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Changes in the Innovation Activity of Transnational Corporations

Implications for Poland

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Abstract

In the present R&D activity of transnational corporations (TNCs) there have emerged new phenomena such as: increasing internationalization, decentralization, diversity of forms, new actors and their relationships, as well as spreading geographical expansion. Various actors (subjects) participate in the innovation activity of TNCs, both own corporate units (R&D centers, foreign affiliates) as well as independent actors from abroad (other firms, institutuions, research centers). It leads to the increasing external orientation of TNCs' innovation activity.

The key change in the organization of TNCs' innovation activity consists in expanding double networks which include corporate affiliates and independent foreign actors. The affiliates increase supply of their own innovations as well as seek and absorb inflow of innovations from other actors in host countries. On one hand, transfer and diffusion of technology from foreign affialiates to domestic firms generates beneficial effects to host economies. However on the other hand, more and more frequently local innovations are taken over by foreign affiliates instead of domestic firms and are internalized in corporate systems.

Implications of the evolving TNCs' innovation activity should be analyzed against the background of weak innovativeness of Polish economy and enterprises. At present diffusion of technology and innovations from foreign affiliates to local firms is very limited due to the weakness. Also because of this reason Polish firms cannot be good partners for technological cooperation with TNCs as well. However recently there has been recorded considerable surge in the innovation activity of Polish firms and large increase of finance for innovations, both from domestic and the EU sources. It can become an opportunity for foreign affiliates to tap to the local pool of innovation and resources, thus undercutting competitiveness of Polish firms and the economy in the future.

Introduction

Under the pressure of globalization forces innovativeness has been coming into prominence as one of key determinants underlying international competitiveness of enterprises. It also concerns transnational corporations (TNCs) which make the leading group of globally competing enterprises. Although most of TNCs conduct their businesses for many years in so-called traditional sectors, nevertheless the present technological revolution offers them many new achievements and opportunities. Like all enterprises, transnationals have been taking advantage of break-through information and communication technologies (ICTs), and other new technologies (advanced materials, biotechnologies, etc) which are applied to create new or modernized products, production processes and business infrastructure. Firms also introduce innovative methods of management and organization, and adjust foreign expansion. At the same time TNCs do change their innovation activity to make it more effective and significant for creating sustainable competitive advantages.

Changes in the innovation activity are of crucial importance not only for TNCs themselves but also for many other firms which compete or cooperate with them all around the world. Subsequently it also implies some impacts for many countries hosting TNCs' research centers and foreign subsidiaries which tap to their resources, expand international production and set up linkages with local firms.

To portray problems which emerge on the international arena the following structure of paper is accepted. First there will be presented a set of features and trends in the evolving TNCs' innovation activity which lead to increasing external orientation of the corporate innovativeness. The second section will be devoted to identifying changes in the organization of TNCs' innovation activity which result in the expansion of corporate R+D and innovation networks, and new roles of foreign subsidiaries. In the third section there will be discussed general implications of the TNCs' innovation activity for Polish firms and the economy, at the present stage of their R+D and technological capabilities. And finally an attempt is made to answer a question, whether the present changes in TNCs' innovativeness are favorable for Poland as the emerging market economy and the new EU member.

1. Characteristics and changes in the TNCs' innovation activity

The basic fact about the world innovation activity is that for many years a predominant position has been taken by TNCs.[1] Actually it is a group of firms originating (with only a few

[1] J. H. Dunning, *Multinational Enterprises and the Global Economy*, Addison-Wesley Publishers, Wokingham 1993, p. 288-301.

exceptions) in the developed Triad countries[2], so their innovation activity is concentrated there as well. The TNCs' innovativeness is strongly linked to their international business – its motives, conditions, forms, effects – and therefore it results in some specific features which distinguish it from the innovation activity of other enterprises.

The following specific features of the TNCs' innovation activity should be taken into consideration. Firstly, innovation process is conducted on a large scale. It means large R+D expenditures, many R+D centers and thousands of researchers, several dozens of subsidiaries implementing and upgrading innovations. Secondly, innovation activity is of a collective character what means involvement of many corporate units and researchers in particular projects, which are quite often supported by independent entities. Thirdly, complexity of corporate innovativeness consists in growing number of crucial, interdependent and specialized actions or inputs into the innovation process which are brought in by its participants. Fourthly, geographical dispersion of the TNCs' innovation activity is due to a relocation of corporate R+D centers as well as outsourcing and offshoring some research tasks to other countries. Fifthly, the need of integrating and coordinating innovative actions and tasks of many diverse units and entities by TNCs' regional or global headquarters. Sixthly, the possibility of multiple use and improvement of innovations by numerous subsidiaries in the home and many host countries, thus spreading the innovation process across borders of countries. Seventhly, diversified ownership structure of the innovation networks as far as they include both capital-dependent units (corporate centers, subsidiaries, joint ventures) and independent entities – mostly other firms - as partners, subcontractors, etc. Eighthly, implementing a "bundle" of radical innovations – based on ICTs and other new technologies - implies a deep "creative destruction" in all domains of firms' activity which is a very difficult and hard process in very large organizations like most of TNCs.

Research activity of TNCs has become a crucial problem to many firms and the world economy.[3] TNCs strain to obtain more and more important (radical) R+D results, to make the research activity more efficient and competitive while less costly and risky at the same time.

[2] Differences in characteristics of the innovation activity of TNCs due to their country of origin are acknowledged herewith but they cannot be investigated in this short paper.

[3] The total TNCs' research expenditures could reach as much as 400 billion of US dollars in 2005, what accounted for approximately 80% of all business expenditures and 60% of R+D expenditures by countries (including Government and business expenses) in the world. The R+D outlays of particular TNCs – like the largest car makers – exceed such outlays of several countries, including Poland. Source: A. Zorska, *Korporacje transnarodowe. Przemiany, oddziaływania, wyzwania (Transnational Corporations. Changes, Impacts, Challenges)*, PWE, Warszawa 2007, p. 112-113.

That is why for the last ten years the R+D activity of TNCs has been changing considerably what implies adjustments in corporate organizations, strategies and foreign expansion.

Increasing **internationalization of the TNCs' research activity** is a salient feature and a crucial trend in the corporate innovativeness nowadays. It stems from changing conditions both inside TNCs and outside them, in the global environment. The internal conditions include among others: reconfiguration of value-added chains and their organizational structures, focus on activity based on core competencies, ICT implementation improving intra-firm information systems and cross-border communication as well as increased business process outsourcing (also in R+D function) and offshoring to other countries. The external conditions relate to the globalization process which spurs hyper-competition, more liberal trade and investment policies, flows of foreign direct investment (FDI), growth of technologically advanced resources and capabilities etc. In the process of internationalizing R+D activity led by TNCs the following trends have emerged:[4]

- Evolution of motives underlying internationalization of R+D what results from mitigation of market-seeking motives (adaptation of technology to particular needs of sales markets) while intensification of efficiency-seeking motives (reduction of R+D costs) and strategic motives (access to foreign pools of knowledge and high skills).
- Increasing specialization (within the entire R+D function) of TNCs' research centers, where basic and core-competence research is still concentrated close to headquarters in home countries while product development and testing is quite often relocated abroad to well-endowed and/or low-cost countries.
- Growing inflows of foreign direct investment to R+D sectors in countries endowed with technologically advanced resources and capabilities where TNCs set up research centers and transfer some R+D tasks to corporate foreign subsidiaries.
- Increasing significance of the East Asian countries – fist of all China and India - as locations for R+D activity offshored by TNCs from the developed countries.
- Increasing role of international cooperation and technological alliances which bring about benefits to companies because of sharing costs and risks, accelerating R+D process, increasing R+D specialization, learning new methods firm partners etc.
- Activation of TNCs' global search for available R+D results, business information and knowledge, innovations applied by other firms etc., in order to integrate them into own innovation process for making it more efficient.

[4] *World Investment Report 2005. Transnational Corporations and the Internationalization of R&D*, UN-UNCTAD, New York – Geneva 2005, p. 101-104.

The above trends point out not only intensification of the cross-border R+D activity but also its deeper specialization, wider cooperation and reorientation to new destinations outside the developed countries. In fact, the R+D activity becomes more and more interdependent with foreign expansion of TNCs.[5] On one hand, research results and innovations underlay creating international competitive advantages what makes a basic condition for any form of foreign expansion of firms. On the other hand, foreign expansion offers to firms many opportunities of intensifying R+D activity at the result of accessing more information and knowledge as well as watching new technologies and innovations used by other firms abroad. Thus a knowledge pool of TNCs can be increased owing to their engagement in foreign operations what further stimulates foreign expansion of corporations.

The internationalization is linked to another crucial trend which is **decentralization of the TNCs' innovation activity**.[6] It means that the innovation process expands beyond TNCs' headquarters and is at least partly transferred to other units of corporate organization, mainly to foreign centers and subsidiaries.[7] The decentralization has spurred under two kinds of specific motives. Demand-oriented motives induce foreign subsidiaries to adapt technologies - transferred from the headquarter - to the requirements on the market of a host country. In favorable conditions adaptation can pass subsequently to a stage of creating new technologies and implementing own innovations in foreign affiliates. Supply-oriented motives have become important for parent TNCs which act under the pressure of enlarging innovation pool needed for expansion on the global market. Foreign subsidiaries with advanced R+D capabilities and developed local linkages can contribute much to corporate pool of innovations. As far as they are embedded in different national environments (including science and technology, economy, society and culture), it is quite possible to encounter new knowledge, technologies, innovations generated by other firms abroad.

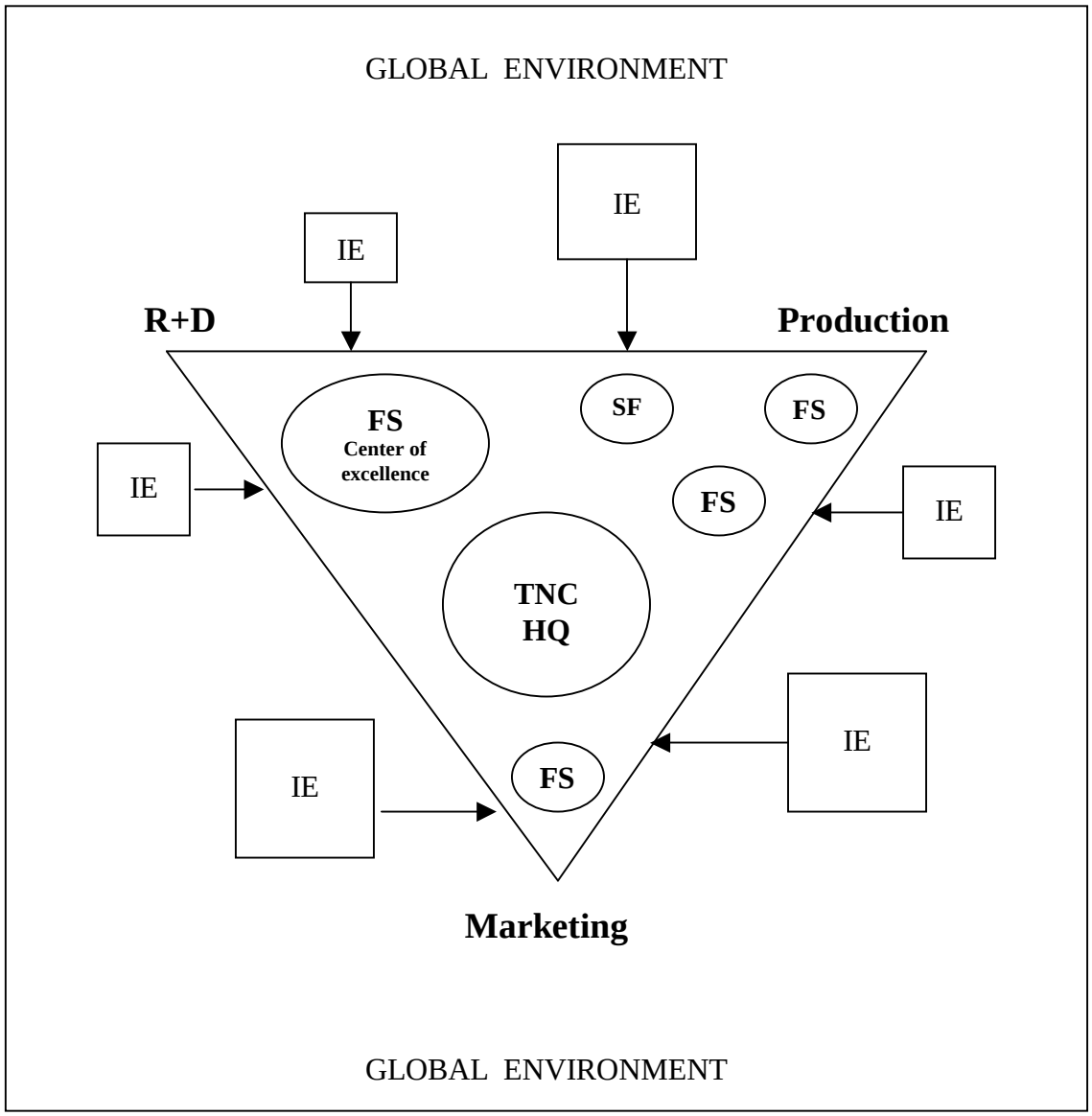
Therefore the innovation activity led by TNCs becomes more and more complex what results from the inclusion of various participants: corporate units (foreign subsidiaries and research centers) and independent entities (firms, centers, researchers) from many countries. All of them form a cross-border, integrated innovation system which is organized and managed by a corporate headquarter. At the same time the participants' "innovation input" is

[5] D. Castellani, A. Zanfei, *Multinational Firms, Innovation and Productivity*, Edward Elgar, Cheltenham – Northampton 2006, p. 24.
[6] J. Birkinshaw, N. Hood, *Unleash Innovation in Your Subsidiaries*, "Harvard Business Review", March 2001, p. 134.
[7] Therefore it can happen that the TNCs' innovation process is both decentralized and internationalized as well.

internalized in the TNC's organization. The participation of various units and entities in the integrated innovation system of TNCs is presented at the Chart 1

Chart 1.

The model of complex integration of TNCs' innovation activity.



Notice:

TNC HQ – a headquarter of a TNC
FS – foreign subsidiaries involved in an innovation activity of a parent TNC;
IE – independent entities (firms, research centers, researchers) involved in an innovation activity of TNC

Source: based on A. Zorska, "*Korporacje transnarodowe. Przemiany, oddziaływania, wyzwania*" („*Transnational Corporations. Changes, Impacts, Challenges*") PWE, Warszawa 2007, p. 262, Chart 4.14.

If assumed that the innovation activity is focused on a development of product (new or modernized one), so it consists of three basic and interdependent value-creating functions: R+D (including design), production and marketing. Roles and tasks of particular units and entities are differentiated and devoted to co-creation and/or implementation of innovations or their parts. Management of the innovation activity concerns many actions such as: innovation development, setting up innovation portfolio (set of new solutions of different potential, advancement, use), configuration of actions and the involved units (their locations), methods of integration and coordination, models of developing new products and introducing subsequent adjustments in inputs, production, distribution etc. As it is difficult to draw all aspects of functioning the TNCs' innovation system on two-dimension Chart 1, it must be added that the complex organization, integration and coordination of the entire TNCs' innovation activity - consisting of many actions, tasks, participants etc - is a dynamic and interactive process which requires a top mastery in management capabilities.

The complex integration of TNCs' innovation activity is based on changing management of corporate innovativeness which has been evolving from a closed model (within own organization) towards an open innovation model (beyond own organization).[8] It means extending the innovation system by inclusion of independent, innovative entities from outside the organization, and quite often from outside home country as well. The opening of TNCs for inflow of external innovation leads to expanding cooperation with other firms – in the same or related sectors – in order to access their pool of knowledge or to develop knowledge (technology, innovations) collectively, in strategic (technological) alliances.[9]

Having discovered a valuable knowledge possessed by other entities, TNCs must find out ways to access it, internalize and recombine within their innovation processes. Therefore seeking, discovering and integrating useful knowledge has become a purposeful three-stage action in some firms. The stages include: sensing (to identify and access knowledge), mobilizing (recombination of scattered pieces of knowledge to work out new, commercial solutions), optimizing operations (selecting optimal scale, capacities, locations etc).[10] As it is believed, such a process of global sourcing and harnessing knowledge, its integration and optimal application lays ground for creating a meta-national competitive advantage of TNCs.

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[8] L. Huston, N. Sakkab, *Connect and Develop. Inside Procter & Gamble's New Model for Innovation*, "Harvard Business Review", March 2006, p. 60. As declared, Procter & Gamble aims to reach soon from external sources as much as 50% of all inventions and innovations applied in its organization.

[9] E. Khan, *Innovate or Perish. Managing the Enduring Technology Company in the Global Market*, J. Wiley & Sons, Hoboken 2007, p. 131-132.

[10] Y. Doz, J. Santos, P. Williamson, *From Global to Metanational. How Companies Win in the Knowledge Economy*, Harvard Business School Press, Boston 2001, p. 6-10, including Fig. 1-1.

The combined effect of the above trends makes a key change which consists in increasing **external orientation in the TNCs' innovation activity**. It should be stressed that in fact it is a double externality because it relates to two aspects of the activity. The first aspect is organizational and means extending the innovation process beyond corporate own organization, towards that of other entities. One can add that at the same time – owing to the decentralization of TNCs' organization – the innovation process has been extended beyond central labs and R+D centers close to corporate headquarters and has moved downward hierarchies, towards foreign subsidiaries. The second aspect is locational and relates to domestic or foreign location of the R+D and entire innovation activity (usually particular parts of it). The internationalization of innovation activity leads to the increasing role of external (foreign) locations what means transferring it to foreign centers/subsidiaries as well as obtaining it from foreign entities (by acquisitions or cooperation). At the result some impacts for host countries do arise. So the external orientation of TNCs' innovation activity has become an important problem not only for corporations themselves but also for their many competitors and partners, and host countries as well.

2. TNCs' innovation networks and the role of foreign subsidiaries

A general trend of the TNCs' organizational evolution consists in gradual moving away from large, multi-layer hierarchies to flatter and more flexible networks. TNCs' networks tend to be more and more differentiated (large differences appear in characteristics of its units – foreign subsidiaries) and at the same time they become more heterogeneous (many independent entities are included in value-creation process). In relation to the TNCs' innovation activity it means that roles of foreign subsidiaries are much differentiated and participation of independent entities expands gradually. In such a mixed innovation structure, corporate headquarter usually plays a leading role which is based on parent's strong position (its resources, capabilities, global brands and market share) in relation to its independent participants (entities) in the network. We shall start with explaining innovation networks - and R+D networks in particular – which are made of independent (external) entities.

The mixed (heterogeneous) R+D networks are created by enterprises which accept sharing costs and risks born on a path to improving their competitive advantages by means of achieving new solutions and applying innovations. Due to participation of various enterprises (with own networks) they are called **external R+D networks**. Participants of the networks are linked with cooperation agreements (alliances) devoted to R+D works. Such activity is

conducted collectively by partners (in a join project or venture) or individually with exchange of research results, or it consists in outsourcing R+D tasks (even offshoring them) to independent suppliers. The main tasks of the mixed R+D networks include reduction of costs and risks, deepening inter-firm "division of labor" and specialization, quick learning, coordination of pre-competitive actions etc.[11] Beside R+D relationships of private enterprises, the research networks can be initiated with Government-sponsored consortia (like SEMATECH in the USA) or by EU-worked-out programs (like JESSI or EUCAR). Another way of developing the networks relates to initiatives of particular firms which engage in many research projects with different partners and create so-called portfolio networks. At the result they are at a disposal of a large set of alliances or R+D projects which provides them with opportunity to choose and develop the most competitive solution (e.g. technology) in the future. As complements to mixed R+D networks there are created multilateral standardization networks which aim at establishing particular technical standard in a given sector. This way a dominant technology is introduced what finally stimulates sales of products by network participants on the market.

Firms in the external research networks participate on different positions and play diversified roles, so they can be classified in three groups[12]:

- Equal member (or partner)
- Bridge-firm (or joiner)
- Orchestrator (or integrator).

Even as an equal member of the network, a firm can enjoy the following benefits of networked R+D: access to information and knowledge, speeding up R+D process, learning technical standards and business practices, setting up contacts with key players in a given sector. However an equal position (which is sometimes a weaker position) can result in too much dependence upon stronger partners, too much "inward orientation" in the network, quicker erosion of own competitive advantages etc. A bridge-firm in the network creates relationships with other firms or group of firms, whereas there are no alliances among them. A bridge position provides opportunity to access information and knowledge in various sources, to act in a more sophisticated and flexible way, to diversify risks etc. However sometimes a bridge-firm is not regarded a trustworthy partner, its relationships and social capital in the network are weaker, and it cannot improve its position in a given sector.

[11] A.-P. De Man, *The Network Economy. Strategy, Structure and Management*, Edward Elgar, Cheltenham-Northampton 2004, p. 9-12, 31-33.
[12] Ibidem, p. 39-46

The strongest position in research networks is taken by an orchestrator.[13] Quite often it is a TNC which is well-known for a global brand and significant market share, a large-scale organization and many alliances as well as much experience in international management. The outstanding position of an orchestrator stems from its competitive resources, integration capabilities, global vision and strategy, first-mover actions in the sector etc. As the network leader, an orchestrator decides upon participation of members and their positions, sets forward cooperation and specialization, stimulates innovativeness and learning. Consequently, not only its position but also benefits are asymmetric.

The external networks are complementary to internal systems of TNCs' subsidiaries and R+D centers. Taking into consideration two kinds of networks – the external and internal ones – we can regard emerging a **double network of the TNCs' innovation activity** as unique and salient feature of this activity. The external and internal networks are interdependent and interactive, and these characteristics are transferred directly to a mode of carrying out corporate innovation activity with participation of diversified units and entities.

Most large TNCs set up a global scope of their double innovation systems what means locating own units and choosing independent entities on three continents at least. However under the expanding regional economic integration and advancing the integration process itself – like in the EU – innovation networks are often shaped regionally at present (although regional subsystems or hubs can make parts of global corporate systems). The double TNCs' innovation networks are embedded in regional innovation systems (if they emerge) and in national innovation systems of host countries as well. In a regional integration grouping TNCs can access advanced resources and capabilities which are critical for their innovation process but at the same time their supply becomes less available for local firms, especially for small and medium seized enterprises.[14] It means that the national supply of resources and capabilities is less available for local enterprises, but on the other hand some innovative local firms can be included into the TNCs double innovation networks (by means of alliances or acquisitions). It can result in weakening of the hosts' national innovation systems in few yaers and finally in mitigating international competitiveness of local firms and the economy.

The **internal network of TNCs' innovation organization** consists of corporate units including headquarters (global and/or regional ones), foreign subsidiaries (involved in R+D,

[13] As one of its roles consists in integrating all network participants, so sometimes it is called an integrator.
[14] S. Christopherson, J. Clark, *Power in Firm Networks. What it Means for Regional Innovation Systems*, "Regional Studies", vol. 41, December 2007, p. 1224, 1233.

production and sales functions) as well as research centers, labs, design divisions or centers. Significance and position of each unit in the TNCs' innovation activity depends on:

- Possessed technologically advanced resources and capabilities
- Achieved initial position in a corporate system
- Functions and tasks charged by a headquarter
- Effectiveness of unit's staff in developing its competitive capabilities
- Cooperation and competition of units within a given organization.

Theses characteristics support a view of TNCs' networks – innovation ones included – as a structure consisting of units differentiated with endowment in resources and capabilities as well as internal and external linkages and relationships.[15] And this differentiation results from headquarter decisions of organizational and investment character as well as growth potential of corporate units, first of all foreign subsidiaries. Their growth is a process of long-term accumulation of resources and capabilities by particular units under given intra-firm conditions and processes as well as external environment in the host country. In case of the innovation activity it means growth of innovativeness of foreign subsidiaries with moving from incremental adaptation of technologies transferred from headquarters towards upgrading numbers, quality and significance of own innovations based on expanding both proprietary knowledge and other knowledge internalized from entities in the local environment.

A successful growth of a foreign subsidiary or research center conveys it to an outstanding position of the leader in a given function which is called a **center of excellence**. It is defined as a corporate unit which is appreciated by a headquarter for achieving the highest capability of creating value added in a given function and is acknowledged to transfer this capabilities to other units for making the best use of them.[16] Achieving status of a center of excellence can be a springboard for unit's further growth as far as it can obtain more means for the capability development. Centers of excellence make true "growth poles" in the TNCs' innovation activity although valuable new solutions can be created in other units as well.

Changing organization of the TNCs' innovation activity is strongly linked to growth of **foreign subsidiaries** as units of internal network and places of creating competitive advantages. The latter issue needs to be cleared. Competitive advantages of TNCs' foreign subsidiaries are developed in three ways: transfer from a headquarter, growth of their own capabilities as well as internalization of knowledge, technology and innovations from external

[15] N. Nohria, S. Ghoshal, *The Differentiated Network. Organizing Multinational Corporations for Value Creation*, Jossey-Bass Publishers, San Francisco 1997, p. 11-15, 19.
[16] T. S. Frost, J. M. Birkinshaw, P. C. Ensign, *Centers of Excellence in Multinational Corporations*, "Strategic Management Journal", vol. 23, 2002, p. 997, 1000.

environment, mostly in host countries. As subsidiary-specific advantages one can point out: managerial capabilities, innovations in products, production and marketing etc., access to unique sources of high-quality inputs, taking advantage of business cluster, good relationships with local entities. If these advantages are transferable and can boost value creation in other corporate units, they can speed up subsidiary's "career" as a center of excellence.

Growth of competitive advantages which are specific to a given unit and can boost competitiveness of the parent company have triggered a true evolution of TNCs' foreign subsidiaries. It means a gradual departure from their traditional role (e.g. in multinational strategies of corporations) based on transferred resources/capabilities and focused on foreign market penetration in effective way. More liberal and decentralized approach of TNCs to their innovativeness has implied recently a more active role of foreign subsidiaries in the entire value-creation activity and their more outward-oriented actions to strengthen their capabilities with knowledge acquired from external sources. Therefore many foreign subsidiaries undergo a process of **"creative transition",** what relates to their role in the TNCs' innovation activity.[17] So there has emerged a non-traditional role of foreign subsidiaries in their parent's innovativeness what means that they are granted more self-dependence and charged with more duties to deliver knowledge, technology, innovations both worked out by themselves and obtained form other entities in host countries. Thus the subsidiaries' activity can generate demand for a local knowledge to be internalized in the corporate innovation system.

The TNCs' innovation systems are partly embedded in particular host countries. Therefore their economies are affected by direct and indirect effects of the corporate activity which emerge on national (local) factor and product markets as well as by local linkages and externalities. Transfer of technology (disembodied as patents or embodied in goods) to a host country is one of the most appreciated effects on its local market of production factors. Moreover, competitive pressure from technologies or products supplied by TNCs' subsidiaries forces local firms to improve their innovativeness for defending their positions on the local market or penetrating new niches on the global market.

However foreign subsidiaries become not only suppliers of technology to host countries but presently they can also absorb new competitive knowledge available on a local market as well. It means buying knowledge or technology on commercial terms, access to it through alliances or acquisition of local innovative firms (pure imitation is not considered

[17] D. Manolopoulos, M. Papanastassiou, R. Pearce, *Technology Sourcing in Multinational Enterprises and the Roles of Subsidiaries: an Empirical Investigation*, "International Business Review", vol. 14, 2005, p. 251-252, 262-263.

here). In case of the emerging market countries, favorable supply effects in TNCs' technology transfer predominate in host economies, although some unfavorable demand effects of subsidiaries' drive to internalize knowledge cannot be excluded in the future. Much depends on development of advanced resources/capabilities and innovativeness in the host countries.

Effects of transferring technologies to a host country are subject to strategies of placing foreign direct investments, what results in setting up foreign subsidiaries and their international production. The largest effects can be expected, if there are set up large, modern facilities (factories) which manufacture products for domestic and foreign markets, and use many local firms as subcontractors. To meet quality and time requirements, foreign subsidiaries provide local firm with technical assistance and learning. It often leads to direct technology transfer and/or knowledge spillovers and externalities, if local firms are capable to absorb and effectively apply diffused knowledge. However, we should consider another case. If local firms do generate a new and competitive knowledge or technology, so they can become vendors, partners or acquisitions to TNCs or their foreign subsidiaries. Then the locals' knowledge flows out of the country and true benefits are enjoyed by a new user.

3. Implications for Poland

The changes in TNCs' innovation activity imply diverse impacts outside their organization both at micro and macroeconomic levels, to large extent outside home countries of corporations. To investigate key impacts on Polish enterprises and the economy, it is necessary to outline brief characteristics of the innovativeness in Poland. The following main characteristics and trends should be mentioned:[18]

- Relatively low level and pace as well as unfavorable trends and structures of the up-to-now innovation activity in Poland, against the background of other countries. Poor development of Poland's innovativeness under the centrally-planned economy has not improved much under the systemic transformation, despite many favorable changes in the Polish economy since 1989.
- Insufficient financing of the R+D expenditures from public and private sources what is accompanied by unfavorable structure of the expenditures, with a heavy predominance of Government-sponsored outlays.

[18] Based on research and publications of many Polish Authors, including E. Okoń-Horodyńska, M. A. Weresa, A. Sosnowska, B. Lubos, M. Marte, M. Kraj, K. Poznańska, K. Zakrzewska, M. Górzyński. M. Piątkowski.

- Insufficient efforts of domestic enterprises to raise their competitiveness by means of conducting R+D and improving innovativeness, against their efforts to compete with low costs/prices of products.
- Poor institutional conditions for conducting R+D and innovation activity, due to lack of full-ranged innovation policy and poor protection of intellectual rights.
- Small engagement of TNCs' foreign subsidiaries in Poland in technologically advanced production while most of it falls into a category of low-tech production.[19]
- Small involvement of TNCs in Poland in conducting own R+D works and introducing their specific innovations while most of them are transferred from abroad.
- Orientation of the existing R+D activity of TNCs towards taking advantage of Polish high-skilled staff employed in corporate centers rather than technological cooperation with Polish firms (due to their poor technological capabilities).
- Under pressures of competition on the domestic and EU markets, in 2007 Polish enterprises increased the R+D expenditures significantly to improve their innovation-based competitive advantages and change strategies of competition.
- Under the program "Innovative Economy" for 2007-2013 a large amount of the EU-financed means of 107 billion euro will be transferred to Poland to upgrade domestic technological capabilities, including ICT business infrastructure.

It is expected that after decades of stagnation, the innovation activity in Poland can be considerably improved in the nearest future, if the main obstacles are levelled off and large finance is available and used in optimal way.

However some doubts arise whether the improving innovativeness brings about much expected benefits to the economy and society in Poland. For inputs needed in innovation processes there will compete not only Polish enterprises but also many foreign-capital companies, i.e. foreign subsidiaries and joint ventures. In 2005 some 16 837 foreign subsidiaries were active (out of almost 60 thousand foreign ones registered) in the Polish economy, where over 1 thousand large TNCs as investors accumulated FDI worth 118,6 billion of US dollars. The share of foreign subsidiaries in total sales proceeds of enterprises amounted to 38,8% in all economy, and to 50,8% in manufacturing industry. They reached even larger share in total investment outlays, as it accounted for 45,0% in all economy and to

[19] According to technology levels (by OECD standards), in 2003 only 7,3% of the international production sold by foreign subsidiaries was classified as high-tech output, while most of it (53,9%) was a low- and medium-technology output. Source: *Inwestycje zagraniczne w Polsce. Raport roczny* (*Foreign Investments in Poland. The Annual Report*), Instytut Koniunktur i Cen Handlu Zagranicznego, Warszawa 2005, p. 110, tab. 3.12.

59,4% in manufacturing industry. As indicated, the innovativeness of foreign companies was higher than that of the domestic ones.[20]

Considering the above research results and the innovativeness performance in Poland, it is possible to draw up the following implications of changing TNCs' innovation activity:

1. Increasing role of innovativeness in sustaining competitive advantages of TNCs leads to a general intensification of international competition based on knowledge, new technologies and innovations. It implies the need of exerting much more efforts by Polish enterprises to raise their technological and competitive capabilities through higher innovativeness. It will make a basic condition for more effective competition and/or cooperation with TNCs on both domestic and foreign markets.
2. Expanding internationalization and decentralization of the TNCs' innovation activity lead to seeking foreign locations to set up R+D centers and subsidiaries engaged in research work. It implies more opportunities for Poland as a host country to attract FDI inflows to some sectors of the economy and to expand their FDI-led growth in the future. However, the quality of the TNCs' investment package much depends on own efforts to raise Poland's international competitiveness and attractiveness, by means of upgrading technological advancement of domestic resources and capabilities.
3. Augmenting external orientation in the TNCs' innovation activity consists in seeking and internalizing more and more knowledge, new technologies, innovations from outside corporate organizations. It implies for the Polish entities potentially more opportunities to exchange knowledge internationally. However, if benefits of the exchange are shared in accordance to bargaining powers, it cannot be sure that Polish entities (and the country) receive a fair share.
4. Changing organization of the TNCs' innovation activity leads to the expansion of R+D and innovation networks with increasing participation of the independent entities. It implies a possible integration of some Polish entities in the innovation networks, most probably in the ones dominated with TNCs as orchestrators. However, it will not be an equal position. The characteristics and effects of the cooperation will depend on quality of technological capabilities of Polish firms and their "knowledge input" to the TNCs' innovation networks. At the same time it will be important for Polish entities to absorb much knowledge from other network participants, if possible.

[20] *Inwestycje zagraniczne w Polsce. Raport roczny* (*Foreign Investments in Poland. The Annual Report*), Instytut Badań Rynku, Konsumpcji i Koniunktur, Warszawa 2007, p. 72, 75, 93, 101, 104.

5. "Creative transition" of the TNCs' foreign subsidiaries means their more active roles in the corporate innovativeness through improving their own specific competitive advantages based on innovations as well as internalizing competitive knowledge of some local entities. It implies that foreign subsidiaries will more and more tap to the Polish resources – mostly high-skilled staff and finance – to increase their innovativeness. At the same time they will try to access and use local capabilities of generating competitive knowledge, if they are increased in Polish enterprises.

Are the implications of changes in the TNCs' innovation activity favorable for Poland? Not entirely, if her characteristics and trends in the innovativeness are considered. At present Poland receives FDI-based transfer of technology which is devoted mostly to industries with low and medium levels of technology. Anyway it is an advantage for the Polish economy. However it will not be an advantage for Poland, if her advancing resources are used mostly by foreign subsidiaries and her capabilities to generate competitive knowledge by local firms are too much accessed by foreign entities.

Thus a new research topic appears which means investigating the experience of other countries how to manage this problem. And a new challenge for Poland emerges to work out an open and effective national innovation system made of diversified participants – i.e. domestic and foreign entities – which can innovate much, reinforce each other, improve competitiveness, generate and distribute benefits fairly.

Bibliography

Birkinshaw J., Hood N., *Unleash Innovation in Your Subsidiaries*, "Harvard Business Review", March 2001

Castellani D., Zanfei A., *Multinational Firms, Innovation and Productivity*, Edward Elgar, Cheltenham – Northampton 2006

Christopherson S., Clark J., *Power in Firm Networks. What it Means for Regional Innovation Systems*, "Regional Studies", vol. 41, 2007

De Man A.-P., *The Network Economy. Strategy, Structure and Management*, Edward Elgar, Cheltenham-Northampton 2004

Doz Y., Santos J., Williamson P., *From Global to Metanational. How Companies Win in the Knowledge Economy*, Harvard Business School Press, Boston 2001

Dunning J. H., *Multinational Enterprises and the Global Economy*, Addison-Wesley Publishers, Wokingham 1993

Frost T. S., Birkinshaw J. M., Ensign P. C., *Centers of Excellence in Multinational Corporations*, "Strategic Management Journal", vol. 23, 2002

Huston L., Sakkab N., *Connect and Develop. Inside Procter & Gamble's New Model for Innovation*, "Harvard Business Review", March 2006

Inwestycje zagraniczne w Polsce. Raport roczny (*Foreign Investments in Poland. The Annual Report*), Instytut Badań Rynku, Konsumpcji i Koniunktur, Warszawa 2007

Inwestycje zagraniczne w Polsce. Raport roczny (*Foreign Investments in Poland. The Annual Report*), Instytut Koniunktur i Cen Handlu Zagranicznego, Warszawa 2005

Khan E., *Innovate or Perish. Managing the Enduring Technology Company in the Global Market*, J. Wiley & Sons, Hoboken 2007

Manolopoulos D., Papanastassiou M., Pearce R., *Technology Sourcing in Multinational Enterprises and the Roles of Subsidiaries: an Empirical Investigation,* "International Business Review", vol. 14, 2005,

Nohria N., Ghoshal S., *The Differentiated Network. Organizing Multinational Corporations for Value Creation*, Jossey-Bass Publishers, San Francisco 1997

World Investment Report 2005. Transnational Corporations and the Internationalization of R&D, UN-UNCTAD, New York – Geneva 2005

Zorska A. *Korporacje transnarodowe. Przemiany, oddziaływania, wyzwania* (*Transnational Corporations. Changes, Impacts, Challenges*), PWE, Warszawa 2007