Background Note for the G20 Trade and Investment Working Group

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TRADE AND INVESTMENT ASPECTS OF THE NEW INDUSTRIAL REVOLUTION

ITC, OECD, UNCTAD, WBG, WTO*

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This report compiles perspectives from participating IOs and does not necessarily represent the views of individual IOs on all issues.

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The New Industrial Revolution (NIR) and the adoption of digital technologies across all industries will result in transformative changes to manufacturing processes, related services and business models, with wide-ranging implications for international production and global value chains (GVCs). Changes in what and how firms produce and trade will significantly affect global patterns of trade and investment. Trade and investment policies must adapt to – and reflect – these new realities.

Introduction

The New Industrial Revolution (NIR) encompasses a wide range of technological innovations. This Background Note for the G20 Trade and Investment Working Group addresses those that are widely seen as exerting the most immediate impacts on trade and investment, principally *the application of digital technologies like advanced robotics, 3-D printing, big data and the internet of things*.[1]

Similarly, the Note focuses on issues that matter for trade and investment policymakers, in particular possible changes in opportunities to participate in – and benefit from – global value chains (GVCs) as a result of changes in the nature of international production and the greater ability of developing countries to participate in them, and new opportunities for SMEs to participate in international trade and investment.

Much of the media attention devoted to technological change tends to focus on disruption and the downside risks associated with new technologies and changing globalization patterns. Governments need to anticipate ongoing changes as best they can and address the costs that adjusting to rapid change entails. Some of these changes – the observed slowdown in trade, the shortening of value chains in some sectors, the heightened (technological) scope for reshoring production in innovation-rich ecosystems, the declining importance of labour costs as a locational determinant for investment, the impact technology exerts on income inequality – raise important questions regarding the feasibility of replicating past development and market integration strategies. But countries at all levels of development also need to better position themselves to take fuller advantage of emerging opportunities. The overall impact of the new industrial revolution depends critically on what countries do to enable their firms and citizens to create and take up jobs and add value in the new, rapidly evolving, environment.

1. Indicative impacts of the NIR on trade and investment

The technological innovations that underpin the NIR and the digital economy can be expected to induce far-reaching effects on comparative advantage. However, due to theoretical ambiguities and a lack of rigorous empirical evidence – some new technologies are not widely adopted yet – any

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[1] The New Industrial Revolution and its implications for a range of other policy areas are also being discussed in the G20 Digital Economy Task Force. Previous reports, under the Chinese and German Presidencies, include OECD (2017), "The Next Production Revolution: A report for the G20", and OECD (2017), “Key Issues for Digital Transformation in the G20”, Report prepared for a joint G20 German Presidency / OECD conference, Berlin, 12 January.

assessment of how technology, factor endowments, regulation and infrastructure will play out jointly to determine trade and investment patterns in this era of technological disruption is inherently difficult to perform and therefore innately tentative in character.

Still, there can be little doubt that the NIR and the digital economy are transforming production and value-adding processes across most sectors. All stages of the value chain are today affected, including internal, upstream and downstream production processes. Such changes may prompt a reconsideration of locational decisions and sourcing options. In some industries, the adoption of digital technologies is already leading to more localized manufacturing, performed closer to the point of consumption. It is also associated with accelerated product servicification and increased reliance on contract manufacturing, as well as with production patterns characterized by increased customization and adaptable scale.

These trends portend potentially significant changes for existing and future patterns of cross-border trade and investment. New modes of value-chain governance are already emerging (e.g. larger numbers of smaller production locations closer to target markets rather than a few major locations, sophisticated centralized coordination and control of production processes), new types of investment (e.g. more investment in services, greater use of non-equity modes of international production (NEMs) and changes in investor behaviour (e.g. more fluctuations in output and flexible use of labour, more footloose production). Evolving firm-level production configurations will naturally affect patterns of intra- and inter-firm trade and investment in GVCs, increase cross-border trade in intermediates, especially intermediate services, increase cross-border data flows (and reliance on them), promote greater volumes of trade in bits rather than bulk, and heighten the intellectual property content of cross-border trade and investment flows.

Changes in the international production and trade networks of globally active firms, both multinational enterprises (MNEs) and, increasingly, small and medium-sized enterprises (SMEs), are affecting the economic imprint that foreign invested affiliates leave on host countries as well as the calculus of the gains from trade for exporting nations and firms. While new technologies can open up important new opportunities for local firms to generate value and connect to regional and global value chains, they can also result in significant employment churning, shorten value chains (through technologically induced re-shoring) and raise the technological threshold for SME participation in value chain production.

These changes will require policy responses. It is likely that calls for liberalizing imports of intermediate inputs (goods and services), reducing trade and establishment costs through trade and investment facilitation, establishing a digital governance regime, strengthening IP protection, and enhancing the performance of investment promotion agencies (IPAs) will increase. More specifically, as locational competition for efficiency-seeking FDI intensifies, IPAs will need to design efficient and effective incentives, supplier development programmes and aftercare services to increase MNEs' linkages to the host economy and retain FDI.

(i) Impact on investment

The NIR is already exerting significant impacts on patterns of global investment. Digital MNEs and tech MNEs (now 13 of the top 100 MNEs[2]) have a relatively light international production configuration. They can reach foreign markets with limited assets and small numbers of employees overseas. Whereas MNEs operating in other sectors report relatively balanced shares of foreign assets and sales, digital and technology intensive MNEs generate approximately 70 per cent of their sales abroad with only 40 per cent of assets deployed outside their home countries.

[2] According to UNCTAD's Top 100 MNEs, see UNCTAD (2017a).

In general, the higher the internet intensity of MNE operating models, the greater the disconnect between foreign revenues and physical assets. Firms operating the largest internet platforms have a share of foreign sales about 2.5 times larger than their share of foreign assets. The economic impact of digital MNEs on host countries is thus less directly visible in terms of physical investment and job creation – although their investments can have important indirect and productivity-enhancing effects.

Digital MNE headquarters are concentrated in a few developed countries and emerging markets. Their ability to operate globally with limited foreign investment could reverse the dominant FDI trend of the last decade towards "democratization" of outward FDI – back to concentration in few large home countries, primarily in advanced economies.[3] At the same time, the ready availability of the internet and increasingly cheap web design offerings means that an ever greater share of SMEs are "born global". This is especially the case in service industries. Such trends offer important new gateways for firms from developing countries to integrate into regional and world markets.

Tech and digital MNEs heavily influence the values of both intangibles and liquid assets in international production. In 2015, the value of intangibles of tech MNEs (relative to the book value of their assets) was double that of other large corporations. Valuable intangibles and strong operating margins are driving large cash reserves in technology companies. At nearly 30 per cent of total assets, tech MNEs have more than twice the cash holdings of other large firms. A sizeable part of such holdings consists of retained foreign earnings.[4] The high value of unremitted foreign earnings relative to the value of foreign tangible fixed assets (six times smaller) implies that overseas investment does not always translate into a scaling up of host countries' productive capacity (UNCTAD, 2017a).

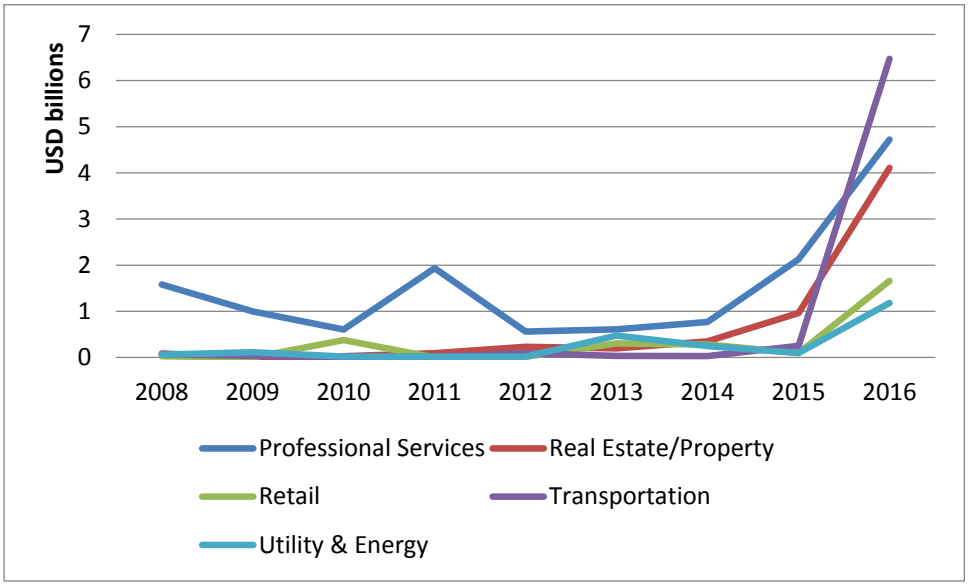
The international production profiles emerging in digital and tech firms could be a harbinger of the future for many industries. To date, the impact of digitalization on the international footprint (foreign assets, sales and employees) of non-digital MNEs remains limited, but a trend towards more asset-light forms of international production and alternative modes of firm governance and internationalization strategies is under way. While digital MNEs are important global players, a key characteristic of the digital transformation is that it is pervasive across all sectors, as digitalization re-shapes business models across a range of sectors and industries.

Indeed, while the rapid growth and globalization of digital firms themselves started a decade ago, the more recent acceleration of international investments in the digital economy by non-digital firms could presage more pronounced international investment effects than those observed to date. As firms in traditional sectors such as transportation, professional services, and retail trade build up their digital capacities to counter competition from new digital rivals, hybrid international business models requiring less FDI could start to emerge outside of the digital economy itself (see exhibit 1). This makes investment an important tool of transferring new technology.

[3] About two thirds of digital MNE parent companies and almost 40 per cent of their subsidiaries are in the United States, compared with 20 per cent of both parents and subsidiaries of other large MNEs.

[4] For instance, United States digital MNEs report a share of unremitted foreign earnings which, at 62 per cent of total foreign earnings in 2015, is almost three times larger than that of other US MNEs.

Exhibit 1: Mergers and acquisitions in 'traditional' sectors to acquire digital companies



Source: Dealogic M&A Analytics database, from OECD (2018).

(ii) Impact on trade

The technological innovations that underpin the NIR and the digital economy are changing what is traded and how trade proceeds. From cutting trade costs and enabling greater volumes of traditional trade to creating novel forms of trade and reshaping value chains, digital technologies have the potential to create new ecosystems for trade, with new players, including SMEs, and new business models. As with investment, this heralds potentially good news for exporters in developing countries whose smaller average size had long represented a binding constraint on greater trade integration.

Digital technologies are significantly cutting trade costs

The technological innovations that underpin the NIR and the digital economy are having profound effects on trade costs by decreasing the relevance of distance (geographical, linguistic) and by facilitating the matching of consumers and producers across borders.

Digital technologies are cutting *transport time and costs*, which, according to Anderson and van Wincoop (2004), are equivalent to a 21% ad-valorem tariff in rich countries. Artificial Intelligence (AI) and big data allow for autonomous driving and real-time itinerary mapping, cutting down time delays and uncertainty, which are particularly harmful for supply-chain transactions. Similarly, logistics are optimized through improved cargo and shipment tracking systems allowing, for instance, real-time adjustment in the temperature of refrigerated containers.

A second set of trade costs that are affected by digital technologies are those involved in crossing borders.[5] Digitalization is facilitating trade, enabling more efficient coordination of activities along global value chains, helping businesses and consumers track packages and facilitating border crossings. Firms are today directly connected with customs authorities through pre-arrival notices. Electronic payment systems of duties and fees with cargo declarations and/or processing systems are also increasingly integrated and border procedures automated, including through Electronic Data Interchange (EDI) system and Electronic Single Windows contributing to greater efficiency of

[5] Analysing the export process of firms from Uruguay, Volpe Martincus et al. (2015) find that a 10% increase in customs delays results in a 3.8% decline in exports.

customs procedures and processes. Blockchain technologies could help streamline customs formalities further by eliminating redundant processes, accelerating customs clearance, reducing costs and fraud, enhancing transparency and auditability, and improving coordination between the manifold actors involved in cross-border trade.

Thirdly, *transaction costs* associated with cross-border trade are reduced by digital technologies. Online marketplaces facilitate the matching of buyers and sellers by reducing search costs. Moreover, various mechanisms (such as online rating systems) implemented on online platforms help to overcome the lack of information and trust in cross-border transactions. As a result, the negative trade effects of geographical distance are reduced in online markets (Lendle et al., 2016). Moving beyond the internet, big data analytics help to better match products to consumer tastes.

Fourthly, advances in communication technologies greatly reduce *communication costs* such as linguistic barriers between buyers and sellers, for instance through the availability of own-language search for buyers on some online platforms.

Fifthly, digital technologies facilitate *cross-border payments*. New business models such as PayPal and AliPay have emerged that cut costs and delays by providing secure alternatives to the traditional correspondent banking system. Increasing reliance on blockchain technology for cross-border payments and trade finance operations (letters of credit) is expected to further ease such transactions.

Creating new forms of trade and increasing traditional trade

Digitalization is enabling trade in a range of sectors and across goods and services. Trade in smaller, often lower-value, physical packages (parcels ordered online) and digitally delivered services (such as internet banking) is growing and new types of bundled goods and services, or services embedded in goods are emerging.[6] Traditional sectoral divides are similarly breaking down, as some ICT hardware firms now focus on providing cross-border network-based services linked to their manufactured products (e.g. IBM selling its hardware and focusing on services such as Watson) and digital services companies also produce physical products (e.g. mobile phones or autonomous vehicles by Google).

While the scale of this trade is hard to measure, UNCTAD estimates that business-to-consumers (B2C) online transactions (both domestic and cross-border) were worth about $2.2 trillion in 2015 (UNCTAD, 2017b).[7] But this represents just the tip of the iceberg, as UNCTAD estimates that fully 89% of e-commerce involves business to business (B2B) transactions. DHL (2016) estimates that cross-border e-commerce, which accounted for 15% of e-commerce sales in 2015, is expected to grow at 25% annually until 2020, and to account for 22% of global e-commerce sales in that year. Developed countries account for the majority of the so-called "*parcelization*" of trade resulting from increased e-commerce. However, the involvement of producers from developing countries is on the rise. UNCTAD (2017b) reports that the share of developing countries in postal deliveries sent abroad rose sharply, from 26% in 2011 to 43% in 2016. Digital technologies not only afford easier access to export markets for developing countries and their SMEs, but have also made them active online importers as well.

Digital technologies further enable new forms of *services trade* by making it technologically feasible and fostering the emergence of new ways of delivering services. This is the case of ICT-related services (services related to the production, use and maintenance of ICTs); Internet-enabled services (services that used to be non-tradeable, but can now be provided over the internet); and digital services (such as cloud computing). In the future, advances in telepresence (technology enabling the user to be present in another space with all of his/her mental ability) and in telerobotics (technology

[6] See Cadestin and Miroudot, 2017 and Lopez-Gonzalez and Jouanjean, 2017.
[7] See also OECD, 2017.

allowing the supplier to perform manual tasks from afar) could prove to be a revolutionary change in the services sector.[8]

Digitalization has also contributed to the wider and deeper "servicification" of manufacturing. Producing goods now relies on the greater use of service inputs, such as engineering, sales or R&D undertaken in-house or outsourced, domestically and internationally. This is often coordinated through digital networks. In parallel, services are also increasingly being embedded in goods and new forms of complementarities between goods and services are arising – smartphones allow access to an ever wider range of services. Moreover, manufacturers also increasingly themselves produce and sell services. Data and associated digital technologies are also powering a manufacturing revolution built on digital services. At the same time, the growing service content of manufacturing activities, and of goods more generally, enabled by the digital transformation complicates the way trade policy (which is often still based on a distinction between goods and services) is applied.

Finally, digital technologies such as *3D printing* make product customization easier and less costly. 3D printing involves only a new design and a change in computer code instead of new production tools and costly modifications to factories. Companies such as Adidas already use 3D printing in highly automated factories in Germany and the United States (i.e., closer to large markets) to produce customized consumer goods – in this case, shoes. At the same time, the demand for customized products has increased thanks to online configuration and product visualization technologies.

Digitalization is creating new opportunities for SMEs

Digitalization promotes both bigness and smallness all at once, but for different reasons. New digital technology can contribute to facilitating the internationalization of SMEs. Yet, where the adoption of new technologies entails large fixed costs, this can increase the gap in competitiveness between large firms and SMEs. Where new technologies go hand in hand with increased market concentration, this can also reduce the likelihood of SMEs benefiting from them.

Digitalization enables SMEs to reach larger numbers of digitally connected customers across the globe. Better and faster access to critical knowledge and information can help SMEs overcome informational disadvantages, notably with respect to larger firms, and compete on a more even footing. Traditionally, access to market relevant information is the first hurdle SMEs encounter when considering export opportunities. New digital technologies and the availability of big data have the potential to offer SMEs information necessary to design products and services for the niche markets typically targeted by smaller firms.

Smaller firms selling digitally enabled services, which tend to have high fixed costs of production but near zero costs of distribution, can reach new markets more easily than those engaged in traditional trade where physical production and delivery constraints remain important hurdles to sustained sales growth. In addition, many services which were provided through commercial presence (Mode 3) can now, in principle, be provided across borders (via Mode 1), creating new opportunities for SMEs who do not need to establish, often at high cost for them, a commercial presence across different countries of operation.

Digital inputs, such as cloud computing services, can help smaller firms access IT services with little upfront investment and to scale up IT functions in response to changes in demand. Doing so provides extra flexibility and cost-efficiency for SMEs seeking to internationalize. Digital technologies are also essential to linking smaller firms to other firms and to GVCs, allowing them to export directly or indirectly, by supplying larger firms.

Online platforms significantly reduce the costs of selling across borders, enabling SMEs to engage in international transactions, both as sellers and as buyers of final or intermediate goods. Moreover,

[8] See Baldwin, 2016.

digital retailers are moving from connecting supply and demand through matching services, to providing additional complementary warehousing, logistics, e-payments, credit and insurance services – in effect creating a new trade ecosystem for SMEs.

Digitally driven sources of finance, such as peer-to-peer lending, equity crowdfunding and invoice trading platforms, hold the potential to close the credit gap for SMEs.[9] Increasingly, online marketplaces also enter the business of providing finance. These alternative finance providers use new technologies and big data to reduce transaction costs and facilitate risk assessments for lending purposes.

For gains from digital technologies to materialize, constraints to the adoption of technology must be overcome, notably in relation to market access and skills. Open, transparent and contestable markets are also needed to source inputs at competitive prices and to reach a global customer base, including as noted above in the absence of local presence.

Many SMEs are found in relatively remote areas that do not necessarily have quality access to traditional forms of transport or digital infrastructure. This can have significantly negative effects on transport and other transaction costs. New technologies – while still in experimental stage – may provide solutions. The use of drones, balloons and satellites for providing internet access in rural and remote areas is currently being tested. Drones can also play a role in facilitating the delivery of goods in remote areas.

Workers require new skills to operate new technologies. By some estimates, approximately 35% of skills demanded for jobs across industries will change by 2020.[10] This represents a drastic and rapid change to which education and vocational training systems will need to adapt. This can represent an important challenge for SMEs which – given their small size – tend to lack the in-house labour market that may facilitate on-the-job-training. Missing out on the right skill sets may put SMEs at a competitive disadvantage in moving into the new economic activities opened-up by new technologies or to upgrade their production systems in line with technological change.

Implications for patterns of trade and comparative advantage

What might these changes mean for patterns of trade and underlying shifts in comparative advantage? On the one hand, it is possible that existing trade patterns will be reinforced, with high-income economies specializing in high-tech and digitally-intensive activities. For one, high-income economies are relatively capital and high-skill abundant, and ICTs and skills tend to be complementary.[11] Second, high-income economies have well-developed broadband networks to support the use of big data. Third, they tend to combine strong formal and informal institutions, as well as deep financial markets. Formal institutions (such as the rule of law) are relevant in contract-intensive technology sectors. Financial institutions can support capital investment. Informal institutions such as organizational capital within firms can also facilitate change and adaptation to new methods of organization of work in an era of smart automation.

On the other hand, a different scenario in which a growing number of developing countries acquire comparative advantage and specialize in high-tech sectors, or harness digitalization to increase the competitiveness of their existing sectors, from agriculture to manufacturing, is also possible. As argued above, an increasing amount of services that used to be non-tradable can now be "ICT-enabled". Loungani et al. (2017) find that while developed countries are responsible for the majority of exports of ICT-enabled services, growth between 2000 and 2014 was strongest in developing

[9] See Association of Chartered Certified Accountants, 2014.
[10] The estimate from the World Economic Forum (2016) is based on a survey of large global and national employers conducted in the first half of 2015.
[11] See Violante, 2008.

countries. Looking to the future, as ever more services can be delivered remotely, developing countries with relatively skilled labour forces and the necessary digital infrastructure may increase their services exports due to the adoption of technologies such as telerobotics. Additionally, digital technologies are re-shaping not only the productivity but also the trade in agricultural products, including through improved traceability and expanded ability to connect suppliers to consumers. Finally, some developing countries with large domestic markets might benefit from the economies of scale (e.g. search engines' quality increasing with their scale) and scope (e.g. services provided by digital firms benefit from each other) – as well as from the localized knowledge spillovers associated with digital technologies.[12]

In sum, the technological innovations that underpin the NIR and the digital economy reduce trade costs, including those associated with customs administration, communication and logistics, and cross-border payments. The combination of falling trade costs and new product offerings is allowing new forms of trade and new markets to flourish. The effects that digital technologies exert on patterns of trade (who exports what?) are however more uncertain. Digital technologies might reinforce the comparative advantage of rich countries in relevant sectors, but might also provide developing countries with new opportunities in the future in a wide range of new and existing sectors.

For developed and developing countries alike, the speed of change associated with technological advances is an important challenge. While greater speed means that the gains from trade become apparent more quickly, it also means that structural change will also be more rapid, with important implications for the way countries deal with technology-induced disruption and the mitigating policies in place to deal with inevitable adjustment costs.

2. Trade and investment policy challenges posed by the NIR

(i) Investment policy challenges

One key challenge for policymakers – particularly in developing countries – is how to ensure their economy's continued attractiveness as a production location for MNEs in order to maintain or improve levels of GVC participation. Closely related is the question of how best to promote upgrading to higher value-added production and trade. A further challenge relates to the impact that the NIR could have on the way MNEs organize themselves globally, in particular the trends identified above towards shorter value chains and lighter international asset footprints (i.e. less FDI) spreading across more industries.

As noted earlier, the NIR will change the determinants and modalities of trade and investment decisions. Some economic factors long critical for the attraction of efficiency-seeking foreign investment, such as low labour costs, may lose in significance, while others assume greater prominence (e.g. the quality of a location's digital infrastructure). Policy determinants will also change, shifting for instance from more generic forms of investment incentives to more targeted ones linked to R&D, innovation and skills acquisition. The NIR also places greater emphasis on the quality of IP frameworks, both in terms of levels of IP protection and their enforcement, and data protection regimes. Overall, countries that have an economic policy conducive to innovation and R&D, a well-developed modern infrastructure, and a high-quality education system supplying an abundance of human capital will likely be more successful in attracting and retaining foreign investment and enjoy first mover trading advantages in an NIR context.

The changes brought about by the NIR, not least the ability of high cost-high wage countries to recapture through technologically advanced means competitive advantages that have progressively shifted to developing countries in recent decades, and the potential for developing countries to

[12] See Goldfarb and Trefler, 2018.

participate in more sectors internationally, point to a significantly more contestable global market for FDI attraction. Such an environment holds important implications for investment policy design, especially in developing countries, notably in terms of investment attraction, facilitation and retention through improved business environments and strengthened investment promotion efforts. It also heightens the importance of policies targeting innovation and the vibrancy of SMEs.

The ability of SMEs to participate in GVCs is both an important investment determinant for MNEs and a key factor in ensuring that investment creates positive spillovers in terms of employment generation, technology and knowledge diffusion and expanded trade opportunities. An important challenge faced by many developing countries in reducing gaps in technological capacity and promoting the participation of SMEs in international trade and GVCs is the level of private sector ICT investment and digital adoption.

To keep up with the rapidly evolving global manufacturing landscape, SMEs in developing countries and economies in transition need to improve their competitive abilities, meet the product and process standards required in world markets, benefit from reduced trade costs and stay connected with both lead (typically foreign) investors in GVCs and external markets.

The main policy challenge for making the NIR work in favour of SME internationalization thus consists of facilitating the spread of new digital technologies and ensuring SMEs' access to them. Ongoing technological disruptions are likely to affect five key determinants of SME internationalization: access to market information; access to finance; access to infrastructure; access to skills; and the ability to meet relevant standards and regulations.

Regulatory uncertainty can be particularly problematic for small players in the economy. Costly access to certification can make it difficult for SMEs to meet regulatory requirements such as cyber security standards. Given the speed at which technology changes, policymakers have a role in ensuring easy access to information on digital standards. The promotion of harmonization or equivalence of digital standards with a focus on openness, transparency and interoperability can also be beneficial for operators, and especially SMEs.

Support for the adoption of new technologies and business models can take many forms. In addition to strengthening local absorptive capacities through education and training, there is a role for supporting investment in local NIR manufacturing capabilities through, for example, the establishment of "maker spaces" and innovation hubs, incubation centres, technology parks and other dedicated economic zones. Such policies will assume greatest importance in countries where the NIR motivates MNEs to replace cross-border ownership linkages with non-equity modes of corporate governance, which will significantly increase the importance of domestic business capabilities, including with respect to access to capital.

Specific policies can also harness the potential for the NIR to generate more opportunities for firms headed by women and in sectors and firms that employ women most intensively. Policy actions could include encouraging investment in – and enhanced access to finance for – women-owned firms, strengthening women's entrepreneurial networks, removing obstacles to the higher labour market participation of female workers, promoting entrepreneurship for women, directing trade and investment support institutions to design promotional activities for women-owned firms, and ensuring better access to education and training for girls and female workers.

The various policy responses to the NIR described above are being pursued in a growing number of countries through industry development policies in which investment policies play a central part. The proliferation of industrial policies, already a trend since the second half of the 2000's and now accelerated in light of the NIR, can however prove challenging for the existing international policy framework for trade and investment. This is so because of competing goals and increasingly proactive and, at times, explicitly trade- and investment-protective, policy measures. In this regard,

the G20's continued monitoring of trade and investment measures is crucial to keep track of individual policy measures taken by governments.

Furthermore, many policies specific to the digital economy, such as policies related to the treatment of data flows, could play a critical role in shaping cross-border economic linkages. These policies are set to grow in salience as digitalization expands and becomes pervasive across production, investment and trade.

Policies dealing with investment promotion

To succeed in attracting and retaining increasingly mobile capital, developing countries will need to strengthen their investment promotion agencies, equipping them with a policy toolbox of efficient and effective (and trade law compliant) incentives and supplier development programmes required to build sustainable and competitiveness-boosting linkages between host country firms – mostly SMEs – and lead firms involved in regional and global value chains.

The race to innovate and the competitive advantages bestowed on "first movers" in the digital economy place greater demands on the quality of national policy frameworks for innovation. The introduction of new technologies leads to changes in managerial practices and the emergence of new organizational forms. In policy terms, this implies that redoubled efforts be directed at promoting entrepreneurship and enhancing access to finance, notably of venture capital. It further implies that workers faced with prospects of significantly greater labour churning over their work life be equipped with the knowledge and skills best able to facilitate needed inter-sectoral mobility and to mitigate the risks of rising income inequality potentially associated with technological divides.

Investment review mechanisms for national security and other reasons

Foreign ownership can give rise to national security concerns for governments. Some countries have developed specific policies to address these concerns while maintaining openness towards foreign investment. The types of transactions that have given rise to national security concerns have evolved over time. Examples include the acquisition by foreign firms of companies producing so-called dual use technologies, the foreign acquisition of critical infrastructure, and, more recently, investments by foreign state-owned enterprises (OECD, 2016). The digital economy has given rise to national security concerns with respect to sensitive data and technologies associated with digital economy (i.e. AI). Few governments have significantly altered their approaches to national security because the mechanisms in place have been deemed broadly adequate for dealing with new sources of concern. Nonetheless, some governments have become more explicit in recognizing digital issues in their approaches to national security.

A key issue going forward relates to the recent acceleration in the acquisition of digital assets by firms operating in non-digital or brick-and-mortar sectors. To the extent that these two trends converge, namely the increased attention paid to digital technologies in the screening of foreign investments on national security grounds and the acceleration in the digitalization of traditional industries, an almost inevitable result will be the broadened scope for international investment reviews based upon national security considerations. Policy attention needs to be given to ensuring that NIR-induced locational competition in technology-advanced sectors not impede access to frontier technologies and/or distort markets.

Challenges from fragmented policies and localization

The digital economy has motivated policy makers across a range of different areas to put in place new laws and regulations to deal with emerging challenges to which digital technologies and business practices have given rise. For example, some competition authorities have raised concerns about the market power that some digital economy firms have developed, as well as the scope for using certain digital technologies to support anti-competitive practices.[13] The high degree of market

[13] See for example OECD (2017).

concentration that characterizes some segments of the new industrial landscape may prompt calls for intensified policy dialogue at the interface of trade, investment and competition law and policy.[14]

The digital economy has generally given rise to fewer concerns for the international investment policy community to date, perhaps reflecting the relatively modest impact it has exerted to date on the international investment regime. Nonetheless, some policies aimed at regulating certain aspects of the digital economy could have increasingly important implications for international investment and the operations of MNEs, especially as digital technologies and business models become more prevalent outside the digital economy itself. These mainly relate to the increasingly important role that data plays in multinational business strategies and the growing number of ways in which governments have started to regulate or constrain the use of these data in addressing a host of public policy concerns such as privacy, national security, cybercrime and politically sensitive (dis-) information.[15]

Among the most important policy issues arising in this area is that of data localization. MNEs are technically able to store their digital data anywhere in the world. In the absence of data localization requirements, firms tend to store their data or locate their own data centres where domestic and international telecommunication connections are of high quality, energy costs are relatively low, and where climactic conditions reduce cooling costs.[16] Data localization requirements therefore usually entail additional costs for firms, such as the investment in storage capacity itself, duplication of servers, and additional data management and related regulatory compliance requirements.

Furthermore, the increasing attention that consumers pay to the social and environmental dimensions of production processes requires continued adjustments in global value chain practices and in business models across all sectors. Some of these adjustments are facilitated by the increased traceability made possible by digital technologies. Promoting sustainable trade and investment outcomes also calls for strengthened host country monitoring and policy enforcement capabilities.

Finally, the greater locational competition brought about by the NIR lends added support to efforts to facilitate cross-border investment, streamlining entry procedures and reducing the costs of establishing and operating a foreign investment.

(ii) Trade policy challenges

The digital transformation has cut the cost of engaging in trade, facilitated the co-ordination of global value chains, helped diffuse ideas and technologies across borders, and connected greater numbers of businesses and consumers globally. While it has never been easier to trade, digital trade has given rise to more complex transactions and policy issues.

In a rapidly evolving environment, governments are facing growing regulatory challenges in ensuring that the opportunities from digital trade can be realized and shared.[17] Existing multilateral trade rules were negotiated when digital trade was in its infancy and, while technologically neutral, there are questions about whether clarifications are needed to reflect new forms of digital trade and the policy issues they raise.[18] Trade rules are also traditionally predicated on whether products are goods

[14] For a fuller discussion of new challenges for competition policy in the digital economy era, see Hallward-Driemeir and Nayyar (2017: 186–187).

[15] On balancing investor and public policy concerns, see UNCTAD (2017a).

[16] The Nordic countries receive significant amounts of business investment in digital data storage capacity for these reasons.

[17] See Lopez-Gonzalez and Jouanjean, 2017.

[18] While work on e-commerce dates from 1998 (WTO, 1998), progress has been slow. At MC11in Buenos Aires, WTO Members agreed to continue work under the current work programme and to "maintain the current practice of not imposing customs duties on electronic transmissions" until the next Ministerial (WTO, 2017a).

or services and which borders they cross, but in digital trade, these can be hard to determine[19]: firms can serve markets from anywhere, and goods are bundled with services.[20] In turn, market openness underpins digital transformation: new technologies are often made available through trade and access to international markets for both inputs and outputs is necessary for scaling up production and increasing competitiveness.[21]

In the digital world, market access requires a holistic approach to goods and services

In digital trade, a single transaction, such as the cross-border purchase of an e-book from a digital platform, is shaped by a range of factors: (i) access to digital networks, which depends on physical infrastructure, the regulatory environment and the degree of competition and liberalization in telecommunications services; (ii) interoperable e-payment methods; (iii) openness in related retail services; (iv) the cost of the e-reader – which, in turn, depends on tariffs, trade facilitation or other technical regulations.

Even a relatively simple digital trade transaction thus requires approaching market openness in a holistic way, looking simultaneously at measures affecting goods, services and digital connectivity. Internet access is a necessary but not sufficient condition for digitally enabled trade in goods. If logistics services in the receiving (or delivering) country are costly due to service trade restrictions, or if goods are held up by cumbersome border procedures, then platform-enabled trade might be curtailed or might not take place.

Simple, cross-border, digitally enabled transactions in goods, services or bundled goods are underpinned by a range of measures which are horizontal to all transactions. Making the most out of digital trade goes beyond removing measures that affect the final delivery of the digital trade transaction and requires thinking about measures affecting the full value chain, including the enablers of digital trade. Engaging in digitally enabled trade in goods means paying attention to services, and trade in digitally delivered services is affected by market access in goods. As firms increasingly move towards trading bundled goods and services, the issues they face accumulate, meaning that both traders and policy-makers will need to consider a wide range of services and goods simultaneously for the potential benefits of digital trade to be realized.

Old measures are raising new issues

Digital trade can amplify the importance of "old" or more traditional trade issues. For instance, trade in low value goods ordered on-line is still subject to traditional physical constraints in crossing a border. Since trade costs can represent a sizeable share of the value of small consignments, how fast and at what cost a physical good can clear border processes is especially important for this type of trade. Issues such as *de minimis* provisions, which stipulate a threshold under which no customs duties are charged, can take on new meaning. At the same time, growing trade in digitally ordered parcels poses new challenges for customs authorities and other border agencies. These relate to

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Moreover, 71 Members further agreed to "initiate exploratory work together toward future WTO negotiations on trade-related aspects of electronic commerce" (WTO, 2017b).

[19] Reports from business suggest that uncertainty on the part of Customs about how to treat new "smart" products is leading to a rise in discretionary decisions which, aside from reducing predictability and transparency, can also result in goods being classified under a heading that attracts a higher tariff. In addition, the classification of services is crucial as it provides the basis on which countries make legally binding trade commitments. Classification boundaries are increasingly fading both within sectors (e.g. between basic and value-added telecommunications services) as well as across sectors (e.g. telecommunications services are increasingly bundled with audio-visual and ICT services as television, streaming and voice calls are made available on the Internet through different platforms) (WTO, 2009). Some concerns have been raised, including by business, that this convergence may give rise to uncertainties relating to which trade commitments are applicable.

[20] See Cadestin and Miroudot, 2017.

[21] See WTO, 2017c.

growing workloads and the need to adapt clearance processes and risk management. They may also relate to revenue issues, in particular tariffs and collection of VAT.

Digital networks also mean that *local* regulatory measures can have *global* effects. Challenges result from the significant heterogeneity among countries' rules and regulations governing digital trade. Although the Internet opens-up the possibility to reach new markets globally, firms are still required to comply with the laws of countries to which they export or where their customers are based. The resulting legal uncertainties or high compliance costs related to differing regulatory regimes can create additional costs and lower incentives to enter new markets. Such problems are most acute for SMEs.

Existing regulatory barriers can also indirectly affect digital trade. Some services, even if supplied digitally, might need to be supported in person. For instance, computer software can easily be transferred digitally but technicians may still need to travel to set up the system and provide training and aftercare to clients. Similarly, some professional services, such as legal or accounting services, can partially be supplied through online platforms, especially if they relate to simpler tasks. However, more complex professional services, particularly in business-to-business transactions, require personal interaction with clients, either through travelling or establishing a commercial presence in the host country. These are affected by existing restrictions to the establishment of a commercial presence (Mode 3) and the movement of service suppliers (Mode 4).

And digital trade raises new issues

The digital transformation raises a host of new issues such as those related to e-payments or interoperability, but the most important relate to cross-border data flows. Data underpin digital trade in numerous ways: as an integral part of production; as an asset that can be traded; as a means to deliver services and co-ordinate global value chains; and as an enabler of trade facilitation. Even when a data flow is not itself a trade transaction, restricting that flow can have trade implications since it can affect the coordination of internationally dispersed production activities or trade facilitation.

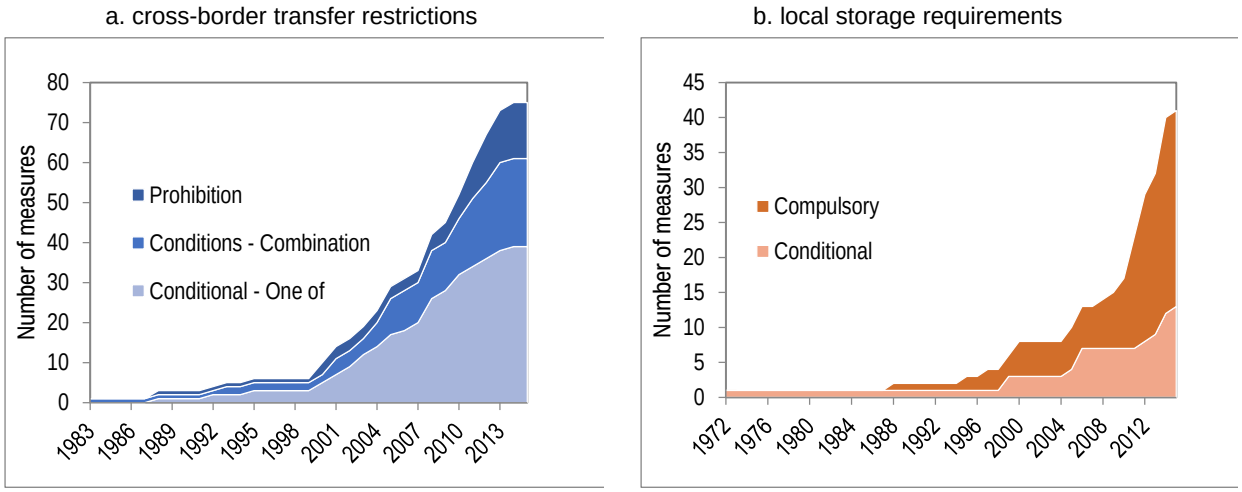
While data are increasingly becoming the ubiquitous raw material of the digital economy, growing concerns about digital security and privacy have led to increased regulation of cross-border transfers of data, or requirements that data be stored locally (see Exhibit 2).[22] While balanced regulation is warranted to ensure appropriate use, storage and transfer of these data, particularly in relation to privacy concerns, complying with different requirements could impose additional costs on firms that operate in multiple jurisdictions. These can take many forms, such as high tariffs on specialized server equipment that companies are required to import in order to meet requirements for local data storage. Another challenge relates to the protection and enforcement of intellectual property rights, particularly the need to strike the right balance that allows right holders to effectively enforce their rights against illegal copying and downloading while not creating costly burdens for intermediaries nor imposing unnecessary obstacles to creativity and innovation for users.

The implications of these measures are not well understood and have led to a polarized debate. One way forward may be to better understand the nature and composition of data flows that are highly

[22] Note: For cross-border data flow restrictions, measures can require at least one of certain conditions to be met or a combination of listed conditions to be met. Conditions include, for example, obtain subject consent, sender ensures adequate protection; model contract clauses approved by data protection agency. The onus of compliance can fall on either the government (as for the adequacy of the data protection regime) or the private sector (as for prior consent by the data subject). Local storage requirements can be conditional (e.g. government must be able to access data; data must be stored in particular place or for a specified period of time); or compulsory (where data has to be stored locally but can be sent abroad, or, as in the case of a prohibition on cross-border data transfers, where data has to be stored domestically and cannot be sent abroad).

heterogeneous, ranging from data associated with engineering to logistics to more sensitive financial and customer data.

Exhibit 2: Stock of identified data measures



Source: OECD estimates, based on 100 measures across 68 economies, with the oldest measure implemented in 1972 and the newest in 2015. Information is not exhaustive and is in the process of being updated.

Finally, reaping the benefits of digital trade will increasingly require international and multi-stakeholder dialogue on approaches that ensure the interoperability of differing regulatory regimes. Here again, the challenge lies in finding a balance that enables key public policy objectives such as privacy to be met while preserving the significant benefits flowing from freer digital trade. Useful lessons may be drawn from how trade agreements help countries to engage in the exchange of goods and services notwithstanding their differences by requiring that standards are transparent; non-discriminatory and not more trade restrictive than necessary to achieve legitimate public policy objectives.

Conclusions

The NIR and the digital economy are transforming production and value-adding processes across sectors, with implications for trade and investment. As advances in technology enable more automated and customized production, the advantage of locating in low-cost locations diminishes while that of locating closer to the point of consumption increases. Digitization is also transforming international trade. It is, on the one hand, facilitating traditional trade by reducing a range of trade costs and, on the other hand, creating new forms of trade through servicification, parcelization and other technology induced-changes both in the nature of goods and services as the means through which they are delivered to customers.

For policymakers, a key challenge is ensuring their economy's continued attractiveness as a production location for MNEs in order to maintain or improve GVC participation. The emergence of the NIR and the digital economy means that greater emphasis needs to be placed on the quality of IP frameworks, data protection, and modern ICT infrastructure and high-quality education. IPAs need to be equipped with a policy toolbox of efficient (and trade law compliant) incentives and supplier development programmes required to build sustainable and competitiveness-boosting linkages between host country firms and lead firms involved in regional and global value chains.

Trade policy in the digital world requires a holistic approach to ensuring market access, looking simultaneously at measures affecting goods and services and as well as other issues that affect digital connectivity. It needs to go beyond removing impediments to the final delivery of digital transactions and encompass measures affecting the full value chain, including the enablers of digital trade.

The issue of cross-border data flows poses an important challenge. On the one hand, there are concerns about the impact that the emerging measures may have on business activity and on the ability to benefit from globalization; on the other hand, there are concerns about ensuring legitimate public policy objectives, such as the protection of privacy and national security. The challenge is to find the balance that enables these key objectives to be met in way that does not restrict trade and investment more than is necessary to achieve the stated objectives, thereby preserving the significant economic and trade benefits flowing from data-enabled trade and investment.

For SMEs, new technologies can open-up important new opportunities to access foreign markets and connect to global value chains. Digital inputs such as cloud computing services can help SMEs access IT services with little upfront investment. At the same time, new technologies can result in raising the technological threshold for SME participation in value chain production. Costly certification processes can make it difficult for SMEs to meet regulatory requirements such as cyber security standards.

Looking ahead, the NIR will continue to raise new challenges for both trade and investment and will place an increasing premium on ensuring that trade and investment policies are aligned.

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