GLOBAL PRODUCTION NETWORKS and KNOWLEDGE TRANSFER MECHANISIMS

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ABSTRACT

This paper aims to examine existing knowledge transfer mechanisims in global production networks within the changing pattern of international trade and industrial upgrading process in several sectors from 1990s to present. East Asian countries constitute the essential interest field of the study. This paper discusses the role of Multinational Companies, advantages of attendance to GPNs, especially in terms of knowledge diffusion and its contributions to local capability creation and how can developing countries get far within these paradigms.Altough developments in the field of information and communication technologies has made access and transfer of information and data(mostly codified knowledge) fundamentally easier since 1990s, it remains limited for some knowledge types which involves a certain degree of tacitness.In this paper,different tacit knowledge types will also be discussed and GPN will be taken as an effective knowledge sharing platform where knowledge management practices of MNCs play a key role on knowledge diffusion.

Key Words: *GPN, MNC, knowledge diffusion, tacit knowledge*

JEL Classification: O30

1. Introduction

After realizing that, industrialization through import substitution policies does not serve the purpose of economic development as it has promised, almost all countries in the world started to quit ISI strategies of theirs and move to an export oriented industrialization strategy. A successfull version of this development

strategy has followed by East and South East Asian countries. Export Oriented industrialization strategy compromises economic growth more useful strategy that takes into account contemporary market challenges, technological change and industrial organization. World War II was a cornerstone of the detachment of import substitution strategies and there has been several fierce debates in the economics literature since then. On the other hand, some of the studies in the economic development literature paved the way for studies that are focusing on the effect of technological change on the development performance of countries.Such that, endogenous growth theory asserted that, there was a portion of economic growth that does not correlate with the growth of traditional production inputs (labor and capital). Similarly, Moses Abramovitz also mentioned “social capability” in company with technology gap, in his 1986 study, as one of the main determinants of catching up of countries.

On the other hand, many authors argue that one of the main reasons why globalization does not lead to convergence has to do with the “tacit” or “sticky” character of much knowledge, knowledge that either has not or cannot be represented by a set of codes (Ernst, Fagerberg, Hildrum, 2001).

Similarly, Stiglitz 1999 also shares the view that knowledge diffusion is important for development of nations and tacit knowledge is the essential type of knowledge that will shape our environment. He asserts that “much of the knowledge that is required for successful development is not patentable; it is not the knowledge that underlies new products or new processes. Rather, it is equally fundamental knowledge: how to organize firms, how to organize societies, how to live healthier lives in ways that support the environment. It involves knowledge that affects fertility and knowledge about the design of economic policies that promote economic growth”.

This paper aims to examine existing knowledge transfer mechanisims in global production networks within the changing pattern of international trade and industrial upgrading process in several sectors from 1990s to present. East Asian countries constitute the essential interest field of the study. This paper discusses the role of Multinational Companies, advantages of attendance to GPNs, especially in terms of knowledge diffusion and its contributions to local capability creation and how can developing countries get far within these paradigms. Altough developments in the field of information and communication technologies has made access and transfer of information and data fundamentally easier since 1990s, it remains limited for some knowledge types which involves a certain degree of tacitness. In this paper, different tacit knowledge types will also

be discussed and GPN will be taken as an effective knowledge sharing platform where knowledge management practices of MNCs play a key role on knowledge diffusion.

This paper consists of four main parts. In the first part, ideas behind the linkages of GPN and knowledge diffusion aspects were given. A special focus was on tacit knowledge and its importance on development of nations. Part 2 constitutes the core of the current study and provides a theoretical framework of global production networks. In this section, the lines of GPN were intended to be drawn by showing the major participants and their interactions with each other. On the other hand, role of MNCs in the GPN and if there is any, distinguished points of these two concepts, existing knowledge transfer mechanisms within GPN and types of trasferred knowledge will also be examined. Part 3 is divided into two sub titles. In the first sub title (3.1) we will try to distinguish three concepts which are data, information and knowledge by referring Davenport and Prusak's 1998 work. In 3.2, our focus will switch to prominent types of tacit knowledge that have detected in GPN and therotical structure of knowledge generation. In this sub title we will also discuss some knowledge management practices within GPN. Finally in Part 4, some overall conclusions and comments will be raised towards the issue.

2. Theoretical Framework of Global Production Networks

Andersen & Christensen, 2005 states that "a global production network is one whose interconnected nodes and links extend spatially across national boundaries and, in so doing, integrates parts of disparate national and subnational territories."Roughly saying, Global Production Networks are major organizational innovations in global operations (Borrus et. al., 2000). It is *an international system set up* to optimize production, marketing and innovation locating products, processses or functions in different countries to benefit from cost, technological, marketing, logistic and other differences (Lall2004).

According to Ernst &Kim 2002, there are three main drivers that have played an important role in the culmination of GPN and make them a necessary pattern to follow in order to cope with the progress of globalization process. These are institutional change through liberalization, deregulation of international trade, diffusion of ICT and increasing global competition have seen to be the drivers of GPN.

Liberalization is key driver regarding the considerable reduction in the cost and risk of international operations and contains trade liberalization, liberalization of capital, FDI and privatization.

ICT on the other hand, has increased mobility, enabled carrying out operations ascross national boundaries,created new markets and needs,enlarged the geography of production and altered the dynamics of competition. Different types of economic units are able to integrate with GPN via ICT. Most of the GPNs are under the leading of a Multinational company.Note that, in order to MNCs to survive, a proper information flow system is vital. DIS plays an important role in the growth and coordination of such networks and is likely to do so to an even greater extent in the future (Ernst, Fagerberg, Hildrum, 2001)

In addition to these, Gupta and Govindarajan (2000) states that, country of origin has a major impact on the propensities of MNCs visa- vis the choice of global strategies.

Fist of all, GPN has a hierarchical structure.It consists of various hierarchical layers from flagships to smaller, local specialized suppliers. It operates in the value chain across firms and national boundaries with a parallel process of integration of hierarchical layers of network participants.

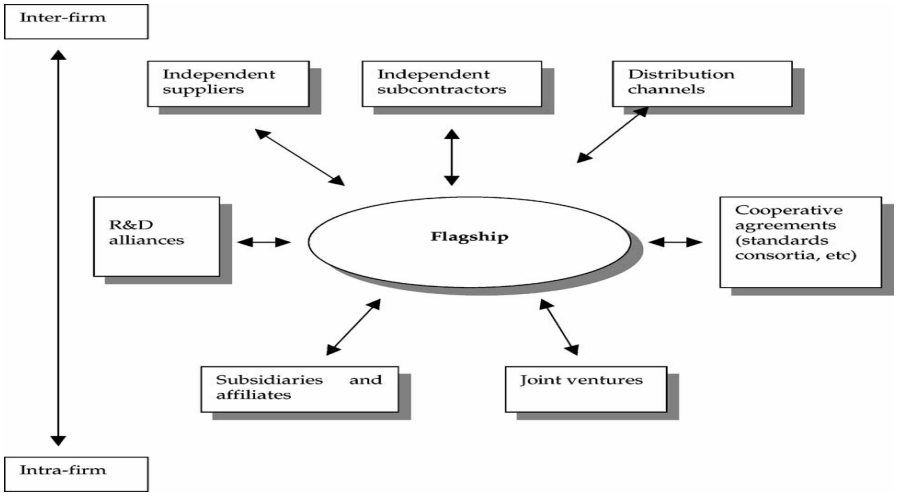

Figure 1: The nodes of a global production network*D. Ernst, L. Kim / Research Policy 31 (2002) 1417–1429*

Second of all, at the heart of the GPN there are MNCs (Ernst&Kim, 2002).MNC is a leader firm.Leader firm is a firm that has the power to coordinate and control operations in more than one country, even if it does not own them (Dicken, 2007,

p. 16). MNCs are big corporations which are generally originated from developed countries such as USA, UK, EU or Japan.In the study of (Ernst&Kim 2002), MNCs are called “flagships” in order to show their leadership in the GPN. They derive their strength from their control over critical resources and capabilities and their ability to coordinate knowledge exchange between the different GPN nodes.

Third of all, GPN combines geographic dispersion with spatial concentration as Ernst&Kim 2002 suggests;”much of the recent cross-border extention of manufacturing and services has been concentrated on a growing but still limited number of specialized lower-cost clusters”

Global Production Networks contain MNCs at the center. The type of MNCs in a GPN could be in the Branded Leader or Contract Manufacturer form. BLs are genereally from Triad countries(USA, UK, Japan) companies like GE, IBM, Compacq while CM represents companies that establish their own GPN in an integrated global supply chain services and carries out outsourcing Activities based on the contract manufacturing, like Solectron and Flextronics. In the literature there is an emphasis on CM type of MNCs after the 1990s.GPN also contain subsidiaries and affiliates, joint ventures, companies which have cooperative aggreements with MNCs, R&D alliances, independent suppliers, independent subcontractors and distribution channels.

How can one distinguishes organizational structues of MNC and GPN? At this point we would like to note that the transition from MNCs to GPN is highly arguable and the interactions they refer have similarities. The extent of GPN contains both intra firm relations and inter firm relations. While independent suppliers, independent subcontractors and distribution channels constitute the inter-firm side of the GPN, the rest of the nodes of GPN represents the intra firm interactions such as flagship’s own subsidiaries, affilliates and joint ventures with its subcontractors, suppliers, service providers as well as partners in strategic alliances (Ernst&Kim,2002). The point where GPN and MNC distingues is the inter firm relations of GPN which includes independent suppliers, independent subcontractors and distribution channels (in most cases retailing).

GPN is considered as a baseline where knowledge tranfer is occured within the different economic units(Ernst&Kim,2002).Flagships need to transfer technical and managerial knowledge to the local suppliers (Ernst&Kim,2002). This function of GPN is presented as the most vital advantage of it for local suppliers in developing countries which are pressumed to be lack of necessary knowledge and skills. This function of global production networks promises local capability formation by local suppliers in developing countries. On the other hand, Gereffi

1999 states that" participation in a global commodity chain is a necessary step for industrial upgrading because it puts firms and economies on potentially dynamic learning curves."

Gupta and Govindarajan (2000) states that "because MNCs are complex multi-dimensional entities, knowledge flows within such enterprises occur not only along multiple directions but also across multiple dimensions". Ernst and Kim (2002) shows that there are several knowledge transfer mechanisms in GPN. There were four formal and informal ways of knowledge transfer introduced in Ernst&Kim2002, which includes combinations of market mediated or non market mediated mechanisims with active efforts of MNCs or passive processes within GPN.

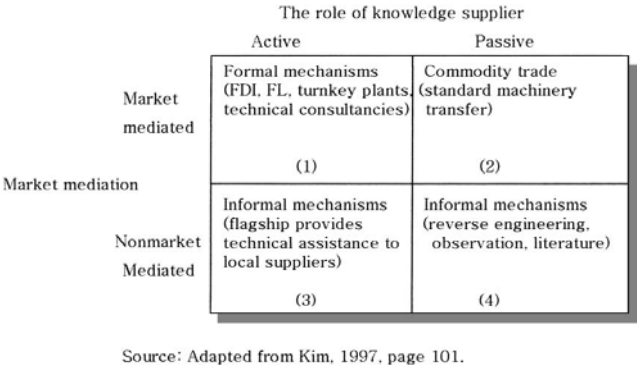

Figure 2: Knowledge transfer mechanisms. ***D. Ernst, L. Kim / Research Policy 31 (2002) 1417–1429***

However, key actor in the knowledge tranfer is MNCs, through disciplining by therating local suppliers to drop them from the network. In the meantime, whatever the realized mechanisim is, there is a natural obligation for local suppliers to show active efforts regarding the hyrerchical structure of GPN in order to exploit benefits of existing in the GPN. On the other hand, MNCs are partly obliged as well to transfer the knowledge they have with local suppliers to enable them to organize their production and management in accordance with the demanded criterias. When local supplier recieves the knowledge and increases its capability, MNCs will be inclined to transfer more complicated engineering and process development knowledge.

Needless to say that, this knowledge transfer from MNCs to local suppliers in DCs or another economic unit of GPN requires knowledge accumulation and intense efforts to create absorbtive capacity of the recipient. Ernst&Kim 2002 suggests; an existing knowledge base and intense effort or commitment are

prerequisites for effective knowledge conversion within GPN.These two factors which is called "absorbtive capacity" by Cohen and Lavinthal (1990) in Ernst and Kim (2002), are decisive for the success of knowledge spillovers within GPN.Also Humprey 2004 implies that "a certain minimum level of capability is required before access to global markets can be achieved "regarding his quatation from UNIDO,2002:105.

3. Types of Tacit Knowledge Detected in GPNs

3.1.Data, Information and Knowledge

Davenpart and Prusak (1998) draw a framework of knowledge creation. They state that there are four requirements to be fulfilled for an information to become knowledge. In other words, after applying the four Cs below, information transforms into knowledge. These are;

1.Comparison: compare the information with other situations we have known

2.Consequences: what are the implications of information on our decision

3.Connections: how does this bit of knowledge relate to others?

4.Conversations: what do other people think about this information?

One can clearly see that knowledge is a mixture of several elements and humans are the essential part of the knowledge creation. It exists and flows within people. It also flows within companies and institutions like a financial asset. In fact, in contemporary business world, knowledge is considered to be the most important asset of a company. The best performing companies are also performing very well on the knowledge management by utilising several advanced knowledge technologies and KM experts and policies within their organization.

According to the categorization study of Haron 2005 which has reviewed of total thirteen writings, there are two main issues about tacit knowledge. It "*can be individually or collectively owned*" and "*can become explicit*".In addition to that, there have three common characteristics elaborated in the study. These are: "tacit knowledge is *experientially acquired*","*difficult to articulate* "and "*plays an important role in the attainment of goal of an individual*."It is also the most valuable asset in an organization if elicited effectively.Tacit knowledge is valuable and a source of competitive advantage for organizations. Although it resides in individual, organizations must identify and capture the tacit knowledge (Davenport &Prusak, 1998).

3.2. Types of Tacit Knowledge and Knowledge Generation

Ernst and Kim (2002), identifies four types of tacit knowledge in addition to the tacit and explicit knowledge types by Polanyi (1962).

1. Embodied knowledge refers the type of tacit knowledge that may become part of the human body as skills.

2. Embrained knowledge refers the type of tacit knowledge that may become part of human being as coginitive capacity.

3. Embeded knowledge refers the type of tacit knowledge that is routinized in organizational practice.

4. Encultured knowledge refers the type of tacit knowledge that is inculcated in the organization as basic assumptions as beliefs and norms.

In the learning process of local suppliers via their interactions with MNCs and defining the concept of "absorptive capacity", four types of knowledge transfer mechanism are decisive regarding the nature of the knowledge.

Nonaka and Takuechi's model of knowledge creation (SECI model) suggested that tacit knowledge can be communicated (Haron,2005).

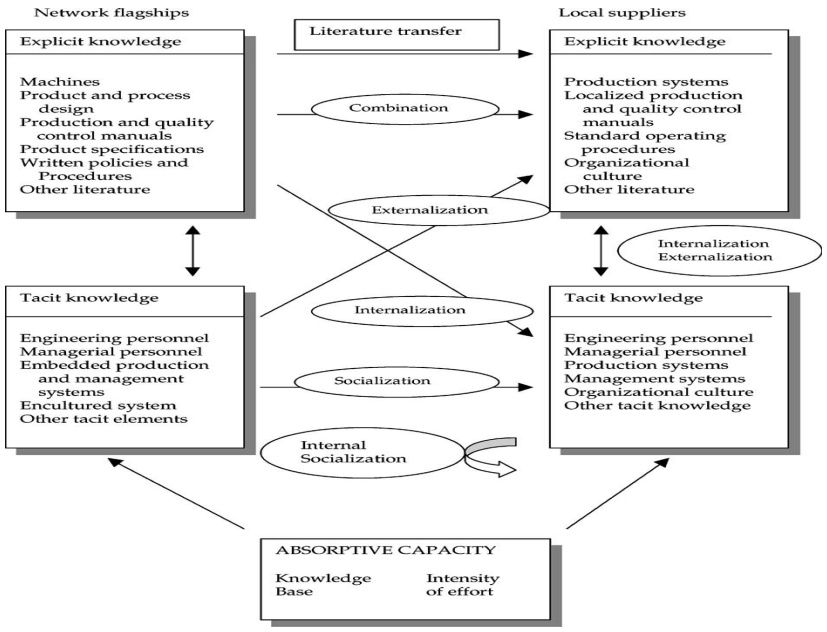

Figure 3: The process of local capability formation. *D. Ernst, L. Kim / Research Policy 31 (2002) 1417–1429*

First of all we might have a look at Nonanaka's knowledge generation model. Simply, tacit to tacit coversion(socialization)takes place when tacit knowledge of one individual is shared with others through training, explicit to explicit (combination) takes place when discrete pieces of explicit knowledge into a new one. Tacit to explicit (externalization) takes place when an individual articulates the foundations of their tacit knowledge. Finally, explicit to tacit conversion (internalization)occurs when new explicit knowledge is shared throughout the firm to use it broaden, extend and reframe their existing tacit knowledge. Needless to say that, internalization is the desired level for a local supplier firm and shows that it has a strong absorptive capacity.

MNCs are the key figures and have superiority in the knowledge diffusion within GPN beacuse they hold the necessary amount of knowledge and experience about the production processes. Since, learning is not an automatic process, there are several active implications requested which requries concious, continious and organized efforts of primarily local supplier's and MNCs. For example, a set of explicit knowledge transfer could be realized by production and quality control manuals between MNCs and local suppliers. Similarly, engineering personel visits to local suppliers could provide externalization via transfering embrained and encultured type of tacit knowledge. To conclude, internalization and externalization could take place more easily between local suppliers regarding the locational advantages and the existence of the similar level of knowledge going through similar technical or non-technical handicaps. Ernst and Kim (2002) states that we can find such examples in Korean SME organizations. In Korea, the Small Industry Promotion Corporation and industry related SME associations frequently organizes observation tour of foreign firms as a way to acquire new knowledge.

One important reason why some knowledge is found difficult to share between people and organizations is because it has not been codified (or only codified to a limited extent such skills can only by learnt by taking part in the activity in which the skill is exercised (Ernst, Fagerberg, Hildrum, 2001).As shown in the figure 3 above, it can be effective especially in the externalization and internalization phases.

4. Conclusion

There is a transition from MNC to GPN in the industrial organization in response to the globalization. Coe,Dicken and Hess 2008 cites that GPNs are made up of actors from a wide variety of national (and local) environments.In the case of a dominant firm within a GPN, the country of origin remains an important influence on how it operates (Dicken, 2000, 2003c; Mikler, 2007)

GPN is considered as a baseline where knowledge tranfer is occured within the different economic units(Ernst&Kim,2002).GPN creates new opportunities for capability creation and increasing knowledge diffusion. However, this process is not automatic, local supplier's effective efforts are necessary to maximize the benefits of existing in network. Several adequate policies and supportive institutions have a key role. Attending to GPN does not replace local development efforts.

Altough there are preconditions and entry barriers, to take part in GPN, being responsible for a level of fragmentation, or being a member of Commodity Chain all premise economic achievement for the developing countries. Accordig to another aspect, GPN effectively as well as provide an opportunity for developing countries to learn and gain various advanced knowledge of management and technology (Xiaobo Wu Guannan Xu Zhenzhen Pei).

The new source of wealth seems to be knowledge both for a firm and country level. It is the intangible, intellectual assets that must be managed.On the other hand, altough there has been a spectacular change in the information and communication technologies and its efect on knowledge diffusion and learning is very important, transferring knowledge between different regions of the world still necesitates several other criterias. First set of criterias can be contextualized roughly as absorptive capacity which is also related with several historical, geographical specifications. On the other hand, knowledge transfer stil has its complexities. Especially tacit knowledge extraction or codifying the tacit knowledge is a field where the most advanced contemporary in-progress Technologies may remain insufficient. Remebering that technology is not the only tool for knowledge diffusion. Technology, people and process constitutes the tricets. That's why within the practice of GPN "people" could become the most effective tool depending on the knowledge type to be shared and current knowledge generation phase of Nonaka's SECI model.

In conclusion, GPN is not only an important pattern in international trade which has observed since 1990s, it is also an important baseline for knowledge diffusion and promises local capability formation to its developing country participants. However, GPN has to deal with several constraints regarding the tacit nature of knowledge in order to provide knowledge diffusion as it has pomised. That's why the role of ICT needs to be re-examined in the context of GPN. Also, if there is any, further research on local capability gains of DC participants of GPNs, should be conducted.

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