twelve OECD countries in 2015 (OECD, 2018b).
4. This is based on data from World Bank Enterprise Surveys for over 25,000 SMEs in the manufacturing industry in developing economies. The World Bank Enterprise Surveys collect data from key manufacturing and service sectors in every region of the world. The surveys are conducted according to the global sampling methodology which uses stratified random sampling to minimize measurement error and to yield data that are comparable across economies. The sampling methodology generates a sample representative of the whole non-agricultural private economy, including services industries, and generates large enough sample sizes for selected industries to conduct statistically robust analyses with levels of precision at a minimum of 7.5 per cent for 90 per cent confidence intervals. Years covered differ from country to country.
5. A commonly used definition of informality (or informal economy) in the literature is the one proposed by Schneider *et al.* (2010) who define the informal economy as comprising market-based legal production of goods and services deliberately concealed from public authorities to avoid paying taxes, social security contributions, and meeting legal obligations/requirements and market standards.
6. <https://www.ilo.org/global/topics/employment-promotion/informal-economy/lang-en/index.htm>
7. The share of women in informal employment in developing countries according to the latest available data was 4.6 percentage points higher than that of men including agricultural workers and 7.8 percentage points higher without (ILO, 2018). In some sub-Saharan African countries, the gender gap between the formal and the informal sector even exceeds 20 per cent (ILO, 2018).
8. eWSF is intended to be a global platform for SMEs to capture GVC and B2B opportunities. Although the site is still in development, the goal is to develop modular pieces to come online as each part is created. http://www.worldsmeforum.org/wp-content/uploads/2016/12/EcelandKasap_CACCI_Nov24.pdf
9. Born global firms are generally defined as those that achieve 25 per cent foreign sales out of their total sales within their first 3 years (Nordas, 2015).
10. For a list of *de minimis* levels as of 28 March 2018 please see https://global-express.org/assets/files/Customs%20Committee/de-minimis/GEA%20overview%20on%20de%20minimis_28%20March%202018.pdf.

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