
Building International Industrial Competitiveness through Global Production Networks

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Abstract

This paper examines the relationships between global value chains (GVCs), foreign direct investment (FDI), and international industrial competitiveness in a context characterized by technological transformation, production fragmentation, and recurring supply-chain disruptions. The literature reviewed shows that participation in international production networks does not automatically generate industrial upgrading. Competitive outcomes depend on countries' positions within value chains, their capacity to capture domestic value added, the technological capabilities of firms, and the strength of domestic supplier networks. FDI can contribute to productivity and technological development through supplier linkages, knowledge transmission, competition, and labor mobility, but these effects remain conditional on absorptive capacity, institutional quality, and multinational sourcing strategies. The paper also emphasizes the renewed role of industrial policy in supporting structural transformation, technological learning, resilience, and strategic positioning within global production networks. Recent disruptions further demonstrate that competitiveness must combine efficiency with supply-chain resilience, diversification, and organizational flexibility. Overall, the literature suggests that sustainable industrial competitiveness results not from international integration alone but from the capacity to transform GVC and FDI participation into domestic technological accumulation, productive upgrading, stronger local linkages, and improved value capture.

Keywords: Global value chains; Foreign direct investment; Industrial competitiveness; Industrial policy; Resilience

JEL classification: F21; F23; F61; L52; O14

Introduction

The organization of international production has undergone substantial transformation as firms increasingly distribute production stages, sourcing activities, technological functions, and markets across several countries. Global value chains have consequently become an important framework for understanding international industrial competitiveness because traditional indicators based primarily on gross exports provide only a partial representation of countries' productive positions. Competitiveness increasingly depends on the functions performed within international production networks, the domestic value generated by these activities, the technological capabilities associated with particular stages, and the relationships connecting domestic firms to foreign suppliers and buyers. The existing literature therefore



distinguishes between simple participation in global production and more advanced forms of integration associated with productivity, innovation, functional upgrading, and greater domestic value capture. International sourcing may provide firms with access to higher-quality intermediate inputs and external technologies, while exporting and relationships with foreign buyers can stimulate learning and quality improvement. However, these benefits depend on firms' capacity to absorb knowledge, undertake research and development, develop local supplier relationships, and progressively move toward more sophisticated activities. International integration must therefore be considered as a potential mechanism of capability accumulation rather than an automatic determinant of industrial development.

Foreign direct investment constitutes a second major component of this transformation because multinational enterprises organize a substantial proportion of international production, technological transfer, sourcing, and cross-border investment. The presence of multinational firms can create opportunities for domestic producers through supplier relationships, demonstration effects, worker mobility, competition, and access to advanced organizational and technological practices. Nevertheless, the literature reviewed in this paper indicates considerable heterogeneity in these effects. Foreign investment generates stronger domestic benefits when multinational enterprises source locally, establish durable vertical relationships, and operate in economies where domestic firms possess sufficient absorptive capacity. Institutional quality, regulatory predictability, openness, and macroeconomic stability also influence both the attraction of FDI and the capacity of host economies to convert foreign investment into productive gains. These issues have acquired additional importance as supply-chain disruptions, geopolitical uncertainty, automation, and digitalization reshape multinational location strategies. Industrial competitiveness therefore increasingly requires a combination of international openness, domestic technological accumulation, resilient production structures, effective institutions, and strategically designed industrial policies. This paper reviews these interactions through three complementary dimensions: GVC participation and upgrading, FDI and domestic capabilities, and industrial policy and resilience within changing global production networks.

1. Global Value Chains as an Architecture of International Industrial Competitiveness

1.1. Measuring GVCs, production fragmentation and international positioning

Cingolani et al. (2017) imply that international competitiveness increasingly depends on the structural position countries occupy within global production networks rather than on trade openness alone, since centrality and relational connections can affect economic performance. Cerina et al. (2015) reinforce this network perspective by identifying core-periphery structures in the world input-output system, showing that countries with similar trade volumes may nevertheless occupy very different positions in international production. Miller and Temurshoev (2017) add a production-stage dimension by distinguishing upstream and downstream locations within value chains, indicating that exposure to demand shocks, technological specialization, and trade integration varies according to where industries operate in the production sequence. Baldwin and Lopez-Gonzalez (2015) further show that contemporary supply-chain trade is organized through regionally concentrated networks of intermediate inputs and internationally coordinated production tasks. Taken together, these contributions imply that industrial competitiveness should be evaluated relationally. A country's performance depends not only on how much it exports but also on which functions it



performs, how central its industries are within production networks, and whether its connections provide access to technologically valuable stages of international manufacturing.

Johnson and Noguera (2017) imply that gross exports can substantially overstate domestic industrial contribution because a growing share of exported goods incorporates foreign value added as production becomes more fragmented internationally. Timmer et al. (2015) provide the methodological basis for addressing this limitation by tracing value added across countries and production stages through world input-output data, thereby identifying where income is actually generated within fragmented production systems. Johnson (2018) reinforces this approach by showing that measures of domestic and foreign value added, vertical specialization, production length, and bilateral value-added linkages provide a more precise representation of countries' positions in GVCs. Los et al. (2015) further demonstrate that decomposing final output according to the geographical origin of value added reveals patterns that conventional gross-trade statistics cannot capture. Together, these contributions imply that export growth should not automatically be interpreted as stronger industrial competitiveness. Economies can increase gross exports while remaining dependent on imported intermediates and capturing only a limited share of final-product value. Competitiveness therefore depends on the domestic capabilities that allow firms and industries to retain a larger proportion of value generated along internationally fragmented production processes.

Amador and Cabral (2016) imply that GVC participation must be distinguished from GVC positioning because technological change, falling trade costs, foreign direct investment, and multinational organizational strategies affect not only the extent of international integration but also the functions performed within production networks. Baldwin and Lopez-Gonzalez (2015) reinforce this distinction by showing that participation in supply-chain trade increasingly involves specialization in particular tasks rather than complete national production of final goods. Timmer et al. (2015) add that tracing value added across production stages allows researchers to identify which economies actually capture income from these specialized functions. Cingolani et al. (2017) further show that favorable network connections can influence economic performance independently of conventional measures of trade intensity. Considered together, these contributions imply that successful integration into GVCs requires more than simply increasing cross-border transactions. Industrial competitiveness depends on developing domestic technological and organizational capabilities, occupying advantageous positions within production networks, and capturing sufficient value from internationally coordinated activities. GVC policy should therefore focus on upgrading functions and strengthening domestic linkages rather than treating participation itself as evidence of improved competitiveness.

1.2. GVC participation, productivity, innovation and industrial upgrading

Lema et al. (2018) imply that participation in global value chains produces stronger technological outcomes when international production linkages interact with effective national and sectoral innovation systems. De Marchi et al. (2018) reinforce this interpretation by showing that learning opportunities within GVCs depend on governance structures, lead-firm characteristics, knowledge relationships, and the absorptive capacities of domestic firms. Fagerberg et al. (2018) add cross-country evidence that greater reliance on imported intermediates does not by itself guarantee stronger development outcomes, since domestic technological capabilities and innovation systems determine whether economies can capture wider benefits from international integration. Lee et al. (2018) further emphasize the need to move from passive participation based on externally supplied technologies toward indigenous knowledge creation and stronger local innovation systems. Taken together, these contributions imply that GVC integration should be treated as a potential learning mechanism rather than an automatic source of upgrading. International linkages can provide access to knowledge,



technologies, and organizational practices, but sustained competitiveness depends on domestic institutions and firms being able to absorb, adapt, and eventually generate increasingly sophisticated capabilities.

Montalbano et al. (2018) imply that GVC participation can generate productivity advantages at the firm level, although the magnitude of these gains depends on the form and intensity of international involvement. Del Prete et al. (2017) reinforce this productivity mechanism in the North African context by showing that participation in cross-border production relationships can improve firm performance beyond the effects associated with conventional exporting alone. Brancati et al. (2017) add that firms engaged in more advanced forms of international production can display stronger innovation and resilience, particularly during adverse economic conditions. Gereffi and Lee (2016) qualify these benefits by showing that governance arrangements influence firms' opportunities to learn, comply with standards, and upgrade within global production systems. Together, these contributions imply that the competitive effects of GVC participation depend substantially on the quality of firms' international relationships. Simple insertion into foreign markets may provide limited benefits, whereas deeper integration involving knowledge exchange, coordination, standards, and advanced production functions can reinforce productivity and innovation. Industrial policy should therefore encourage forms of participation that strengthen learning and organizational capabilities rather than focusing only on increasing the number of firms connected to global markets.

Pipkin and Fuentes (2017) imply that entry into a GVC represents only the starting point of industrial development because sustained competitiveness requires process, product, and functional upgrading toward activities with greater technological and value content. Lee et al. (2018) reinforce this upgrading perspective by emphasizing that developing economies need to transform externally driven participation into domestic knowledge creation and progressively stronger local value chains. Gereffi and Lee (2016) add that governance relations among lead firms, suppliers, clusters, and institutions determine the opportunities available for such upgrading. Montalbano et al. (2018) further show that productivity benefits differ according to how firms participate in international production, indicating that not all forms of integration provide equivalent competitive returns. Considered together, these contributions imply that GVC-based industrial strategies should focus on trajectories of capability accumulation rather than participation rates alone. Firms must move toward more sophisticated functions, strengthen innovation capacity, and develop relationships that support knowledge transfer and standards compliance. Sustainable industrial competitiveness therefore emerges when international integration becomes a platform for continuous upgrading rather than a stable position in low-value production stages.

1.3. Imported inputs, processing trade and export competitiveness

Bøler et al. (2015) imply that the productivity benefits of international sourcing become stronger when firms simultaneously invest in internal R&D, because technological capabilities improve their ability to exploit imported intermediates. Halpern et al. (2015) reinforce this mechanism by showing that imported inputs can raise productivity through access to higher-quality, technologically differentiated, and more diverse intermediate goods. Bas and Strauss-Kahn (2015) add that lower barriers to imported inputs can support product-quality upgrading and influence export prices, indicating that international sourcing affects competitiveness through differentiation as well as cost reduction. Fan et al. (2015) provide complementary Chinese firm-level evidence that input-tariff reductions encourage quality upgrading and changes in export pricing behavior. Taken together, these contributions imply that access to foreign intermediates can become a significant source of industrial upgrading when firms



possess the knowledge required to integrate more sophisticated inputs effectively. Trade liberalization therefore generates larger competitive gains when accompanied by domestic R&D, technical capabilities, and organizational capacity. International sourcing should consequently be viewed not simply as import dependence, but as a channel through which firms can combine foreign technologies with internal innovation to move toward higher-quality and more technologically advanced products.

Manova and Yu (2016) imply that firms' modes of participation in global production are partly shaped by financial constraints, since processing trade can allow firms with limited capital to access international manufacturing without independently financing imported inputs. Dai et al. (2016) reinforce the importance of distinguishing participation modes by showing that processing exporters differ substantially from ordinary exporters in productivity characteristics, meaning that high export volumes do not necessarily reveal strong domestic capabilities. Brandt and Morrow (2017) add that tariff structures influence firms' choices between processing and ordinary trade and therefore affect how much production and sourcing occur domestically. Kee and Tang (2016) further demonstrate that GVC participation can coexist with rising domestic value added when firms progressively substitute domestic inputs for imported intermediates. Together, these contributions imply that international integration should be evaluated according to the organization and domestic content of production rather than export performance alone. Processing arrangements can provide an entry route into global manufacturing, particularly for constrained firms, but sustained competitiveness requires gradual movement toward greater sourcing autonomy, stronger domestic supplier networks, and higher domestic value capture.

Atkin et al. (2017) imply that exporting can itself generate capability development because interaction with foreign buyers may induce learning and quality improvements rather than merely selecting already productive firms into external markets. Kee and Tang (2016) complement this perspective by showing that firms can increase domestic value added while remaining integrated into international production, suggesting that learning and supplier development can progressively deepen local industrial content. Bøler et al. (2015) add that internal R&D increases firms' capacity to benefit from foreign sourcing, linking external integration with endogenous technological accumulation. Manova and Yu (2016) provide an important qualification by showing that financial constraints influence how firms organize participation in GVCs and may limit their autonomy over sourcing and production. Considered together, these contributions imply that GVC participation can support industrial competitiveness when it evolves from externally dependent arrangements toward stronger domestic capabilities. Foreign markets and imported inputs can provide knowledge, technology, and learning opportunities, but long-term upgrading depends on firms' ability to finance innovation, develop local suppliers, improve product quality, and progressively capture a larger share of value within international production systems.

2. Foreign Direct Investment, Multinational Enterprises and Domestic Industrial Capabilities

2.1. FDI spillovers, supplier linkages and productivity

Alfaro-Ureña et al. (2022) imply that the developmental contribution of FDI becomes stronger when domestic firms enter direct supply relationships with multinational enterprises, because these linkages can transmit production standards, managerial practices, and technical know-how. Newman et al. (2015) reinforce this mechanism by showing that vertical relationships between foreign affiliates and domestic firms constitute an important channel through which technology transfer can raise productivity. Kee (2015) adds an indirect pathway



by demonstrating that multinational demand can improve domestic supplier markets and generate benefits for local firms sharing those suppliers, even when they do not transact directly with the foreign affiliate. Amendolagine et al. (2019) further show that these benefits depend on the extent to which multinational firms source inputs locally rather than operate as enclaves relying predominantly on imported intermediates. Taken together, these contributions imply that FDI strengthens industrial competitiveness primarily when foreign investment becomes embedded in domestic production networks. The number or scale of multinational establishments alone therefore provides an incomplete indicator of developmental impact. Supplier integration, local sourcing, knowledge transmission, and upgrading requirements determine whether foreign presence generates broader productivity effects across the host economy.

Liang (2017) implies that FDI spillovers depend substantially on domestic firms' absorptive capacities, since technologically and organizationally stronger firms are better positioned to internalize knowledge generated by foreign investors. Njikam and Leudjou (2019) reinforce this conditional interpretation by showing that backward-linkage spillovers vary according to both investor origin and the absorptive capacity of local manufacturers. Murakami (2020) adds that governance arrangements within GVCs influence the opportunities available for information diffusion, indicating that foreign ownership and production-network relationships should be considered jointly. Nguyen and Revilla Diez (2019) provide an important qualification by showing that multinational presence does not necessarily generate significant upgrading among Vietnamese suppliers when local linkages or knowledge transmission remain weak. Together, these contributions imply that attracting FDI is insufficient as an industrial-development strategy when domestic firms lack the capabilities or relationships needed to exploit foreign knowledge. Effective policy must therefore combine investment attraction with supplier development, technological upgrading, workforce capabilities, and institutions facilitating durable production linkages. FDI becomes more likely to strengthen competitiveness when domestic enterprises can move from simple transactional relationships toward sustained learning and increasingly sophisticated participation in multinational value chains.

Lu et al. (2017) imply that the apparent relationship between foreign presence and domestic productivity must be interpreted cautiously because multinational firms do not enter industries and locations randomly, while competitive effects can coexist with genuine technological spillovers. Alfaro-Ureña et al. (2022) strengthen the causal case for beneficial linkages by showing that domestic firms improve performance after becoming suppliers to multinational buyers, providing more direct evidence of learning through production relationships. Amendolagine et al. (2019) add that multinational characteristics and GVC organization influence the likelihood of local sourcing, meaning that different types of FDI can generate substantially different domestic effects. Nguyen and Revilla Diez (2019) further demonstrate that weak supplier upgrading remains possible even in economies with substantial multinational activity. Considered together, these contributions imply that FDI policy should evaluate the quality of foreign-domestic relationships rather than assume uniform spillovers from multinational presence. Industrial competitiveness depends on whether investment stimulates local procurement, knowledge transfer, supplier upgrading, and capability accumulation while avoiding displacement effects that outweigh technological benefits.

2.2. Multinational production, ownership and domestic productivity

Belderbos et al. (2021) imply that the productivity benefits domestic firms derive from inward FDI depend partly on their prior internationalization capabilities, since firms already exposed to foreign markets may be better positioned to absorb knowledge and respond to



multinational competition. Rigo (2021) reinforces this interaction between GVC participation and technological learning by showing that two-way traders are more likely to adopt foreign-licensed technologies and that such acquisition is associated with productivity improvements. Bournakis et al. (2022) add that vertical linkages are particularly important, with backward spillovers from downstream multinationals contributing to domestic total-factor-productivity gains more clearly than horizontal effects. Olayinka and Loykulnanta (2019) broaden the mechanisms involved by emphasizing demonstration, competition, and worker mobility as channels through which foreign technologies can diffuse to domestic firms. Taken together, these contributions imply that FDI contributes more strongly to industrial competitiveness when domestic firms are already connected to international markets and possess sufficient capabilities to exploit multiple channels of technological transfer. Multinational presence therefore creates opportunities for upgrading, but the realization of these benefits depends on trade experience, absorptive capacity, production linkages, and the ability to integrate externally generated knowledge into domestic operations.

Demena and van Bergeijk (2017) imply that FDI spillovers cannot be treated as uniformly positive because their magnitude varies substantially with host-country conditions, firm characteristics, empirical design, and the specific channel through which foreign presence affects domestic producers. Fons-Rosen et al. (2021) reinforce this need for careful identification by distinguishing knowledge effects from competitive pressures when estimating domestic productivity gains associated with foreign investment. Alfaro and Chen (2018) add another mechanism by showing that multinational production can improve aggregate productivity through market reallocation toward more productive firms, meaning that FDI effects extend beyond direct knowledge transfer. Setzler and Tintelnot (2021) further demonstrate that multinational activity reshapes local labor and production markets through effects on wages, employment, and firm outcomes. Together, these contributions imply that the industrial consequences of FDI emerge from several simultaneous processes, including knowledge diffusion, competitive selection, resource reallocation, and labor-market adjustment. Evaluating foreign investment solely through average productivity spillovers therefore risks obscuring both gains and adjustment costs. Industrial policy should identify which mechanisms dominate under particular institutional, sectoral, and regional conditions before assuming that greater multinational presence will automatically strengthen domestic competitiveness.

Bircan (2019) implies that the organizational structure of foreign ownership matters for productivity because multinational control differs in degree and form rather than constituting a simple foreign-versus-domestic distinction. Bournakis et al. (2022) reinforce this organizational perspective by showing that ownership structures and vertical relationships condition the extent to which multinational presence generates domestic productivity gains. Alfaro and Chen (2018) add that foreign multinational activity can reshape host-economy performance through reallocation between firms as well as changes within firms, linking ownership structures to broader market dynamics. Fons-Rosen et al. (2021) further demonstrate the importance of separating genuine knowledge spillovers from competition effects when assessing productivity consequences. Considered together, these contributions imply that the competitiveness effects of inward FDI depend not only on the volume of foreign capital but also on how multinational firms are organized, how deeply they interact with domestic producers, and how their presence changes market allocation. Policies aimed at attracting FDI should therefore consider ownership configuration, vertical linkages, competitive effects, and domestic absorptive capacity rather than treating all foreign investment as economically equivalent.



2.3. Institutional quality, openness and the effectiveness of FDI

Jude and Levieuge (2017) imply that the developmental effects of FDI depend substantially on institutional quality, since host economies with stronger governance are better able to convert foreign investment into sustained economic gains. Hayat (2019) reinforces this institutional complementarity by showing that FDI becomes more productive when governance supports efficient resource allocation, contracting, and knowledge diffusion. El Hamidi and Ed-Dib (2019) add a North African perspective by linking FDI with trade openness and institutional quality, indicating that foreign investment contributes more effectively to international integration when embedded in a supportive institutional environment. Ed-Dib and El Hamidi (2020) further emphasize that the interaction between openness, FDI, and institutions shapes the benefits that host economies derive from foreign capital. Taken together, these contributions imply that FDI-oriented industrial policy should not focus exclusively on attracting investment volumes. Institutional reforms determine whether foreign capital becomes integrated into domestic production, supports exports, and facilitates participation in international value chains. Stronger governance can reduce transaction costs and uncertainty while improving the capacity of domestic firms to absorb knowledge and benefit from multinational activity.

Peres et al. (2018) imply that institutional quality affects countries' ability to attract FDI because multinational enterprises consider governance conditions when selecting locations for internationally mobile production. Sabir et al. (2019) reinforce this interpretation by showing that several governance dimensions influence foreign-investment inflows across both developed and developing economies. Contractor et al. (2020) add that national regulations and the broader business environment shape multinational location decisions by affecting operating costs and uncertainty. Kurul and Yalta (2017) further demonstrate that improvements in selected institutional characteristics can stimulate FDI in developing economies. Together, these contributions imply that competition for multinational production is partly institutional rather than purely based on wages, market size, or fiscal incentives. Economies seeking deeper integration into GVCs must therefore provide predictable regulatory environments, credible institutions, and efficient administrative arrangements. Such conditions increase the likelihood that multinational firms will locate technologically significant activities within the host economy. Institutional quality consequently becomes part of industrial competitiveness because it determines both the attractiveness of a location and the stability of the conditions under which foreign firms establish long-term production relationships.

Asamoah et al. (2016) imply that the capacity of developing economies to attract productive foreign capital depends jointly on institutional quality and macroeconomic stability, since uncertainty weakens investors' willingness to commit resources. El Hamidi and Ed-Dib (2019) reinforce this argument by showing that institutional conditions interact with trade openness and FDI in North African economies, linking domestic governance with broader international integration. Contractor et al. (2020) add that regulatory predictability influences multinational location choices by changing the costs and risks associated with operating in host countries. Jude and Levieuge (2017) further show that institutions affect not only the volume of FDI attracted but also the extent to which foreign investment contributes to economic performance. Considered together, these contributions imply that institutional quality affects both stages of an FDI-based competitiveness strategy: attracting multinational activity and converting that activity into productive benefits. Countries seeking stronger GVC participation therefore need stable macroeconomic conditions, credible regulations, effective institutions, and openness policies that encourage durable linkages between foreign investors and domestic production systems.



3. Industrial Policy, Resilience and Strategic International Competitiveness

3.1. Industrial policy, structural transformation and competitive capabilities

Liu (2019) implies that industrial policy should be designed with production-network structure in mind because support directed toward strategically positioned industries can generate effects well beyond the targeted sector through input-output linkages. Lane (2025) reinforces this network interpretation by showing that South Korea's Heavy and Chemical Industry policies not only expanded supported sectors but also generated benefits for downstream users and produced persistent changes in comparative advantage. Kalouptsi (2018) adds an international dimension by demonstrating that Chinese shipbuilding subsidies altered production and market outcomes in a globally contested industry, showing that national policy can reshape competitive positions across borders. Criscuolo et al. (2019) further provide causal evidence that targeted industrial interventions can increase employment and investment, although their effectiveness must be assessed against possible displacement and inefficiency. Taken together, these contributions imply that industrial policy can influence international competitiveness when interventions target activities with strong technological and production linkages. The relevant criterion is therefore not simply whether a sector receives support, but whether assistance generates durable productive capacity, complementary investment, and spillovers across interconnected industries rather than temporary expansion confined to subsidized firms.

Juhász (2018) implies that temporary protection can contribute to long-term industrial development when it allows firms to overcome technological adoption costs and accumulate capabilities that persist after the original intervention disappears. Aghion et al. (2015) qualify this mechanism by showing that policy support tends to perform better when rivalry among firms remains active, suggesting that protection should facilitate upgrading without eliminating competitive discipline. Andreoni and Chang (2016) reinforce the capability perspective by emphasizing that modern industrial policy must address structural interdependencies, technological learning, and the development of domestic productive systems capable of retaining greater value within fragmented global production. Aiginger and Rodrik (2020) broaden this interpretation by presenting industrial policy as an instrument for innovation and structural transformation rather than simply sector preservation. Together, these contributions imply that successful intervention should be temporary, capability-oriented, and compatible with competitive selection. Support becomes more defensible when it allows firms to acquire technologies, develop skills, and strengthen domestic linkages that eventually improve their position in international production networks. Industrial policy should therefore encourage learning and structural upgrading rather than perpetuate low-productivity activities through indefinite protection.

Juhász et al. (2024) imply that contemporary industrial-policy debates increasingly concern the design and empirical evaluation of interventions aimed at technology, exports, resilience, and strategic sectors rather than the older question of whether governments should intervene at all. Aiginger and Rodrik (2020) reinforce this broader orientation by connecting industrial policy with structural transformation and adaptation to changing global production systems. Lane (2025) provides supporting evidence that targeted intervention can produce lasting changes in comparative advantage when it succeeds in building productive capabilities, while Aghion et al. (2015) show that these gains need not require suppressing competition among supported firms. Considered together, these contributions imply that GVC-oriented industrial strategy should combine selective support with competition, learning, and outward



orientation. The objective is not simply to expand domestic production but to move firms and sectors toward technologically more sophisticated functions, strengthen connections with upstream and downstream activities, and improve the domestic capture of value within international production systems. Effective policy therefore depends on institutional capacity, causal evaluation, and the continuous adjustment of support according to observed capability accumulation and competitive performance.

3.2. Supply-chain shocks, resilience and industrial competitiveness

Baldwin and Freeman (2022) imply that the competitiveness of global production systems increasingly depends on resilience as well as efficiency, since concentration, limited substitutability, and poor visibility can magnify the effects of disruptions. Barrot and Sauvagnat (2016) reinforce this mechanism by showing that shocks transmit particularly strongly when firms depend on technologically specific inputs that cannot be replaced easily. Boehm et al. (2019) add firm-level evidence from the Tōhoku earthquake, demonstrating that dependence on disrupted Japanese suppliers generated substantial production losses for connected firms. Carvalho et al. (2021) further show that buyer-supplier networks can amplify localized disturbances and spread their effects across broader production systems. Taken together, these contributions imply that international sourcing strategies should not be organized exclusively around minimizing costs under normal conditions. Firms operating within GVCs also need alternative suppliers, greater information visibility, substitution possibilities, and contingency mechanisms capable of limiting network propagation. Strategic industrial policy can support this adjustment by identifying critical bottlenecks and encouraging diversification where supplier specificity creates excessive vulnerability. Resilience therefore becomes an integral component of international industrial competitiveness rather than a separate objective considered only during crises.

Gereffi (2020) implies that the COVID-19 shortages in medical supplies reflected not simply globalization itself but a combination of geographical concentration, governance weaknesses, demand surges, and limited capacity to reconfigure production rapidly. Bonadio et al. (2021) reinforce this qualification by showing that global supply chains contributed to the transmission of pandemic shocks while also demonstrating that complete domestic self-sufficiency would not necessarily have eliminated vulnerability. Verbeke (2020) similarly rejects the expectation of generalized reshoring and argues that multinational enterprises are more likely to reconsider risks, governance, and location choices selectively while preserving many advantages of international specialization. Coveri et al. (2020) add a policy dimension by arguing that exposed vulnerabilities justify industrial measures supporting diversification, strategic capabilities, and more resilient production structures. Together, these contributions imply that the appropriate response to GVC risk is selective reconfiguration rather than wholesale retreat from international production. Competitiveness requires balancing efficiency with security of supply by identifying activities where concentration or strategic dependence is excessive while preserving international specialization where diversification and organizational flexibility provide effective protection against shocks.

Kano et al. (2020) imply that GVC resilience cannot be understood solely through geographical sourcing patterns because governance, ownership, coordination, institutional conditions, and organizational relationships jointly determine how internationally dispersed production functions. Verbeke (2020) reinforces this organizational perspective by emphasizing that multinational firms respond to disruption through selective changes in governance and risk management rather than simple relocation toward domestic production. Coveri et al. (2020) add that public policy can influence these adjustments by strengthening strategic capabilities and supporting more diversified production structures. Baldwin and



Freeman (2022) further show that resilience depends on the particular nature of exposure, including concentration, substitutability, visibility, and the capacity to reorganize supply. Considered together, these contributions imply that resilient GVC participation requires a multidimensional strategy combining organizational adaptation, supplier diversification, institutional coordination, and targeted capability development. Governments and firms should therefore evaluate vulnerabilities at the level of specific inputs, relationships, and production functions rather than classify entire international value chains as inherently fragile. Sustainable industrial competitiveness emerges from the capacity to preserve the efficiency advantages of cross-border specialization while developing sufficient flexibility to absorb and reorganize around major disruptions.

3.3. GVC governance, geography, digitalization and strategic positioning

Krenz et al. (2021) imply that automation can alter the geography of international production by reducing the importance of labor-cost differentials and increasing the attractiveness of technologically advanced manufacturing locations. Strange and Zucchella (2017) reinforce this interpretation by showing that Industry 4.0 technologies, including digital manufacturing, automation, additive manufacturing, and data-intensive coordination, can modify firms' outsourcing and offshoring decisions. Antràs and de Gortari (2020) provide a complementary theoretical foundation by demonstrating that the location of individual production stages depends jointly on trade costs, productivity, and the spatial organization of other stages within the same value chain. Antràs et al. (2017) further show that firms construct interdependent international sourcing portfolios in which the choice of one supplier country affects the value of sourcing from others. Taken together, these contributions imply that future industrial competitiveness will depend increasingly on the ability of countries to offer technologically compatible locations within broader production systems rather than simply low production costs. Automation and digitalization can reorganize established GVC configurations, while sourcing decisions remain interconnected across countries. Industrial policy should therefore strengthen technological capabilities, logistics, digital infrastructure, and supplier ecosystems capable of attracting or retaining strategically important production stages.

Dallas et al. (2019) imply that competitiveness within GVCs depends partly on power relations because lead firms, suppliers, and other actors differ in their ability to establish rules, negotiate terms, and capture value. Strange and Humphrey (2019) reinforce this governance perspective by showing that contemporary production networks frequently rely on organizational arrangements situated between arm's-length markets and complete multinational ownership, with important consequences for control, coordination, and knowledge transfer. Coe and Yeung (2019) add a territorial dimension through the concept of strategic coupling, whereby regional assets must be connected effectively with the strategic requirements of global firms if participation is to generate sustained local benefits. Shi et al. (2021) extend the argument toward sustainable competitive advantage by linking GVC participation with longer-term manufacturing performance and sustainability-oriented positioning. Together, these contributions imply that successful GVC integration cannot be evaluated solely through export volumes or production costs. Domestic firms and regions must develop bargaining capabilities, technological assets, institutional support, and organizational relationships that allow them to retain value and improve their position within production networks. Competitiveness therefore depends on both participation and the capacity to influence how value is governed and distributed.

Antràs et al. (2017) imply that international sourcing decisions form interconnected portfolios rather than isolated bilateral choices, since inputs from different countries jointly influence firms' production costs. Antràs and de Gortari (2020) reinforce this relational



interpretation by showing that the attractiveness of a country for one production stage depends partly on the location and characteristics of other stages in the chain. Coe and Yeung (2019) add that regional competitiveness emerges when local assets are strategically coupled with global production networks, while Strange and Humphrey (2019) demonstrate that organizational forms shape the coordination and transfer of knowledge across these internationally dispersed activities. Considered together, these contributions imply that GVC competitiveness is inherently systemic. A country cannot strengthen its position simply by improving one isolated activity if surrounding supplier relationships, governance arrangements, logistics, or technological capabilities remain weak. Industrial strategies should therefore focus on coordinated upgrading across interconnected production stages, stronger domestic supplier networks, and institutional arrangements that improve firms' ability to participate in complex international sourcing systems. Sustainable value capture depends on how effectively domestic capabilities are embedded within the wider architecture of global production.

4. Discussion

The literature first demonstrates that participation in GVCs should not be confused with improved industrial competitiveness. Timmer et al. (2015) and Johnson and Noguera (2017) show why value-added measures provide a more accurate representation of countries' contributions to internationally fragmented production than gross-export statistics. Their contributions indicate that economies may record substantial exports while retaining only a limited proportion of the value embedded in final products. This distinction is reinforced by Baldwin and Lopez-Gonzalez (2015), who describe international production as increasingly organized around specialized tasks rather than complete national production systems. At the firm level, Montalbano et al. (2018) and Del Prete et al. (2017) associate deeper participation in international production with productivity improvements, while Lema et al. (2018) and De Marchi et al. (2018) emphasize that learning depends on domestic innovation systems, governance relationships, and absorptive capacity. The findings reviewed therefore converge toward a capability-based interpretation of GVC participation. International integration creates access to technology, knowledge, foreign inputs, and demanding markets, but competitive gains become sustainable only when domestic firms can internalize these resources and develop progressively more sophisticated functions. This interpretation also explains why Pipkin and Fuentes (2017) treat process, product, and functional upgrading as central to sustained development within GVCs.

A similar conditional relationship emerges from the literature on FDI. Newman et al. (2015) and Alfaro-Ureña et al. (2022) identify vertical supplier relationships as an important channel through which multinational enterprises can improve domestic productivity and transmit production standards, managerial practices, and technical knowledge. Amendolagine et al. (2019), however, demonstrate that such effects depend strongly on multinational sourcing behavior because firms that rely primarily on imported intermediates create fewer opportunities for domestic suppliers. Liang (2017) and Njikam and Leudjou (2019) further emphasize absorptive capacity, showing that domestic firms require sufficient technological and organizational capabilities to benefit from foreign presence. These findings help explain why Nguyen and Revilla Diez (2019) observe that substantial multinational activity does not necessarily result in significant supplier upgrading. Institutional conditions add another layer to this relationship. Jude and Levieuge (2017) and Hayat (2019) associate stronger institutions with a greater capacity to transform foreign capital into economic benefits, while El Hamidi and Ed-Dib (2019) connect FDI, trade openness, and institutional quality in the North African context. FDI-led competitiveness therefore depends on the interaction among foreign investment, local sourcing, domestic capabilities, institutional conditions, and sustained



relationships between multinational enterprises and host-country firms rather than on foreign capital inflows alone.

The third major implication concerns the changing role of industrial policy under conditions of technological transformation and recurrent supply-chain disruptions. Juhász (2018), Aghion et al. (2015), and Aiginger and Rodrik (2020) suggest that industrial intervention can support technological learning and structural transformation when assistance remains compatible with competition and capability accumulation. More recent contributions reinforce the importance of production-network effects. Liu (2019) shows that support directed toward strategically positioned industries can propagate through input-output relationships, while Lane (2025) provides evidence that targeted intervention may generate persistent changes in comparative advantage. At the same time, resilience has become an increasingly important dimension of competitiveness. Baldwin and Freeman (2022), Barrot and Sauvagnat (2016), and Carvalho et al. (2021) demonstrate how concentration, supplier specificity, and network structures can amplify shocks. Gereffi (2020), Bonadio et al. (2021), and Verbeke (2020) nevertheless caution against interpreting these vulnerabilities as evidence for generalized reshoring. Their arguments instead support selective diversification, improved visibility, and organizational flexibility. Finally, Strange and Zucchella (2017) and Krenz et al. (2021) show that automation and digitalization may modify the geography of production. Industrial policy must therefore combine technological upgrading, resilient supply networks, institutional capacity, and strategic integration into evolving global production systems.

Conclusion

The literature reviewed in this paper indicates that global value chains and foreign direct investment have become important determinants of international industrial competitiveness, but their effects remain highly conditional. Participation in GVCs can provide access to larger markets, higher-quality intermediate inputs, advanced technologies, organizational knowledge, and foreign buyers. Nevertheless, these opportunities do not automatically translate into technological upgrading or greater domestic value capture. Countries and firms obtain stronger benefits when they develop absorptive capacity, invest in research and innovation, strengthen domestic supplier networks, and move progressively toward production stages characterized by greater technological and organizational content. FDI produces similarly differentiated outcomes. Multinational enterprises can transmit knowledge through supplier relationships, competition, demonstration effects, and worker mobility, yet such spillovers depend on local sourcing, domestic firm capabilities, institutional quality, and the organization of multinational production. The central implication is that international openness should be accompanied by domestic capability formation. Industrial competitiveness is strengthened when global integration contributes to the accumulation of productive knowledge, the development of local linkages, and the capacity of domestic firms to retain a larger proportion of the value created within international production systems.

The changing international environment also requires a broader conception of competitiveness that incorporates resilience, technological change, and strategic industrial policy. Supply-chain disruptions have demonstrated that production systems organized exclusively around short-term efficiency may become vulnerable when firms depend heavily on concentrated or technologically specific suppliers. However, the literature does not support a generalized withdrawal from international production. Instead, competitiveness increasingly depends on diversification, supplier substitutability, improved information, flexible organizational arrangements, and the capacity to reconfigure production when disruptions occur. Industrial policy can contribute to these objectives when it encourages technological learning, complementary investment, domestic supplier development, and strategically



significant productive capabilities while maintaining competitive discipline. Automation and digitalization may further alter the location of production stages by reducing the importance of traditional cost advantages and increasing the role of technological infrastructure, skills, logistics, and digital capabilities. Future industrial strategies should therefore seek neither unrestricted dependence on global production nor generalized national self-sufficiency. A more sustainable approach consists of combining international integration with domestic technological accumulation, institutional development, resilience, and continuous upgrading within evolving global production networks.

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