

Technological Advancements and their Application for the Development of the Republic of Macedonia



Economy

Keywords: market economy, business factors, global technical-technological developments, contemporary economies, competitive markets, etc.

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Abstract

Among the most important reasons for the accelerated development of the contemporary economies are considered the permanent achievements in the sphere of the technical – technological development that have enabled the transformation of these states in societies based on skills and knowledge (knowledge based societies). These changes, within the very short time, benefit global dimensions by being positioned as determining factors in the designing and conception of developmental changes in the future of all states. Macedonia also, as one of the states in transition, in a continuation of nearly two decades is creating and realizing a politic of the market economy, based on the application of measures for disorder and liberalization of the market reports. The pragmatic and fast articulation and acceptance of these global changes by the economies on development appears as a special moment for the creation of technical – technological pre – conditions of the development that, then will enable the efficient utilization of the developmental factors on the orientation of the manufacturing subjects in export, through the raising of their competitive level, and through this, the fast integration in the competitive European and world market. From this we come to a conclusion that “contemporary manufacturing structures” are based on the new and high technologies, that are as a result of the scientific – technological permanent researches. While the existing structure of manufacturing in Macedonia is based on the classical and antiquated technology, which cannot be ranked as competitive economy with exporting abilities, even though is realized a politic of the opened market. Overwhelming percentage in the rapid technical – technological development of the modern economies is based on the activities and results from “research – developments” (R&D) within the frames of the enterprises, that have their own budgets for these purposes. Based on this the states with technological domination (USA, Japan, Germany, France, Great Britain etc) from gross domestic production (GDP) separate between 2,5 % up to 3 % for research - development purposes. The main part of these financial means provide the companies themselves that operate in a totally competitive ambience of the market. In the conditions of globalization, is though that nearly 60% from the net investments of the American enterprises belong to the research – development sphere. Based on this, is imposed the necessity of creating the conditions for an accelerated transport and of the application of the new technologies that intensify various processes of modernization of the actual manufacturing structures of the states in transition. Starting from these factors of development should, with the help of the competent state institutions, to be created a favorable ambience for the development of entrepreneurship and innovational abilities of small and medium enterprises, in which will be enabled motivational conditions for innovative competitions between the participants in the market. Therefore the national companies should draft a clear concept towards the “challenges of the new technologies”, through the involvement of considerable part of the budget that is dedicated for “R&D”, with the purpose of stopping of the trend of marginalization of the involvement of budget means for these purposes. In the developed states, the overwhelming part from the budget support for research – development is dedicated for fundamental researches, which are linked with “positive externals” that are manifested as “social good”.

Introduction

In the contemporary conditions of the global economy, among the most important factors for the socio – economical accelerated development are considered the permanent technical – technological achievements that have opportunity of transforming the less developed states into societies based on skills and knowledge. The fast and pragmatic acceptance of these global changes by the economies in development appears as an imperative for the creation of technical – technological pre-conditions of the development, which then, will enable the efficient usage of the developmental factors over the orientation of subjects of the manufacturing in export, through the raise of their competitive level, and through this, their integration in the competitive world market. The Republic of Macedonia, in this 20 years period of transition is creating and realizing a politic of the market's economy, based on the application of the relevant reforming measures with a purpose of the realization of an accelerated economic development. While the “contemporary manufacturing structures” are based on the new technologies with high performances, which are as a result of the permanent scientific – technological researches, the existing structure of manufacturing in Macedonia is based on the classical and antiqued technology, which cannot be ranked as a competitive economy with exporting abilities, even though actually, is applied a politic of the opened economy. In this direction, should be emphasized the fact that, the overwhelming part of the states that mark a rapid technical – technological development, their successes are based on the activities and results from “researches – developments” (R&D) that are realized within the frames of existing enterprises, and which have their own budgets specially for these purposes. In this direction, the states with dominant technology in the world such as – USA, Japan, Germany, France, Great Britain, Canada, Italy etc “from their gross domestic production” (GDP) separate between 2,5% up to 3% for research – development purposes. By emphasizing the fact that the main part of these provided financial means provide the companies themselves that operate in a totally competitive ambience of the market. Nearly 60% from the net investments of the American enterprises are dedicated to the research – development sphere. Starting from these facts, to the states in development and transition is imposed the necessity from the creation of conditions for accelerated transfer and of the application of new technologies that intensify the carious processes of the modernization of actual manufacturing structures. Therefore, based on these factors of development should, with the help of the competent state institutions, to be created a favorable ambience for the development of entrepreneurship, as an business philosophy, and the innovative abilities of the small and medium enterprises, in which will be enabled motivational conditions for innovational competitions between the participants in the market. Based on this national economies should draft a clear concept towards “the challenges of new technologies”, through the involvement of a considerable part from the budget of the company, that is dedicated for “R&D”, with the purpose of preclusion of the symbolic involvement trend, of the budget means for these purposes. In the developed states, the overwhelming part from the budget support for research – development is dedicated for fundamental researches, which are linked with the “positive externals” that are manifested as “social good”. Today in the global technical – technological conditions, each country that hasn't created a comprehensive, efficient and

pragmatic concept towards these changes is risked to remain in the margins of global developments. It is understood, Macedonia also, as well as the other states of the Balkan that are still in transition, besides the serious difficulties in the sphere of national economy but also in the other spheres, has no other alternative except a fast and adequate submission towards these contemporary technological challenges and the acceptance of qualitative changes with purpose of the fastest possible adaption towards the international standards for manufacturing and exchange.

1. Socio Economical Predispositions of the Contemporary Technological Changes

In the developed states the permanent changes in the sphere of the technical – technological development appear as a constituent part of the developmental processes that enables the transformation of these places into societies based on knowledge. It is understood that, these contemporary technical – technological changes have a special importance even for the economic development of Macedonia because the technologies with high developmental predispositions appear as a base of the new economical changes through their applications in sectors of propulsive character that have impact on the general social development. These technologies, in general, manifest some characteristics: the high ability of accumulation of the capital, high educational predispositions, the special mission and role of the state institutions in the definition and providing of the preconditions for the application of these high technologies etc. When we are in the sphere of phenomenon of the technology with high developmental predisposition (high – tech sector) should be emphasized that it is considered that technology in which, at least two or more times, is invested for research – development issues (R&D) from the average of the industry: information technology (IT), optical electronic, nanotechnology, biotechnology, advanced materials etc. It is understood that the Information and Communicative Technology, in the conditions of the global economy has manifested greater synergistic developmental effects, because of their linking communicative predispositions not only in the national, but also in the global level. As a result of the great impact of the technology on the development of the national economies of the more developed states (the application of the new technologies participate with over 50% in the norm of development of the USA, with 55% in Japan, 72% in Great Britain, 75% in France, 77% in German etc.) appears the necessity of the conception of relevant developmental strategies and politics that will be in correspondence with the new challenges that derive from the uninterrupted technical – technological progress.

In the contemporary world economies, their permanent socio – economical development is based on the high competitive abilities of the business subjects, their functional organizational forms, the ways of communication etc, all these qualitative predispositions that are in a direct dependence from “production, distribution and of the usage of the knowledge and information”. The moment of transfer of the knowledge is very important for the general economic development because are distributed through various participants, adequate structures and specialized institutions that are in function of the enlargement of general socio – economical capacities through this component of the technological development. Therefore, the economies based on knowledge manifest relevant developmental consequences that come to expression through material investments in the sector of

information and communicative technologies, in the computational equipments etc, in the investments of the non – material nature research – search, training of workforce, the insurance and proficiency of the professional qualified workers, the perfection of the computer software, the granting of various scientific services for the education in the sphere of the employment, export etc. Based on this, is imposed the fact that today nearly 60% from GDP of the OECD countries are realized from the economies based on knowledge and skills. Should be mentioned also the so-called economies “economies that learn”(learning economy) that as base take the experience transformed in knowledge and skill, these moments that appear as necessity for permanent learning through the participants and various networks. The high requirements and the need of these economies that continually learn derives as a result of the immanent desire of the business for benefit, that can be realized only through the invention and application of various innovations, the improvement of the production–service quality, the increase of quantity, improvement of the design, management, marketing etc. Exactly, the phenomenon of Globalization appears as result of the technical – technological development and comes to expression through the casual attachment of the sphere of productivity and innovations, on one side, and of the dependence, continually in raise, on the other side, between the productivity and global markets of the products, services, of the workforce, existing technology, the capital etc. Based on this we can conclude that the phenomenon of globalization doesn't only mean the issue of the buying and selling of goods and services, but also the dissemination of the knowledge and skills, the spread of productivity and its accompanying activities in the form of various servicing, the application of the most appropriate forms of marketing, of the consulting services, the cooperation in the research – search sphere, in the sphere of various scientific methodologies, in the sphere of the movement of capital, investments etc. Not to forget that on one side of these processes stands the desire and the real possibilities on the other side, that implicates a dilemma related to the opening of these national economies of the states in transition towards the world market, which follows as a result of the confrontation of these not enough competitive economies with the harsh criteria of the unmerciful concurrence among the participating subject, as well as with the rules of “World Trade Organization” but also with the other existing rules. The position of the enterprises of the states in transition depends from their abilities for invention of innovations and the speed for their spreading, and based on this, the national strategies and politics as point of orientation should have the competitive abilities in the international level and not in national level. Within the frames of drafting an efficient technological politic can be included some general characteristics:

- The include of knowledge and information – with the purpose of support of the creation of knowledge and information, and after this, the dissemination (spreading) and the transfer of these sources;
- The focus towards the factor of the human (human factor) through the exist and care for the issue of the advancement of the very advanced levels of education, with the only purpose the level of knowledge, skills and experience to be increased;
- The involvement and support of the socio – economical spheres that are important for the increase of the competitive level of enterprises with the purpose of providing a better place in the global market;

- The involvement of the possibilities of communication, connections and cooperation between various participants within the frames of national existing systems of innovations;
- From this derives and the possibility and necessity of the cooperation of all participants in the globalized market, especially when it is about the projects with international character that have the orientation of the involvement of various social and economical spheres.

2. The Creation of a New Developmental Policy as a Precondition for Accelerated Technical Technological Development

From above we can conclude that the creation of a comprehensive developmental politic can be realized in an adequate socio – economical ambience which depends on many factors within the frames of that environment. If it is made a comparison between different factors within the frames of that concrete environment then, it is understood that, can be differentiated some factors that have a greater impact because of their specific nature. The factors that have a specific impact over the creation of an efficient technological politic, within the frames of the relevant environment, are considered⁹⁹: political stability and then, also economical; the definition of developmental policy; the creation of equal conditions for the all participants in the market; the role of the state institutions in the leading of contemporary processes; the membership in European structures; the attraction of direct foreign investments etc;

About the issue of “political stability” should be emphasized that in the Republic of Macedonia exist important political moments that upload the opportunities of creating a stabile political ambience, as a precondition for the motivation of foreign investments. As a priority issue for Macedonia is the realization of a politic of mutual trust between the existing entities, the resolution of name issue, that nearly two decades is contested by Greece and is followed by different reflections, as well as other issues of the political and religious character with neighboring countries. These appear as very important moments that prevent the political stability, and then, also the economical stability. Unfortunately, Macedonia is stuck related to the opportunities to pass the transition phase, which even after two decades still cannot pass it with success. Within this period of transition were implemented reforms in various spheres but, which did not give the expected results: instead of the decrease of unemployment, the same is continually increasing; the level of poverty is also increasing (according to many researches in Macedonia every third resident is not able to provide the elementary essential basket of food products, that means that over 30% are poor); also the industrial production continually marks decrease, that implies the decrease of norms of the GDP increase; all these have consequences on the issue of the increase of payment deficit and so on. In the toughening of the general political situation in this period in Macedonia, as a result of different disagreements that were followed with the loss of markets, various embargos and blockades, and as a culmination, also was the conflict of the year 2001, which has caused serious consequences as in the economical aspect as well as in the increase of social

⁹⁹ Потикнување на растот (1998), Економски меморандум на Република Македонија, Групација на Светска Банка.

tensions. Therefore, in an obligatory way is imposed the issue of “definition of the position and the role of the state institutions” that comes to expression through the realization of further reforms, which should possess a more operative than declarative component, that implies the deep reformation of all institutions that are still under the shadow of the past. State institutions should realize as soon as possible the economical functions that will be in function of the developmental needs of business subjects. This implies that the state with its institutions should stand as far as possible from its involvement in business issues that function within the frames of the market economy. The role of these institutions should come to expression by providing favorable conditions for the development of various business initiatives in the private sector through the legal definition of the general business conditions and the normative – legal sphere. State institutions should be engaged in the direction of creating favorable competitive conditions for all participants in the market, as for the aspect of providing the conditions for the realization of various business initiatives by the entrepreneurs of the small enterprises, as well as in the aspect of providing the conditions for stimulation of innovative activities, that is understood, result with the opening of new work places and mitigation of unemployment. The role of the relevant state institutions should come to expression in conception and approval of an efficient technological policy, which in a complementary way, with the research – scientific policy enter in the structure of the general industrial policy of the country. The creation of equal conditions for all participants in the market – is considered as one of the priority issues that should be realized by the state institutions because without the existence of a competitive ambience for all business subjects in the market, cannot exist an ambience for the invention of innovations, because only innovations add the competitive abilities of the country subjects that with success to go out in international markets. The free market fights the various barriers and restrictions by the governmental institutions that prevent the various entrepreneurial initiatives to enter or to get out of the relevant business. Therefore, should be created mechanisms through the relevant legislative in order to exist a real business ambience that fights the disloyal concurrence.

The issue of the “membership in European structures” is considered as an issue of the strategic character for Macedonia. The accession of Macedonia in the EU structures provides, firstly a political stability and then, through various opportunities (the increase of export, employment, education, science, technology etc) also economical stability. In this context Macedonia has signed the “agreement for stabilization and association” (April, 2001) with the EU that has enabled to it some predispositions toward the integration in these institutions as soon as possible. With the purpose that the criteria for the entrance in the EU to be realized as soon as possible, Macedonia, parallel with the taken obligations and realized reforms, has started with the realization of additional obligations that have to do with different spheres as: the adaption of country’s legislation with that of the EU, the realization of the reforms in the public administration sphere, definition, conception and implementation of the efficient developmental policy as well as other issues. Based on the obligations that come out from the signer agreement for stabilization and association, is drafted an “action plan” for the implementation of this agreement for the realization of which is established a “comity for euro-integrations” that has the character of operating and working organ.

The issue of the “attraction of foreign direct investments”, the same enables the realization of the economic developmental objectives in a level of the developed and competitive economies, that then enable the expansion of the market through the added competitive economies of the domestic subjects that can confront all the challenges of the global market. These issues of the attraction of foreign investments enables the creation of an favorable global ambience for the expansion and dissemination of the new changes that contribute in the building of an economy based on information. The foreign investors can invest in all socio – economical spheres under equal and very favorable conditions. Actually, even though, from the legal aspect and declaratively, exist very motivational moments, in Macedonia in comparison with the other countries of Balkan, the foreign investments have confirmed the symbolic character that means that Macedonia has the last place in table of countries in transition according to the foreign investments. Even though there exist preconditions for the attraction of foreign direct investments through “various customs and tax releases”, interest reliefs, expediency of the establishment of enterprises through the system of a wicket, through the providing of a favorable business infrastructure etc, yet all these moments does not have such a big importance in comparison with the factors that have to do with the “political and economical stability” that have been elaborated above. Therefore, should be emphasized that besides the different existing predispositions for the motivation and attraction of foreign investments, the same cannot be realized if does not exist a higher level of political stability, and based on this also the existence of a stabile macroeconomic ambience. In this obligatory way is also is imposed the issue of other segments that encompass the dimension of “the general business environment”, that have to do with the reforms in jurisprudence, the ensuring of the capital from the borrowers, the protection of intellectual property, transfer of the profit, the height of contributes, protection of the investments etc.

3. Interdisciplinary Nature of the Technological Policy and its Correlation with the Economical Policy

The partial access that that comes to expression through the existence of certain documents and activities in Republic of Macedonia cannot be in function of the definition and solution of complex issues and a functional dependence, which in essence include the developmental competence. As Macedonia, as well as the other states in transition, in the contemporary technological development see their chance to enter in a higher phase of development through the involvement and participation of qualitative factors that impact on the increase of GDP (gross domestic production) and in this way, also in the general economical development of the country. Therefore appears a necessity from the aspect of drafting and realization of a consistent technological policy, which will be in accordance with the adequate measures as of the budget policy, as well as with those measures of educational, scientific, export – import, interest policy etc. Exactly, because of the interdisciplinary character of the technological policy, in the realization of the same participate, various institutions with relevant jurisdictions: Ministry of education and science, Ministry of economy, Ministry of agriculture, Ministry of justice as well as other institutions and agencies interconnected with different jurisdictions in the realization of this policy. The realization

of a longtime technological policy should enable an accelerated passage in the higher phases of the economical development, that later will enable, increase of GDP, permanent decrease of the deficit in the payment balance, increasing the welfare of residents etc. Through the realization of a technological policy, with a complementary character with the general economical policy, can be achieved these objectives:

- The general increase of the technologic level that is manifested through the increase of the segment of education and science;
- The increase of the level of technological abilities of country's industry, in which case comes to the general development of the production, investment activities and innovative abilities;
- The permanent increase of the offer of the country' innovations etc.

The technological policy should be supported on other alternatives that represent various combinations of the country's and foreign knowledge, that means that country's knowledge and skills should be combined with the foreign ones, imported with the purpose of support of strategic technological processes. Macedonia, even though is a small and not so developed country, with not enough developmental resources, because of the considerable potential of the workforce with high qualification, that represents a comparative superiority, can realize a vantage with the creation of a policy of motivation and stimulation of the human capital¹⁰⁰. Therefore, investments in human capital implicate activities that increase the productivity of work through the education and various trainings in the work places.

Among the basic factors for the enlargement of the economical activities and for the efficiency of the enterprises in the competitive market appear some factors that, freely can be treated as pillar factors with propulsive character of the socio – economical development, among which can be considered: policy in the sphere of innovations, policy in the sphere of dissemination of innovations and policy of the transfer of technology and knowledge.

The phenomenon of knowledge as a precondition for their materialization in concrete forms of innovations, can be achieved through two elementary forms: the formal forms of the benefit of knowledge and the informal forms, and the possibilities of their diffusion, also through the different forms of interaction in the enterprise itself, interactions between enterprises in different levels as well as the interactions of these business subjects with the different institutions that realize public functions. The sector of small and medium enterprises, as a holder sector of developmental changes, with their importance and position in the general national economy, because of their flexible predispositions toward the liberal market, because of their business opportunities in the creation of GDP, which come to expression through their high innovational abilities, appear as a target group that in every aspect should be supported by the side of state institutions. These are main motivational moments for the integration of position and role of small and medium enterprises within the frame of the existing technological policy. In the specialized spheres of advanced technology there exist various forms of the support of small and medium enterprises, forms which can come to expression through:

¹⁰⁰ Gary S. Becker(1993); Human Capital, National Bureau of Economic Research, p.17-18.

- participation by the side of small enterprises in different research – scientific projects within the frames of EU;
- connectivity between the successful enterprises of the country with the known companies with multinational and intercontinental character, based on the long-term agreements for cooperation in the sphere of production, common investments, in the sphere of research – development, in the sphere of common investments¹⁰¹ etc;
- cooperation in different multinational projects with the known and proved institutions in the sphere of research – development as – universities, known centers with these professional orientations, with the known technological parks etc.

These moments should be in function to the efficient adaptation of the country's enterprises towards the changes that open the paths toward an information economy namely towards an economy which uses the knowledge and skills. In this context, we will emphasize the moment that has to do with the definition of the compatible educational system¹⁰², a system which should be in function to the needs of the participants in the market as well as to their entrepreneurs with the only purpose that these subjects in the competitive market to be able with a great success to cope all socio – economical challenges.

Conclusion

Permanent contemporary developments in the sphere of technological development hold different socio – economical challenges important for the perspective future of the Republic of Macedonia. The setbacks in this direction appear as a result of great differences that exist with other developed countries from this aspect. Actually, the process of approaching of the norms of development of Macedonia with that of the developed economies is on dependence with the speed of the creation of the new factors of development, among which a specific importance has the technological development. The existence of classical technology with extensive character, and in general antiquated, even though exists an orientation of the open economy and competitive ambience in the world market, the export of Macedonia, that has more the elementary character, cannot have bigger developmental effects. The mentioned contemporary changes impose different challenges before the national economy and contemporary resources of the development. This implies the confrontation of the economy of Macedonia with the different challenges and threats in the international markets and, with the purpose of their successful cope, the orientation of the domestic economy in the direction of the use of resources and comparative advantages. Based on this, we conclude that the knowledge and information are profiles as basic resources of the XXI century, which enable the dissemination of the activities related to the providing, conservation, processing and dissemination of the information starting from the electronic technologies for the elaborating of information up to the sphere of education and administrative activities. Therefore, the creation of the conditions for the development of innovative abilities, for the providing of an

¹⁰¹ Prof. Dr. Naser Raimi: "Menaxhimi i biznesit të vogël"; Tetovë, 2008, fq. 115.

¹⁰² Barro R. J. and Sala-Martin X (1995), *Economic Growth*, New York: Mc Graw-Hill.

ambience with competitive character where will be developed the knowledge and skills of the workforce, which will be able to convey and to straddle the new information challenges and horizons, appears as an imperative that does not have an alternative, of the complex character that will be in function of the accelerated socio – economical development of each country.

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