

The Covid-19 pandemic and the future of Global Value Chains (GVCs)

Evert-jan Quak

Institute of Development Studies (IDS)

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Question

- *What is emerging evidence on the effect of Covid-19 on GVCs?*
- *Is there any evidence on how Covid-19 impacts on lead firm-SME linkages and the green transformation of GVCs in Middle-Income Countries (MICs)?*
- *What evidence is there on how the resilience of GVCs can be supported in responding to Covid-19?*

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1. Summary

This rapid review synthesises the literature from academic, policy, knowledge and business institution sources on the discourse on reshaping Global Value Chains (GVCs) as a result of the current Covid-19 pandemic and how GVC support programmes might have to adapt to the “new normal”. **This review concludes that lead firms in GVCs could decide to diversify suppliers, reshore (near-shore) production closer to demand or intensify linkages with existing suppliers.** Which strategy firms embrace depends on the sector and the degree of complexity of the supply chain and aims to increase the resilience of GVCs. **The literature is clear that e-commerce and digitalisation are essential tools to increase resilience in GVCs.**

The Covid-19 pandemic has shown the importance of a better understanding of GVCs in relation to epidemic outbreaks. Queiroz et al. (2020) and Ivanov (2020a) conclude that the topic has still to be adequately investigated, and very much is still unknown. **The literature also mentions that there is now an opportunity for building inclusive and sustainable GVCs,** although few sources provide the empirical evidence to support that this is actually happening.

What do we know about the impact of Covid-19 on GVCs?

The impact of the Covid-19 pandemic on GVCs can be distinguished between supply-side and demand-side impacts, direct and indirect impacts, and short-term and medium- to longer-term impacts. While these impacts eventually affect all producers in the value chain, the financial burden is unlikely to be shared equally across the chain. Protecting own cash position to ensure continuity in the short-term will likely come at the expense of chain partners to a considerable degree, particularly SMEs down the supply chain (Meester & Ooijens, 2020).

By using simulation models, researchers found that Covid-19 will mostly disrupt sectors that depend more on GVCs, particularly the most tightly integrated into the global supply chains (Strange, 2020; Bonadio et al., 2020). It has also been measured that GVCs are responsible for a sizeable degree of the overall GDP contraction, amplifying the magnitude of domestic shocks. Furthermore, global supply chain losses seem largely dependent on the number of countries imposing restrictions and that losses are more sensitive to the duration of a lockdown than its strictness (Guan et al., 2020).

The current debate focuses on how GVCs should change due to disruptions initiated by the pandemic. Some scholars believe that the combination of trade-policy shocks (increased protectionism) and Covid-19 could irreversibly accelerate the transformation of GVCs (Javorcik, 2020; Lin & Lannig, 2020). However, **there is also some reservation amongst scholars to rush into conclusions as the current evidence does not explicitly support the idea that complex GVCs have been hit the hardest during the pandemic** (OECD, 2020; Miroudot, 2020, Verbeke, 2020). As such some economists think that there could be little significant change in GVCs and that adjustments will concentrate more in health-related industries as the economic rationale for most GVCs still holds.

How do lead firms build resilience in GVCs?

What lead firms do after Covid-19 will largely be influenced by the “impetus to change,” such as economic and political pressures, and “the ease of adjustment,” such as the difficulty of replacing certain suppliers and the capital costs associated with moving to new locations (Aylor et al., 2020). The result will be different per sector and firm, for example decisions on asset-light

models of investment and automation-driven reshoring. **The literature is clear that resilience building and increased digitalisation are the two main urgencies for GVCs in a post-Covid-19 scenario.** Resilience to bounce back quickly after the disruption and digitalisation as a tool to continue transactions and operations during lockdown periods. However, in complex supply networks with thousands of suppliers involved (e.g. automotive industry), diversifying suppliers to increase resilience involves considerable ongoing costs.

The design of a resilient GVC requires four principles as the supply chain management literature refers to as ECAC: engineering, collaboration, agility, and culture (Lopes de Sousa Jabbour et al., 2020, p.n/a). **Aylor et al. (2020) introduce three levers to improve resilience in GVCs by separating source (supplier ecosystem), make (manufacturing network), and deliver (channels and consumers) levers in the chain.** For each lever, different strategies can be applied by different firms in different sectors. As a result, Aylor et al. (2020) modelled three adaptation strategies for firms in GVCs: revised global supply chains, migrated global supply chains (often referred to as China+1 strategy), and regionalised supply chains.

Relocation is not an option for all companies. **The challenge of lead firms after Covid-19 lies in a combination of how modern supply networks are structured and how lead firms choose to engage with their suppliers.** In general, the literature seems to agree that many foreign companies are expected to continue with a China +1 strategy, while China is expected to remain the main manufacturing centre in the near term, with trends towards diversifying global industrial capacity set to continue over a longer period. **Supporting existing suppliers is another critical way to create resilient production networks, as multinationals increasingly recognise that suppliers are their intricately linked partners and trusted long-term relationships often result in quick recovery after a crisis.**

Call for inclusive GVCs

There is also a call to strengthen lead firm-SME linkages as Covid-19 has shown that risks are disproportionately channelled to SMEs and costs have been pushed down the GVC to the smaller entities. A Baker McKenzie (2020) report mentions that they expect supply-chain risk management to be extended at the lead firm level by including lower-tier suppliers, which goes beyond the pre-Covid-19 principle of only focussing on the top-tier suppliers. **However, limited evidence could be found in the literature on how Covid-19 has disrupted lead firm-SME linkages in GVCs.**

The literature mentions that progress towards more inclusive value chains could be undermined due to fragile lead firm-SME linkages. The ITC (2020) report mentions several solutions beyond investments in strengthening the resilience of small-scale suppliers that could strengthen the links that these firms have within supply chains: a) better contracts with SME suppliers can facilitate the sharing of risks, b) lead firms should redesign their approach to collaboration and costing with SME suppliers to ensure more equally shared value, and c) the way that the supply chain is managed and developed over time can foster an agile work culture that improves the capacity to adapt.

Green solutions will change GVCs

The literature also mentions the opportunity of developing more sustainable (greener) GVCs in a post-Covid-19 world. **For GVC firms in middle-income countries this means that the need to invest in the enabling capacities to comply with environmental standards and regulations**

(Blyde, 2020). Furthermore, the literature highlights the importance of digitalisation as a tool to establish sustainable GVCs driven by green logistics. **Both (increased environmental standards and digitalisation) could be an extra burden for SMEs to participate in GVCs.** Kenner (2020) also mentions that targeted decarbonisation policies and interventions could make production closer to the market more attractive for some sectors. Although this could reduce the carbon footprint of specific GVC, the potential impacts (positive and negative) on emerging economies is not clear yet as empirical evidence is scarce.

The case study in this report on electric vehicles shows that greener solutions could change dramatically GVCs. The Deloitte (2020) report estimates that a third of all new cars sold globally will be electric by the end of this decade as petrol and diesel vehicles “likely reached their sales peak” during the pandemic. As the growth market will become electronic vehicles, this means that current supply chains will change as electric vehicles need far less different parts and main parts will be re-usable and recyclable. New actors such as software firms will enter the automotive GVC, creating threats and opportunities for middle-income countries, such as Brazil (Masiero et al., 2017). **The case study also shows that governments in emerging economies use incentives to stimulate market opportunities for domestic firms to enter electric vehicle GVCs (e.g. Indonesia).**

How to support resilient GVCs

This review shows how important government support (but also from business support organisations) is to increase resilience in GVCs and to anticipate to new opportunities (e.g. e-commerce and electronic vehicles). Support should be channelled mainly to SMEs to enable them to participate in GVCs and to lead firms to enable them to link with SMEs. **As such the literature does not predict a dramatic shift in GVC support programmes, only an emphasis on digitalisation and resilience building.**

The way forward is to distinguish short-term (crisis), medium term (recovery) and long-term (new normal) interventions to support firms to build resilient GVCs (OECD, 2020). Governments can do this by maintaining an open trade and investment environment, address financial and other issues of firms that participate in GVCs, promote standards and certification procedures including risk awareness, develop stress tests for critical supply chains and include criteria for robustness of supply chains in government procurement procedures, and promote e-commerce and support programmes for SMEs, among others (OECD, 2020)

The literature is clear that reshoring incentives (e.g. fiscal incentives, relax labour or environmental standards to compensate for additional costs), should not be promoted and only in a transparent way as there is no evidence that it increases the resilience of GVCs to tackle the issues related to this pandemic or other future crises.

2. Increasing complexity of GVCs

Global Value Chains (GVCs) are characterised in the literature as linked activities undertaken by firms in different countries (Donovan et al., 2015; Kano et al., 2020; Strange et al., 2020). Although small firms could dominate GVCs, most GVCs involve large international corporations. As such, multinational enterprises are an important driver of GVC development, and they account for two-thirds of international trade (Meyer et al., 2020, p.n/a). Depending on the firm’s strategy, the degree of integration within the GVC varies between firms and sectors.

Even highly integrated corporations still need to buy inputs and rely on independent distributors (Strange, 2020).

Kano et al. (2020, p.578) mention that **the role of multinational enterprises in GVCs has shifted away from hierarchical entities, with their traditional focus on managing internalised overseas investments, to corporations as international lead firms**. “These firms work with and integrate their geographically dispersed strategic partners, specialized suppliers, and customer bases into complex structures...” (ibid, p.578). This means that international corporations may remain in control of GVCs. However, activities are less likely to be internalised which has increased dependencies between multiple actors, including the rise of domestic corporations and linkages with Small- and Medium-sized Enterprises (SMEs) in emerging economies (Yeung, 2016). The expansion of GVCs over the past decades has reshaped the geography of world trade and has allowed some Low- and Middle-Income Countries (LMICs), particularly in Southeast and East Asia, to engage in the production of more complex manufactured goods by specialising in distinct activities in GVCs (Meyer et al., 2020; Yeung, 2016).

The rise of complex GVCs is the result of fragmentation and dispersion of business activities across the globe due to enabling technologies, regulative forces, increasing attention on core competencies, and growing externalisation of business activities (Kano et al., 2020). Therefore, the literature also speaks about supply *networks* instead of supply chains. Strange (2020, p.459) lists the following benefits of GVCs above domestic ones:

- **Cost advantages:** In particular, for advanced economies, inputs of intermediate goods and services from abroad may be cheaper (e.g. labour costs) than similar inputs sourced from the domestic economy.
- **Limited productive capacity:** There may not be enough productive capacity in the domestic economy to provide the necessary inputs in sufficient quantity, or inputs of the requisite quality.
- **Increased resilience:** Diversified global sourcing could reduce firms’ unsystematic risks and provides them with greater resilience to supply chain disruptions.
- **Choice:** Consumers value the greater choice offered by the availability of final goods that include products from foreign sources.

Although there are extra costs related to GVCs compared to domestic value chains in terms of higher transportation costs, extended delivery times, and greater complexity, **the potential benefits of GVCs have outweighed the costs in the last decades** (Strange, 2020, p.460). To maintain these benefits, GVCs rely on the relatively free movement of goods and services, and of people and capital worldwide. In particular, “most tangible goods” need to be physically delivered from one location to another and, as such, involve the movement of people across national borders (ibid, p.460).

3. Covid-19 and Global Value Chains

Disruptions in GVCs during the Covid-19 pandemic

Covid-19 started in the Chinese Hubei province, in the capital Wuhan. After strict lockdown rules were established to contain the spread of the virus, many Chinese manufacturers with linkages within GVCs had to suspend production or reduce their production capacity. For example, Wuhan is central in manufacturing parts for the automotive sector; as a result, the lockdown

disrupted the production of cars all over the world due to reliance on lean GVCs (Meester & Ooijens, 2020). **The literature mentions several reasons why the Covid-19 pandemic could disrupt GVCs so badly.** Most of the reasons relate to the complex set-up of GVCs as mentioned in Chapter 1:

- As the virus has been detected in most countries around the world, the resilience benefit of diversifying global sourcing has weakened.
- The pandemic has interrupted the international movements of people, capital, goods, and services (e.g. through physical distancing and lockdown measures).
- The greater the distances involved and the more borders that need to be crossed, the more transaction costs have increased due to the disruptive effects of Covid-19.

The impact varies per industry. For example, the food sector was less disrupted as demand remained,¹ while other sectors were hit hardest (e.g. aviation, hotels, restaurants). The OECD (2020, p.6) mentions the example of the IT and electronics value chain, that although being highly complex and long, like the automotive sector, it did not suffer as much. Although Apple has delayed the launch of a new iPhone during the crisis, the device is now successfully sold mostly on-line. The production of four other iPhone models was also delayed by one month. Its main competitor, Samsung, reported not having any meaningful production disruptions (OECD, 2020). However, larger firms shifted parts of the production to suppliers in countries with less Covid-19 cases, such as Vietnam.² As a result, individual suppliers lower in the value chain in specific countries were impacted (Bytesnap, 2020).

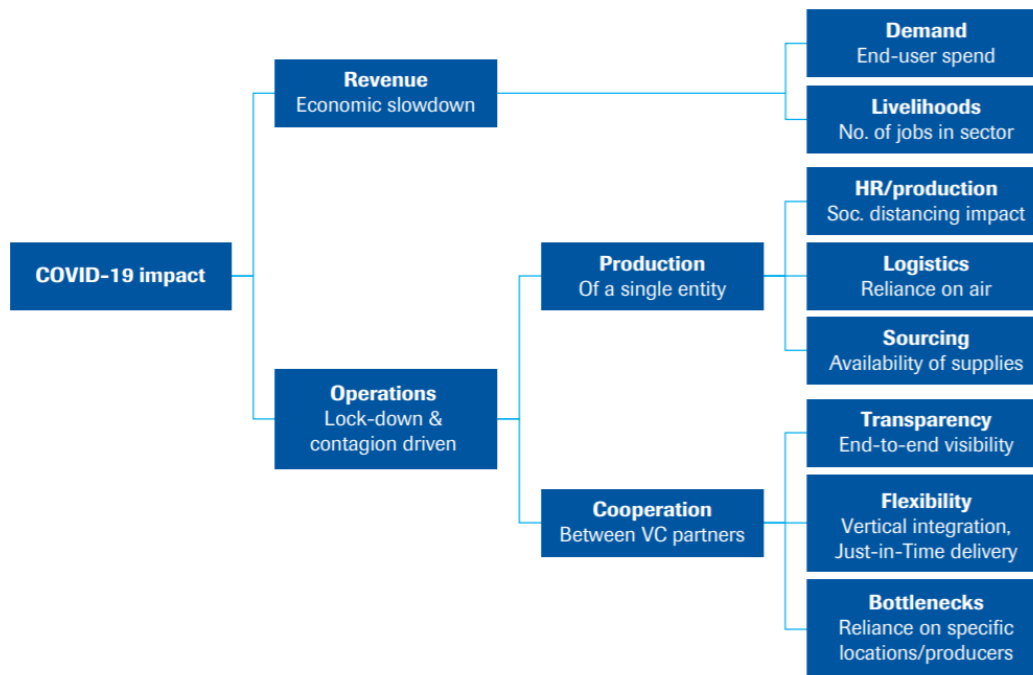
The literature shows that, in general, businesses resuming normal operations still face higher costs (at least in the short-term) at ports, as well as when handling their produce and inputs by air, rail and road (Meyer et al., 2020; Rincón Aznar et al. 2020). For example, for deliveries of car parts to Europe, the USA, and South America, which are usually made by sea, many East Asian suppliers have switched to more expensive air freight to meet delivery deadlines (Petkov, 2020). More detailed evidence on the impact of Covid-19 on global logistics can be read in the IFC (2020) report.

The impact of the Covid-19 pandemic on GVCs can be distinguished between supply-side and demand-side impacts, which also need to be differentiated for short-term and medium to longer-term implications on GVCs; Figure 1 illustrates the impact of Covid-19 on GVCs. The OECD (2020) report adds “direct impacts” (due to staff sickness and social distancing) and “trade and investment impacts” (due to policy restrictions).

¹ This does not mean that food supply chains were not interrupted. Studies have shown the impact of Covid-19 on food systems and hence on food security. See: Reardon et al. (2020).

² This news source mentions the example of Google and Microsoft who have shifted production from China to Vietnam. <https://asia.nikkei.com/Spotlight/Coronavirus/Google-Microsoft-shift-production-from-China-faster-due-to-virus> (accessed September 2020).

Figure 1. Overview of different impacts of Covid-19 on GVCs



Source: Meester & Ooijens, 2020, p.3, reproduced with permission from Netherlands Institute of International Relations 'Clingendael'.

On the demand-side impacts, Strange (2020) and Meester and Ooijens (2020) mention the following impacts:

- **As countries implement lockdowns and firms must shut-down, demand from both consumers and businesses slumps for the duration of the lockdown.** Changes in consumer and firm purchasing behaviour will require adaptations to production and distribution networks, and as these adaptations take time to come into effect there is a risk of shortages and/or overproduction. For example, companies can decide to sell stocks rather than newly produced products (Strange, 2020; Meester & Ooijens, 2020).
- **In the medium to longer-term reduced consumer expenditure, consumer confidence, and the wider economic slowdown make it more difficult to return to pre-Covid-19 demand levels.** Lower demand in virus-affected states across the world will be transferred down the value chain, affecting demand and production levels at each stage, even in areas not directly affected by the virus (Strange, 2020; Meester & Ooijens, 2020).
- **Demand impacts are likely to vary strongly across sectors** (e.g. demand for agricultural products is likely to fall less than demand for seasonal garments) and the number of employees affected is also strongly mediated by the degree of labour-intensive stages in the production process (Strange, 2020). For example, garments and mining may both be heavily affected, but the garment sector is far more labour-intensive, aggravating the impact on employees (e.g. Van Teijlingen & Hogenboom, 2020; Dekker, 2020).

On the supply-side impacts, Strange (2020) and Meester and Ooijens (2020) mention the following impacts:

- **The main short-term interruption in the operations of firms within GVCs is that employees are restricted from accessing and/or travelling to their workplaces**, limitations due to physical distancing rules, and the risk of Covid-19 for employees' health. Alternatively, when enterprises decide or must continue their operations, employees' health may be severely impacted (Strange, 2020; Meester & Ooijens, 2020).
- **Assets' operations may also be affected due to logistical constraints** as well as constraints in suppliers' production and reliability. For example, air cargo corridors have been disrupted and port handling takes more time (Strange, 2020; Meester & Ooijens, 2020).
- **There are indirect effects on suppliers of intermediate goods and services, as buyers cancel orders and/or extend their payment periods.** Such effects are larger when the buyers are large firms who can exploit the power asymmetries in their GVCs. As such, supply shocks are likely to fall disproportionately on SMEs and their employees, and on self-employed people: these groups typically have limited cash reserves. Although some exceptions exist in some sectors (e.g. e-commerce firms, delivery firms) most sectors are affected (Meester & Ooijens, 2020).
- **The medium-term and longer-term impacts on the supply-side development in GVCs, depend heavily on how rapidly demand can bounce-back** and the flexibility of firms to adapt to the "new situation" of continued constraints and uncertainties (Strange, 2020; Meester & Ooijens, 2020).

Often the **supply- and demand-side effects are interrelated**, disrupting the operations within GVCs. Meester and Ooijens (2020, p.4) mention how both supply- and demand-side impacts affect the cooperation between value chain partners:

- **Transparency:** GVCs' transparency may function as an amplifier of any demand changes. Particularly, visibility on demand fluctuations reduces the further up the value chain one goes. As demand changes occur rapidly this affects producers far removed from the end-consumer the most, also called the "bullwhip effect", leading to heavy costs to absorb the mismatch (Meester & Ooijens, 2020, p.4).
- **Flexibility:** Even highly transparent GVCs struggle when firms are not sufficiently flexible or able to adjust to signs of reduced demand. Long value chains involving steps with long cycle times, low inventories and significant vertical integration may especially face difficulties in adjusting when demand falls or individual links stop working, as individual producers have made significant upfront investments or may face difficulties in cooperating with new partners (Meester & Ooijens, 2020, p.4).
- **Bottlenecks:** Some GVCs may rely on specific locations or providers for specific critical goods or services, creating vulnerable bottlenecks. A clear example mentioned by Meester and Ooijens (2020) can be found in the automotive industry, which was heavily affected by the initial outbreak of Covid-19 in Wuhan as a number of manufacturers sourced critical components from the affected area.

While these impacts eventually affect all producers in the value chain, the financial burden is unlikely to be shared equally across the chain. Protecting own cash position to ensure continuity in the short term will likely come at the expense of chain partners to a

considerable degree (Strange, 2020; Meester & Ooijens, 2020). The bargaining power of different producers in the chain is key in determining which chain partners will manage to avoid such costs. Furthermore, Meester and Ooijens (2020, p.4) mention some decision-making initiatives that could trigger power bargaining between different actors in the value chain: financial health, cost reduction, de-risking efforts, and uniqueness versus cost.³

The literature on the indirect impacts of Covid-19 often refers to the disruption for **jobs and livelihoods** in both the formal and informal economy (ILO, 2020; Djankov & Panizza, 2020). Disruptions in GVCs are one of the contributions to such impacts, affecting groups differently, such as women workers, migrant workers, and/or informal sector workers, who often play a vital role in GVCs. **The scope of this rapid review does not include these impacts as it focusses on how Covid-19 affects the operational and coordination aspects of GVCs.**

Measuring the impact on GVCs

Lin and Lanng (2020, p.n/a) show that China's domestic and international trade transactions suffered a week-on-week drop of 56% beginning mid-February. The United States, United Kingdom, and Europe followed suit, with a combined initial drop of 26% in the beginning of April, and a continuing decline of 17% in late April (Lin & Lanng, 2020). **Less trade is one aspect of how Covid-19 has affected GDP growth in countries worldwide.** Emerging data from Q2 shows that major emerging economies suffered large GDP reductions in comparison with the Q1: -23.9% in India (the largest quarterly contraction on record),⁴ -17.3% in Mexico,⁵ -16.5% in the Philippines,⁶ -5.3% in Indonesia,⁷ -51% in South Africa, and -9.7% in Brazil.⁸

Strange (2020, p.460) mention that Covid-19 has mostly disrupted sectors in which economies lack domestic productive capacity, depending more on GVCs. Also, domestic industries that are highly integrated within GVCs have been disrupted, however, this depends on the sectors. A study by UNIDO Thailand and United Nations Thailand (2020) illustrates this for the automotive sector in the country. **Covid-19 measures had the strongest negative impact**

³ For example, in Indonesia, workers in mining, garment and palm oil production are pressured to continue business as usual to maintain the country's position in the value chain and limit the economic impact of the crisis (Dekker, 2020). This has led to health risks and concerns about forced labour and has highlighted a lack of state protection for its own citizens. This undermines efforts in ethical sourcing and transparency and exacerbating patterns of inequality and marginalisation in several countries (Van Teijlingen & Hogenboom, 2020; Meester et al., 2020).

⁴ Source: <https://fortune.com/2020/09/01/india-economy-gdp-q2-2020-covid/#:~:text=India's%20gross%20domestic%20product%20shrank,the%20world's%20top%20five%20economies> (accessed September 2020).

⁵ Source: [http://www.xinhuanet.com/english/2020-07/31/c_139252816.htm#:~:text=MEXICO%20CITY%2C%20July%2030%20\(Xinhua,\(INEGI\)%20said%20on%20Thursday](http://www.xinhuanet.com/english/2020-07/31/c_139252816.htm#:~:text=MEXICO%20CITY%2C%20July%2030%20(Xinhua,(INEGI)%20said%20on%20Thursday) (accessed September 2020).

⁶ Source: http://www.xinhuanet.com/english/2020-08/06/c_139269367.htm#:~:text=Home-,Philippines'%20GDP%20growth%20rate%20drops%2016.5,Q2%202020%2C%20lowest%20since%201981&text=MANILA%2C%20Aug.,country%20to%20a%20technical%20recession (accessed September 2020).

⁷ Source: <https://www.thejakartapost.com/news/2020/08/05/indonesias-gdp-contracts-deeper-than-expected-at-5-32-in-q2.html> (accessed September 2020).

⁸ Source: <https://brazilian.report/coronavirus-brazil-live-blog/2020/09/01/q2-gdp-results-place-brazilian-economy-in-recession-again/> (accessed September 2020).

on the automotive sector as indicated by the drop of manufacturing performance index in April 2020, about 82% year on year, showing the lowest production since 1987. However, the same report also mentions that the electronics sector was far less disrupted. As such, due to the interdependence in some GVCs, even countries that have been less affected by health impacts, still saw economic activities slowing down significantly due to the inter-connectivity of their economies with the wider world.

Most recent resources that quantify the impacts of the Covid-19 pandemic on GVCs are based on mathematical simulation models (Queiroz et al., 2020). See here some of the findings from such studies:

- **Bonadio et al. (2020) showed that the GVCs are responsible for a sizeable minority of the overall GDP contraction.** The mean contribution of foreign shocks to the fall in GDP is about one-third of the total, which means that an average country would experience an 11% GDP contraction purely due to the foreign lockdowns. **The economies with the largest foreign shock contributions (in proportional terms) are among those most tightly integrated into the global supply chains:** Brunei, Kazakhstan, Saudi Arabia, Chile, and Colombia. Among these five countries, foreign shocks account for 57% of the total contraction on average.
- Guan et al. (2020) found with their model that **global supply-chain losses that are related to initial Covid-19 lockdowns are largely dependent on the number of countries imposing restrictions and that losses are more sensitive to the duration of a lockdown than its strictness.** If only China had been affected, the results suggest that the GVCs effects (measured by value-added) would have been 3.5% of GDP, while the spread and containment measures in high-income countries in Europe and the United States could result in 12.6% fall in GDP. Another insight from the model is that even countries that are not directly affected by the virus experience large losses propagated by GVCs, and LMICs are more vulnerable to indirect effects. Specific country sectors are most vulnerable to such impacts, even in scenarios in which Covid-19 does not spread globally. Examples are electronics (e.g. China⁹), automotive (e.g. Germany¹⁰), catering, and tourism sectors.
- Ivanov's (2020a) simulation model shows that **the timing of the closing and opening of the facilities at different degrees might become a major factor that determines the impact of the outbreak on GVCs' performance rather than an upstream disruption duration or the speed of epidemic propagation.** The lowest decrease in GVCs performance can be observed in cases when the facility recovery at different positions in

⁹ In the scenario of a global spread and 6 months disruptions through lockdown measures, the recovery of China's labour supply and transportation capacity to pre-Covid-19 levels does not prevent ongoing impacts to its electronics sector through GVCs, which are largely forward effects from upstream Asian countries, which result in a reduction in the sector's output of 32.8%. In this global scenario, downstream consumption in countries such as the United States, Japan, Mexico, and France is reduced by a total of 40% (Guan et al., 2020).

¹⁰ Guan et al. (2020) measured for the scenario of a spread of Covid-19 only from China to high-income countries in Europe and the United States, would result in labour and transportation constraints in Germany and many of the countries that supply auto parts and raw materials, causing a decrease in production by the German automotive sector of 28.8%. Such decreases in German production ripple upstream to suppliers in Hungary, Spain, Italy and the United States, and downstream demand for German cars decreases in the United States, China and Austria by 29.1%, 37.6% and 22.3%, respectively. In the case of global spread and more widespread and longer-term lockdowns, the output of the German automobile industries decreases by a further 0.9%, mainly through disrupted supplies from LMICs to Germany (Guan et al., 2020).

the supply chain is synchronised in time. **The most negative impact on the supply chain performance is observed in the cases with very long facility and demand disruption durations downstream the chain** regardless of the disruption period in the upstream part. Ivanov (2020a) concludes that as such it is not only important to consider where the outbreak starts, and even not so important what percentage of supply base is located in the origin region but it is the scale of the “ripple effect” that should be particularly taken into account.

- Holland and Liadze (2020) studies the extent to which international trade linkages can amplify a common domestic shock. **They conclude that global spill-overs through trade linkages (e.g. through GVCs) could amplify the magnitude of domestic shocks by 60% on average.** In other words, if all countries around the world suffered a 1% domestic shock, the global economy would be expected to contract by 1.6% after accounting for spill-overs. For some of the smaller, very open economies, the spill-over effects from the rest of the world could even dominate the impact of the domestic shock on their own.
- Inoue and Todo (2020) quantified the economic effect of a possible lockdown of Tokyo to prevent the spread of Covid-19 by looking at the negative effect such lockdown may propagate to other regions through supply chains. Although not based on GVCs but domestic supply chains, the model’s outcomes are interesting and show that **when Tokyo is locked down for a month, the indirect effect on other regions in the country would be twice as large as the direct effect on Tokyo**, leading to a total production loss of 27 trillion yen in Japan, or 5.3% of its annual GDP. Although the production shut down in Tokyo accounts for 21% of the total production in Japan, the lockdown would result in a reduction of the daily production in Japan by 86% in a month.

Overall, the Covid-19 pandemic has shown the importance of a better understanding of GVCs in relation to epidemic outbreaks. Queiroz et al. (2020) and Ivanov (2020a) conclude that the topic has still to be adequately investigated, and very much is still unknown. Queiroz et al. (2020) did a systematic literature review of academic resources on the topic, although not exclusively *global* value chains. The analysis of the 32 selected studies shows that resource management is a great preoccupation: logistics and supply chains play an essential role in coordinating and integrating the multiple members’ activities, including manufacturers, transportation, government, etc. (Queiroz et al., 2020, p.n/a).

4. Reframing GVCs after Covid-19

Will GVCs change?

Covid-19 has exposed the vulnerabilities of interconnected and interdependent GVCs, having triggered a profound debate about the future of GVCs. However, even before the pandemic, GVCs were altered due to a shift in the political discourse towards forms of protectionism (e.g. US-China trade war), technological changes (e.g. big data, digitalisation, blockchain), and the urge for more inclusive and sustainable GVCs (e.g. climate change, inequalities).¹¹ As such, some firms already moved production and sourcing closer to the end-

¹¹ These pre-Covid-19 trends in GVCs were discussed in e.g. Sivarajah et al., 2017; Yasmin et al., 2020; Schniederjans et al., 2020; Kurpijuweit et al., 2019; Clarke & Boersma, 2017.

users, changing the governance and structure of GVCs even before the Covid-19 pandemic occurred. This trend is visible in statistics: since 2011, the expansion of GVCs has stopped (OECD, 2020, p.3).

Some scholars believe that the combination of trade-policy shocks and Covid-19 could irreversibly accelerate the transformation of GVCs (Javorcik, 2020; Lin & Lanng, 2020). Mainly, the Covid-19 pandemic is referred to as a wake-up call for a new balance between risk and reward for GVCs, as pandemics, climate change, natural disasters, protectionism, and manmade crises could result in frequent major disruptions. Javorcik (2020, p.112) for example mentions that many countries are only now discovering how dependent they are on supplies coming from China, e.g. almost three-quarters of blood thinners imported by Italy come from China, and 60% of antibiotic components imported by Japan and 40% imported by Germany, Italy, and France come from China. This realisation has led to calls urging more self-reliance and reshoring, creating new opportunities for countries that were not previously on the radar to participate in GVCs (Javorcik, 2020).¹² Cordon and Buatois (2020) and Kenner (2020) foresee more regionalisation (reshoring/near-shoring), in particular for strategic sectors (e.g. pharmaceuticals) indeed, while Lin and Lanng (2020) mention that manufacturing hubs such as Vietnam, Mexico, and India are likely to benefit from the shift away from China.

There is also some reservation amongst scholars to rush into conclusions as the current evidence does not explicitly support the idea that complex GVCs have been hit the hardest during the pandemic (OECD, 2020; Miroudot, 2020, Verbeke, 2020). According to Miroudot (2020, p.121), the most impacted industries are those relying on the movement of people or passenger transport. And for countries under lockdown, the bulk of the impact is through the fall in domestic demand hurting domestic *and* GVCs (Miroudot, 2020; Bonadio et al., 2020). Analytical work indicates that the contraction of GDP would have been worse with re-nationalised GVCs, as government lockdowns also affect the supply of domestic inputs (Bonadio et al., 2020). As such some economists think that there could be little significant change in GVCs and that adjustments will concentrate more in health-related industries as the economic rationale for most GVCs still holds.

Such findings let Verbeke (2020, p.445) to conclude that:

“[T]here will undoubtedly be long-term impacts on established IB [international business] managerial practices, such as human resources management. The main guiding principles of GVC design, however, are less likely to change: the GVC governance system came into existence because it was better suited to serve economic efficiency and to create economic value than other types of governance”.

Kenner (2020) and Freund et al. (2020) show that reshoring cannot be the full answer because large markets like the EU and US need a functioning global trading system. For example, the EU accounts for 15% of global exports and about the same share of global imports. Kenner (2020, p.n/a): “It is an awkward ideological leap to expect to participate in this system as an exporter, while also systematically looking to reduce your reliance on imports. In essence, if

¹² Javorcik (2020, p.114) mentions that many countries in Eastern Europe and eastern and southern Mediterranean have a comparative advantage in products now exported by China. To seize this opportunity to enter or to intensify participation in global value chains, countries will need to step up their investment promotion efforts. Javorcik (2020, p.114): “They will need to inform potential investors about business opportunities on offer, showcase their commitment to maintaining a good business climate, and signal their welcoming attitude to foreign direct investment.”

the EU wants to be a seller, it has to be a buyer as well". As such, reshoring or near-shoring should not be the result of increased protectionism (although both could be related), because reshoring will not automatically deliver resilience nor more robust GVCs (Leering et al., 2020). Furthermore, reshoring will most likely go hand in hand with automation to reduce costs, not resulting in major job creation. Freund et al. (2020) show that in previous shocks, like the 2011 Japan earthquake, affected firms worldwide did not react with reshoring. **However, there is evidence that they were increasingly engaged in strategies to build linkages with other suppliers with the same competitive advantages as the Japanese firms, particularly in LMICs.** No evidence was found that supply chain diversification was increasingly regionalised (Freund et al., 2020).

Leering et al. (2020) refer to the automotive sector and do not expect that significant changes in the GVC will happen due to Covid-19. **With thousands of suppliers involved in a vehicle's supply network, diversifying suppliers to increase resilience involves considerable ongoing costs,** they argue. Even if they are only used as backups, suppliers need to be able to produce to detailed specifications and meet quality and safety standards at any time. Holding more inventory also involves higher costs for working capital and storage costs, especially considering the bulkiness of many of the parts. Interestingly, Leering et al. (2020) also mention that **the shift to electric vehicles will deliver a transformation in supply chains in the automotive industry, which offers opportunities for building resilience.** Electric vehicles have fewer parts than vehicles with traditional engines, so as the share of electric vehicles in total sales increases during this decade, the number of suppliers will go down (see more in Chapter 7).

See: Figure 2. What GVCs are more prone to change than others (Aylor et al., 2020, p.3), <https://web-assets.bcg.com/8d/6f/993b0da4424dac2931263f02df1c/bcg-designing-resilience-into-global-supply-chains-july-2020.pdf>

Which sectors (and firms) adapt better to change than others, depends on two factors, according to Aylor et al. (2020): **company decisions will largely be influenced by the "impetus to change," such as economic and political pressures, and "the ease of adjustment," such as the difficulty of replacing certain suppliers and the capital costs associated with moving to new locations** (Figure 2). The impetus to change has become prevalent in recent years and could increase even further due to Covid-19. Qiang et al. (2020) mention the example of the USA and Japan. In the USA the government is working on proposals to push American companies to move operations or key suppliers out of China by offering tax breaks, while the Japanese government agreed on a US\$2.2 billion support package to subsidise manufacturers that move their production out of China (Qiang et al., 2020).¹³

The literature is clear that resilience building and increased digitalisation are the two main urgencies for GVCs in a post-Covid-19 scenario. Resilience to bounce back quickly after the disruption and digitalisation as a tool to continue transactions and operations during lockdown periods. Ivanov (2020b, p.n/a) shows that the research angle of the management of global

¹³ The consumer products maker Iris Ohyama is the first in line to take advantage of this subsidy (Qiang et al., 2020).

supply chains has already increased the scope over time away from “leagility” with a focus on responsiveness in the 1990s, towards “resilience” with a focus on natural and manmade disasters since 2005, “sustainability” triggered by climate change after 2010, and “digitalisation” with a focus on data analysis since 2015. Understanding GVCs during and after the Covid-19 pandemic requires analysis and integration of all these research angles (Ivanov, 2020b).

The next sections will look first at the meaning of “resilience” and “viability” regarding GVCs. In the current debate, most attention goes to understand if resilience measures have worked during the pandemic and how they could be improved as a reaction to ever more efficient (but less flexible) lean and just-in-time GVC systems. Ivanov’s (2020b) study adds to this discussion the principle of “viability”. Cross-cutting for both resilient and viable GVCs is the role of “digital” solutions. Beyond resilience, viability, and digital, there is an increasing literature on the urge to make GVCs more sustainable (e.g. reaction to climate change) and inclusive (e.g. increasing participation of SMEs) after the pandemic. These topics will be examined in more details in chapters 6 and 7.

Resilience

In the discussion about resilience, a distinction is made between what reliance actually means and the difference with robustness. This is important because building robustness and resilience in GVCs requires different strategies (Miroudot, 2020). Robustness means “the ability to withstand a disruption (or a series of disruptions) to maintain the planned performance” where resilience means “the ability to withstand a disruption (or a series of disruptions) and recover the performance” (Ivanov, 2020b, p.n/a). As Miroudot (2020) explains, during the pandemic robustness matters mostly for medical supplies, while resilience matters for negatively affected industries (e.g. tourism).

Miroudot (2020) further explains that since important costs are associated with robustness, such as investing in a diverse supply networks and tools that allow the monitoring of risks, **many companies are not interested in cancelling out all risks in their supply chains at all cost**; they accept the risk of major disruptions, but nevertheless invest in reducing the time needed for recovery, which is typically a resilience strategy. The OECD (2020, p.8) report mentions the following case of Cisco after the 2011 earthquake in Japan. The company hardly lost revenue while implementing the “Cisco lean model”. This means that the company had effectively integrated risk awareness at all levels in the value chain and put in place monitoring mechanism for resilience, with an index to assess the time to recover for all its suppliers.

Resilience can be built in different ways:

- **Sourcing strategies** may differ across activities depending on the level of acceptable risk, with supplier diversification and ‘just in case’ processes an objective for essential activities (OECD, 2020).
- Through products (with buffer stocks and standardised inputs easier to be replaced) and the **design of the value chain** (identifying places and suppliers less subject to risk) (Miroudot, 2020, p.124).
- **Risk management** strategies at the firm level are emphasising risk awareness and promoting agility, for example through resilience monitoring (assessing the time to recover for each type of supplier) (OECD, 2020; Miroudot, 2020, p.124).

As such agility is an essential pillar for resilience. **The ITC (2020) report shows that a constructive reaction to risk is to take advantage of it. Agile firms change form in response to the current situation, show the ITC (2020) survey amongst firms.** This may include customising or proposing new products or business models according to new market trends. Agile firms have created new products and services such as designer masks and rapid testing technologies during the pandemic to shift to products with high demand.

The ITC survey (2020) also shows that during the lockdown, some firms lent their employees to other active businesses in essential industries. In their survey amongst SMEs, roughly 21% of the companies that responded adopted this strategy to deal with the pandemic. ITC (2020, p.39): “Here is where it is good to be small, because it’s easier for small firms to take swift decisions and develop new products quickly. **What SMEs may lack in productivity; they gain in agility.**”

However, Miroudot (2020) emphasised in his conclusions **two common misunderstandings** in implementing resilience strategies:

- The first mistake is to equate self-sufficiency or domestic production with robustness.
- The second mistake is to focus on the location of production; the overriding imperative during a crisis is to maintain and scale up production.

Leering et al. (2020) mention the example of the electronics sector, which is mainly concentrated in Southeast Asia. **The complexity of electronics supply chains reduces the scope for diversifying suppliers** because it is difficult for firms to evaluate dependencies across different tiers of the supply chain. Even if a firm successfully diversifies the suppliers of 90% of its inputs, disruption to any of the remaining 10% is still enough to shut down production (Leering et al., 2020). Therefore, awareness of potential disruption in supply chain management in such complex GVCs should be based on resilience, instead of focussing on robustness.

Hence, single sourcing and a long-term relationship with a single supplier is also a strategy often observed for improving supply-chain resilience. This strategy might not be optimal in terms of robustness when this supplier is affected by risk. However, there is empirical evidence that supplier diversification is associated with a slower recovery from supply disruptions, whereas the use of long-term relationships is associated with more rapid recovery (Jain et al. 2017).

Viability

According to Ivanov (2020b, p.n/a), resistance to disruption needs to be considered at “the scale of viability to avoid market collapses and secure the provision of goods and services”. Where resilience is based on building capabilities within a pre-set system to weather out disruptions, **viability is much more related to the capability of being able to change the system over time to respond to disruptions without a time limit.** Ivanov and Dolgui (2020, p.2907) refer to this as “a behaviour-driven property (continuous system change) of a system with structural dynamics” in an “open system context” that is “survival-oriented without fixed time windows in a long-term scale”. As such Ivanov (2020b, p.n/a) places viability as “the highest analysis level for supply chain reactions to disturbances”, which is based upon stability (the ability to return to a pre-disturbance state and ensure a continuity), robustness, resilience, and viability. According to Ivanov (2020b), viability is “the ability to maintain itself and survive in a changing environment over a long period of time through a redesign of the structures and re-planning of economic performance with long-term impacts”.

The Viability Supply Chain model that Ivanov (2020b) introduces (see Figure 3) relies on three cycles: an agility-oriented, resilience-oriented, and survival-oriented cycle. He also demonstrates how the components of the viability supply chain model can be categorised across organisational, informational, process-functional, technological, and financial structures which all include potential disruptions in the short- and long-term.

See: Figure 3. Viable supply chain ecosystem framework (source: Ivanov, 2020b), <https://doi.org/10.1007/s10479-020-03640-6>

Technology and digitalisation are all important building stones of this model. Digital, data-driven technologies can support the GVC decision-making in cases of long-term, severe disruptions such as epidemic outbreaks (Ivanov & Dolgui, 2020). Viability will encourage investments in flexible and adaptable production and distribution systems (e.g. omnichannel, additive and digital manufacturing) along with reactive, real-time mapping of supply and demand (Ivanov & Dolgui, 2020, p.2912).

5. Lead firms' strategic decision-making on resilience

The literature mentions that the recovery process would require a reassessment of the structure of a supply chain in terms of location, production capacity, and management of the flow of materials and information amongst the current actors of the supply chain in order to identify pros and cons and eventually to reconfigure the supply chain structure (Govindan et al., 2020). Kano et al. (2020, p.584) published a figure that shows decision-making processes and influences on GVCs' outcomes such as firm-specific performance, upgrading, and chain level durability and stability (see Figure 4). These are structured around "structural governance" (control, location, network) and "strategic governance" (learning, the role of lead-firm, GVCs orchestration) measures, while influenced by macro-level influencers (e.g. economic development) and micro-level influencers (e.g. management capabilities). Although it is from pre-Covid-19, Kano et al.'s (2020) conceptual model is useful to understand the strategic decision-making processes of lead firms in GVCs and how this could be affected by the pandemic.

See: Figure 4. A comparative institutional framework of GVC governance (source: Kano et al., 2020, p.584), <https://doi.org/10.1057/s41267-020-00304-2>

To understand management decisions for dealing with disruptions in supply chains, the three Ts are mentioned in the literature: time, transparency, and trust (Lopes de Sousa Jabbour et al., 2020, p.n/a). Time means focussing only on adding value processes that customers are willing to pay for; transparency relates to the necessary levels of inventory and costs of production which are reliable and fair for the joint planning of production and sales; and trust is the consequence of collaborative working practices that enable the sharing of gains and losses (Wilding, 2003 – as cited in Lopes de Sousa Jabbour et al., 2020, p.n/a).

Looking at how firms coped with previous major disruptions, shows the importance of having good management and governance systems in place. As Meyer et al. (2020, p.n/a) mentions, in 2003, during the SARS crisis, many Asian companies along GVCs increased production in response, built buffer levels and stocked up inventories. Many firms developed

business plans, establishing parallel sites or shifting operations, and invested in IT to enable remote working (Meyer et al., 2020). Now, because of advanced, activity-based accounting and digital tools, as well as other managerial innovations in coordination and control (such as block chains), senior managers can identify and isolate very narrow, modular activity sets to be coordinated with each other (Verbeke, 2020). For each activity set, they decide on internalisation versus external production, and on its optimal location. They continuously reflect on what should be done inside the firm versus outside of it, and where. **The outcome is, according to Verbeke (2020) that a GVC with great agility responds swiftly to exogenous shocks.**

The argument of Cordon and Buatois (2020) is that the GVC model that is only focussed on optimisation of minimum cost and volume stability has become irrelevant. Supply chain management has become the prime driver of company business, which according to Cordon and Buatois (2020) makes it feasible in a post-COVID-19 world to introduce supply chain stress tests, like financial stress tests became the norm after the financial crisis for financial institutions. As volumes become more variable, supply chains must become more adaptive, as actors in the value chain prepare for major catastrophic events. Technologies such as comprehensive dashboards that lay out the full status of production and shipment, down to the last detail and refresh every 20 minutes to provide a real-time overview of the entire supply chain will become the norm (Cordon & Buatois, 2020).

The design of a resilient GVC requires four principles as the supply chain management literature refers to as ECAC: engineering, collaboration, agility, and culture (Lopes de Sousa Jabbour et al., 2020, p.n/a):

- **Supply chain engineering:** Mapping the structure of a supply chain, covering all of its members, including first and second-tier suppliers, channels of distribution and final consumers, is important in order to identify likely bottlenecks that may restrict the flow, capacity and visibility of production. Lopes de Sousa Jabbour et al. (2020) mention that the use of “critical path and risk register tools” can help managers to perform the required map assessment of a supply chain.
- **Supply chain collaboration:** Sharing information is the best way to increase visibility and reduce risks in a supply chain. The purpose of collaboration in a supply chain is to create a common understanding of the strategy of the supply chain. Therefore, sharing outputs from political, economic, social, and technological analysis (PEST forces) and risk assessment of demand, supply, and processes between actors of a supply chain creates a community perspective (Lopes de Sousa Jabbour et al., 2020).
- **Supply chain agility:** Lopes de Sousa Jabbour et al. (2020) mention two ways for agility. Firstly, visibility is related to monitoring the flow of materials and information across a supply chain to ensure that procurement, production, delivery schedules and orders will be met. Secondly, velocity concerns reducing the “end-to-end” time taken for producing and delivering products and services need to be analysed. Digital technologies, such as cyber-physical systems, sensors, barcodes, internet of things, collaboration portals and cloud computing can enable both the visibility and the velocity of supply chains.
- **Supply chain risk management culture:** Risk assessment management should be developed as part of the routine of a company and its supply chain to build an ability to anticipate and respond to disruptions. Leadership towards the creation of risk assessment teams would help firms to pursue this culture. Big data analytics and blockchain are means of gathering and recording information to be analysed (Lopes de Sousa Jabbour et al., 2020).

An ITC (2020) Covid-19 survey reveals that SMEs were far more likely to adopt agile responses to the crisis than larger firms. However, they were also slightly more inclined to adopt retreating strategies than bigger companies. It was mainly large businesses, for their part, that could adopt a resilient approach than SMEs, underscoring their greater capacity to ride out the storm. ITC (2020, p.39): “The take-away from this analysis is that while large companies can afford to stay put and be resilient, small companies must either adapt to the crisis in an agile manner or collapse”.

However, this does not mean that larger (lead) firms are not adjusting to changes, only that their agility is part of the wider resilience strategy. As the architects of GVCs, lead firms constantly adapt to risks and opportunities by reconfiguring production networks and optimising supply chain complexity (Qiang et al., 2020). They strategise to improve not only efficiency, but also their resilience. Their strategies consider technological advancements, shifting consumer preferences and government policies. Therefore, Qiang et al. (2020) believe that Covid-19 will extend rather than reshape existing strategic thinking by lead firms, for example decisions on asset-light models of investment and automation-driven reshoring.

Aylor et al. (2020) introduce three levers to improve resilience in GVCs by separating source (supplier ecosystem), make (manufacturing network), and deliver (channels and consumers) levers in the chain. For each lever, different strategies can be applied by different firms in different sectors. As a result, Aylor et al. (2020) modelled three adaptation strategies for firms in GVCs: revised global supply chains, migrated global supply chains (often referred to as China+1 strategy), and regionalised supply chains (see Figure 5 and 6).

See: Figure 5. Levers of improving resilience across supply chains (source: Aylor et al., 2020, p.n/a)¹⁴, <https://www.bcg.com/en-gb/publications/2020/resilience-in-global-supply-chains>

See: Figure 6. Three emerging models for adapting supply chains (source: Aylor et al., 2020, p.n/a)¹⁵, <https://www.bcg.com/en-gb/publications/2020/resilience-in-global-supply-chains>

For example, Vietnam has absorbed much of the manufacturing capacity that China has lost. The country has signed several international trade deals and invested significantly in industrial infrastructure over the past decades, while labour costs are around 50% less than China (Oxford Business Group, 2020). Other countries are looking to capitalise on the shift away from China (even pre-Covid-19). For example, Indonesian government outlined in 2019 plans to develop more special economic zones to position the country as a leading destination for manufacturing firms looking to move out of China (Oxford Business Group, 2020). Firms that

¹⁴ Accessed via Boston Consulting Group (BCG) website, <https://www.bcg.com/en-gb/publications/2020/resilience-in-global-supply-chains> (accessed September 2020).

¹⁵ Accessed via Boston Consulting Group (BCG) website, <https://www.bcg.com/en-gb/publications/2020/resilience-in-global-supply-chains> (accessed September 2020).

might want to relocate some parts of the production closer to demand are looking to opportunities in Mexico (US-focused firms) and Northern Africa (European-focused firms).¹⁶

However, relocation is not an option for all companies. Many business experts see the efficient Covid-19 responses in China as a pro. Another factor complicating any potential relocation is related to parts and raw material, with many countries still reliant on China for the components needed for production. Furthermore, once export-oriented manufacturers set up a base in China, they serve to stimulate local enterprise as SMEs integrate into their supply chains, which can enhance manufacturing self-sufficiency over time (Oxford Business Group, 2020).

The key is that traditional supply chains have transitioned into supply networks. **The challenge of lead firms after Covid-19 lies in a combination of how modern supply networks are structured and how lead firms choose to engage with their suppliers.** The outcomes can be very different for countries, sectors, and specific firms due to strategic decision-making processes. In general, **the literature seems to agree that many foreign companies are expected to continue with a China +1 strategy, while China is expected to remain the main manufacturing centre in the near term, with trends towards diversifying global industrial capacity set to continue over a longer period** (Oxford Business Group, 2020; Qiang et al., 2020; Kenner, 2020). As mentioned earlier, Jain et al. (2016) provided evidence that long-term relationships among companies are associated with a more rapid recovery from a crisis.

Therefore, supporting suppliers is another critical way to create resilient production networks, as multinationals increasingly recognise that suppliers are their intricately linked partners (Qiang et al., 2020). Lead firms can accelerate payment for goods that have either been produced, or are in the process of being produced, as shown by global garment retailers, and by suppliers of Boeing airplanes. Multinationals can also help suppliers adapt their production process to a different market after COVID-19 (Qiang et al., 2020). For example, Apple is helping its partners redesign and reconfigure factory floorplans to maximise interpersonal space (Qiang et al., 2020).

Finally, technological change and automation also play an important role in the decision-making outcomes of firms. Multinationals can use artificial intelligence, machine learning, and Big Data to monitor a producer's entire supply network and can use ICT advances to remotely plan, develop and oversee production, connect to customers, and fulfil orders (Verbeke, 2020). For example, as Qiang et al. (2020) mention, Toyota has efficiently implemented this approach since the 2011 Japanese earthquake, allowing it to track components and replace them easily during COVID-19.

As such, Verbeke (2020) foresees four new research areas related to areas where GVC decision-making could change due to Covid-19: a) increased investments in intelligence and contracting safeguards, b) reducing levels of irreversible investments abroad, c) improved relational contracting with key partners and ex-post governance, and d) increased levels of diversification. The extent and effectiveness in which companies can adapt to the vast

¹⁶ In early May regional media reported that US tech giant Apple would produce around 30% of its AirPods – some 3m-4m units – for the second quarter in Vietnam rather than China (Oxford Business Group, 2020). Indian automotive manufacturing companies such as Tata Motors and Maruti, for example, are increasing local sourcing to reduce their dependence on China (Qiang et al., 2020). And Renault, for example, recently announced that it is withdrawing from its joint venture with Chinese state-owned automobile manufacturer Dongfeng (source: Reuters 14 April 2020 - <https://uk.reuters.com/article/us-renault-m-a-dongfeng/renault-quits-its-main-china-venture-after-weak-sales-idUKKCN21W0HB>, accessed September 2020).

interruptions and shortages, and are able to re-organise production systems, will determine the impact on GVCs and their role in the world economy as we know it (Rincón-Aznar et al., 2020, p.R3).

6. Covid-19 and Lead firm-SME linkages

A Baker McKenzie (2020) report mentions that they expect supply-chain risk management to be extended at the lead firm level by including lower-tier suppliers, which goes beyond the pre-Covid-19 principle of only focussing on the top-tier suppliers. Baker McKenzie (2020, p.10) acknowledge that lower-tier suppliers are “critically important to the overall supply-chain hierarchy, and disruptions at these levels can quickly cause disturbances throughout the chain”. Many of these lower-tier firms are SMEs. SMEs are not always suppliers to lead firms. They can also have an essential role in the distribution network of products and services to local markets (e.g. through shop networks, home delivery services) or with horizontal linkages to larger production units (see Box 1).

However, limited evidence could be found in the literature on how Covid-19 has disrupted lead firm-SME linkages in GVCs. Most information is anecdotal, mostly by looking at the available evidence (pre-pandemic) and predicting what the potential impact of Covid-19 could be. A World Trade Organization (WTO, 2020) publication mentions that current disruptions disproportionately affect sectors in which MSMEs are highly integrated into GVCs. For example, in office equipment, electronics, chemicals, petroleum and plastic sectors, MSMEs import almost 60% of total inputs from foreign countries (backward participation), while in the automotive and furniture sectors, MSMEs – especially foreign-owned MSMEs – export more than 40% of their total sales through direct or indirect trade channels (forward participation).

As such, the WTO (2020, p.4) mention that **MSMEs that participate in GVCs can be disproportionately at risk and progress towards more inclusive value chains “can be undermined”.** **Most MSMEs in LMICs were already excluded in GVCs for various reasons.** The WTO (2020) mention that MSMEs' exports amount to only 7.6% of total sales in the manufacturing sector in LMICs. Reasons commonly invoked to explain the low participation of MSMEs in international trade include lack of relevant skills, lack of knowledge about international markets, and cumbersome regulations and border procedures, as well as limited access to trade finance. In particular, the MSME trade finance gap, which is estimated at about US\$ 1.5 trillion per year by the Asian Development Bank (ADB) as cited by WTO (2020, p.4), is a concern to increase given the negative effects of Covid-19 on financial market confidence. “This offers especially negative prospects for firms in [LMICs] where a lack of trade finance can severely hinder trade opportunities” (WTO, 2020, p.4).

In general, the pre-Covid-19 literature on lead firm-SME linkages focuses mainly on vertical linkages and is dominated by theoretical and conceptual papers outlining the benefits (and disadvantages) for SMEs of linking with large businesses (Quak, 2019). Only a few empirical papers exist on the subject, mainly by gathering the data from the side of large firms. The conclusion of the literature is that SMEs can expect benefits from participating in GVCs, as they increase SME competitiveness through business linkages, enhance product quality due to technology transfer, and facilitate SME expansion to overseas marketplaces with job creation (Canare et al., 2017). Lead firms have an advantage as well to access new markets and distribution networks, to diversify supplies, and to improve their ethical and social responsibilities (Canare et al., 2017; Botelho & Bourguignon, 2011).

However, the literature also mentions some main constraints (WTO, 2020; Quak, 2019; World Bank, 2018):

- **Most international lead firms are rarely in a direct trading relationship with SMEs**, particularly the smaller ones; the relationship is often mediated by one or more levels of trader and supplier. The question then arises of how international lead firms can support suppliers to trade with SMEs, and in doing so reconcile their inclusion with commercial drivers.
- **It is usually the smaller firm that bears a greater risk.** These risks could be due to the difference in resources available to the small and large partner and to the development of trust and commitment. The latter relates to transparency differences in GVCs towards smaller firms in GVCs that are often upstream and lack information on strategic decisions from lead firms.
- **Limited access to technology restricts the ability of most micro- and small entrepreneurs and base-of-the-pyramid customers to pivot to e-commerce**, which is an increasingly important factor for GVC involvement. SMEs risk losing out to large businesses with greater access to capital to invest in technology.

There are also **constraints from the side of lead firms**, namely (Canare et al., 2017):

- Being part of a business linkage programmes require internal commitments of many years involving significant resources, technology, and persistence.
- Lead firms may have difficulty selecting potential SME partners without accurate information that can be used to evaluate their performance and reduce the risks of working with them.
- A supportive enabling environment is a critical foundation for encouraging business linkages between lead firms and SMEs.¹⁷

These constraints to engage in inclusive supply/trade linkages in GVCs show how fragile these linkages are for any major disruption, and therefore for the current pandemic. As such, it could be predicted that Lead firm-SME linkages that have been built over the past years could be severely disrupted due to the pandemic.¹⁸ e-Commerce and digitalisation of supply networks are indicated to become more important to maintain lead firm-SME linkages, risk and costs assessments are needed to maintain linkages, as are a supportive enabling environment. However, no empirical evidence for this could be found yet.

A recent IFC report (Geaneotes & Mignano, 2020) mentions how inclusive businesses as lead firms in their sectors in emerging markets have adapted during the Covid-19 crisis to support their low-income and vulnerable suppliers, distributors, and customers. Some important lessons could be learned from this for other (international) lead firms to maintain inclusive value chains (Geaneotes & Mignano, 2020):

¹⁷ For example, labour market rigidity, cross-country regulations, non-tariff barriers, inability to meet the quality and standards for certain products, managerial constraints and lack of access to credit make SMEs hesitant to step forward. However, most of these constraints can be eased by policy support and regulatory coordination. Source: Geaneotes & Mignano, 2020.

¹⁸ Interpretation by the author after analysing the literature.

- **Leverage existing tech-based information and payment channels:** Many inclusive businesses use technology platforms to support and engage with micro and small enterprises in their supply and distribution chains. Inclusive businesses now leverage these platforms to distribute Covid-19 related health information and arrange payments.¹⁹ This includes using financial technology to facilitate digital money transfers and payments by their customers, retailers, and distributors and, in some cases, waiving fees for online or telephone orders and financial transactions (Geaneotes & Mignano, 2020).
- **Adopt alternative distribution channels:** As many retail outlets have closed due to the requirements for social distancing, inclusive businesses, like other businesses, are now ensuring continued access by offering their products and services online. To enable business-to-consumer deliveries, inclusive retailers are partnering with small transportation companies that deliver goods via motorcycle. Where consumers are not comfortable using e-commerce, or lack the necessary technology to do so, businesses have extended their services by taking orders and managing deliveries by telephone (Geaneotes & Mignano, 2020).
- **Adapt the product or service:** To help the small farmers and micro-distributors/retailers in their value chains to continue operating; some inclusive businesses are modifying their product and service offerings. For example, they are processing products so that they have a longer shelf life, shifting their service from transporting people to transporting essential goods, and adjusting their technologies or products to utilise contactless approaches to paying for goods and services and making deliveries (Geaneotes & Mignano, 2020).²⁰

Box 1: The different linkages between SMEs and lead firms explained

SME participation in GVCs and their link with lead firms can be distinguished between producing and exporting final products and intermediates. In contrast, others might not export but deliver products and services to domestic larger firms that are directly connected to GVCs. The following information was derived from the Ganne and Lundquist (2020) study:

- **Direct forward participation:** Evidence from Southeast Asia reveals, that SME exports of intermediates in Thailand represent a bigger share of their overall exports than for large firms – 16% of SME exports are sold to firms abroad for further processing. In comparison, only 6% of large firms' exports are processed further (López González, 2017 – as cited in Ganne & Lundquist, 2020). This finding reflects the opportunities that GVCs open for SMEs to integrate into the global economy by specialising 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 bigger in the services sector. In Vietnam for example, the share of SME exports used by other countries to produce other exports increases from 5% when only manufacturing

¹⁹ For example, Cargill (a global commodity trader and processor) in partnership with FarmForce, a cloud-based mobile platform, is now deploying its digital farming application to disseminate COVID-19 information to over 1,200 cooperatives and lead farmers in Côte d'Ivoire. Olam International (a global agricultural supply chain integrator and commodity trader) is doing the same by using its online platform to send information and advice on Covid-19 to suppliers and arrange online payments. Source: Geaneotes & Mignano, 2020.

²⁰ For example, Dodla Dairy (a dairy company in India) that sources from cooperatives of small farmers began purchasing some of farmers' excess milk and converting it into powder. This is creating continuity and stability in the dairy supply chain. In Sri Lanka, PickMe app with over 60% of its drivers operating motorised rickshaws, quickly shifted its services from ride-hailing to delivering essential goods such as groceries and liquid petroleum gas for cooking. Not only does this enable the company's drivers to continue earning a living, PickMe is providing a much-needed service for consumers. The company has also established an emergency hotline for hospital staff who need transportation to get to and from work. Source: Geaneotes & Mignano, 2020.

is considered, to 26% when service firms are included (López González, 2017 – as cited in Ganne & Lundquist, 2020). As such this evidence provides an interesting new perspective on SME GVC participation in Southeast Asia.

- **Direct backward participation:** Another way for SMEs to benefit from GVCs is through imports of intermediate goods (backward participation), which matters for competitiveness (Lopez-Gonzalez, 2016 and 2017 – as cited in Ganne & Lundquist, 2020). It 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 & Strauss-Kahn, 2014 and 2015 – as cited in Ganne & Lundquist, 2020). According to WTO estimates, GVC participation by SMEs in the manufacturing sector in LMICs 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 – as cited in Lundquist, 2020).
- **Indirect participation in GVCs:** Smaller firms often participate in GVCs indirectly by supplying intermediates to other local firms – domestic or foreign-owned – that export (indirect forward participation). 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. Studies that analyse the role of SMEs as suppliers reveal that focusing only on direct exports significantly underestimates the role played by SMEs in GVCs. 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 – as cited in Ganne & Lundquist, 2020), and for independent SMEs (i.e., those not owned by a larger domestic firm or foreign firm – OECD, 2018c – as cited in Ganne & Lundquist, 2020). Evidence shows that SMEs tend to channel their indirect exports through large firms rather than through other SMEs (Cusolito et al., 2016 – as cited in Ganne & Lundquist, 2020). 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 (WTO, 2016 – as cited in Ganne & Lundquist, 2020).

In many cases, lead firms have passed the risk burden along the supply chain to vulnerable small businesses in LMICs (ITC, 2020). As a result, disruptions cause reductions in employment and bankruptcies, as well as insufficient supply to the lead firm and its customers. The ITC (2020) report mention several solutions beyond investments in strengthening the resilience of small-scale suppliers, but also to strengthen the links that these firms have with supply chains:

- **Better contracts with SME suppliers** can facilitate the sharing of risk. Indeed, when buyers provide risk insurance services through contracts, it can attract suppliers and encourage them to invest in producing higher-quality output to foster long-term stable buyer-supplier relationships (ITC, 2020).
- **Lead firms should redesign their approach to collaboration and costing with SME suppliers** to ensure more equally shared value. The mutual trust that results encourages the sharing of information and collective action to withstand challenges. This ‘social capital’ in the supply chain can be crucial to transmitting information and funds as necessary to respond to crises (ITC, 2020).
- **The way that the supply chain is managed and developed over time can foster an agile work culture that improves the capacity to adapt.** Such an approach implies embracing rather than rejecting supply chains and acknowledging that trade and open markets are not a hindrance in building national resilience to shocks caused by virus outbreaks or other external factors (ITC, 2020).

Ganne and Lundquist (2020) and an IMF (2020) report on SMEs participation in GVCs also highlight the importance of e-commerce and digitalisation for SMEs to participate in GVCs and their linkages with larger firms as e-commerce: a) reduces costs to participate in GVCs, b) is an enabler of alternative business participation in GVC, and c) will create opportunities for new business models. Support is needed to enable SMEs to benefit from these advantages (see more in Chapter 8).

7. Covid-19 and the green transformation of GVCs

Building sustainable GVCs

Sarkis et al. (2020) foresee four potential shifts in supply and production activities in GVCs that could trigger both economical and sustainable recovery from the current health and economic crisis.

- **Change in behaviour:** During the pandemic service providers are learning a great deal about the operational features of their digital systems improving the quality and ease of use quickly, while users become further normalised to work with such systems, which could result in less physical travel.
- **Change in localisation:** The exposed vulnerability of overreliance on just-in-time and lean delivery systems due to Covid-19 could result in smarter logistics systems, including reverse logistics for secondary materials and waste products and enabled by internet of things technologies. This could make local sourcing easier, replacing extensive transportation of processed goods over long distances with intermediate storage, depots, and material reserves. Recovered plastics and metals can be used as feedstocks for 3D printing, and these applications can provide opportunities for locally recycled materials and other by-products derived from local waste exchanges or eco-industrial parks.
- **Distancing and technology:** New advances in digital automation and cyber-physical systems are enabling the implementation of decentralised manufacturing operations. These technological capabilities are valuable for social distancing while maintaining production. Robotics provide the added advantage that they can be directly operated over longer distances.
- **Data information:** More specifically, blockchain, internet of things, and radio-frequency identification sensor technologies provide for enhanced traceability and transparency in value chains. In addition, enhanced risk monitoring systems can be integrated with satellite technology and artificial intelligence. Such arrangements could save time, resources, and energy – especially at moments when it is important to know in real-time where critical materials are situated in complex supply chains.

Sarkis et al. (2020) predict that such change can only occur if governments are willing to invest and support such changes. Different dynamics could influence such decisions. For example, finance ministers are in need to find new sources of public revenue, which may be an opportunity to impose substantially higher taxes on fossil fuels. On the other hand, governments could also be under pressure for a quick fix by revitalising national economies to disengage on climate change and to do all that is possible to put people back to work compromising on environmental issues.

Meester et al. (2020) mention the importance of the European Green Deal in the debate of a green recovery from Covid-19, in which the European Commission pledged to fund greener transport and cleaner energy, as measures that prevail sustainable and green recovery. According to Meester et al. (2020), **this EU ambition could have an international effect beyond the EU borders**. They mention the example of Dutch companies who released a joint statement endorsing a strong focus on sustainable GVCs rather than specifically on the sustainability goals of European companies. Such transitions in GVCs imply ethical choices regarding who will bear the brunt of the costs not only for this crisis but also for green recovery.

Blyde (2020) indeed mentions that there is a natural tension concerning trade and environmental policies. On the one hand, the increasing environmental requirements imposed by industrial countries are sometimes seen as unilateral protectionist actions that could increase production costs and, thus, harm the competitiveness exports from LMICs. On the other hand, and these requirements might be viewed as an opportunity to innovate and differentiate production, allowing firms to enter more competitive supply chains (or move along more profitable stages), resulting in potentially higher export prices and profits while improving energy efficiency (Blyde, 2020). Covid-19 has increased the awareness of global lead firms about the environment and climate change as there are concerns of major future natural and health disruption. **For GVC firms in LMICs this could result in higher importance to enable capacities to comply with environmental standards and regulations** (Blyde, 2020).

Kenner (2020) also mentions that firms will take notice of the future impact of decarbonisation, particularly if companies are incentivised to reduce their carbon costs through re-shoring strategies. **Targeted decarbonisation policies and interventions could make production closer to the market more attractive for some sectors**.

Green logistics

Green logistics is mainly focussing on lowering the carbon footprint of the logistics behind GVCs. This can be done by ever more efficient logistics, low or zero-CO₂ emissions of transportation, and relocation closer to the market. Covid-19 makes this already complex task more difficult as companies have to deal with more controls at borders and disruption of production and demand. As we have seen in this review, with new strategies looking for more resilience, firms could expand diversity, increase supply networks, look seek for cost reduction. Therefore, it still has to be seen what will happen with green logistics in GVC. **The literature on green logistics and Covid-19 is not abundant. Some business sources that promote green logistics expect an increase in calls for ecological and resource-saving logistic concepts and solutions.**²¹ However, real evidence that this already happens due to Covid-19 is lacking.

With a number of influential factors such as delivery times, order amounts and stock quantities, transport routes and the deployment of resources, logistics could appear too complex for clear and fast decision-making, particularly during the pandemic. However, by evaluating processes, data and cross-dependencies, even complex logistic tasks that include environmental and climate change issues can be solved efficiently. For example, **daily route planning about**

²¹ See for example Optano, which published two articles about green logistics regarding Covid-19: <https://optano.com/en/green-logistics-a-fashion-trend-or-a-chance-to-differentiate/> and <https://optano.com/en/green-logistics-the-chance-in-the-covid-19-crisis/> (both accessed in September 2020).

optimal capacity and avoiding empty runs, reduces costs and is good for the environment.

Case study on electric vehicles and GVCs

A report by Deloitte (Woodward et al., 2020) on the production and sales of electric vehicles is optimistic that the current pandemic will continue to increase the market share of electric vehicles worldwide. Although due to Covid-19 and the anticipated economic recession, annual car sales are unlikely to reach pre-Covid-19 levels until 2024, the report forecasts that the pace of recovery is mainly a result of a slowdown in petrol sales; “electric vehicles EVs will continue to have a positive trajectory during the COVID-19 recovery period and may well end up capturing a disproportionate share of the market in the short term” (Woodward et al., 2020, p.).

The Deloitte (2020) report estimates that a third of all new cars sold globally will be electric by the end of this decade as petrol and diesel vehicles “likely reached their sales peak” during the pandemic. China is seen as the global leader in demand and production of electric vehicles, with a domestic market share of electric vehicles estimated at 48% in 2030 (Woodward et al., 2020), followed by Europe at around 42%, while the USA is behind with a domestic market share of 27% (Woodward et al., 2020).

In a previous report, Deloitte (2019) had identified that new entrants in the production of electric vehicles would mainly be Chinese firms. However, the majority of the increase in production will come from established automotive firms. **The 2019 report also warned of a gap between the production and consumer demand for electric vehicles, where the industry heavily invests in increasing the production capacities, while demand will grow with a lower pace.** This would increase pressure on incumbent electric vehicle makers (start-ups and established brands) and could according to Deloitte (2019, p.11) result in “the prospect of today’s powerful OEMs acting as white label suppliers to other brands now a real possibility”. However, with the increasing awareness of consumers about climate change and air pollution during the pandemic, the gap could be less severe in 2030 as anticipated.

The push for electric cars is also strategic and will change automotive GVCs. **Sundaram et al. (2018) showed that supply networks will change dramatically with the shift to electric cars as other (and less) components are needed for the production.²² Also, electric vehicles could become part of the circular economy principle as major components such as batteries and drive units are designed for remanufacturing and re-use** (Sundaram et al., 2018). This is in line with the expectation of a study by Masiero et al. (2017) on the GVC of electric vehicles, that foresees a boom in recycling industry linking to the electric vehicle GVC. However, Bonsu (2020) mentions that there are views amongst stakeholders on weaknesses on lack of business model addressing value chain circular and low-carbon solutions; particularly, increasingly ethical issues with raw minerals.

²² The production of electric vehicles has the advantage of being simpler, requiring less use and replacement parts such as gearboxes, fuel pumps, filters, injectors, radiators. As such they also need less maintenance and spare parts after production, which could have main influence on the suppliers of these parts. However, the production costs continue to be substantially higher, especially in the production of batteries, which currently present one of the major technology challenges to overcome, although technical improvements and mass production will reduce these costs (source: Masiero et al., 2017).

At the moment, electric vehicles are not yet produced within fully developed GVCs (Masiero et al., 2017). By conducting interviews with electric vehicle producers in Japan and South Korea the researchers conclude that in both countries the high cost of components, the high complexity of integration, and the lack of maturity of suppliers are the key barriers toward the industry's consolidation globally. **New entrants in the value chain are very much likely, such as software firms and firms that produce sensors.** New entrants into the GVC will disrupt, increase new partnerships, and create opportunities and risks for existing suppliers (Deloitte, 2019; McKinsey, 2019).²³

Importantly, what the impact of this is on countries that have been successfully integrated within the GVC of petrol cars has to be seen. It will depend on major investments in R&D, state support for the electric vehicle industry, and capacities within the labour force to shift more to electronic systems. MICs with strong electronics sectors could have the advantage to link this sector with domestic or foreign lead firms active in the production of electric vehicles. Masiero et al. (2017) show with a case study on Brazil that there are many opportunities for Brazil to integrate within the emerging GVC of electric vehicles. Japanese and South Korean executives in the automotive industry mentioned that, although companies need to overcome specific technical challenges, firms might be willing to seek efficiencies in the production and supply of components outside their national borders. Producers in Japan and South Korea were committed to capturing the value of GVC segments. This will not only increase exports opportunities for MICs, but also ensure access to world-class inputs for the major car makers.

For Brazil, as an example, the development of electronic systems in electric vehicles, such as the Battery Management System (BMS), is seen as an excellent opportunity to insert itself into the emerging value chain since the country is recognised worldwide in software development (Masiero et al., 2017). Competences regarding the development of batteries, control systems, and electric engine technology already exist in Brazilian universities, research institutes, and traditional automobile industry and suppliers. However, a strong integrator that could align efforts more effectively to create local projects is currently lacking. Thus, federal and local governments could undertake a more active role in the development of such GVCs.

Because of the opportunities in the industry, **countries anticipate with initiatives to stimulate domestic production of electric vehicles.** For example, Indonesia could be set to see rapid electric vehicle growth thanks to **presidential decree 55/2019**, which places stimulation of the electric vehicles market alongside energy efficiency and security; and clean air quality.²⁴ Under the terms of the new legislation, the nation is expecting electric vehicles to make up 20% of the vehicle market by 2025. While the decree offers support to electric vehicles importers for a limited time, the bulk of the incentives available are targeted at vehicles made from domestic

²³ Volkswagen announced their openness to share their electric vehicles platform with other leading actors in the market (in the literature often named as OEMs – Original Equipment Manufacturer). Tier-1 suppliers and OEMs are intensifying their cooperation and are building strategic partnerships. For example, engineers from Daimler and Bosch are working together, collocated in two locations to develop hardware and software. OEMs are also moving closer to strategically important tier-2 suppliers and tech companies and are using directed-buy or “direct buy” (by OEM) mechanisms for the sourcing of key components, and to gain access to IP, shape IP development, or secure critical supply (source: Mc Kinsey, 2019).

²⁴ Source: <https://www.pv-magazine.com/2019/12/04/indonesia-plans-domestic-electric-vehicle-industry/> (accessed September 2020).

components and at the providers of battery swap services and battery waste recycling, charging station installers and companies which accelerate the roll-out of other electric vehicles infrastructure. In terms of domestic components, two-wheel electric vehicles must have at least 40% Indonesian parts to qualify for subsidy from 2023 onwards and at least 80% from 2026. Four-wheel vehicles must be at least 35% made in Indonesia by 2021 and 80% by 2030.²⁵

8. Supporting resilience building in GVCs

Covid-19 specific interventions

Specific measures to support companies during the Covid-19 crisis have proven to be important for firms. For example, the ITC (2020) Covid-19 business survey said that tax waivers, temporary tax relief and financial programmes are amongst the most helpful government measures. **This shows that in the short-term (i.e. during the crisis) firms face is a liquidity crisis accompanying the health crisis** (ITC, 2020). GVCs need to be maintained and operations supported. Some examples come from the ITC (2020) report:

- **Policymakers seem to target actions to safeguard export-oriented businesses.** In Bangladesh, for example, the government committed to pay the wages of employees in export-oriented industries. The Philippines has exempted export-oriented industries and business process outsourcing from the shutdown. In Pakistan, accelerated tax refunds are being granted to companies in export industries.
- **Trade finance helps cash-strapped small businesses keep their export clients** and is particularly relevant for firms that export to compensate for lower local demand. For example, the Export Credit Bank of Turkey extended its credit repayment periods by two to six months and stretched its rediscount credit terms to two years.
- **To facilitate trade and reduce domestic prices**, many countries are waiving customs fees. For example, China reduced cargo dues and port facility fees by 20% over 1 March–30 June 2020. Sharjah in the United Arab Emirates is exempting all bulk goods from port storage fees for 90 days and has cut the tariff for truck parking at ports by 50%.
- **Some countries are changing their border procedures to encourage timely issuance of international commercial documents.** Indonesia, for instance, has introduced accelerated customs procedures for reputable traders and authorised economic operators. Government legal services – issuing force majeure certificates and legal advisory services, for example – can be particularly relevant for SMEs that export, because they may face more business disputes as cargos become blocked in transit.

Increasing resilience within GVCs takes time and the short-term measures should be linked with longer-term policies and interventions that give incentives to cope with the after-match of the crisis and prepare for the next crisis. Incentives should be linked with the strategies mentioned in Chapter 6 to support firms (lead firms and SMEs) to increasing their resilience.

²⁵ Source: <https://www.pv-magazine.com/2019/12/04/indonesia-plans-domestic-electric-vehicle-industry/> (accessed September 2020).

Figure 7. Main policy recommendations for GVCs in times of Covid-19

Crisis	Recovery	New normal
Maintain operations of essential GVCs and increase supply	Help to restart GVCs	Promote robustness and resilience in GVCs
<ul style="list-style-type: none"> Facilitate trade by removing trade barriers and by ensuring the smooth functioning of international transport and customs 	<ul style="list-style-type: none"> Maintain an open trade and investment environment to reduce the time to recover and continue to support trade facilitation 	<ul style="list-style-type: none"> Create a stable regulatory environment (including through trade and investment agreements that can include provisions for the smooth operations of GVCs)
<ul style="list-style-type: none"> Prioritise shipments for essential goods and adapt rules for movement of key personnel 	<ul style="list-style-type: none"> Address financial and other issues of firms that can delay the recovery of GVCs and support MSMEs 	<ul style="list-style-type: none"> Promote standards and certification procedures including risk awareness; review transport, logistics and customs clearance regulations to better mitigate disruptions
<ul style="list-style-type: none"> Increase supply of essential goods by facilitating investment and operation permits and by expediting certification procedures 	<ul style="list-style-type: none"> Adapt health measures to the needs of firms operating in an international environment 	<ul style="list-style-type: none"> Develop stress tests for critical supply chains and include criteria for robustness of supply chains in government procurement procedures on a non-discriminatory basis
		<ul style="list-style-type: none"> Promote the diffusion of digital technologies that can improve information systems for risk management (e.g. Internet of Things)

Source: OECD, 2020, p.9

OECD (2020, p.8) mentions that in the recovery phase, GVCs can play an important role in ensuring supply by “reducing the time needed for production to reach pre-crisis levels”. As such, **the report recommends that maintaining an open trade and investment environment is critical, while also addressing the requests of firms that may need specific and time-limited support to recover.** Figure 6 shows the OECD (2020, p.9) recommendations in different phases (crisis, recovery, new normal). On reshoring incentives (e.g. fiscal incentives, relax labour or environmental standards to compensate for additional costs), the OECD is, like many other sources, reluctant given the lack of evidence that domestic supply chains fared any better than international supply chains during the COVID-19 crisis, “the additional economic and social risks of extensive re-shoring policies and nationalisation far outweigh any perceived gains in terms of security of supply” (OECD, 2020, p.9).

The literature on supporting resilience does not seem to emphasise for a new direction of support for lead firms and suppliers (larger or smaller) in a post-Covid world. Most recommendations seem to be a continuation of older ones with an emphasis on e-commerce and digitalisation. Lead firms could push for more digital solutions and interactions within GVCs. For example, the literature on Lead firm-SME linkage programmes seems not to advocate for a completely different agenda but accelerate support with **a focus on digitalisation and e-commerce.**

Supporting e-commerce: what do we know?

What are those recommendations? The GVC Development Report 2019 (WTO, OECD, World Bank, 2019) mentions that designing domestic policies to enhance the benefits of GVC participation for domestic firms (while addressing potential adjustment costs, mainly for SMEs), includes **the enhancement of connectivity by investing in infrastructure and digital technologies combined with free trade and investment policies.** Governments would do well to develop a comprehensive digital strategy to maximise the gains from GVCs, the report states, recommending a holistic approach of investing in information and communication technology and in training along with undertaking measures to improve trade openness, the business environment and innovation (WTO, 2019).

As lead firms have the capacities to do this, targeted support is mainly needed for SMEs to prevent them from losing out. SMEs' access and use of digital technologies remains constrained by various factors, in particular a reliable internet connection (Fernandes et al., 2017). When it comes to e-commerce, the most important technological requirement remains basic access to the internet. It is therefore vital that governments provide their business sector (and in particular SMEs), with affordable, high-quality internet infrastructure (Ganne & Lindquist, 2020). Mobile technology is increasingly important for businesses, and governments should support both mobile infrastructure and efforts to create mobile-friendly, paperless e-government systems (Ganne & Lindquist, 2019).

However, in MICs, 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 organisational and process innovation (OECD, 2018). For example, an important pillar for e-commerce is e-payment systems; however, there is still a lack of trust and obstructions for SMEs to use e-payment platforms (Lukonga, 2020). ITC (2017) survey showed that 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, 2017).

To promote SME participation in GVCs, the literature (e.g. Ganne & Lindquist, 2019) mention that **policymakers 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, which is even more important in the Covid-19 crisis (Ganne & Lindquist, 2019).

Lukongo (2020) shows that in North Africa, Middle East, and Pakistan policies to promote SME growth and employment have not had the envisioned success, thus a fundamental re-thinking of the strategy for developing SMEs is needed. **Partial implementation of reforms and idiosyncratic factors contributed to the underperformance, but frictions in the design of SME policies also played important roles**, according to Lukongo (2020). Firms will need to embrace agility through digital to address the ever-faster changing business environment (Lukongo, 2020). Overall, a well-articulated strategy that addresses supply and demand constraints to digital adoption by businesses complemented by sustained efforts to implement financial sector and the business support reforms is the key to success. To cite (Lukongo, 2020, p.41):

“Regulatory sandboxes can help enhance supervisory communications with market participants, accelerate digital transformation of traditional entities and improve their knowledge of technologies, market development, and application of regulatory and supervisory frameworks. Risks will, however, need to be addressed, including ensuring an even playing field between fully regulated entities and those operating in the sandbox to avoid regulatory arbitrage (Wilson 2019).”

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 (Lanz et al., 2018).

Supporting SME participation in GVCs: what do we know?

More general support programmes to the private sector and value chain development mainly focus on SMEs and their challenges for participation (Quak, 2019; World Bank, 2018). The ADB (2015) surveyed enterprises on 19 policy items that could encourage greater participation of SMEs in GVCs by linking them to lead firms. The top five comprised of tax incentives for small suppliers (now tax incentives mainly include lead firms), trade facilitation measures, simplification of trade procedures, improving domestic infrastructure, and reforms in ICT and transport. The study (ADB, 2015) noted that SMEs that succeeded to link with global markets were significantly ahead of their counterparts in the sourcing of inputs and suppliers, production capacity, technology use, and networking. Although SMEs stand to benefit from participating in global markets many of the SMEs lack the confidence to enter the global market (ADB, 2015).

A supportive enabling environment, therefore, is a critical foundation for encouraging business linkages between lead firms and SMEs. Governments can address these issues by focusing on building SME capacity, offering them financial incentives, helping smaller firms keep up with international standards for product quality, reducing red tape, improving infrastructure, and prioritising education (ADB, 2015). Enabling conditions such as ease of starting a business, contract enforcement, ease of hiring and firing employees, absence of corruption (e.g., bribes), and transparent taxation are important to SME and lead firm operations. Instead of mandatory or restrictive policies such as imposing local content requirements on MNEs working with SMEs, governments should focus on connecting different companies through information dissemination and competent delivery of basic services (Botelho & Bourguignon, 2011).

Resilience building in GVCs starts with firms themselves implementing a coherent strategy, while supported by governments through policies, interventions, and programmes. In addition, support should also come from business support organisations, which can from their side be supported by international organisations to provide technical assistance to small businesses, such as training and advisory services to implement new standards (OECD, 2020; ITC, 2020). Business support organisations must continue to deliver on their mandate, even though they are themselves facing health concerns, teleworking challenges, and risks to their sources of revenue (ITC, 2020). Business support organisations can provide information on Covid-19 from a business perspective. They are also in a great position to shoulder some of the risks when entering new markets or international supply chains. Businesses working together can reduce costs through shared procurement, create economies of scale and access new opportunities by sharing knowledge and resources (ITC, 2020).

Good business support organisations benefit from their knowledge of business, their convening power and their credibility to represent micro and small enterprises and make their needs known among policymakers and funders (ITC, 2020). The aim should be to make management systems resilient and ensure product quality and safety. Most importantly, there should be closer collaboration and coordination among international organisations, business support organisations and regulatory bodies to work together in assisting small businesses and ensuring a fair business environment (ITC, 2020).

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<http://www.jstor.org/stable/10.7591/j.ctt18kr4pg.9>

Access to Webinars on the future of GVCs

- Global Development Institute (University of Manchester): Covid-19 and the future of GVCs <http://blog.gdi.manchester.ac.uk/watch-covid-19-and-the-future-of-global-value-chains/>
- Korean Economic Institute of America: Future GVCs in East Asia after Covid-19 <http://keia.org/event/future-global-value-chains-east-asia-after-covid-19>
- World Bank: GVCs in the time of Covid-19 <https://www.worldbank.org/en/events/2020/07/29/global-value-chains-in-the-time-of-covid19-coronavirus-experience-of-ethiopia-and-vietnam>
- Center for International and Global Studies (Duke University): Covid-19 and GVCs disruptions and restructuring <https://igs.duke.edu/news/covid-19-and-global-supply-chains-disruptions-and-restructuring>
- Forum for Research in Empirical International Trade: International trade economists discussion on GVCs and Covid-19 <https://www.freit.org/ITO/>

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