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RESEARCH ARTICLE

Technology and Competitiveness: Technological Innovation for Developing Economies Growth

Manoel Goncalves Rodrigues[1*], Fernando José Pereira da Costa[2]

[1]*Business Administration, Universidade Estácio de Sá.*

[2]*University of Santiago of the Compostela, Spain.*

******Corresponding Author: Email:* ***manoel.grodrigues@gmail.com***

Abstract

The conditions of developing economies is highlighted by the relative position of each country at the hierarchical structure level related to what has been called economy-world system,arising from the International Division of Labor (DIT), alsoInternational Division of Labor and Production(DITP) as well as their own insertion regarding the world economy.By its turn, this has been marked by the advance of the emerging countries pertained to Semi-periphery and by the relating retreat of the several economies compounding the capitalism « Organic Central Core», especially those that integrate the European space.However, such a move may not come to be definitive, where the emerging economies are still far from the level achieved by the countries belonging to the center of capitalism. The late industrialization and development experiences leave a clear intention in outlining strategies for training, with the technological development in productivity and competitiveness. In this process, the policy/management of technology and innovation has an important role.

Keywords*: Competitiveness, Economic Growth, Innovation, Technological Development, Technology Management.*

Introduction

The condition of the developing economies is defined as result of the level and formof each country´s/economy´s insertion at the level of world economy, of international trades, level of industrialization and technological development, by configurationregarding the relative positions occupied by each country with regard to international hierarchical structure. On the other hand,the International Division of Labor (DIT) - also called the International Division of Labor and Production (DITP)-is defined/presented within the system-world capitalist economy ambiance.

Actually, the DIT/DITP dialectically configures the level and the form of insertion of each country/economy within the world economy context.Within a dynamic evolutionary perspective-a close look at the current situation of the world economy will show the same results of a framework marked by the accelerated rise of emerging countries of Semi-periphery and the recoil experienced by several economies belonging to the «Organic Central Core» of capitalism, especially those belonging to its European component.

At the world economy level (economy system-world) there is the simultaneity between two movements. On the one hand the decline in Europe in technological, economic, industrial, financial, geopolitical and geo-economic terms (the only significant exception seems to be Germany, holder of a complete, integrated and industrial unit of weight, as well as a broad technological base) to another, the unequivocal Asian rise, with the gradual transfer of the economic, financial, commercial, industrial and technological center of the world from the Atlantic to the Pacific, if an analysis based on Braudel´s view (*neobraudeliana*, or derived from this theoretical matrix) on the seas and the hegemony of nations/economies is conducted.

The Asian Tigers are established as industrial/technological bases; the New Tigers (like Malaysia and Vietnam, e.g.)seem to follow them; India is established as an industrial/technological power, especially regarding the Information and Communication Technologies (TIC) Japan, despite its relatively less enthusiast performance, it is highlighted in the financial, industrial and technological background (especially at the innovation level) and also as a great capital exporter and promoter of direct investments abroad, many of them in the Asian space itself, as pointed out by ADDA [1] ,

when analyzes the predominantly regional character of the Japanese transnational corporations to promote overseas investments.
However, the most impressing case is China, that shows a remarkable performance,being converted in world plant,being transformed in *global player*, forcing the international demand for energetic and mineral resources,comprising native industrial companies, quickly converted from importer to exporter, training/qualifying a great labor force in a relatively short time and already using the interaction Industrialization/ Technological Training, configuring the triple«Industry-Technology-Innovation». The Asian economies and their respective dynamics must be seen/analyzed as parts which integrate a wide system (Asia system), although the systemic-integrated view must be amplified towards something much wider/dynamics, whatever,the Asia/Pacific system, which will also embrace the Americas,becoming an area of significant dynamism at the level of system-world capitalist economy.

On the other hand, a long term sustainability of the levels of the Asian economies´ growth and those which already start comprising the Asia/Pacific system, will depend on the definition/reproduction (at an amplified scale) of a true/efficient model of development, that is completely contrary to the economic liberalism and the liberal-individualist reasonableness so expensive for the Western world. The trajectory historically done by the Asian economies leads to a system of anti-liberal economic organization, contrary to the liberal-individualism, training and innovation.This, however, if regarding an analysis a little more caring in terms of the experiences compared to industrialization and development.

The analysis of the experiences of industrialization and development in the 19th and 20th centuries (Germany and Japan) and the relatively more recent situations, as were(and are) the cases of the Asian Tigers (mainly South Korea and Taiwan),show that those countries prioritized cleared strategies of training.In the first case, there are the well succeeded national-industrializing experiences of the late economies, while in the second, there is the upgrade of the countries cleared peripheral or post-colonials.In both situations, however,delay overcoming resulted in a clear investment in technological development and knowledge as factors which enable the increase of productivity gains and strong growth of competitiveness.Undoubtedly, this is the way to follow by the Periphery/Semi-periphery countries which thus seek for overcoming their interaction subordinated to the world economy.

Technological Delay in Peripheral Economies

According to Baumgarten [2], the contemporaneous world has suffered significant changes and these of diverse origin (namely: economic, political, social, geopolitical, cultural, institutional, etc.), acting for remodeling of the material basis of the society from new configurations which end up also defining new strategies of accumulations outlined/supported by generation/diffusion processes of new knowledge established due to the technological process.The contemporaneous forms of production and accumulation involve deep organizational/cultural restructures which also raise different directions with regard to orientation and intervention in the distinct social agents.Tensions are innumerable, of great dimension and with diverse causes (the expansion of the financial sphere, the expansion of the technical-productive component, the acceleration of the process of industrial displacementand the bigger speed of the economic and social segmentation shifting), with impacts at the level of the regulatory policies and instruments.On the other hand, such globalization (hegemonicin economic, financial, political and ideological terms)is comprised of central, peripheral and semi-peripheral actors,which at least conditions it as analytical-conceptual category.

To Baumgarten [2] should be considered the theoretical-conceptual construct of the information and knowledge geopolitics and its implications at the level of the development strategies, which are specially linked to differences (within social, organizational and territorial ambiance)related to the access to strategic information/knowledge, before the capacity of innovation/learning, in conformity to the new forms of ownership/privatizationof strategic knowledge and also before the new requirements for the development policies.Therefore,issues related to the current relationships between economic and social development, science/technology and differences.Therefore, some issues are highly significant, where the following are highlighted:the role of knowledge/information in world distribution in terms of power/wealth;the spatial distribution of science/technology of the international scenario and the strategies of economic and social development.

Although the existence of strong contradictions which involve the relationship between the three corners of that true civilizational triangle (capitalist economic development, knowledge and sustainability),with the predominance of actions designed to meet the resolution of the immediate problems related to economy adjustment and interests of hegemonic nations which condition/constraint the accomplishment of the advance reached at the level of scientific-technical knowledge,the fact is that it is clear that the peripheral/semi-peripheral countries need to strive more relevant positions with regard to the scientific and technological knowledge, in order to break the links of dependence, for training under the scientific/technological view for knowledge generators/creators.

Thus, accordingly to what Baumgarten signs [2], with regard to the scientific/technical knowledge (generation, production, ownership and management), though maintenance, at least in terms of short/medium term, of the hegemonies´ coincidences found (economic, industrial andtechnological), some changes towards reduction of concentration concerning the scientific-technical knowledge would be soon verified.Those changes have happened in Asia and Europe, notably in the first, representing a counter-moving concerning the concentration and perpetuation (or even its worsening)in terms of the spatial dynamics of the process of scientific and technological developmentwithin the hierarchical context of the economy-world.

Thus, if there is, e.g.in terms of scientific-technical knowledge,a gap between *hegemon* (USA)) and the major part of peripheral or even semi-peripheral areas, on the other hand, such occurs with areas of recent or relatively recent industrialization of Asia, where a significant moving of scientific-technological knowledge expansion.Indeed, the process of scientific-technical development occurredin a more concentrated way in some few countries, mainly in Triad area (USA-European Union-Japan),however, diversifying the contributions at the level of the scientific development, with the appearance of good indicators of Science and Technology (S & T)- publishing growth, e.g. at the level of the semi-peripheral countries. Among these, the quick advance recorded by the Asian countries, especially for the accelerated expansion in China is highlighted.

According to what Feldmann records, technology plays a crucial role in terms of companies´ performance and competitiveness, as well as countries´/economies´. Thus, there is a great possibility of the companies and countries/economies compensate the scarcity of factors and their weaknesses through the development of new products/processes.These, in their turn,are obtained through technology.In fact,technology has to mitigate at the level of importance of production factors knownas fundamental by the traditional economic analysis and the classic comparative advantages(low wages,abundance of raw materials,low capitaland great internal markets) were called into question or relativized by the advances and technological innovations simultaneously driven/delivered by such process of globalization.

The new paradigm is based on innovation, i.e. on heavy investments in Research and Development (R&D). However, in the context of numerous countries which compose the periphery/Semi-periphery initiatives designed for innovation are still relatively small and P&D efforts relatively little relevant, when compared, for example, with countries such as Singapore, South Korea and Taiwan. Currently, for example, the Latin America and Caribbean region is beyond an important provider of scientific and technological knowledge, because although host about 9% of the world population, the entire region corresponds to only 1.6% of the total worldwide invested in S&T. With low levels of R&D and S&T, it becomes very difficult to achieve significant results in terms of the symbiotic-interactive «Economics/Technology» relationship.

On the other hand, according to what Feldmann signs [3] there is also a discrepancy between Latin America and Caribbean economical weight and S&T efforts, whether at the level of resources applied in R&D, or the number of scientific publishing andpatents deposited in the USA.On the other hand, the Latin America and Caribbean present a performance clearly better in in scientific activitiesthan in technological activities.In the end, the region shows a predominance ofimported Technologies, which conduct to a limited articulationat the level of the binomial Science/Technology and translate an enormous weakness regarding the bonds existing between the industrial production sphere and the technological basis, hence configuring, a weak interaction before the relationship Industrialization/Technological Training.

Beyond this, if compared with the economic development of some Asian countries (especially

South Korea and Taiwan) with the progress of Latin America and Caribbean andin the 80s, There are decisive aspects which explain the enormous growth of the Asian economies (notably the Asian Tigers) before the stagnation of the Latin American and Caribbean economies over that decade.In fact,the continent presented five deficiencies when compared to the thriving Asian economies. Those deficiencies would be the following:the presence of a decayed educational systemwith poor training of engineers;there was much transference of technology (mainly of the USA), but a low capacity of absorption due to the small investment of the local companies in R&D);existence of a weak S&T infrastructure;a significant delay in telecommunication development;no emphasis on electronic products´ development and the weak bond/articulation «University/Company».

Technological Innovation and Competitiveness

According to Schumpeter [4], it is necessary to distinguishthe economic leadership of invention. The inventions need economic importance until the moment of its practical applicability.Hence, any arising improvement, in practice, any consequence from invention applicability requires, for analysis, a completely distinct attitude. In fact, the entrepreneurs can be inventors and capitalists, and they are, in fact, for coincidence and not by nature (and vice versa). Besides, the innovation conducted by entrepreneursneeds to be inventions at all. The opposite of the shown in literatureit is no advisable to give too importance to the inventions.Thus, Schumpeter´s analysis gives prior character to innovation.

Accordingly with FINEP records [5], innovation is the deployment of a new product (good or service) or that it is to be significantly improved.The innovation concept is also applied to a process, a new business method or a new organizational method at the level of the businesses´ practices, the organization of the working place or external relations. A general aspect concerning an innovation is that this opposite to discovery or invention, must be deployed.It is important to point outthat one of the most remarkable characteristicsof innovationis that this one present in effects, i.e., cumulative impacts which are transferred, dynamically, along all the technological-productive chain. Actually, as Ashton states [6], i.e., innovation is a process which once started tends to accelerate.

As recorded in Nuplitec [7], discovery is understood as revelation or identification of something (or any phenomenon) ignored till then, but already existing in nature, through mankind´s observation skill. But invention (patentable invention)is all technical solution unknown till then, not included in the technical state (state of technical arts), that can be industrially used.In that sense,, it is to note that while the inventor launches a whole technical innovation, the society provides exclusive right in a limited time,being the patentin the document that protects the technical innovations.Thus,it is said that a new product(or even improve or enhanced)is deployed whenis seen effectively introduced in the market.In the same way,new business and organizational methods are deployedwhen start to being used effectively at the level of businesses´ operations.

Yet, according to FINEP [5], when the technological innovation is to be referred, it is worthy to observethat the same is presented at the level of four possibilities, namely: product, process, business way and organizational form. Besides, the technological innovation can be classified as incremental or radical. Incremental technological innovation is understood as an improvement of something already existing or the reconfiguration of a technology already present for other goals. Radical technological innovation is something whose characteristics, attributes or use varies, significantly, when compared to the already existing ones.This concept involves technologies radically new or that come to be based on current technologies combined for new use.

Thus, as pointed out in FINEP [5], the technological innovation embraces products and processes technologically new (radical technological innovation) or that come to present significant technological improvements (incremental technological innovation). On the other hand, the non-technological innovation refers to market, service, design or organization, while the companies´ innovative activities do not limit to the technological innovation activities. Therefore, it is worthy to signthat while the radical technological innovations have the potential to change the competitive basis in favor of the innovator theirprojects show a major level of risk and take more time to reach tangible results.

On the other hand, the incremental technological innovations are more secure and cheaper, enabling a return within a reasonable

timing. According to what FINEP states [5], the technological strategy only makes sense when attached to a competitive strategy. Indeed, the competitive strategy, when followed by a technological strategy, tends to be more solid, because generates barriers to the entrance of the possible (or effective) competitors. Actually, from this principle, it can be assumed that several strategies co-exist or take place along the time within a same company.Therefore, thus, within the ambiance of company innovation and strategy, the following strategies can be identified: offensive (develops); defensive (upgrades or purchases); imitative (copies with lower cost); dependent (depends on the leader to innovate); traditional (incremental only) and opportunistic (window of opportunity).

In regard to the economic conceptof the technological innovation process, considered as the main cause of long term economic development, Rosenberg is evoked who observes the presence of a relationship between technological change and production function change, since the higher advances a the level of the scientific knowledge will bring new fields of combination of factor relatively more efficient regarding the production of a determined goods or the elaboration of a given asset. In part this explains the existence of aninteractive binomial Industry-Technology, uncovering the two-way relationship between the industrialization process and the technological innovation process, as well as the double sense which relate the industrializing moves and the technical process.

Actually, as recorded by Rosemberg [8] the societies which reached high levels of industrialization acquired skills less usual for resolving certain types of that require creative capability and this latest´s understanding is fundamental for understanding the growth/development process.Therefore, it is possible to assume thathighest levels of industrialization make aneconomy more susceptible to being technologically trained and lead (very likely) society to highest levels of qualification and *expertise*.

When approaching the technical progress matter, Rosenberg [9] signs that the same is shown under multiple and diverse forms, which could be synthetized by the need of the obtainingof bigger total volume of production and this superior in qualitative termsfrom a determined amount of resources.In other words, the technical progress approach seems to be resumed asthe introduction of new processes of production cost reduction of a same product. However, the technical progress, Enabled by technological innovations (and enabler of the technological innovations), not only implies economic-quantitative aspects, but also qualitative, such as qualitative improvements of products,social wellbeing and society evolution.

Thus, to Rosenberg [9] an ongoing quick growth will demand development of new products and new industries. This aspect is of fundamental importance when seeking for the establishment of connection pointsbetween the technological progress and the industrializing processes, especially in the case of the three Industrial Revolutions. More specifically,the occurrence of a revolutionary-industrializing process will mean a technological leap, with the rising of new products,the whole reconversionof productive sectors with the respective technical-organizational impacts (Automation of the automobile industry, for example) and the rising of new segments of industry (with high level of technological incorporation, high added value and softer in technical-productive terms).

So, taking as example the rising of the mechanical loom where Schumpeter [4] notes that the same was introduced in the production process by the new inventors, leading the new relation between costs and pricescarrying out a whole reorganization of industry (production increase, competitiveness, disappearance of the old-fashioned business, dismissal of workers, etc.), interacting by obtaining and employing new combinations at the level of the productive process and the technical-organizational structure and with its introduction/use by the new entrepreneurs, i.e., by the few entrepreneurs which saw the innovation process the perspective of proposingnew solutions meeting market expectations (the innovative entrepreneurs). In the 20th century, technology would start to being analyzedin a more detailed way, based on the economic development theories. From then, with Schumpeter [4], the leading role of the 20th century economy has been given to technological innovation, focusing on the positive effects of product and process innovations in economic development and also analyzing companyandentrepreneurs´ role.

Therefore, andreassi [10], from Schumpeter [4] point out five types of innovation, namely: 1 – introduction of a new goods(with which consumers are not still familiarized)or a new goods´ quality; 2- introduction of a new method of production, that is, of a method that has not still

been tested in determined area of industry and that has been generated from a new scientific discovery or still from new method of commercial approach of goods; 3- the opening of a new market, in which an specific area of industry has not still entered, independent of market existence or non-existence. 4-achievement of a new source of raw material or goods partially manufactured, independently of that source or goods existence or non-existence; 5-the rising of a new organizational structure within a sector, as the creation of a monopoly position or the breaking of a monopoly.

In that way, from Schumpeter´s approach, Andreassi [10] notes that by concerning dimensionof the impact caused by innovation, when such approach refers to innovation, in fact, it is reporting radical innovations, i.e., those which lead to a great economic or Market impact, leaving for a secondary plan the so-called innovations of incremental order, i.e. the technical enhancements of continual basis, which also are important to the understanding of the innovative process. However, despite this limitation, Schumpeter´s analysis had a huge influence on the level of innovative activity analysis, whether radical or incremental order.

According to Ribaultet al. [11], in a more precise form, technology is understood as a complex set of knowledge, means and know-how, that is organized aiming production. But to Carneiro [12], the word technology accepts diverse reading perspectives, which makes difficult the soon understanding of the concept and requires a deep analysis of several implications, notablyat the level of the relation between science and technology, that, in its turn it is due to knowledge organization and the use of techniques required for survival and developmentbeing necessary the rigorous assessment, as done by João Caraça, cited by Carneiro [12] of the concepts of scientific discoveries(organized set of knowledgefrom an objective study of the empirical phenomenaand the technology(set of scientific or empirical knowledge directly applied to production or enhancement of goods and services. On the other hand, Uranga y otros [13] state that technology, undoubtedly, is something closer to us and, simultaneously, something of great complexity, which should be approached between the physical set of nature laws and the set of social economic relations.In fact,even being developed within itsown internal laws, technology only has sense when is involved within a determined system. Thus, for incorporating technical progress as "endogenous variable", the generation of technology in economic terms must be explained, as well as the evaluation of the possible ways through which is possible to go along a specific project of development. Finally, from this concept, technology can be conceited as a form of knowledge substantiated both by science and others more common types of knowledge and skills.However, the result is not the use of an elaborated knowledge, but its turninginto a system of own thinking.

On the other hand, Mathias [14] when trying to analyze what would lead to the Industrial Revolution beginning in the 18th century enumerates a number of aspects, including technological innovations, recording that the introduction of technological innovations in the production process made possible the increase of productivity, with the consequent low prices.

Thus, the circle that would become a stand-alone and self-sufficient process is closed, in order to contain in itself new forces able to develop and create more innovations. Thus, when here, this work refers to innovations (notably to technological innovations), the question begins with the introduction of techniques and inventions in the context of the production process, leading to higher productivity, with the consequent reduction of production costs, which enables the decrease in prices of the final products, leading to the expansion of the consumer market until the mass consumption itself.

Therefore, innovations (specially the technological ones)are in the basis and beginning of the industrial capitalism, being a deep important element for its characterization and explanation of its own dynamics. So, any industrialization process which occurs in the context of any industrialization process, results in technological changes which are not present in innovation in the context of the productive process, but also by the development of a sector which produces machinery and equipment (machinery which produce machinery), making the accumulation process stand-alone).In other words,the industrialization process is only plentifully done, when the productive apparatusitself is capable to generate autonomously and sustainably, the technical inventions that are to be converted,when being inserted in the context of the production processtechnical innovations or technological innovations (machinery, equipment, techniques and process) which will guaranteecontinuity, reproduction and expansion

of accumulation process. This results in the introduction of innovations (technological innovations) within the productive apparatus ends up generating other innovations (technological innovations), a true and virtuous chaining extremely beneficial to the generation and diffusion of technical progress, in order to shape an effective technical-economic-productive system.

On the other hand, innovations are essential not only for an economy technological training, but also for updating it in technological/productive terms, in order to enhance its levels of productivity/competitiveness. Thus, as signed by Sánchez and Paula [15], the deep transformations lived today and the intense advances in terms of S&T reinforcethe need to promote continuous renewing of the technological processes, in order to ensure competitiveness. So, new/complex arrangements/interactive models are configured in terms of technological innovation and paradigms.This happens in an accelerated pace,which make close relationship between the involved agents (researchers,technologists, producers, suppliers,traders, users and sponsors, etc.) indispensable.

Technological Innovation Management

Concerning knowledge, as well as its production and management (technology and technological or scientific-technological knowledge) as objects of the public policies), when analyzing the Brazilian case, Nicolsky [16] notes that exists anenormousweight of the academic production at the level of the national scientific research, which in practice is translated by papers´ publishing, i.e. articles.This can be considered as an enormous weakness in terms of Brazilian scientific research, since it is actually a free transference of knowledge to countries which are enabled to use them. Thus, those countries would reinforce their information/knowledge basis, applying it in its production sphere, in order toget higher levels of competitiveness and to better compete with Brazilian economy. This would seem to be the greatparadox of thenational scientific production, in other words, to weak its technological-competitive basis through the promotion of the own competitiveness reinforce (from other countries). Thus, in order to promote the generation of the technological innovations so necessary tocompetitiveness of the Brazilian industry,it would be necessary toredirect the efforts of R&D, in order to support the process of generation of innovations in the context of the Brazilian productive sector.

As highlighted by Nicolsky [16] that would be feasible by concerningas model South Korea,where the interaction between state-owned institutions of technological research and private industrial companies has been decisive.This presupposes the breach oftraditional academic view which has always markedresearch in Brazil, i.e., of total hegemony of the researched academic culture, according with the research is exclusively carried out at public universities and research centers, in order to define a new model in terms of R&D, thathas a theme the industrial technological innovation. Actually, the technological innovation happens within the ambiance of the company´s productive sector (mainly in industry) in order to meet the real demand of society and market for new products/processes. The academic area role is the training of qualified/educated human resources and the generation of scientific knowledge and not the development, manufacture and trading of end products. However, the academic area (universities,research centers and technological institutes)can and must be involved in applying technological research in in partnerships with state-owned companies, private or mixed, citing as an example the development of technology for oil exploration in deep waters that arose from the partnership between a public university institution (Coppe /UFRJ) and a state-owned company (PETROBRAS).

On the other hand, Nicolsky [16] alerts that should be highlighted the fact that the Brazilian industrialization which occurred with strong participation of transnational companieswould constitute anhistorical obstacle to the formation of a technological innovative basis in Brazil, once the centers of Research, Development and Innovation (RD&I) are used to be located near the head offices, because the displacement of certain activities linked to RD&I,further being relatively recent (logics of the global space of production), it is not a wider process.In Brazilian case,the local production of the transnational companies were protected by significantly high custom barriers, which made Brazilian companies not to find any stimulation concerning the generation of their own innovations and were limited to purchase licenses of imported technologies.This aspect would be the main difference in the Brazilian process of industrialization for the national-industrializing processes of certain Asian countries (especially South Korea and Taiwan);in the beginning,these countries used licensed technologies.However, opposite to Brazil,these

countries started to guide the industrialization processes with Technologies developed nationally.However, the current reality in Brazil would have already ask the reformulation of national company concept, where the company position began to be considered (owned mostly of national partners or not) before the innovation process.

Hence, as signed by Nicolsky [16] If the company acts in the Brazilian market and bet clearly in PD&I, in order to raise the competitiveness of products produced in the country, can be considered as national, because it would contribute to its sustainable development. On the other hand, if there are companies belonging to Brazilians who bet on innovation (working with Asian companies), on the other, there are others that are just agents of the local diffusion of innovations, which would mean unequal competition with other domestic producers. The status/treatment of national company should be assigned to those who bet on innovation. In fact, only these should have access to certain benefits (tax incentives, differentiated rates of financing, pricing margin for purchases and Government procurement, resources for research and strategic partnerships). The University, the research centers and technology institutes cannot replace companies. Soon, the policy to promote innovation and technological progress should aim the mobilization of industrial companies and their related sectors/subsectors in the sense of increasing the efforts of R&D.

Final Comments

As defended by Nicolsky [16-17] it must have a systemic-interactive interaction between the promotion of efforts for R&D with consistent public policies with innovation and creation of a breeding-ground culture truly conducive to innovate in terms of technology, processes and products (priority for basic education/technical; training of labor force for industry; health preferred inversions, transportation, energy and telecommunications; favorite financing rates and adequate fiscal policy). With this, a new model at the level of promotion of technological progress that supports the long-term sustained growth of the Brazilian economy and define a new paradigm in terms of development, more self-centered in terms of decision-making centers, based on technological innovation, in training and in generating knowledge/application can be established. Thus, investing in technological innovation, in training and in the generation of knowledge implies the adoption of a strategic posture that support within a systemic-integrated approach of public policies in order to define an industrial policy that will lead to national sustained growth and the configuration of a development model, less dependent on and tow, that ends up configuring a more active insertion of Brazilian economy in the context of world economy.

Therefore, progress/technological development and knowledge creation/management, in the more magnified case of the peripheral/semi-peripheral countries and specifically Brazil, those cannot be thought outside the domain of public policy and without a vision/strategic attitude before technological issue, notably with regard to technological. Breaking with academic traditionalist view in respect of knowledge generation and technological training requires a dynamic-systemic interaction of institutional character which brings together universities, technological centers, technological institutes and public companies, notably the industrial sector. This presupposes an active, dynamic and strategic State, that works as aggregator, promoter and enabler of all these institutions and which promotes, through direct/indirect instruments, national technology excellence. The recent Asian example, from the Asian Tigers to China, now by new Tigers, must be followed by Brazil and other peripheral/semi-peripheral countries, in the sense of breaking up with the technological specialization and dependency with the peripheral condition itself in part generated and reproduced to scale magnified by the absence of empowerment/technological innovation.

The local technological capacity goes through national innovative companies. In the case of South Korea, it was possible to ensure the companies/national technology interactive interface by the existence of the chaebols and the Government/corporate effort with regard to the use of national technology. In the case of Brazil, where the presence of transnational corporations with intense use of imported/licensed technology, including those of Brazilian companies, which act as true diffusers/multipliers of multipliers of external technology, is strong, articulation, nationalization/innovation would be an instrument of high strategic content.This initiative could stimulate the installation ofRD&I centers oftransnational corporations in Brazil, and, on the other hand, encourage/support research/innovation in domestic enterprises. In fact, there is a synergistic effect-interactive between these two measures, although the

installation of PD&I centers by transnational companies is conditioned by their strategies of trans nationalization/displacement and the dynamics of the such process itself called globalization should be understood as the current stage of the capitalism system-world.

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