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Abstract

The article aims at analysis of knowledge-oriented growth of TNCs' foreign subsidiaries, their transformation and evolving participation in knowledge development by parent transnational corporations (TNCs). The author's concept of increasing involvement of foreign subsidiaries in leveraging knowledge in TNCs' organizations is presented with a focus on a new process of "creative transition" by corporate foreign subsidiaries and its implications for the parents and host economies. The research method is based on integration of concepts, elements and instruments used in international management and international business to investigate the evolution of the knowledge development process in TNCs' cross-border organizations.

The analysis of knowledge development and transfer in TNCs, and growth of their foreign subsidiaries as well as key factors of expanding their knowledge-oriented activities reveals the "creative transition" process which is underway in the subsidiaries. It leads to their increased participation in the knowledge development by TNCs and implies some results for parent firms and host economies. It is concluded that the knowledge-oriented activity of foreign subsidiaries can result in possible capturing valuable knowledge co-created by domestic entities what can imply weakening innovativeness and competitiveness of the host economies.

The problem of knowledge-oriented activity of TNCs' foreign subsidiaries and its domestic impacts has not been investigated in Polish publications yet. The article offers a conceptual basis for further theoretical and empirical research with a focus on impacts in a host economy resulting from the knowledge-oriented activity of TNCs' foreign subsidiaries and shows a necessity to work out a fair approach to sharing benefits of knowledge creation and utilization in the host economy.

Key words: foreign subsidiaries, transnational corporations, knowledge
JEL: F 23, L 23, M 16, 0 32.

Introduction

Managing development, transfer and implementation of knowledge in large firms has become a crucial, complex and challenging task nowadays. The complexity stems from approaching knowledge development at the same time in four areas: value creating functions (R&D and others), one of the key processes (implementing innovations) and set of instruments being operated as well as intra-firm institutions involved (units, teams, positions). Specific features of transnational corporations (TNCs) make their knowledge management even more complex, difficult and challenging for reasons of global competition, differentiated corporate networks (hundreds of subsidiaries and branches), geographical dispersion (dozens of countries) and diversity of various foreign locations. To enhance knowledge development and implementation by foreign subsidiaries more and more significance is attributed by TNCs to knowledge-augmenting locational advantages in host countries.

The article aims to portray an increasing significance and contribution of corporate foreign subsidiaries in building up knowledge resources of their parent TNCs. To investigate these problems a wider perspective to cross-border knowledge development in TNCs is adopted which combines some selected issues of strategic management and key aspects of international business. The latter includes foreign direct investment (FDI) inflows to host countries which effects are well researched. As much less attention is drawn to activities of TNCs' subsidiaries, it has become very important to focus investigation on their knowledge-oriented business in host countries. New issues concern a process of "creative transition" underway in many corporate foreign subsidiaries which activate their own research efforts as well as expansion of knowledge-augmenting relations and linkages in host countries.

The author puts forward hypothesis that the present growth of TNCs' knowledge resources depends considerably on changes in the knowledge development and transfer by corporate foreign subsidiaries and their "local embeddedness" in host countries. To support verification of the hypothesis and explain gathering arguments, the author has created a new model illustrating participation of foreign subsidiaries in knowledge development and transfer of parent TNCs including access to knowledge-augmenting locational advantages in host countries by the subsidiaries. The author's method combines both approaches of international management and international business to provide a wider perspective of TNCs as a cross-border, knowledge-oriented organizations which units (foreign subsidiaries) can grow, evolve and develop their specific knowledge owing to the expansion and "embeddedness" in host economies. And the impacts concern both the organizations and the economies.

For an in-depth explanation of the mentioned problems following four sections are structured. Section 1 deals with changing knowledge development and transfers in TNCs, mostly relating to growth of TNCs' foreign subsidiaries. Section 2 investigates external

and internal factors affecting evolution and intensification of knowledge development in corporate subsidiaries. Section 3 explains "creative transition" of foreign subsidiaries in building up their own stocks of knowledge, technology and innovations, thanks to their own R&D efforts and cooperation based on "local embeddedness" in host countries. Some effects of the "transition" process for subsidiaries, parent corporations and host countries are discussed in section 4. Conclusions are focused on changing participation of foreign subsidiaries in the knowledge development by TNCs and possible impacts on knowledge endowment and utilization in host economies.

Knowledge development in TNCs and transfer to foreign subsidiaries

The approach of strategic and international management to knowledge in a firm is primarily rooted in resource-based theories which have been developed since 1980s by prominent researchers, e.g. Wernerfelt [1984], Barney [1991], Grant [1996], Nonaka and Takeuchi [1995]. Firms are endowed in heterogeneous knowledge in both intangible and tangible forms. For that reason knowledge application – altogether with other resources and capabilities – can result in different, firm-specific core competencies, competitive advantages and unique competitive strategies, as theorized by Hammel and Prahalad [1994], Porter [1986], Kogut and Zander [1992]. New questions have emerged with much increased significance of knowledge as a key strategic resource of firms under the growth of knowledge-based economy.

Firms' rivalry on the global market requires not only successful strategies but also a cross-border structure of organization which is based on corporate units located on local markets. As stated by Bartlett and Ghoshal [1989], the units – foreign subsidiaries and branches – need to be integrated and coordinated within cross-border corporate networks. The TNCs' network structures have become differentiated and heterogeneous due to including diversified resources (and linkages) of subsidiaries as well as many independent entities (companies) employed for execution of various tasks on behalf of the leading firm, as stated by Nohria and Ghoshal [1997]. The networks have become very useful for the conduct of TNCs' knowledge-creating activities, especially since information technologies and networks (internet) have been introduced, as emphasized by DeMan [2004]. Knowledge management in large, heterogeneous networks of TNCs have become a key capabilities of firms, underlying their effectiveness and competitiveness on the global scale.

As conceptualized by Chakravarthy et al. [2002, pp. 305–322], managing knowledge in an organization relates to three processes: knowledge accumulation (creation and/or acquisition), protection (legal and organizational) as well as leverage of knowledge (its application and further transformation). Knowledge accumulation and leveraging

can be regarded as a knowledge development, if new competencies and competitive advantages can be created. Such activities are executed in a coordinated and integrated manner, at different levels of organization, by its various units and specialized teams. In a broad sense, they are engaged in working out new knowledge, converting it into particular technologies or other solutions and implementing them as innovations in products, processes, value adding functions, business infrastructure, etc.

Knowledge development in TNCs is initiated with enlargement of the resource what can result from conduct of R&D in own organization, engagement in technological alliances with other entities (firms, research centers), acquisition of new technology on the market (licensing) or unfair imitation of innovations. Due to strategic importance of knowledge, TNCs' headquarters are usually involved in its management unless some tasks are delegated to other units. A new knowledge can be used separately or in combination with pre-existing knowledge and/or the acquired one. Learning of new or combined knowledge and its application in organizations are activated. Many corporate units are included to internalize the transferred knowledge and commence adapting it and exploiting [Zorska, 2007, p. 157]. The involvement in exploration of new knowledge in corporate subsidiaries can be initiated with their own R&D activity or technological cooperation conducted abroad. If so, a new round of knowledge leveraging and learning – from a bottom of organization – gains momentum.

The growth of knowledge-oriented activity led by TNCs is usually portrayed as the result of conducting R&D activity in the whole organization. A long-term increase in R&D spending by the group pf 1000 largest corporations has been recorded and its growth rate exceeded 9% in the recent two years, reaching US dollars 603 billion in 2011[2]. The most research-oriented are three industries: computing and electronics, health and automotive which account for 65% of total R&D spending (and industrial equipment as a fourth one). Although the USA and their corporations remain the leaders by value of R&D spending, the highest growth rates of spending are reached by China and India. Nearly half of the investigated companies confessed a slow growth of effectiveness in idea and knowledge generation, and a need to improve internally-focused mechanisms for converting those ideas to products [Booz&Company, 2012, pp. 6–20]. Such results indicate that much remains to be done in enhancing the whole innovation activity led within TNCs' networks. As far as foreign subsidiaries (including factories and research centers) make the core of corporate networks, it is worth to portray their activity which relates to creation and leveraging knowledge, technologies and innovations.

A foreign subsidiary can be defined as any operational unit which is controlled by equity ownership hold by the investing company and located outside its home country. Referring to value functions or operations, in the group of foreign subsidiaries one can find factories (with research, technology or innovation departments), R&D centers, sales outlets and other units. Each foreign subsidiary makes a specific unit of corporate organization, due to its resources, capabilities, position in network, linkages, relations

and location in a host country. For that reason they make differentiated networks of corporate units. Their activity is usually complemented by "inputs" of independent units, i.e. local companies and centers, and subsidiaries of other TNCs.

Growth of each foreign subsidiary is featured with some individual "paths", due to a form of investment (acquisition or green-field project), endowment in production factors and capabilities, and locational conditions. Much depends on characteristics of a given sector. Foreign subsidiaries in manufacturing industries usually follow four-stages "paths", although particular stages can differ considerably. In modern IT-based services corporate subsidiaries can be placed closer to or just on the final (fourth) stage and conduct activity for a whole global corporate network and/or in niches of the global market.

Alongside each "path" and moving up the "ladder" by subsidiaries, intra-firm knowledge transfers do occur and tend to evolve on particular growth stages. Basically, the sequence of four stages can be usually distinguished in a long-term "life" of TNCs' foreign subsidiaries [Birkinshaw, Hood, 2003, p. 196]:

1. Growth initiated by a parent company when transfer of knowledge and other resources and capabilities is executed
2. Growth induced by internal factors in a subsidiary when development of its specific knowledge is initiated and expanded
3. Growth supported by a knowledge-augmenting locational advantages in host country and subsidiaries' effective "local embeddedness"
4. Growth accelerated by linkages in TNCs' cross-border network and competitive forces in the global environment.

Passing through subsequent growth stages involves changing knowledge flows between a foreign subsidiary and its parent TNC and among various corporate units. A large transfer of knowledge (and other resources) from the parent initiated at the stage 1 can be gradually limited at stages 2 and 3, while subsidiary's own knowledge resource increases (especially at the stage 3). If the knowledge of high value-creating potential is developed by a subsidiary, than at the stage 4 it reaches a position of "center of excellence" and becomes a source of specialized knowledge, technology or innovation transfers to some other corporate units and possibly to independent entities. The position of "excellent" subsidiary in a TNCs' network is raised considerably from local to global corporate innovator. It should be stressed that passing stages is accompanied by raising activity of foreign subsidiaries as participants of corporate cross-border networks, executing various functions and attempting to boost innovativeness and competitiveness of the organization.

Innovation networks of TNCs make cross-border structures which enable integration and coordination of R&D tasks and further knowledge development by corporate units and other entities (as the nodes of networks). Their activity is orchestrated by some leading TNC called integrators[3]. The knowledge-development activity is specialized and

distributed in many units/entities due to their competencies and locational advantages in given host countries. Diversified participants, their linkages and interactions in the innovation activity add systemic character and special qualities of the structure and coin its new term, i.e. innovation systems of TNCs. The systems undergo some evolution towards open innovation what means e.g. more cooperation in innovation activity, accepting external knowledge, participation of various entities and inter-organizational knowledge transfers, emergence of knowledge brokers [Chesbrough, 2006, pp. 8–11].

Nowadays the corporate innovation systems are well developed, diversified and integrated, so four models of them have been worked out [Kao, 2009, pp. 110–112]. They range from linkages of own corporate R&D units in a given host country, to more diversified linkages and cooperation with local entities engaged in research work, further to much diversified linkages and relations with entities of all origins in a given country and finally to building up a large-scale innovation ecosystem. The ecosystem model is featured with penetrating well-advanced national or regional innovation systems in those host countries which lead in growth of the knowledge-based economy.

It should be stressed that globally dispersed and integrated corporate innovation systems are managed under increasing influence of multiple factors of diversified origins: within TNCs and beyond them – in the global environment. Systemic linkages in the corporate innovation networks enable transmission of the factors to knowledge-oriented activities of TNCs' subsidiaries in various countries.

Factors affecting knowledge development in TNCs' foreign subsidiaries

Nowadays TNCs' subsidiaries – like all other companies – face pressures to upgrade their resources, capabilities, innovativeness, various linkages and relations at much higher rates than 15–20 years ago. Concerning resources, it is indicated that knowledge development in TNCs' foreign subsidiaries and their increasing participation in knowledge transfer within corporate networks are affected by the following groups of factors:

1. External factors rooted in the global and/or regional environments
2. Internal factors stemming from the corporate system
3. Endogenous factors acting in a given subsidiary
4. "Local embeddedness" of TNCs' subsidiaries in networks operating in host countries.

Although some interactions of the factors and their changing impacts on subsidiaries do happen, at the moment only basic aspects of influence will be discussed. Understanding of the factors enables comprehension of forces and changes in the activity of the subsidiaries both by their managers as well as local entities and Governments in host countries.

External factors emerge from a large complex of the contemporary economic, technological and institutional changes which can be gathered and synthesized as key processes: globalization and growth of the information- and knowledge-based economy. External factors generate forces changing conditions and courses of economic activity at all levels: micro, mezo and macro. In case of firms, emphasis is put on a complexity of knowledge-leveraging and value-creating processes, and a necessity to rely on constantly evolving innovation and business networks, partly focused on key entities outside TNCs' systems [Ryall, 2013, pp. 81–87]. Within this line of considerations there are put down some key pressures on the activity of TNCs' subsidiaries which include:

- Support of parent firms' competitiveness on the global market with knowledge-based, specific advantages developed by their foreign subsidiaries
- Access to the best locational advantages in host countries and first of all to new R&D results and knowledge, talented staff, supportive infrastructure and institutions
- Cooperation with local partners and participation in external innovation networks
- Taking advantage of some economic arbitrage on the global scale (e.g. differences in wages, rates, taxes, new regulations or FDI incentives)
- Adjustment to dynamics of business activity on the key markets and to technological developments outside the Triad countries, mostly in Asian countries.

In technologically advanced and globalized sectors (e.g. information, pharmaceutical, telecom equipment) knowledge development of firms and their subsidiaries is affected also by evolving industry-specific factors of technological, economical and institutional character [Van Egeraat, Breathnach, 2012, p. 1164].

Internal factors are shaped by the functioning and activity of TNCs, and related to changes in their business models, value creating chains, structures and strategies, foreign expansion, innovation systems, various relationships, etc. In knowledge development by TNCs, special roles are played by intra-firm functional linkages and relations among all units (starting with R&D function) and by modes of effective knowledge transmission (through FDI and other channels). If intra-firm process of knowledge leveraging is well managed, than higher effectiveness of TNCs' external linkages for knowledge acquisition is also recorded [Fang, Wade, Delios, Beamish, 2013, p. 36].

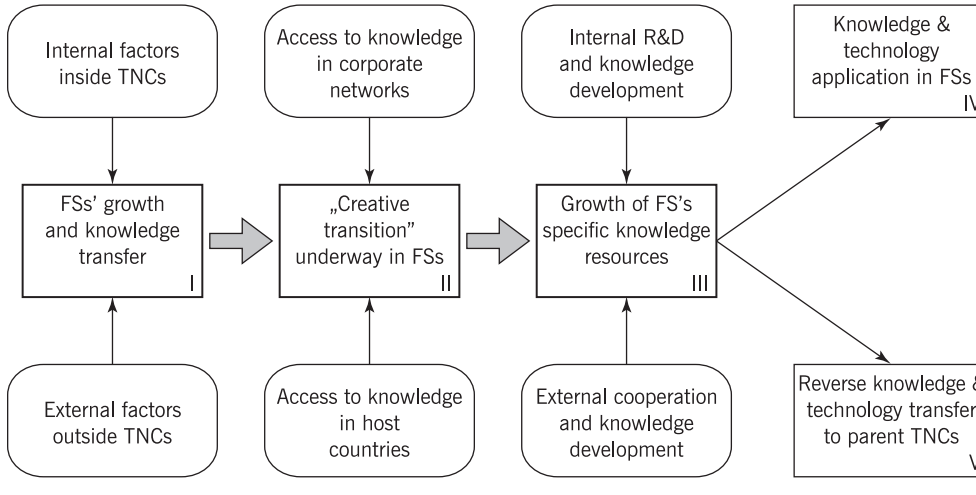
Under the accelerated technological progress and intensified competition, changes in TNCs are introduced constantly, so a faster process of their "creative destruction" is acknowledged. Of special importance for knowledge development in corporate foreign subsidiaries are the following internal changes inside their parent organizations:

- Intensification of the R&D activity (own and in cooperation) as well as generating, leveraging and transmission of knowledge
- Outsourcing and offshoring of value-creating functions (mostly of business services)
- Changing cross-border strategies and structures towards globally or regionally integrated networks
- Reconfiguration of global or regional value chains or supply chains

- New knowledge-oriented FDI projects (both acquisitions and green-field investments)
- Changing the innovation activity towards more open and cooperative models
- Supporting initiatives for building multicultural teams and staff training.

Remarks on the factors affecting knowledge development in corporations lead to sketching out a model of foreign subsidiaries' participation in knowledge development and transfer in TNCs which is presented on Chart 1.

CHART 1. Participation of foreign subsidiaries in knowledge development and transfer by parent TNCs



Notes: FSs – foreign subsidiaries; TNCs – transnational corporations

S o u r c e: own study

The two groups of factors (external and internal ones[4]) can stimulate knowledge development in subsidiaries (block I) and give a rise to their further involvement in the process of knowledge "production" and transfer, and some changes in their functioning and activity (block II). More on the transformation of knowledge-oriented activities of subsidiaries is given in the next section.

Endogenous factors relate to functioning of (and introducing changes in) subsidiaries themselves, in three domains of knowledge management: a/ its transfer from TNCs' headquarters or other corporate units; b/ own, complex efforts to develop new, valuable knowledge; c/ capability to cooperate with external entities. Much depends on a particular stage of subsidiaries' growth (as discussed in section 1), position and tasks in a corporate network and access to resources and capabilities outside a given

subsidiary. Taking it into account, one can list the following main processes and trends affecting creation and application of knowledge inside TNCs' subsidiaries:

- Absorption of knowledge transferred to a given subsidiary (from inside and outside of TNCs), including primarily its effective implementation in products and processes
- Creation of new knowledge, resulting from own R&D and ability to convert it into technologies and innovations which can be successfully commercialized
- Ability of a given subsidiary's staff for conducting multi-cultural communication, supportive cooperation and effective organizational learning
- Ability to enforce new initiatives leading to the expansion of a given subsidiary
- Ability to target long-term growth and plan subsequent actions to raise position in a corporate network.

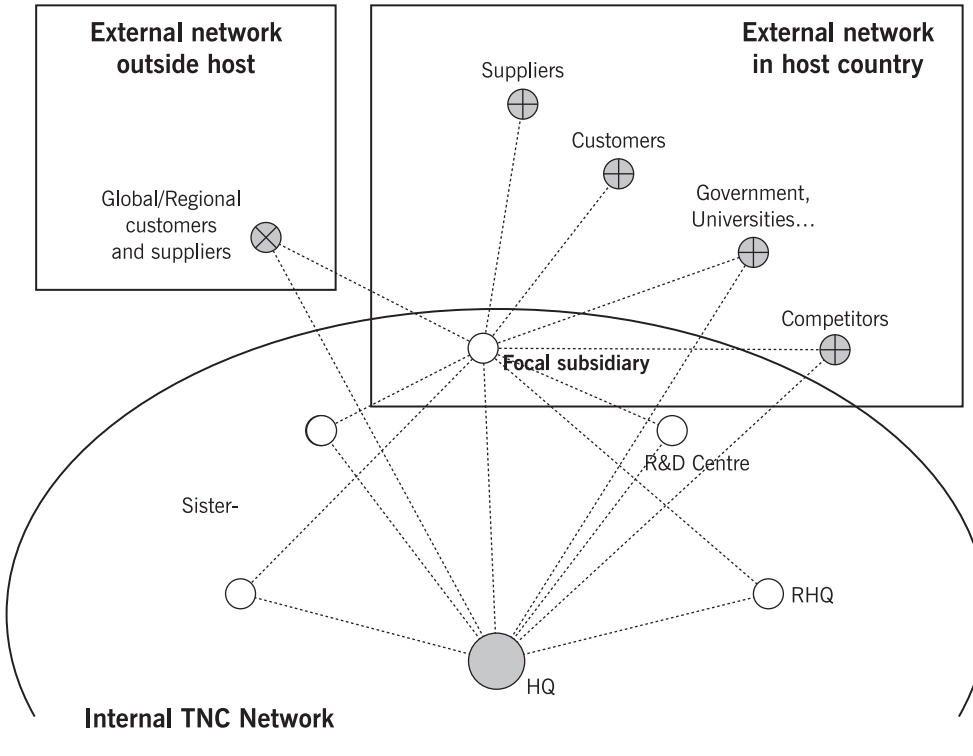
Differentiation of foreign subsidiaries is initiated with unequal resource transfers from the TNCs' headquarter and it can be increased considerably owing to capability for absorbing knowledge transferred to them (at stages 1 and 2, see section 1). Absorption means ability to identify value-creating potential of new knowledge, assimilate it with possessed resources and implement effectively for commercial actions. The absorption process depends not only on subsidiaries' resource endowment but also on their ability and strong involvement in knowledge leveraging and organizational learning. Earlier good experience, close relations and strong linkages of subsidiaries with knowledge transferring corporate units or other organizations (firms) can facilitate the absorption process and further subsidiaries' own knowledge development [Park, 2012, pp. 554–555]. Moreover, TNC parents can promote subsidiaries' absorptive capacity by some organizational mechanisms and instruments, especially if the local sales markets are competitive [Schleimer, Pedersen, 2013, pp. 664–665].

"Local embeddedness" is a specific feature of TNCs' foreign subsidiaries and it emerges if they are able to develop extensive local linkages and relations, and/or permeate into local networks for capturing more benefits of locational advantages in a given host country. "Local embeddedness" stems from interactions between characteristics of foreign subsidiaries and advantages of foreign locations. For the former, there are important motives of FDI placing, investment form (acquisition or green-field investment) and value-adding function executed in a given subsidiary. In case of knowledge-oriented subsidiaries, to increase their "local embeddedness" there are significant knowledge-augmenting motives, green-field projects and executing R&D functions (possibly linked to R&D-based production). For the latter, global attractiveness of foreign locations is important. It should be stressed that a present approach to choosing foreign locations requires to consider TNCs as border-crossing enterprises which seek both advantages of particular countries (to capture trans-border effects, e.g. in resource diversification) and of particular places or agglomerations within particular counties (to take advantage of spatial heterogeneity within a given country, e.g. location of business clusters or universities) [Beugelsdijk, Mudambi, 2013, pp. 420–421].

The most attractive foreign locations for knowledge-oriented TNCs' subsidiaries should offer valuable knowledge and/or new technologies, skilled labor and modern infrastructure, specialized business clusters, developed local innovative entities (R&D centers, universities, companies) and institutions of good quality[5]. Most of them can be accessed by corporate subsidiaries *via* local market or obtained by participation in local networks. Local networks can much facilitate access to national institutions and tapping to domestic flows of information, knowledge, technology or talented and creative personnel, which can be accessed from networked local entities or subsidiaries of other TNCs. Therefore, foreign subsidiaries can benefit at the same time from advantages of internal (corporate) and external (local) networks in host countries [Collinson, Wang, 2012, p. 1502, Fig. 1].

Chart 2 refers to the participation of foreign subsidiaries – as a focal unit – in both internal (corporate) network and external ones (in a host and other countries). In fact, it is "dual embeddedness" – a unique attribute of corporate subsidiaries.

CHART 2. **Local „embeddedness" of TNCs' foreign subsidiaries in corporate internal network and external network in a host country**



S o u r c e: Collinson, Wang, 2012, p. 1502, Fig. 1

The focal subsidiary – e.g. a "center of excellence" – can develop relationships and linkages with various units and entities in order to take advantage of their knowledge-related resources and capabilities. Special importance is attributed to knowledge-creating entities in a given host country.

The involvement of corporate foreign subsidiaries in expanding abroad their "local embeddedness" is driven by the following processes and forces which take place at present:

- Combined pressure of all external, internal and endogenous factors on upgrading competitiveness of the subsidiaries and their parent firms on the global market
- Evolving geographical and sectoral patterns of FDI flows which are more and more directed towards non-Triad countries (e.g. BRIC countries) and services (mostly modern business services, including R&D)
- Changed attitude of TNCs to choice of foreign locations which leads to a focus on the most attractive foreign locations in the world and use of a global "locational portfolio" for facilitating implementation of locational strategy and global configuration
- Liberalized access to foreign locations and large improvement of locational advantages in the non-Triad countries (especially in Asia), including stocks of knowledge, technology, skilled labor, infrastructure, institutions, FDI incentives, etc.
- Reorientation of Government policies in many countries towards supporting domestic innovation activity, especially within national and/or regional innovation networks
- Capture of benefits by foreign subsidiaries owing to recombination of knowledge from various sources: own R&D projects, corporate organization and external networks.

The last point refers to a fact that "local embeddedness" can be turned into "dual embeddedness", if TNCs' foreign subsidiaries are able to enter, manage and take advantage of two network structures, i.e. corporate (internal) network and local (external) network. Owing to numerous locally embedded foreign subsidiaries, the globally competing TNCs are able to access and integrate knowledge resources in many foreign locations. For this reason, TNCs can be engaged in a "multiple embeddedness" by means of their foreign subsidiaries located in many countries, and can access their knowledge resources and institutions, and permeate into their innovation systems. However it can imply problems with knowledge management in dispersed foreign locations, running cross-border innovation networks, facing many risks, exposure to erosion of competitive advantages, needs of protecting intellectual rights, etc.

As exhibited on Chart 1, the external and internal factors do affect growth and knowledge flows of TNCs' subsidiaries (block I) what leads to substantial changes – coined as "creative transition" – in their functioning, growth and participation in the process of knowledge enlargement of parent companies (block II). The discussed factors to some extent affect also growth of foreign subsidiaries' potential for knowledge development by own means and cooperation with external (local) partners.

"Creative transition" of foreign subsidiaries

Changes in the knowledge-oriented activity of corporate subsidiaries concern the process of R&D internationalization carried out by TNCs. The process has gained momentum since 1990s and at that time it was well investigated by UNCTAD [2005]. Since that prominent publication, aggregated data on FDI flows in the R&D sector have not been published but experts are convinced of a long-term upward trend related to the expansion of such investments [Veliyath, Sambharya, 2011, p. 408]. The conviction is based on value of FDI flows and numbers of R&D centers published by particular host countries as well as some reports of corporations themselves (see below). The R&D internationalization is also conducted by means of non-equity forms (various agreements and contracts between foreign parties) and their number and contract value grow more rapidly than industries in which they operate [UNCTAD, 2011, p. 133].

The R&D internationalization process is confirmed by value of R&D expenditures made abroad by TNCs. The overseas research expenditures of TNCs have increased in almost all developed home countries, with a leading value and share held by US corporations [Veliyath, Sambharya, 2011, p. 408]. As reported from another side, in many countries research expenditures of foreign companies increase and make considerable input to domestic expenditures. Most of the countries in the world recorded externally funded R&D share of 5 to 15 per cent in 2005 – with a few higher, like Ukraine, Greece, UK – and the upward trend is maintained in a long term. The share of externally funded R&D in Poland accounted for 5,74 per cent in 2005 what makes a humble result against Czech Republic with 13,69 per cent and Hungary 10,67 per cent [Hall, 2011, pp. 4, 22, Annex Tab. 2]. TNCs originating in the USA make a leading group of companies placing R&D expenditures in other countries. Foreign subsidiaries of American corporations executed research programs worth over US dollars 40 billion what made as much as 14,3 per cent of the R&D performed by all US businesses in 2009, against 10,9 per cent in 1997 [Anderson, 2012, p. 223, Tab.10]. The leading host country for the American offshored research activity and facilities is Switzerland, followed by other Western European countries. However, a growing share of the non-Triad countries reached 12,5 per cent in 2009, with China and India as a main recipients of the American offshored R&D centers [*ibidem*, p. 223, Tab. 11]. In general, the transfer of foreign research capabilities to host countries is usually regarded by them as a favorable process supporting expansion of a domestic R&D sector.

A complementary view on the R&D internationalization is offered by knowledge management in corporate innovation systems. The evolution of activity led by TNCs' foreign subsidiaries has become a significant component of changes in corporate innovation systems. It has been initiated by withdrawing from passive application of knowledge or technology transferred from TNCs' headquarter. Then subsidiaries started to increase their capabilities to absorb knowledge more effectively, expand better

adaptation of technologies to local needs and as well as upgrade or modernize received technologies [Birkinshaw, Hood, 2001, pp. 132–137]. At the same time subsidiaries have become more involved in creating and implementing R&D results from their own projects or joint projects with local partners. Introducing innovative solutions has contributed to expanding their participation in the development of TNCs' knowledge resources and expansion of whole innovation systems [Castellani, Zanfei, 2006, pp. 47–50]. At the same time the subsidiaries increased their innovation-oriented linkages within corporate networks and outside them – in host countries.

The increasing activity of foreign subsidiaries proceeds under enlarged scope of their autonomy in decentralizing corporate organizations. It means more freedom for initiatives and actions of subsidiaries' managers in evolving structures and relaxed formal dependence from regional or global headquarters of TNCs. Good execution of obligatory value-added functions and tasks leading to a market success can raise trust of supervisory units and their acceptance of new initiatives, and lead to granting greater autonomy for a given subsidiary to take decisions and actions on its own account. It is stressed that having become more independent, foreign subsidiaries are able to set up more relations and expand new linkages both inside and outside the corporate networks[6], according to their plans of knowledge-oriented expansion. In general, the engagement of foreign subsidiaries in new, successful initiatives and actions for leveraging corporate knowledge and competitiveness is appreciated as a manifestation of internal entrepreneurship in TNCs.

The changes in the subsidiaries' innovation activity have been recognized as a new process and termed a **"creative transition"**[7]. The process has developed considerably in the recent 10 years. "Creative transition" underway in many TNCs' foreign subsidiaries consists in a process of developing their resources and capabilities, in particular creating new knowledge (by own R&D effort) or modernizing applied technology, engaging in research cooperation with local partners, reverse knowledge or technology transfer to corporate headquarters and its recombination with a knowledge resource owned by parent TNCs. The activity of foreign subsidiaries contributes to improving innovativeness and competitiveness of the whole parent corporation, and supports key changes in its strategy and organization aimed at adjusting to new trends in technology and competition on the global market[8].

The significance of foreign subsidiaries as a source of knowledge and innovation created in the TNCs' organizations is indicated by the following main processes and trends [Zanfei, Castellani, 2006, Chapters 1 and 2]:

- The acknowledged process of increasing internationalization of R&D activity which is conducted by most of the TNCs
- The acknowledged process of raising share of foreign financing in total and business R&D expenditure in many countries
- The rising share of technologies worked out abroad in the whole pool of technology application in TNCs

- The importance of outsourcing and offshoring which are focused on business services – including R&D – in the process of restructuring TNCs' organizations
- The predominance of own corporate internal network as a basis for innovations introduced in TNCs.

The "creative transition" of foreign subsidiaries and their increasing significance in the TNCs innovation systems should not be portrayed as a steady and continuously proceeding process of changes in corporate organizations. To some extent the course of process depends on motives, modes and patterns of allocating resources (capital, knowledge, skilled labor force) which is undertaken by corporate headquarters. The specialized motives concern in general building up the knowledge resource needed by TNCs or in particular augmenting their home-base knowledge (i.e. created in home country of the corporation). More FDI flows are directed to those countries which support growth knowledge-based economy and succeed in upgrading their resources, capabilities, institutions and other locational advantages [Veliyath, Sambharya, 2011, pp. 410–411]. Host country knowledge can be critical to scale and quality of innovations introduced in foreign subsidiaries while knowledge accessed in corporate network may not lead to increased innovativeness of some subsidiaries. However it should be stressed that much depends on sourcing and combinative capabilities of subsidiaries and their drive to knowledge development which seems to be significant for a "creative transition" potential [Phene, Almeida, 2008, pp. 913–914].

The support of TNCs' headquarters for transition of foreign subsidiaries depends on characteristics of these particular units and general adjustments in the organization. Foreign subsidiaries which are based on acquisition of local companies sometimes receive more resources than subsidiaries set up as green-field projects. Such decisions are justified by larger adjustments needed in the former group for adapting to conditions of corporate organization. Older, larger and distinguished foreign subsidiaries – especially those appreciated as "excellence centers" – are more eagerly equipped with resources by their parent TNCs. A good reason for a priority of a given subsidiary in the headquarters' resource allocation are its wide intra-firm linkages as far as it implies a larger diffusion of knowledge, technology and innovation in a whole corporate system [Dellstrand, Kappen, 2012, p. 239]. The increasing attractiveness of a given foreign country (e.g. its large innovation program) seems also to be a good reason for granting more resources to expand activity of a particular existing subsidiary.

As a consequence of diversified resource transfers from TNCs' headquarters, the potential of foreign subsidiaries to advance "creative transition" and leverage knowledge is different in terms of a course and dynamics of the process. Moreover, external conditions in host countries are also important. It concerns access to valuable locational advantages and possibility for successful "local embeddedness". On the other hand, innovation success is not guaranteed and foreign subsidiaries face certain risks. For instance, they arise from danger of leaking unique knowledge, new technologies or innovations out to

the other firms – possible imitators and competitors – on domestic and other markets. Poor protection of intellectual property rights and extensive imitation of new solutions in a host country becomes a real threat to innovative subsidiaries and their parents.

Implications of the "creative transition" process

The discussed changes in the knowledge-oriented activities of corporate subsidiaries affect their current operations and far more. The results of "creative transition" proceeding in TNCs' foreign subsidiaries can be traced in three following domains:

- Particular subsidiary
- Corporate organization
- Host economy.

The successful "creative transition" of a particular **subsidiary** can bring about growth of its specific knowledge resource and improved capabilities, growth of size and market share, expansion of relations and linkages, increased position in corporate innovation system [Zorska, 2007, pp. 236–239]. For the discussed questions the most important is growth of own valuable knowledge resource enabling creation or improvement of competitive advantages being specific to a particular subsidiary. Its place and participation in the process of knowledge development by TNCs' foreign subsidiaries is demonstrated as blocks III and IV on Chart 1. The new advantages can leverage a business and performance of the subsidiary, and trigger other favorable changes. That can be illustrated with passing by innovative subsidiaries from ordinary exports to technologically advanced activity in exports of manufactures and services to more developed countries. Becoming a strategic, international expansion arm of the parent TNC is quite possible [Pananond, 2013, p.1].

For **TNCs' organization** a "creative" subsidiary can bring in a new knowledge which makes a kind of its "input" to a pool of corporate knowledge resource. If a subsidiary becomes a new innovation center, then a corporate innovation network must undergo adjustment, including all or some units (nodes) and linkages with the increased position of distinguished subsidiary. It can also imply changes in the total resources allocations, company's business model, competitive strategy, alliances, global configuration (with changing foreign locations), etc. For the discussed questions, crucial changes relate to flows of knowledge within TNCs' organization and in particular the emergence or growth of reverse knowledge or technology transfer from foreign subsidiaries to headquarters of parent TNCs. The reverse transfer is distinguished as block V on Chart 1.

The reverse transfer of knowledge or technology relates to successful results of knowledge-augmenting activity led by foreign subsidiaries (including R&D centers) which can be distinctive, relevant and valuable, and can be easily absorbed by parent TNCs. To engage in reverse knowledge transfer, foreign subsidiaries should be well-

motivated and posses ability to conduct such actions. However, large cultural differences among countries can affect reverse knowledge flows across TNCs' cross-border organization [McGuiness, Demibarg, Bandara, 2013, p. 190].

At first, the reverse technology transfer occurred among corporate units located in the Triad developed countries where good locational advantages favored expanding R&D activity by foreign (Western) TNCs and their subsidiaries. The reverse knowledge and technology flows were concentrated almost entirely in the group of developed countries. Two new trends draw attention in the recent years. The first one consists in the reverse technology transfer which is directed to the Triad home countries from corporate subsidiaries located in less developed countries, mostly BRIC. It is linked to the "creative transition" process in TNCs' foreign subsidiaries. The second trend relates to a new reverse transfer from developed to developing countries which results from the FDI expansion in the Triad led by emerging TNCs from less developed countries [Kedia, Gaffney, Clampit, 2012, pp. 170–171]. Foreign subsidiaries of the emerging TNCs located in the Triad strain to acquire knowledge or technology abroad and send it back to corporate centers in the home countries. Foreign subsidiaries of the emerging TNCs usually do not leverage new knowledge abroad but transfer it back for working out product innovations to be introduced on domestic and global markets as quickly as possible [Di Minin, Zhang, Gammeltoft, 2012, pp.196, 200]. In both cases of reverse technology transfers to developed and developing countries, the TNCs' technology practices can result in draining host countries of new knowledge.

The "creative transition" of foreign subsidiaries can bring about mixed consequences for **host economies**. In general, the effects of FDI inflows and activities of foreign subsidiaries can generate some changes in a host economy, including markets of production factors and products, externalities for local firms and spillovers as well as some impacts on national institutions and systems [Zorska, 2007, pp. 282–315]. Referring to the knowledge-oriented activity of foreign subsidiaries, both knowledge inflows and outflows should be considered. Large knowledge or technology transfers from parent TNCs to a host country occur mostly at the initial stage of subsidiaries' activities or at other stages, if some modernization is conducted in TNCs. Following "creative transition", a new knowledge is created in corporate foreign subsidiaries. In both cases a national pool of knowledge located in a host country is enlarged. However, the transferred or created knowledge is owned by foreign companies (TNCs) and utilized to generate benefits to them and not necessarily to a given host economy.

Being established in a host country, TNCs' knowledge-oriented subsidiaries can affect the domestic economy considerably. The national economic activity expands, including mainly increased production and exports (with changing structures), employment, tax revenues, various spillovers, externalities for local firms, their raising technological capabilities, etc. Much depends on orientation of subsidiaries towards serving domestic or foreign markets and their "local embeddedness". However, the expansion

of knowledge-oriented foreign subsidiaries can also imply some unfavorable effects for host economies. Implementing new knowledge or technology, foreign subsidiaries can attract skilled and talented labor (e.g. from domestic entities) and raise wages, draw finance from public institutions, buy out local innovating firms, acquire attractive real estate properties, undercut domestic firms with their stronger competitive advantages, boost prices of some goods and services, etc. The effects may concern also the activity led by TNCs and their subsidiaries in national innovation and regional (sub-national) systems which are under a threat of leaking new knowledge and competitive advantages out from the national economy [Cusmano, Mancusi, Morrison, 2010, pp. 248–249].

An analysis of the Chinese ICT sector shows that R&D offshoring by Western TNCs to their foreign subsidiaries in China has a positive effect on the R&D efforts of domestic firms located within the same city or cluster. However, the positive impact diminishes as the geographical distance between foreign (corporate subsidiaries) and domestic companies increases [Qu, Huang, Zhang, Zhao, 2013, pp. 502, 513]. The relocation of TNCs' research capabilities to their foreign subsidiaries in China has contributed to the accelerated increase of technological and competitive advantages of Chinese firms in the ICT and other sectors. However, imitation practices made a part of this process to the detriment of the subsidiaries.

Different results have been reached from empirical research of Spanish firms. The analysis focused on industry and firm levels of inward FDI and its impacts on innovative performance of domestic firms. As concluded, FDI inflows are negatively related to the innovativeness of local firms in Spain. After investing in the country, TNCs' foreign subsidiaries introduced innovations transferred from their parents and their home countries what resulted in crowding out domestic innovations from productive use in Spain and/or relegating domestic firms to less profitable market niches [Garcia, Jin, Solomon, 2013, pp. 231, 242]. As otherwise written by the Authors: "*Inward FDI blunts domestic innovation*" [*Ibidem*, p. 242]. For this reasons national innovation system can become weaker.

Analysis of national innovation system (NSI) reflects another approach to assess the impacts of TNCs' foreign subsidiaries on knowledge endowment and innovativeness of host countries. "Local embeddedness" of foreign subsidiaries implies close relations and linkages of the subsidiaries with domestic entities networked in a given NSI what results in their access to new knowledge and its diffusion in the system. TNCs' foreign subsidiaries are well positioned to identify business potential of new knowledge and are able to capture it quickly for their use and/or transfer to parent TNCs. At the result new knowledge will not generate competitive advantages and new businesses to the benefit of given host country.

A broad view of such changes holds that national innovation systems become more "open", prone to internationalization and co-existence in the global system of innovation [Chang, 2009, pp. 1199, 1220]. Therefore, a domestic sector can benefit from knowledge

links and transfers, if the country's NSI is open to external or global relationships and linkages. However, in some cases knowledge generated in national innovation system can leak out to entities networked in the global innovation system, mostly to TNCs and their subsidiaries. As concluded: "*Systems of innovations are increasingly complex and intertwined with regional, national and international levels of innovative activities being integrated*" [*Ibidem*]. For such integration, the knowledge creation, transmission and application with an aid of TNCs' foreign subsidiaries is by all means the most important.

Summary

The author has put forward hypothesis that the present growth of TNCs' knowledge resources depends considerably on changes in the knowledge development and transfer by corporate foreign subsidiaries and their "local embeddedness" in host countries. To support verification of the hypothesis, a new model illustrating participation of foreign subsidiaries in knowledge development and transfer of parent TNCs is elaborated to illustrate the way of thinking. It can be stated that the author's hypothesis is supported by the following findings:

1. Recognition of knowledge as a strategic resource of a firm and growth of knowledge-oriented activities conducted by TNCs have resulted in the expansion of their cross-border innovation systems based on networks of foreign subsidiaries and other entities
2. Activation of knowledge development in TNCs' foreign subsidiaries is driven by four groups of factors internal to the corporate organization and external to it, with more significance attributed to "local embeddedness" by the subsidiaries in host countries
3. "Creative transition" underway in TNCs' foreign subsidiaries stems from crucial organizational changes and new competencies which lead to the valorization of their resources and capabilities, mostly connected with own R&D and knowledge creation, and cooperation with local entities, finally leading to use of knowledge for upgrading own advantages or to initiate reverse technology transfer to the parent TNCs.
4. "Local embeddedness" in the knowledge-augmenting environment of host countries can play important role in the development of knowledge, technology and innovations in foreign subsidiaries by means of their relations and linkages with local entities, possibly those networked in national or regional innovation systems.

It can be concluded that impacts of the "creative transition" process and increased knowledge-creating capabilities of TNCs' foreign subsidiaries imply possible changes for themselves, parent organizations and host countries. Of special concerns are some possible, unfavorable impacts for national innovation systems and host economies, so much more attention of national Governments – not only to FDI inflows – but primarily to knowledge-oriented activities of TNCs' subsidiaries is recommended.

The author's contribution to understanding the contemporary knowledge development in TNCs and their subsidiaries consists in applying an integrated approach to the problem. Combining theoretical approaches and empirical research results gathered from management and international business makes it possible to portray a large landscape of crucial changes underway in TNCs and the world economy. The changes are spread from TNCs' cross-border networks to many host countries, so it is vitally important to be aware of them. The article offers such possibility and the research results are summarized below.

Rivalry on the world market has forced TNCs to sustain their competitiveness by means of changes in their strategies, organization and value chains to be oriented towards creation, application and leveraging new knowledge for upgrading competitive advantages. Such changes have been introduced or allowed by TNCs' headquarters in their foreign subsidiaries which make efforts to increase participation in the development of knowledge resources to be owned by their parents. The increasing participation is a long-term process based on passing through growth stages and some "maturation" of foreign subsidiaries which become more autonomous and self-dependent, well-endowed in resources and capabilities, aspiring for higher positions in corporate innovation networks and linked to other corporate units and local entities in host countries.

The knowledge-oriented activity of corporate foreign subsidiaries is stimulated by four groups of factors: external, internal, endogenous and "local embeddedness". For the activity inside foreign subsidiaries a crucial capability consists in absorption of knowledge transferred from various sources and creation of knowledge and technology by own R&D effort. Much depends also on subsidiaries' abilities to develop "local embeddedness" in order to use locational advantages of host economy, mainly its resources of knowledge, technology and skilled labor, infrastructure, institutions, etc. The best results are achieved, if TNCs' foreign subsidiaries participate in and benefit from two networks: internal (corporate) and external (i.e. national innovation system in host countries).

The key mechanism for increased participation of foreign subsidiaries in knowledge development by TNCs consists in activating "creative transition" in the subsidiaries. The process of "creative transition" underway at present in corporate subsidiaries stems from crucial organizational changes and new competencies which lead to the valorization of their resources and capabilities, mostly connected with own knowledge creation and cooperation (focused on R&D activity) with local entities, and finally lead to application of knowledge for upgrading own advantages or to initiate reverse technology transfer to the parent TNCs.

By means of expanding relations and linkages with local entities (firms, R&D centers, universities, public institutions), foreign subsidiaries can not only tap to knowledge-augmenting domestic resources and capabilities *via* market but also take advantage of knowledge or technology diffusion among networked entities within national innovation

systems in host countries. For these reasons knowledge is not only created by TNCs' foreign subsidiaries but also appropriated from of their host environment. It usually results in the accelerated knowledge development in foreign subsidiaries themselves and in the whole parents' systems what leads to TNCs' increased global competitiveness. At the same time the effects for host economies are mixed and tend to evolve under changing advancement and flows of TNCs' knowledge, and depend on its wide productive use in host economies.

More and more attention is drawn to some unfavorable effects of corporate "creative transition" generated for host countries which can suffer from draining domestic market of new valuable knowledge, high-skilled labor force (and raising wages), acquiring innovating firms, outperforming local enterprises, undercutting new industries and exports, etc. To some extent Government policies can prevent or mitigate such unfavorable impacts. Therefore, more attention, prediction and determination of host Governments are needed in approaching the activities of TNCs' foreign subsidiaries in the age of knowledge-based economy.

Hopefully, theoretical research of the knowledge-oriented activities led by TNCs' foreign subsidiaries can assist undertaking empirical analyses of their true effects which arise in host economies and recommending a fair approach to sharing benefits of knowledge generation and utilization rather within national borders than across borders.

Notes

[1] The article is based on author's research in the state-sponsored project "Knowledge-based Economy: Between Theory and Practice", No. KES/S/06/13.

[2] By value of R&D spending, Toyota has become the world's leader with US dollars 9,9 billion in 2012. The group of 10 largest R&D spenders includes also Novartis (9,6), Roche (9,4), Pfizer (9,1), Microsoft (9,0), Samsung (9,0), Merck&Co (8,5), Intel (8,4), General Motors (8,1), Nokia (7,8). However better financial metrics are recorded in the group of 10 most innovative companies which consists of the following firms: Apple, Google, 3M, Samsung, General Electric, Microsoft, Toyota, Procter & Gamble, IBM, Amazon.com. Only three companies appear on both lists: Samsung, Microsoft and Toyota.

[3] Orchestrated innovation networks are managed by some large TNCs, e.g. Royal Philips, Hewlett-Packard, Intel, Procter & Gamble, Pfizer, Abott Labs, Kraft Foods, 3M, DuPont, AstraZeneca.

[4] To make comprehension easier, the external factors exhibited on the Chart 1 include both global (on the world scale) and local ones (explained as „embeddedness") while the internal factors combine the ones acting in a given corporation (referred to as internal) as well as in a subsidiary itself (discussed as endogenous).

[5] The research indicates a significance of higher quality institutions (e.g. for protection of intellectual property rights) in host countries for outsourcing and offshoring services – including execution of R&D projects – by TNCs [Liu, Feils, Scholnick, 2011, pp. 560, 568].

[6] Under the increased autonomy of foreign subsidiaries, the role of their inter-organizational (external) relationships becomes more significant and brings about positive effects, as indicate results published by Gammelgaard, McDonald, Stephan, Tűselmann [2012, p. 1169].

[7] The concept of „creative transition" has been put forward following results of a research project on TNCs' subsidiaries in Greece published in an article by Manolopoulos, Papanastassiou, Pearce [2005, p. 251].

[8] Information on outstanding innovations introduced by corporate foreign subsidiaries in the emerging-market countries appear in economic journals and raise much astonishment. One of the examples relates to laboratories of General Electric in Bangalore (India) which are famous for the most sophisticated health-care products, including a hand-held electrocardiograph (Mac 400) which is small, effective and cheap. Corporations in the Fortune 500 list have established 98 R&D facilities in China and 63 in India, in 2009 and now probably more [Wooldridge, 2010, pp. 3–7].

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