



INSTITUTE FOR WORLD ECONOMICS

HUNGARIAN ACADEMY OF SCIENCES

Working Papers

No. 142

December 2003

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PERIPHERAL PARTICIPANTS IN GLOBAL PRODUCTION
NETWORKS. CHANGING DYNAMICS IN THE
TRANSFORMATION FROM INDUSTRIAL
TO INTELLECTUAL CAPITALISM



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SUMMARY

There is a burgeoning international literature on the rapid spread of new organizational practices in the dynamic business environment of knowledge-based economies. The knowledge-based approach to organizations – as opposed to one based on transaction costs – presumes that the new structures replace the traditional virtues of formalization and specialization with flexibility and vertical forms, while hierarchical coordination gives way to trust-based, horizontal network forms. This paper goes against a near consensus in theoretical literature, arguing that hierarchical coordination persists in global production networks. It contrasts the experience of peripheral players recently incorporated into global production networks (GPNs) with the ‘fading-hierarchy’ thesis of organizational economics. The incorporation has occurred in a vertical manner, making them subject to hierarchical coordination. This is due to the modernization patterns found in transforming and some developing countries that are receiving foreign direct investment (FDI).

Section 1 describes the modernization patterns, found in newly integrated peripheral countries, referred to as modernization through network integration. Network integration has brought spectacular reorientation of exports. However, there have been three other changes: (i) a much-increased share of intermediate goods in output and exports, (ii) a greater concentration of production and export structures, and (iii) a marked fall in the degree of autonomy enjoyed by the integrated actors. The paper develops the hypothesis that the functional diversity of companies’ activity is strongly related to intra-organizational embeddedness. Along with other factors, this sets the hierarchy level of the coordination form to which they are subject. The beneficial macro-economic and export-composition indicators of countries specialized in ICT hardware are contrasted with the characteristics of their modernization experiment that display the properties of industrial capitalism. Though they specialize in ‘new-economy’ industries, they fail to display knowledge-economy features, which leaves their modernization achievements vulnerable.

The persistence of hierarchical coordination in GPNs can be explained. Although MNC headquarters have to play a new role under intellectual capitalism (integrating dispersed knowledge into one system), their traditional functions persist (organizing for and managing efficient resource allocation and output production) and call for traditional organizational practice. The present functions vary for each stage of the value chain. The stage that newly integrated peripheral units are concerned with is one that calls for traditional organizational practice and has retained most from the features of industrial capitalism. It is subject to diminishing returns in an era of increasing returns. Unsurprisingly, therefore, the new units are subject to hierarchical coordination and Chandlerian ‘command and control’ mechanisms.

Section 2 investigates whether the integration pattern of peripheral countries can have a similar developmental impetus, as it could be observed in the high-performing South-East Asian economies. The paper analyses the differences between the development perspectives in the supplier-oriented development strategies of the two groups of countries and puts forward predictions about future organizational dynamics in GPNs.

INTRODUCTION*

Much literature on international business in the last couple of years has been devoted to analysing the changes in the organization of economic activity. Researchers assert that in a knowledge-based economy, the boundaries of firms and between firms and markets undergo significant changes (Foss 2002; Mendelson and Pillai 1999; Grandori 2002; Langlois 2003). The revolution in information technology has brought organizational changes that modify transaction costs, and thereby affect both the horizontal structure and the vertical configuration of industries.

The fact that technological changes call for organizational changes has long been recognized (Perez 1983; Henderson and Clark 1990). Three lines of research can be detected, all pointing to similar outcomes of organizational change. (i) There is a reduction in the frequency of hierarchical coordination. (ii) There is a flattening of vertically integrated organizations. (iii) Networks, as a third form of coordination alongside markets and hierarchies (Powell 1990), are becoming in-

creasingly common in economic activity.

The point of departure for (i) is increasing fragmentation of the value chain (Arndt and Kierzkowski 2001; Feenstra 1998). This has been driven by the revolution in information technology, which cut coordination and monitoring costs, facilitated codification of knowledge, and reduced the importance of geographical distance, at least for some activities. In this wise, the new technology has reduced internalization-based advantages and reversed the process of vertical integration. Market-based transactions have squeezed out some of the ones hitherto coordinated hierarchically. The key players in an increasing number of industries have adopted modular organizational structures. Global customers have started to outsource complex bundles of value-adding activities related to a product or subsystem of a product.¹ That means they no longer seek vertically integrated suppliers with excellent manufacturing capabilities and low factor costs, preferring independent contract manufacturers capable of undertaking all the required functions. Independent units are connected by advanced information and communication technology (ICT) sys-

* The paper was presented at the BRIE-ETLA Workshop on the New Economy (Florence, Italy, 17–18 October 2003) as part of the research project ‘Tracking the Transformation’, supported by Fifth Framework Programme of the EU.

¹ Customers require independent process development and component design capabilities of their contractors. They entrust to them the procurement function, logistics, testing, packaging, and of course financing of the activities.

tems.² Hierarchically coordinated, vertically integrated organizations have thus given way to network organizations marked by horizontal cooperation, reciprocity and mutual trust, instead of hierarchical supervision of work processes. Even internal organizational structures and the remits of subsidiaries have been opened up to competition. Units now compete for assignments, and thereby indirectly for additional resources (Birkinshaw and Hood 1998), so that ‘market elements’ have been incorporated into the hierarchies.

Attention in (ii) is drawn to the mounting importance of distributed knowledge (Smith 2000). Ownership of assets used to be the source of authority in the traditional organizations of industrial capitalism. In intellectual capitalism however, a diminishing proportion of the relevant knowledge base remains internal in many industries, and an increasing part is sourced from outside experts. Since knowledge accounts for an increasing share of value added and physical assets for a decreasing share in intellectual capitalism, ownership and control is retained over a diminishing proportion of the production inputs. The traditional source of authority becomes weaker as authority shifts to those controlling crucial resources of

information and knowledge. Knowledge sourcing is subject to arm’s length transactions (Pavitt 2001),³ so that allocation and exploitation of knowledge assets cannot be hierarchically coordinated.

The best example of distributed knowledge is presented by complex, multi-technology products and systems, which have become increasingly prominent in total output and trade (Prencipe et al. 2002). Multi-component, IT-intensive products like aircraft engines, power stations, residential and office safety systems and so on incorporate a plurality of technologies, and firms cannot develop them all inside. The manufacturers of such products and systems integrate the knowledge and coordinate the activity of various external, specialized suppliers and research institutions. System integration replaces the authority relations of ownership-based hierarchies with the method of coordination appropriate in their case. Increased knowledge specialization is accompanied by the necessity to coordinate various actors with different knowledge capabilities.

The point of departure for (iii) is the new business model that has emerged in the knowledge-based economy (Keil et al. 2001; Granstrand

² Hitt 1999 found a marked negative correlation among firms between volume of information-technology capital and level of vertical integration.

³ Even with internally held knowledge assets, the more specialized the knowledge of an actor, the greater the extent to which hierarchical coordination loses its hold.

2000). Here sustainable competitive advantage is determined by factors other than the traditional determinants of corporate competitiveness. In the era being referred to as ‘intellectual capitalism’ (Granstrand 2000), companies have to capitalize on their own as well as outside knowledge. Simply slicing up the value chain and the geographically optimizing factor costs no longer guarantees sustainable competitive advantage (Szalavetz 2003). While the latter calls for hierarchical coordination, the new core capabilities of combining new elements of knowledge with traditional ones and creating new, complex value, while recognizing, gaining access to and exploiting knowledge beyond the firms’ boundaries, require network creation and coordination capabilities (Ritter and Gemünden 2003).

Nevertheless, the claim that the relevance of hierarchical coordination is fading is far from general in organizational economics. Foss 2001 describes a multitude of cases in which the presence of authority is still relevant, necessary and so highly probable even in ‘Hayekian settings’, i. e. the knowledge economy with a dispersed knowledge base.

Authority is relevant in cases where speedy decision-making is needed, or where economies of scale in decision-making can be detected. Furthermore, authority may derive from possessing decisive information. The setting of business objectives is based

on authority relations, as is the determination of the incentive structure. An employee may possess superior knowledge to his/her employer in a specific context, so that authority-based monitoring becomes superfluous, but monitoring of the achievement of business objectives remains the province of traditional authority relations.

Hodgson 2002 argues that the idea of ‘internal markets’ or ‘quasi-markets’ within firms is a myth. In fact, strategic decision-making is subject to hierarchical resolutions.

This paper sets out to contribute to (iii) by contrasting the experience of peripheral players, recently incorporated into global production networks (GPNs), with the ‘fading-hierarchy’ thesis of organizational economics. It is argued here that hierarchical coordination persists in GPNs, but not that nothing has changed or that the sharp conceptual distinction between firms and markets has remained the same. Non-hierarchical forms of coordination have indeed proliferated as firms concentrate their activities within their core competence, increase their outsourcing and join GPNs. Within such networks, it is possible to discern both pure hierarchical relations and horizontal forms of co-operation based on mutual trust and closer to the market end of the continuum. The level of the relations in the hierarchy and shares of the various forms of coordination change continually along with

the competence and position of individual network members.

The point is that the incorporation of the newly integrated peripheral players into the GPNs has taken place in a vertical manner, so that they are subject to hierarchical coordination. This follows from the modernization patterns in the transforming and certain developing countries receiving FDI.

Section 1 describes the modernization patterns of the newly integrated peripheral countries (NIPCs) as modernization through network integration. Some arguments are developed for the hypothesis that the functional diversity of the companies' activity is strongly related to their intra-organizational embeddedness and determines, along with other factors, the level in the hierarchy level of the coordination form to which they are subject. The beneficial macroeconomic and export-composition indicators of the countries that have specialized in ICT hardware are contrasted with the characteristics of their modernization experiment, which displays the properties of industrial capitalism. Notwithstanding their specialization in 'new-economy' industries, these economies do not display features of a knowledge economy, which leaves their modernization achievements vulnerable.

Section 2 investigates whether the integration pattern of peripheral

countries can have a similar developmental impetus as the one observed in high-performing South-East Asian economies (HPSEAEs). We analyse the differences between the development perspectives of the supplier-oriented development strategies of the two groups of countries and develop predictions about future organizational dynamics in GPNs.

1) MODERNIZATION THROUGH NETWORK INTEGRATION

The standardization and commodification of information technology and the accumulation of knowledge about it during the growth phase of its technology cycle were marked by a rapid expansion of output. This luckily coincided with overall opening and liberalization of the FDI policies of the transforming and many developing countries. In the growth phase of the technology cycle, when the period of technological uncertainty is over, turbulent product innovations subside as industry standards emerge and innovations based on existing technologies begin. Characteristically, there are process and organizational innovations aimed at cutting costs, fuelled by efficiency-seeking FDI. These intensifying inward flows have integrated these countries into the rapidly spreading

GPNs. Much has been written about the benefits of FDI to structural modernization, technological upgrading, corporate competitiveness and macroeconomic performance in recipient countries.⁴ This section concerns only the effects on network integration.

Network integration brought three types of changes for the recipient countries, along with a spectacular re-orientation of exports. (i) They experienced a significant increase in the share of intermediate goods in their output and exports. (ii) There was an increased concentration of their production and export structures. Those specializing in ICT hardware manufacturing underwent a spectacular technological upgrading that led some analysts to draw exaggerated conclusions based on international comparisons of the technology intensity⁵ or price/quality position⁶ of their export structures. (iii) There was a marked decrease in the autonomy level of the actors after their integration.

Growth based on intermediate goods

The rising share of intermediate goods at the expense of complex, finished

products can be attributed to three factors.

Greenfield investment constituted the first driving force. Newly established production facilities were globally integrated into the organizations of their MNC owners. Manufacturing of certain components was relocated from other units, so that the output of the new actors necessarily consisted of intermediate goods.

The most spectacular improvement in performance indicators can be observed in countries whose FDI portfolios are dominated by resource-seeking investment.⁷ These were made either as greenfield investment or through privatization. Privatization-induced restructuring represents the second driving force behind the increase in the share of intermediate goods in output and exports. The state-owned firms privatized used to manufacture finished products, but restructuring of their outdated product mix led them to take a step back along the value chain. They abandoned their specialization in complex finished goods, and soon after privatization, started to manufacture components and other intermediate goods instead.

The third impetus came from changes in investors' integration patterns. These changes have not been so

⁴ It is not the purpose of this paper to provide a comprehensive list of general and specific references. Here are a few of the papers dealing with Hungary's experience with FDI: Csáki 2001; Antalóczy and Sass 2001; Hamar 2001; Szanyi 2001.

⁵ Éltető, 2000; Guerrieri 1999; Soós, 2000.

⁶ Landesmann-Burgstaller 1997; Eichengreen and Kohl 1998.

⁷ The motive behind resource-seeking location decisions is typically to acquire specific resources such as raw material or labour, at lowest real cost (Dunning 1993).

widespread as (i) and (ii). The evidence is little more than anecdotal in some sectors of mechanical engineering. Several host country-oriented, market-seeking investments show a change in the owners' initial investment motives. Initially, the product mix at some privatized companies consisted of complex, multi-technology products and systems, which were incorporated into the owners' global organizations under a multi-domestic strategy. However, insufficient domestic demand led owners to abandon their initial, market-seeking investment motive. Where local market growth for complex final products failed to meet expectations and capacity at local subsidiaries was lying idle, the subsidiaries were entrusted with component manufacturing for export. Owners transferred the manufacture of various intermediate products to them as a lifeline, being forced by poor market conditions to change strategy for one that was resource-seeking or efficiency-seeking, rather than market-seeking, i.e. a global strategy instead of a multi-domestic one. This caused such subsidiaries to move production to an earlier stage in the value chain.

Concentration of export structure

One conspicuous feature in peripheral countries that have recently undergone modernization through network integration is high concentration of their production and export structures. A high share of their output and exports consists of a restricted number of

products and comes from a small number of companies.⁸ This is especially striking in countries that have specialized in specific ICT hardware products and in other globally concentrated industries. If global output of a certain product is concentrated at only a couple of locations, a single investment deal can have a huge quantity effect on a host country's production and export structures and on its macroeconomic indicators. Furthermore, the denominators of the performance indicators (GDP, total exports, etc.) were quite low in the NIPCs, reflecting a low intensity of economic activity, and causing a variety of statistical distortions in the first phase of transformation. There still needs to be caution in drawing conclusions from the indicators customarily analysed, in transforming and in developing countries (Szalavetz 1998).

Based on the rapid improvement in the technology intensity of exports (increased share of high-technology products in the export structure), analysts drew premature, exaggerated conclusions about modernization. In fact, these countries were still far from becoming knowledge economies. They

⁸ In 2000, the share of the top three foreign-owned exporters in Hungary's total exports was 25.1 per cent. In Costa Rica, also a recently integrated peripheral country that underwent spectacular modernization through network integration and specialization in ICT hardware, the figure was 29.5 per cent. (Own calculations based on UNCTAD, World Investment Report 2002. New York and Geneva: United Nations.)

had merely specialized in the physical processing of tangible inputs of the ‘new economy’. However, their technological specialization in itself did not indicate improved non-price competitiveness or increased innovation potential. These two vital determinants of sustainable modernization in the age of intellectual capitalism are still lacking.

Reduced autonomy

In the early years after network integration, the incorporation of the new actors in the global structure of manufacturing was marked by geographical separation of production-related service activities from production (physical processing activities). Some of the physical processing tasks have been assigned to newly acquired and modernized companies. On the other hand, marketing and sales departments, design laboratories and research and development facilities were closed down as unnecessary under conditions of exclusive intra-firm supplies and manufacturing according to the technological specifications of the owner. In most cases, even the procurement function became superfluous, as the owner-customer organized just-in-time delivery of raw materials and components to the subsidiary. Traditional suppliers were not considered reliable enough, so that the owners preferred to do business with their own longstanding partners to supply their newly acquired subsidiaries. Thus local companies that used to perform all corporate functions

have become single-function production facilities within a wider organization.

This reduction in autonomy can be associated first with the step back along the value chain, mentioned earlier. Manufacturing intermediate products according to the technological specifications of a customer-owner requires fewer autonomous decisions than manufacturing complex finished products. Secondly, pre-production and post-production activities will have been transferred to other members of the network. Activities lost are ones whose contribution to value creation has ever increasing importance and higher than average knowledge-intensity, such as R and D, design, process development, marketing, sales, pre-sales and after-sales service.

Functional diversity means a diversity of intra-organizational and network connections. The number of a network member’s connections with other units in the network correlates strongly with its level of autonomy.

Mono-functional processing entities are linked only to intra-firm customers and – passively – to suppliers. They are in a position of strict subordination to head office. If they organize procurement independently, on the other hand, their links with their suppliers become active and their autonomy level increases, as they select and monitor suppliers, provide them nec-

essary technological specifications and so on. If subsidiaries are entrusted also with prototyping and process development, they develop intra-organizational links with other units' technicians and engineers responsible for process development. The coordination of technical and technological issues takes place on a cooperative basis of equal parties sharing knowledge, not on hierarchical terms. If local subcontracting subsidiaries design the component they manufacture, the number of their links with other network members increases, since they have to cooperate with designers of other modules of the product. They will be able to influence the architectural design of the subsystem into which their component is incorporated. Their links multiply again and their subordination decreases even more if they also take on product customization.

To sum up, diversity of corporate functions in a subsidiary brings deeper organizational embeddedness, which reduces the degree of subordination. Newly integrated companies had their corporate functions severely restricted and their organizational embeddedness was minimal, which affected both their autonomy level and the coordination pattern of their activities.

There is little need to explain that the hierarchy level of the intra-organizational and intra-network relations of new network members is not determined by spatial features. It can-

not be claimed that peripheral players as such are subject to vertical integration and hierarchical coordination. The hierarchy level of a specific coordination mechanism depends on the variety and system embeddedness of its corporate functions and not on the actor's geographical location. The hierarchy level of production facilities located at the centre of the world economy is similar to that of production facilities in peripheral countries. On the other hand, R and D units or marketing and sales units in peripheral countries are normally granted similar autonomy as to similar centrally-located units. The only difference between central and peripheral single-functional production units is that the former find it easier to improve their organizational position, gain access to additional resources, and entrusted with additional and more knowledge-intensive assignments and functions by lobbying head office (Birkinshaw 2000; Birkinshaw and Hood 1998). Head-office assignments develop more rapidly and the subsidiary's initiatives meet less resistance.

Value chain stage and hierarchy level

The incorporation of new peripheral members in GPNs has moderated the overall tendency towards hierarchy reduction within them. The persisting heterogeneity of coordination forms can be explained by the emergence of new roles that MNC headquarters have to perform in intellectual capitalism,

while still carrying out their traditional functions of strategy formulation and provision of strategic and organizational leadership. The new role prompted by the emergence of intellectual capitalism is to integrate dispersed knowledge into one system. The core functions of MNCs include recognizing and assimilating external knowledge elements, coordinating agents that possess them, and ensuring they are applied optimally and effectively. This function requires a coordination mechanism different from hierarchical, command-and-control, authority-based relations

However, the traditional functions of MNC headquarters typical of the era of industrial capitalism have remained vital in certain contexts. This traditional function of organizing for and managing efficient resource allocation and output production calls for the traditional formal procedures, central decision-making and hierarchical coordination. Headquarter functions vary at each stage of the value chain. The stage of concern to newly integrated peripheral units is one that necessitates traditional organizational practices and preserves the greatest share of the characteristics of industrial capitalism: it is one subject to diminishing returns in an era of increasing returns. At this stage, MNC headquarters behave as cost-minimizing units, i.e. the transaction cost-based approach to organization applies (Williamson

1975 and 1985), as opposed to the knowledge-based approach. The activity of new members is therefore marked, unsurprisingly, by rigid task definitions and high reliance on formal rules and procedures. They are subject to the hierarchical coordination of Chandlerian ‘command-and-control’ mechanisms.

2) FUTURE ORGANIZATIONAL DYNAMICS – PROSPECTS FOR PERIPHERAL ACTORS

The patterns of network integration just described suggest that the resulting modernization is vulnerable. FDI inflows in ICT manufacturing have not led to the emergence of a new type of capitalism, in which new organizational practices are necessary. Network integration has been driven mainly by factor-cost differences. This is a typical determinant of local competitiveness in the era of industrial capitalism, but not in the new business model of intellectual capitalism. The integrators were not setting out to exploit some distinctive local knowledge or capabilities.⁹ The main draw was cheap and reliable labour.

⁹ There are attractive exceptions – cases of home-base augmenting and technology-seeking flagship investments (see the categories of Kuemmerle 1999), creating local R and D units. But they remain individual instances too small in number to support any general conclusions.

At first sight the initial ‘victory’ in global locating competition suggests a sustainable development path for the newly integrated countries receiving FDI. Such modernization is sustainable according to optimists who refer to ‘transfer-driven modernization’. Further development will be driven by rapid capacity expansion and – from a quality point of view – by the ability of local subsidiaries to accumulate technology.

In fact, superficial network integration with a minimal number of system interactions leaves it easy for the subsidiaries’ business to be transferred. Furthermore, if organizational embeddedness, i.e. deep and extensive relationships with other corporate units, exerts a positive influence on subsidiaries absorptive capabilities (Anderson et al. 2001), lack of it effectively hinders the accumulation of local competence.

In principle, there are two ways for ICT-driven, modernization-inducing network integration to occur: (i) inclusion of many local, independent SMEs in global networks through information technology, and (ii) geographical dispersion of FDI to new peripheral locations. International business literature abounds in success stories about service SMEs in peripheral countries having adopted e-business strategies, provided application services via the Internet, and thereby helped to improve the economic performance of

their countries. (Coviello and McAuley 1999; Teubal and Avnimelech 2001)

ICT enhances the internationalization and network integration possibilities of SME, even in manufacturing. According to HPSEAE success stories (Bell and Pavitt 1992; Hobday 1994; Kim and Nelson 2000), local companies follow a trajectory of technological learning and capability accumulation. At the end of a multi-stage process,¹⁰ the competitive advantage of local actors grows to such an extent that they become capable of competing head on with established producers of certain products or, at least of becoming horizontally integrated specialized suppliers within GPNs.

This type of subcontracting-oriented development and dynamic learning has brought network-position improvement up to a point, but becoming horizontally integrated independent contract manufacturers is not feasible for two reasons. First, network-position improvement for independent production units is much more demanding nowadays, in an era of global suppliers, than it was a decade or two ago. Gradually acquiring a nodal posi-

¹⁰ The rungs of the ladder can be well designated by OEM (original equipment manufacturing), ODM (own design and manufacturing) and finally OBM (own brand manufacturing). Approaching the issue from the angle of innovation activities, the stages can be described as imitation, process innovation, incremental product innovation and radical innovation. Several other approaches are found in the literature on the various taxonomies of the technological capabilities of firms. (For a summary, see Radošević 1999.)

tion in the network, improving one's status from a supplier-subcontractor to a network member that organizes regional procurement and sales, up to the status of a contract manufacturing-services provider operating on a global scale requires more than manufacturing excellence. Nor is it sufficient to master knowledge-intensive, intangible value-adding activities related to production. Such capabilities have to be combined with an ability to finance capacity build-up and procurement, establish advanced IT systems, and do all the other capital-intensive corporate functions required to assume the complex bundle of value-adding activities.

Irrespective of their capabilities, local companies that face financial constraints and are unable to concentrate huge resources and finance investment will never attain the high degree of autonomy granted to contract manufacturers. Rapid technological learning will not improve the financial position of peripheral operating units. Although moving up the ladder of technological learning brings some capital accumulation, even in an optimal case, the financial strength of local companies remains far below the level required to become a nodal member of the network.

The other side of the coin is underdevelopment of local financial markets, which leads to the second explanatory factor of the differences between the development perspectives of

NIPCs and HPSEAEs. The latter (especially Korea and Taiwan) have a vastly greater volume of state resources available and the willingness and capacity to mobilize them and engage in developmental intervention.¹¹

The obstacles to an HPSEAE type of modernization are not confined to institutional inefficacy or want of resources, although these two are formidable barriers. Exacerbating the problem in the transforming economies is lack of will to intervene. After decades of a command economy with distorted prices and state ownership, large subsidies have become discredited. It has become unimaginable to apply the kind of instruments and methods used in HPSEAEs or give large amounts of subsidy for investment and exports. The role that publicly owned enterprises played in technical and industrial development in the HPSEAEs, through subsidized technology licensing and the purchase of foreign capital goods is inconceivable.

Actors in peripheral economies have hardly any alternatives other than vertical integration into GPNs, which furthermore offers several advantages for new network members possessing weak national production and innovation systems. They benefit from transfers of technology and know-how. With privatized facilities, vertical inte-

¹¹ For the role of the developmental state in the HPSEAEs, see Wade 1990.

gration enables comprehensive restructuring of local facilities. This complex range of transfers proves vital to successful integration of peripheral network members.

As for future organizational dynamics, the main issue is whether such peripheral countries can embark on a sustainable path of modernization, despite the changes in the institutional and business environment already discussed. Does their specialization in ICT hardware manufacturing induce gradual development, manifested in improved positions for local actors in GPNs? What are the preconditions for such development?

Before addressing these questions, let us consider an issue relevant in the shorter run: the possibility of creating local networks. How can local subsidiaries get beyond their present ‘satellite’ position within networks? An important structural weakness in peripheral countries that have undergone modernization through network integration is that MNCs often fail to create forward and backward linkages with domestic firms. The embeddedness of local MNC activity in the host economy is minimal, at national and regional level. This also reduces technology and productivity spillovers, indirect employment generation, etc.

The low intensity of inter-firm cooperation can be explained partly by the specific features of certain indus-

tries. It has been persuasively demonstrated that industry characteristics have a marked effect on the extent of local vertical linkages of country-specific, parent firm-specific, and sector-specific determinants of local content ratios in the production of 272 Japanese companies in 24 countries (Belderbos et al. 2001). Such linkages are less frequent in high-technology sectors than in mature ones. Since component production in most high-technology industries is extremely concentrated globally, it is subject to global sourcing and most unlikely to lead to the creation of a network of local suppliers and local sourcing of tangible inputs. Strategies aimed at developing complementary domestic linkages and thereby accelerating technology diffusion and growth will show poor efficiency in countries specialized in high-technology industries like electronics and/or ICT hardware. In these industries, the emergence of a local network that incorporates local suppliers does not depend exclusively on endogenous factors, i.e. on local companies’ successful movement along the industrial learning curve. The factors are exogenous factor, to do with global suppliers’ locating decisions. If several MNCs belonging to the same value chain decide to locate their activities in the same agglomeration, a network of local suppliers will emerge.

Although these findings are supported by the experience of NIFCs,

there are cases belying the argument that industry specifics represent a clear determinant of the propensity to engage into local supplier-network creation. For several HPSEAEs, notably Korea (Ernst 2002) and Singapore (McKendrick et al. 2000),¹² a strong, dynamic and flexible local supplier base represents an important determinant of sustained modernization in the electronics and ICT industries. The existence of a local supply base even in globally concentrated industries represents another significant difference of industrial upgrading experience and development prospects between HPSEAEs and NIPCs.

In fact, it was not the creation of local networks but their incorporation into global networks that was the main force behind the modernization and catching-up of peripheral countries. However, local operational units have to become increasingly embedded in the host location to produce a further improvement in performance. Economic policy needs to promote this objective, not necessarily by striving to ‘create’ local tangible input suppliers, but rather by making local actors capable of offering strategic business services, such as software development, testing, logistics etc. Industries marked by a globally concentrated supply chain and a low propensity to establish local

networks of tangible input suppliers may still have a demand for local intangible input supplies. This seems worth pursuing, as intangibles account for a rising share of total inputs.

Promoting existing manufacturing firms’ diversification into knowledge-intensive production-related support services, i.e. developing increasingly complex and specialized supply chain capabilities, is a good method of improving their position within the network and increasing their internal network embeddedness.

Despite the changes in the institutional and business environments discussed here, network participation offers plenty of development opportunities for local subcontractor-subsidaries if they can undergo a conscientious programme of functional upgrading. The realistic prospect for their development is not to improve their position within the network up to a point of becoming independent, horizontally integrated contract manufacturers, but rather to improve it within the organization. Having moved along the traditional industrial learning curve and accumulated technological and functional capabilities, local subsidiaries may become regional competence centres within their MNC organization, and some may even acquire world product mandates (Birkinshaw 1996).

However, in an era of contestable intra-firm positions, the state needs to

¹² In Singapore the ‘local’ supplier-base of the hard disk drive industry is in fact regional: networks span Indonesia, Thailand, Malaysia, China and the Philippines.

take a more active, ‘developmental’ approach. It may not be enough just to follow a passive policy that allows local actors at the micro level and the host economy at macro level to be driven ahead by modernization-inducing FDI. Retaining existing investors, attracting new ones and promoting functional upgrading of local subsidiaries is the best channel to increasing local value added. It is also essential because if countries specialized in ICT hardware face a massive divestment move by their existing investors, they can hardly step upwards or specialize in even more technology-intensive, higher-technology industries. The gradual industry-upgrading experience of the HPSEAEs, involving a move from low-technology industries to high-technology ones that sustained the modernization process, would not be feasible for NIPC that were already specialized in high-technology industries at the beginning of their modernization process.

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