

GLOBAL PRODUCTION NETWORKS AND LINKAGES: A NEW DEVELOPMENT PERSPECTIVE

By

Ali Shamsavari

Kingston University

Abstract

This paper attempts to bring together advances in literature on industrial economics and marketing, development economics, complexity (evolutionary theory), international business and geography of global production in order to illustrate an emerging paradigm of development which I call linkage promotion (LP).

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One of the most significant lessons Craggside's science teaches is the importance of networking. The power and light system relied on making networks at every level, on every scale. Every local light system needed a technical network, its advance needed widespread commercial and scientific networks, and the global spread of the power and light systems required comparably planetary networks of engineering and knowledge. The trick was to make what worked in one place work anywhere. This enterprise, in turn, required accumulation in special places, such as power stations, labs, cable offices and classrooms, of resources otherwise widely and chaotically distributed. These processes of networking and accumulation governed the politics and geography of the light and power revolution. Individual components of the network might be the result of relatively solitary invention and discovery, but the whole power and light network was collective and collaborative, a genuine achievement of public engineering.

From Illuminations (the history of electric light) by Professor Simon Schaffer of Cambridge (Prospect, Dec. 2004, pp.35-36)

Introduction

In this paper I will first discuss the various ways in which global networks, production systems, etc. have arisen. Later in the paper I will address options for developing countries (LDCs) in relation to these developments. The emphasis will be on the emergence of the linkage promotion (LP) approach to economic development. The issue examined will be the extent to which this new approach may be considered as a new strategy compared to the traditional strategies of import-substitution (IS) and export promotion (EP).

Networks

Networks as social phenomena, for instance a network of family and friends, have been studied by sociologists for many decades (Iacombucci 1996, Thompson, et. al. 1991). The importance of the Chinese 'family network' for the flow of FDI into China in recent decades has been emphasised by many authors and commentators (Dicken 2003).

Business networks have rarely been subjected to economic analysis but have studied by researchers in the field of business marketing (Ford 2002). In these studies networks have been largely defined as webs of customer-supplier relationships in industrial markets. But networks arise for a number of reasons and in a diverse set of circumstances (Jarillo 1993). Increasingly these networks assume an international dimension and are organised on a global scale. We will discuss these points below.

Network as an Alternative to Vertical Integration

The word “network” is not used to refer to an internalised form of cooperation between a number of business units with a unified system of ownership and control as it occurs in the case of a vertically integrated firm. The latter obviously involves some form of supplier-customer relationship but is not a network. A network involves a number of independent companies. The network may even evolve into an alliance (including strategic alliance, in which two or more companies may work together with a common mission, e.g. cost cutting or quality improvement) but still stay as a network of independent firms. Alliances may further evolve into mergers which thus ends the formal network structure.

The traditional Toyota system of subcontracting, which involves sourcing of parts and components to independent companies most of which are in close geographical proximity to Toyota, represents a typical network which works as an alternative to vertical integration which traditionally characterised many Western carmakers until the last three decades. The Toyota system, which perfectly suited its management technology innovation involving Just in Time (JIT) manufacturing, represented an alternative to vertical integration, thus introducing competition (market) in its supply chain (Womack et al. 1991, Jarillo 1993).

In Shamsavari (1991) the key feature of dialectical as opposed to analytical method hinged upon the issue of fixed oppositions, e.g. between market and planning. The recent literature on strategic business networks, for instance, clearly points to the artificiality of setting up fixed oppositions between market (arm’s length) transactions and internalisation (e.g. vertical integration).

The strategic network overcomes this fixed opposition by combining both planning (cooperation) and market (competition). In such a network we observe both forces at work. These forces have shaped the evolution of the world capitalist economy for decades.

The strategic network, which combines both in-house (internalised) and outsourced (externalised) activities, overcomes the deficiencies of market and plan. In such a network the fixed opposition between competition (market) and co-operation (plan, vertical integration) disappears as the units in the network, e.g. supplier companies, may compete with each other in supplying the best quality products at least cost. (In the Toyota system of outsourcing a supplier may be dropped in favour of another supplier which may offer a better product at lower cost; furthermore the inefficient supplier may not be completely dropped but advised how it could improve efficiency).

Thus the strategic network involves both cooperation (e.g. between suppliers and customers) and competition (delivery on time with the required quality and price)

The Bases for the Formation of Networks

Networks may arise for a number of reasons and in a variety of circumstances. As stated above a typical network may involve customer-supplier relationships in industries where a large number of parts and components are used. But a network may arise due to the nature of products and services being offered. Thus a network involving a franchisor and a great number of franchisees is formed to protect intellectual property rights. A network may arise for a number of reasons, pursuing a number of objectives:

Efficiency seeking:

Creating a network of suppliers and customers in order to reduce costs, e.g. by achieving economies of scale in supplier companies. Today car makers may locate assembly operations in a limited number of locations but outsource parts from a great number of locations.

Customer-value seeking:

In this case the strategic network is not so much concerned to cut costs but enhance quality and value added.

Quality Seeking:

A customer- supplier network may be formed to enhance the overall quality of the final product. In industries that depend on many components (cars and computers) a network may be formed with the objective of improving the quality of the final product through enhanced quality of components.

Intellectual Property Rights Protection:

A network may arise due to the need of a company in possession of certain intellectual property rights to protect these rights as they may involve technologies that are simple and easy to copy, e.g. franchisor-franchisee networks such as Benneton, Gap and Esso.

Evolution of Networks :

Networks evolve over time depending on the history of collaborating enterprises. As we have seen some of these networks involve customer-supplier relations especially in industrial markets. In these markets transactions are often continuous and long term as opposed to consumer markets where transactions are discontinuous and short term (complex vs. simple relationship). In business

markets we see an evidence of increasing adaptive behaviour and thus complexity.

This adaptive behaviour has many facets:

1. A buyer may opt to diversify its sources of supply in order to reduce costs.
2. A buyer may opt for a single source of supply if the quality and price are right.
This may lead to a long term relationship.
3. A buyer may wish to reduce the complexity of the supply chain by trimming down the number of suppliers (e.g. car assemblers have switched from component and parts suppliers to module suppliers)
4. The most adaptive behaviour occurs when customers and suppliers develop relationships based on problem solving: a customer may not be certain about its requirements. A supplier may find the solution for the customer's problem.

In a situation like this we see evolution as the firms involved in the relationship have to change in order to accommodate each other's needs. The customer will change as it becomes apparent that what it requires is not achievable. The supplier will change as the requirements of the customer become clearer or more apparent to the supplier. This interaction and mutual adaptation is the essence of complexity in business markets. Strategic business networks are based on this mutual and adaptive behaviour. The complexity also involves multiplicity of customer-supplier relationships. Another feature of networks in industrial markets is cross investment and cross fertilisation. A customer may find it beneficial to invest in the business of supplier, share information and collaborate in innovation. In fact the network may extend beyond conventional customer-supplier relations and may involve even competitors. The increased importance of the customer in

an increasingly competitive global economy has made this trend inevitable. There are two developments in this area:

1. **Reverse marketing:** This happens when a supplier company has new ideas about final or intermediate products, which may be of interest to customers and competitors.
2. **Collaboration with competitors:** Knowledge-based companies may collaborate with competitors to gain competitive advantage for both parties involved.

The evolution of supplier-customer relationships in the automotive industry illustrates the points made above very clearly. In the Ford company factory operating in Bahia (Brazil) some suppliers are located in close geographical proximity to the Ford plant, some within the plant in charge of assembling complete modules (Dicken 2003, p.368). This shows the highest degree of evolution in supplier-customer relations. One may wonder as to what is left to the Ford Company to do. The answer is that Ford, like many other companies, is largely involved in brand management and R&D. In order to illustrate the evolutionary path in supplier-customer relations the following typology of forms or stages of collaboration in automotive industry is presented.

1. **Traditional subcontracting:** this entails production of components from specifications provided by car assembler companies. Here the supplier has full responsibility for quality, performance and delivery of parts.
2. **Provision of component systems:** production and assembly of component systems (modules) based on specifications supplied by car assemblers. Suppliers control the quality and costs of these modules. The supplier also controls the logistic chain of the component systems.

3. **Parallel development:** Suppliers are involved in the manufacture, assembly and development of components. The supplier has the capability of making technical and cost adjustments to design of components and modules.
4. **Co-development:** the supplier assumes complete responsibility for design and manufacture of components and modules. They are involved with the assembler in both product and process engineering. The assembler manages the technical interface between components. (Laigle, 1996, Dicken 2003, Shamsavari & Taha 2003)

We can add a further stage of development where the suppliers are also in charge of assembly, while the car company is only involved in R&D and brand management.

Global Networks, Production Systems and Value Chains

When a network extends beyond national borders it becomes a global network. International subcontracting (outsourcing, contract manufacturing) has played a major part in the rise of global networks (see below). But the scope of global value chains goes beyond outsourcing. In general it involves a rational spatial configuration across national borders, which includes outsourcing of parts and components, location in strategic markets and use of industrial clusters. These trends have created what is commonly known as deep integration of transnational companies (TNCs) in world economy, the rise of globally integrated production systems, etc.(UNCTAD 1993).

What has been identified in this paper as a global network is a pure form (concept) that excludes all equity participation by a lead TNC. It basically involves

contractual relationships between independent companies. However it does entail a system of functional relations and geographic configuration.

In reality a 'pure' network structure is rare. What we find is a mixture of network structure and various non-contractual and equity based relations.

Thus a more generalised structure may be in place that combines elements of a 'pure' network with non-contractual and equity based relations with collaborating firms. For instance, the Toyota system, identified earlier in this paper as a network, involves a modest degree of equity participation in supplier companies.

In general we may find TNCs that rely on a web involving both their affiliates and independent companies (e.g. contract manufacturers).

A more general concept that subsumes the network structure has been known as a 'global production system' (UNCTAD 2002). This concept is largely based on a number of previous formulations by scholars in the field of systems of international production (e.g. Gereffi 1994). According to Gereffi, global commodity chains (GCC) have 3 dimensions:

1. **An input-output structure**
2. **A territoriality** (spatial distribution of various production stages)
3. **A governance structure** (ownership, control and coordination)

(PP. 96-97)

Gereffi also identified two types of commodity chains, i.e. buyer driven (e.g. clothing) and production driven (e.g. auto industry). We are not concerned here about the theoretical validity of this typology. The point we wish to emphasize is that this approach has been very influential in studies of global production systems. The UNCTAD (2002) report's formulation of global production systems

is largely based on Gereffi. This report also characterises international production systems by 3 aspects corresponding roughly to Gereffi's 3 features:

1. **Governance:** This involves 'the structure of control that determines the geographic and functional distribution of business activities and ensures their coordination' (ibid. p 12). Issues addressed here include degrees of functional hierarchy, equity and non-equity relations between businesses and decentralisation vs. centralisation.
2. **Global value chain:** This entails decision as to what components of the value chain is kept as an activity internal to the firm (in-house) and what components are externalised (outsourced) (ibid. p 123)
3. **Geographic configuration:** How to determine the optimal location of various components of the value chain including international outsourcing decisions (ibid. p 124).

The above classification is confused and confusing. For instance, geographic distribution of activities of a firm appears under both governance and geographic configuration.

A more logical classification, I believe, should contain the following elements:

1. **Ownership structure:** to what extent TNCs will opt for equity (FDI, joint ventures) vs. contractual forms (licensing, turnkey).
2. **Coordination and organisation:** What structure of control and organisation is suitable for the strategies of TNCs (e.g. centralisation vs. decentralisation).
3. **Geographical configuration:** how will a TNC disperse and distribute the elements of the value chain around the globe and what are the determining factors of this process.

We will discuss these aspects below.

The value chain approach to global production systems is inadequate. It only focuses on necessary conditions for outsourcing not sufficient conditions, e.g. locational advantages offered by host economies or regions in the home country to which the outsourced business function is destined.

Decisions about equity vs. non-equity participation by TNCs are largely determined by the nature of the product and the sector in which the lead company operates. Both Gereffi and UNCTAD distinguish between production-driven vs. market driven networks. The examples are auto and garment industries respectively. In the auto industry the technology is complex and difficult to copy, thus the tendency towards equity based participation including FDI and joint ventures. In the garment industry the technology is simple and easy to copy, hence a tendency toward contractual forms in order to protect intellectual property rights. The centralisation vs. decentralisation decision is influenced by a large number of factors including product, customer, host country and company characteristics.

As to outsourcing decisions, we now go into greater detail.

A Brief History of Modern International Outsourcing

International outsourcing occurs when a manufacturing firm in a developed country subcontracts the manufacture of parts, components, sub-assemblies or even final goods to a firm in an LDC to take advantage of lower labour costs or special incentives provided by the host government, e.g. tax breaks. This form of contract has its origins in the US companies that operated in Mexico in the 1950s and 1960s. These companies would export parts and components, e.g. of electric or electronic goods to Mexico to be assembled into final goods, thus taking advantage of lower labour costs. The final products would be re-exported back to

the US or exported to other countries. This form of international business was encouraged tremendously by changes in the US Tariff Code in late 1960s. These changes involved exemption of American parts exported to Mexico from US tariff when final products were exported to the US. Thus only value-added in Mexico, primarily labour costs which were low, was subject to tariff. Similar changes in EU enabled European firms to shift parts of their manufacturing operations to North African countries. Today a number of countries, particularly in Asia (a good example being People's Republic of China), operate Export Processing Zones (EPZs) which include developed infrastructure, skilled but low-cost labour and tax incentives, to attract foreign investment. Textiles, electronic goods and air-frame production are some of the examples of the sectors involved in international subcontracting. The advantages for LDCs are immense as they acquire modern technology, have access to rich country export markets and enjoy a high rate of economic growth. Originating companies benefit from low wages, skilled and disciplined workforce and tax breaks.

Reasons for Outsourcing

1. Lower costs of production:
 - i) lower costs of factors of production, e.g. labour
 - ii) achievement of economies of scale
 - iii) other locational advantages such as lower taxes, tax holidays, good infrastructure, export incentives.
2. Clustering: availability of expertise and specialised services in given locations, (see below).
3. Quotas, e.g. MFA (international textile quota system to be phased out in 2005)
4. Flexibility

5. Dependability

What is lacking in traditional approaches to outsourcing is the dynamic, evolutionary perspective. Outsourced activities may not forever remain offshore but evolve over time into centres of technological excellence that may serve both foreign and domestic markets. Outsourcing may also be attracted to industrial clusters or lead to the formation of such clusters.

Below we will discuss the variety of ways in which outsourced operations of TNCs (often to their affiliates abroad) may evolve in an increasingly complex and adaptive paths.

According to Ferdows (1997) the following types of outsourced operations can be identified:

1. **Offshore factory:** This is the case of 'pure' outsourcing based on lower input costs. Well-known cases include Mexico in the 1950-60s and Singapore in the 1960s. Often back-end, labour intensive, sections of the value chain were outsourced. Targeted markets were largely rich home countries such as the USA.
2. **Source factory:** Basically the same as offshore, but with greater authority over selection of suppliers, production planning, product design and outbound logistics. This involves a greater level of technology transfer as well as transfer of more business functions.
3. **Server factory:** Basically the same as source, but with greater diversification of markets from home to regional markets, involving adaptations in product and process technologies to suit these markets.

4. **Contributor factory:** Like server but with greater responsibility in product and process engineering. These factories will serve home, host and third party markets. They may compete with home country plants in product and process technologies. They may develop their own engineering and development capabilities and greater freedom in choice of suppliers.
5. **Outpost factory:** This an intelligence gathering unit located near suppliers, competitors, customers and research establishments.
6. **Lead factory:** This entity creates new products and processes for the company. It has the authority to engage in research and development, choose suppliers and engage in outsourcing on its own.

The above-mentioned forms clearly show an evolutionary perspective on the development of outsourced operations. To the above list we may add a further stage:

Linked factory; this form arises when close relations develop between the affiliate of a TNC and host country suppliers and partners. This is the highest stage of development.

Industrial Clusters

This concept refers to a geographical space where various firms or their subsidiaries are located in proximity to each other e.g. Hollywood, Detroit, Silicon Valley, Bangalore (India), Cambridgeshire, Limerick (Ireland), San Paulo (Brazil) and Shezhen (China). The complementarities of activities of various firms or business functions, the similarities of services offered, which attract similar clientele, supplier-customer relationships are some of the bases for the rise of industrial clusters.

These clusters may arise for a number of reasons:

1. Agglomeration economies: when companies benefit from the proximity of other firms which may be sources of supply such as raw materials, components and business services in general. The advantages include lower communication and transportation costs.

It may be argued that the above factors are less relevant today due to the 'shrinkage of economic space' brought about by ICT revolution. But the fact remains that many companies still find close personal contact and live face to face communication and 'bonding' to be important in business dealings.

2. The geographical area may also offer good infrastructure and availability of skilled labour. Other locational advantages include tax holidays by host governments to TNCs, export processing zones (EPZs) etc.
3. The knowledge revolution has encouraged a new form of clustering. This involves a spatial coming together of universities, science parks and small and medium sized enterprises (SMEs) that are science and technology based.
4. The need to reduce high levels of vertical integration of a company. Firms that show a high degree of vertical integration that may prove to be costly and inefficient may benefit from the existence of clusters as it reduces the uncertainties often associated with the need for vertical integration.

The latter is one possible locus for linkages between TNCs and domestic firms.

As emphasised by many authors, the increasing role of innovation has re-created the importance of the local space as opposed to the global:

“The process of innovation is no longer restricted within the boundaries of a single firm but brings together different technological capabilities and implies links between different actors, firms or industries, very often dispersed spatially... The

process of globalisation results in a globally integrated network, especially where new product conception and the innovation process are concerned. The more the firm competitiveness depends on innovation-based production, and thus on different sets of competences and tacit knowledge, the more differences of location become important and meaningful... Space is not neutral and the corollary of this process of globalisation is the increased importance of localisation". (Keeble and Wilkinson, 2000, p.27)

It is in this context of the importance of localisation that we embark on the analysis of linkages between domestic enterprises and TNCs as a new strategy of development.

Linkages

Linkages traditionally have been identified as technical relationships in industrial sectors which normally involve several sequential stages. Backward linkages refer to stages that come prior to the assembly or manufacturing stage, e.g. production of memory chips that go into a PC. Forward linkages relate to stages that succeed assembly, e.g. sale of the PC to a wholesaler or a retailer. Linkages form the basis for traditional vertically integrated companies (see above).

Hirschman (1956) pioneered the linkage approach to development strategies in LDCs. He suggested that to maximise the efficiency of any investment in the industrial sector the priority should be given to industries that show high backward and forward linkages. Thus automotive industry would be a chief candidate as it shows very high backward linkages (a car typically uses 10,000 parts). Mining has very low backward linkage but may have a moderate forward linkage.

Hirschman's analysis was based on closed economy assumptions and on the then fashionable "Import Substitution Industrialisation" (ISI) strategy for development. It also largely ignored the role of TNCs.

The linkage approach was further developed (e.g. Shamsavari 1973) by removing the closed economy assumption and incorporating the role of TNCs. The contribution of FDI to development was measured by the extent of domestic content production (sourcing from local suppliers), i.e. the degree of domestic linkage creation. Inevitably the ISI bias remained.

The modern linkage approach developed largely by writers of UNCTAD world investment reports since 1999 (UNCTAD 1999, 2000, 2001, 2002, 2003) and more recently by Taha (2002), Shamsavari and Taha (2003) and ILO (2003) tend to get away from the ISI bias, incorporate fully the role of TNCs in development but at the same time emphasise the potential of local/domestic capabilities to link up with TNC as the way forward for many developing countries.

The linkage promotion approach has also figured prominently in development policies of a number of developing and transition economies that have opted for a high degree of global economic integration, e.g. Ireland, Malaysia and the Czech Republic (UNCTAD 2001, pp. 184-189).

The modern linkage approach incorporates the traditional concepts of linkages but goes further. It also embraces the openness and export orientation (as in traditional EP approach) but emphasises dynamic (rather than static) comparative advantage. Thus the emphasis is on improving competitiveness in an increasingly competitive world economy. This involves a number of factors including quality of products, education of the labour force and upgrading of the skills. Thus it is no longer enough to attract and sustain FDI flows on the basis of cheap labour. Host

countries need to upgrade the skill levels of the labour force and create new locational advantages and competencies (e.g. a software industry in India that has attracted equity participation by Intel and more recently Microsoft). The role of global value chains and industrial clusters is very important in this process. These systems are the locus of the process of globalisation with local input (localisation). The process of development today cannot be conceived as localisation (as in ISI strategy) or globalisation (as in traditional EP strategy). The first strategy was suitable for certain countries with large markets in the 19th century and part of the 20th. century (USA, China, India, Brazil). The second strategy worked for a number of decades for low cost and export oriented economies (Hong Kong, South Korea, Taiwan and Singapore).

The difference between ISI policies and the new emphasis on promotion of linkages (UNCTAD 2002; Taha 2002) consists of the following:

In ISI the emphasis is on self-sufficiency, but there are several problems here including isolation from world economy. This normally involves:

1. Consumer welfare loss due to possible high prices (due to import restrictions such as high tariffs) for domestic consumers.
2. Lower quality for consumers as parts and components used by domestic producers may not match international standards.
3. Export loss as foreign buyers may expect higher quality.
4. Lack of exposure to the latest technological developments.

Possible advantages of ISI include emphasis on domestic competence and national enterprise development.

By contrast the linkage/export promotion model is more (international) market oriented. Does this involve loss of relative autonomy of nations in their national economic development?

On the contrary, the emphasis in the LP approach is on national/domestic enterprise development, but combined with various degrees of openness to foreign trade and FDI. In an increasingly globalized world economy involving greater competition it is important to keep abreast of the latest technological developments in serving global markets.

The difference between the ISI regime and the linkage approach is that while ISI cushioned and protected domestic enterprises from foreign competitors, the linkage approach emphasizes the development of dynamic national firms which can link up with MNCs as suppliers, partners, etc. on equal footing.

Economic development is a process which involves both globalization and localization. The relationship between these two aspects has changed over time. In the 19th century and much of the 20th century the localization aspect dominated the development process. After World War II the success of NICs heralded a new wave of development processes in which globalization began to dominate localization. In LP localization has acquired a new lease of life: clustering and networking (see above).

A TNC can source its supplies from its country of origin (home), an affiliate in any country (including host), or from a host country company.

A developing host economy faces an enormous task in encouraging a TNC to choose the latter option. The problem is whether or not the technical capability of the domestic companies matches the requirements of TNCs. These technical

capabilities either exist or need to develop with assistance from the host government or TNC.

If such capabilities exist then the government must identify them and encourage domestic companies with those capabilities in order for them to link up with TNCs. At the same time TNCs need to be informed about these capabilities and encouraged by incentives in choosing domestic companies over foreign affiliates.

In the case of companies that have a potential to link up with TNCs the government should assist them and encourage TNCs to link up with domestic enterprises (e.g. by offering training to domestic companies and tax breaks to the TNC). The linkage promotion approach need not be limited to existing and potential suppliers companies (as is the case in most of the linkage promotion programmes in some of the countries mentioned above). There are other ways in which domestic companies can link up with TNCs.

The South Korean car industry shows that if there are dynamic domestic companies with actual potential capabilities in order to develop into TNCs themselves, they can enter partnerships with foreign TNCs (e.g. the Hyundai joint venture with Japanese Mitsubishi). They may also enter into strategic alliances with foreign TNCs.

The emergence of software and other IT service companies in India, which has attracted equity participation by Compaq and Microsoft in Indian IT-based companies, shows that linkages can be established at a horizontal level as well as vertically.

The Linkage Promotion approach in development planning involves developing strategies by government for

- I. Enhancing the existing capabilities of domestic enterprises in terms of their ability to become suppliers of TNCs, or partners with a TNC (joint ventures, strategic alliance).
- II. Selecting those domestic enterprises that have the above capabilities (actual or potential) and encouraging them in linking with TNCs.
- III. Offering incentives to TNCs (tax breaks, etc) to link up with domestic enterprises.

Points I-III above involve static capabilities. There is also a great deal to be done in the area of dynamic capabilities. This involves enhancing educational standards and upgrading of present skills

One important area, neglected by the existing literature on linkages, is the possibility of domestic enterprises in host countries becoming partners of TNCs either in joint ventures or strategic alliances.

- IV. Investment by TNCs in supplier domestic companies. This point is not made in UNCTAD (2001) but is a very important issue. In customer-supplier relationships in industrial markets it is very common to find a customer who would invest in a supplier firm either to enhance quality of parts or solve problems.

Conclusions

There are a number of strategies that a host country can adopt (see Gwynne, chap.10; Malecki, chaps.2, 7 & 8; Howells & Wood, chap. 9; Shamsavari & Taha 2003) to establish and strengthen linkages between TNC and domestic companies:

- 1) Improving the skills and educational standards of the work force and ensuring that TNC's are committed to the education of the domestic labour force. As education and technical training is essential to the diffusion of transferred technology in the economy a systematic educational programme with co-operation among the host government, host companies and the TNCs is essential
- 2) Ensuring that TNCs are committed to export competitiveness and thus export growth. As one of the most beneficial effects of FDI in host countries is its contribution to export growth in the latter, export competitiveness remains crucial for this strategy (UNCTAD 2002).
- 3) Surveying the technological capabilities of the country and establishing a strategy to enhance existing capabilities. Without such a policy initiative there will be a lot of duplication of effort and investment and foreign exchange loss by the LDC. This may be part of a programme of supplier selection for TNCs in the host economy. Alternatively, it may identify domestic companies which may qualify as partners, joint venture or strategic alliance candidates for TNCs
- 4) Insisting on domestic content requirement only to the extent that domestic supplier industries meet international standards in quality and price (see point 7 below).

- 5) Encouraging domestic research and development that is most relevant to the specific conditions of the country and developing links between research establishments, universities and domestic and foreign companies.
- 6) Ensuring that TNC's are transferring appropriate technologies. Appropriateness here refers to both factor endowments in the host LDC and the cost for the host country in foreign exchange.
- 7) Encouraging TNCs to invest in supplier industries. UNCTAD (2001) shows how important the linkage between TNCs and domestic host country firms is for economic development in LDCs. As indicated in Taha (2001) investment by multinationals in domestic suppliers is vital for establishing such linkages. Why is this important? One of the reasons that a TNC may outsource parts and components for assembly operations outside the host country may be the low quality of these parts produced domestically. By investing in a supplier company the TNC will be able to help the supplier company to achieve a better quality at a lower price. The gain for the host country can be immense as the process will involve enhanced technological capability. As mutual investments by customer and supplying companies are quite common in many industries, there is no reason why this cannot be practised in developing countries. Taha (ibid) identifies feeder/supplier industries in Egypt as one of the main arenas for technological transfer in the Motor Vehicle Industry. Encouraging collaborative, long term relationships between TNCs and domestic firms, leading to strategic alliances is key to both technology transfer and development of the host developing country.

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