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**INNOVATION AND ENTREPRENEURSHIP IN KNOWLEDGE BASED ECONOMY**

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**ABSTRACT**

*In the modern era of new knowledge economy, innovation and entrepreneurship activities are considered to be some of the most important factors influencing economic development, both in national and international level. The paper attempts to define the main factors which determine the innovation and entrepreneurial capability of a country and to investigate the implications on economic growth, namely, to which extent economic development depends on the presence of an environment favorable to innovation, based on the endogenous development capabilities? This paper attempts to examine the role of entrepreneurship and those of innovation activities (technical change, research and development and diffusion of technology) and the effects of economic growth process. The quality of human capital is a key contributor to innovation and economic development and is becoming all the more important in the contest of the knowledge society. As trade in services and information grows, the economy of today will increasingly call for employees with new skills and competencies beyond those in the traditional economy. Therefore, an efficient education system, adapted to the needs of the labor market, and the improvement of skills and employability are crucial to continued economic growth and increased employment.*

**KEYWORDS**

Firm Specific Factors, Entrepreneurial Environment, Knowledge Economy, Productivity.

**INTRODUCTION**

Innovation has a variety of roles. As a driving force, it points firms towards ambitious long-term objectives. It leads to the renewal of industrial structures and is behind the emergence of new sectors of economic activity. In brief, innovation is:

- The renewal and enlargement of the range of products and services and the associated markets;
- The establishment of new methods of production, supply and distribution;
- The introduction of changes in management, work organization, and the working conditions and skills of the workforce.

Innovation increases the productivity of the factors of production by increasing production and/or lowering costs. It provides room for flexible pricing and increased product quality and reliability. Competition makes this quest for productivity an ongoing activity, and successive improvements are a guarantee of not falling behind. Innovation in terms of products (or services) makes for differentiation vis-à-vis competing products, thus reducing sensitivity to competition on costs or price. Improved quality and performance, better service, shorter response times, more suitable functionality and ergonomics, safety, reliability, etc., are all elements which can be strengthened by innovation and which make all the difference for demanding customers.

International investment and market access are primary vehicles for the cross-border transmission of innovation which assures growth and wealth creation in participating countries. This participation is based on long term economic processes such as new market development, job creation, enterprise as well as structural changes and adjustment costs. International investment liberalization in the context of open market frameworks is essential to the diffusion of benefits created by globalization.

**TECHNOLOGICAL CREATIVITY**

Technological creativity and advancement are key components of not only innovation and growth, but also their sustainability in the long term. Most of the economy consists of users of a given technology and is concerned chiefly by the breadth of the application of technology outside the sector that invented it. Therefore, R&D is an incomplete indicator for innovative capacity. The emergence of the knowledge economy means there is greater focus upon and recognition of the notion that people and their skills is the key to international competitiveness and sustainable growth. At the same time, it implies an increasing pace of change, for which new competencies must be acquired. To better adapt school programs to the needs of the employment market, a careful analysis of the skills required for specific sectors/ jobs and their broad commonalities is an essential step, which can be facilitated by close co-operation with the business community.

**HUMAN RESOURCES**

Research, development and the use of new technologies – in a word, the technological factor – are key elements in innovation, but they are not the only ones. It must incorporate those means that the firm must make an organizational effort by adapting its methods of production, management and distribution. Human resources are thus the essential factor. In this respect, initial and ongoing training play a fundamental role in providing the basic skills required and in constantly adapting them. The ability to involve the workforce to an increased extent, and from the outset, in the technological changes and their implications for the organization of production and work must be considered a deciding factor. Innovation in work organization and the exploitation of human resources, together with the capacity to anticipate techniques and trends in demand and the market, are frequently necessary preconditions for the success of the other forms of innovation. Since the life-cycle of products and services is becoming ever shorter, and generations of technologies are succeeding each other at an ever faster rate, firms are often under pressure to innovate as fast as possible. The time of entry into the market and the moment of introducing a new product onto it are becoming crucial factors in competition. Finally, it is the dissemination of new techniques; products and services to the whole of the economic fabric which allows full benefit to be gained in terms of competitiveness.

In knowledge-based economies, the efficient systems are those which combine the ability to produce knowledge, the mechanisms for disseminating it as widely as possible and the aptitude of the individuals, companies and organizations concerned to absorb and use it. The crucial factor for innovation is thus the link between research (the production of knowledge), training, mobility, interaction (the dissemination of knowledge) and the ability of firms to absorb new technologies and know-how. There are two important types of knowledge industries: First, there are those industries whose major product is knowledge itself; then there are industries that manage or convey information. The first group includes industries such as software, biotechnology, and information technology hardware; and occupations such as engineers, scientists, programmers, and designers, whose major output is research that translates into new products and services. These industries are driven not by machinery, skilled shop floor workers, or even capital – although these all play a role – but rather by individuals engaged in research, design, and development. While these industries make up less than seven percent of the economy's output, they are in many ways key drivers of the New Economy. Just as capital – and machinery – intensive industries (e.g., autos, and chemicals, steel) drove growth in the 1950s and 1960s, knowledge production firms are the growth engines of the New Economy.

On the other hand, a large share of the economy is now involved in managing, processing, and distributing information. These industries include telecommunications, banking, insurance, advertising, law, medicine, and much of government and education; and occupations such as managers, lawyers, bankers, sales reps, accountants, and teachers. In these industries, effective handling and managing of information, rather than breakthrough knowledge generation, are the keys to success. New technologies hold the promise for higher economic growth. However, to fully realize these gains, skills must be

upgraded to match the changing labor market requirements, individuals must be mobilized to seize business opportunities and firms must adapt their organizational structures. The quality of human capital is a key contributor to innovation and economic development and is becoming all the more important in the context of the knowledge society. As trade in services and information grows, the economy of today will increasingly call for employees with new skills and competencies beyond those in the traditional economy.

### ENTREPRENEURSHIP

Managers describe entrepreneurship with such terms as innovative, flexible, dynamic, risk taking, creative, and growth orientated. The popular press, on the other hand, often defines the term as starting and operating new ventures, leading to the conclusion that, "the entrepreneur is not a fixed state of existence; rather entrepreneurship is a role that individuals undertake to create organizations." The Schumpeterian entrepreneur recognizes and initiates (possible) changes in the society, and in doing so he/she creates a multi-linked dynamic process. To act with confidence beyond the range of familiar beacons and to overcome that resistance requires aptitudes that are present in only a small fraction of the population and that define the entrepreneurial type as well as the entrepreneurial function. This function does not essentially consist in either inventing anything or otherwise creating the conditions, which the enterprise exploits. It consists in getting things done. Entrepreneurial behavior thus described that change the established pattern. Changing established patterns of behavior through entrepreneurial activity rather than as continuous occurrence is mediated through 'swarms' or momentary events. Enterprise or 'entrepreneurship' as it is sometimes called is a slippery concept. Not easy to work into formal economic analysis, because it is so closely associated with the temperament or personal qualities of individuals.

### KNOWLEDGE-BASED ECONOMY

The increasing recognition by policy makers and academics of the importance of the emerging "knowledge-based economy" for future output and employment growth has yet to be reflected in any policy action. Thus, the simple comparison, popular in many policy circles in the 1980s, of the United States' impressive and Europe's poor, experience in employment creation in the 1970s and 1980s, is now being complemented by trends in employment growth by educational category and accompanying earnings. The evidence suggests that during the 1980s all the advanced countries appear to be confronted with a reduction, and in some cases even a collapse in the demand for unskilled labor, partly as a result of technical change, partly as a result of their opening up to international trade. On the one hand, the move towards an information society is likely to lead to substantial changes in the demand for various sorts of educational and skill requirements. On the other hand, it is highly likely that large parts of the unskilled labor force will become excluded.

Information infrastructures provide the foundations for the exchange of goods and services in the markets of the future and generate "electronic commercial" opportunities that will affect all business practices. The development, design and availability of these new instruments will shape social and economic life. Furthermore, as a result of increased globalization, information and communication technologies stimulate world-wide competition among firms. The rate of innovation accelerates in specific areas while the emergence of new families of technology and products may be slow due to weak aggregate demand raising macro – as well as microeconomic challenges closely associated with the need for de- and re-regulation of new product markets, particularly in the service sectors. Intra – firm relationships are affected by the intensified competition and the need for accelerating innovation and rapid adjustment to new market trends.

The overall long-term tendency towards a more strongly knowledge-based economy, in terms of both input proportions and the nature of the output, is accelerating. At the firm level, this is reflected in the fact that the shift in the demand for skills is strongest in firms introducing information technology. The dramatic decrease in the cost of obtaining data and information produces a shock effect, while the decline in the price of information is at the core of a new wave of productivity growth. This is especially true for organizations and institutions strongly involved in the production, use and distribution of knowledge (education, research, development) but also firms as learning organizations. The term 'knowledge-based economy' founded on two aspects:

1. Knowledge and technology are the main drives of the economic growth, and
2. The high-technology sectors are the leading contributors to national output and employment.

### TECHNOLOGY AND INNOVATION

Technological innovation is vital for firm's competitive advantage. One of the features of the New Economy is that in the transformation process, the major input is intellectual property: knowledge, research, information and design. These inputs have supplanted (in value) the material inputs required to build physical units. Therefore, there is no doubt that in 'knowledge-based economy' essential role plays the systematic application of the scientific knowledge to new product, process or service. The intellectual property and technology are the foundations of the economic development.

Five principles for managing technology and innovation: First, there must be a need, or demand, for the technology. Without this need driving the process, there is no reason for technological innovation to occur. Second, meeting the need must be theoretically possible, and the knowledge to do so must be available from basic science. Third, we must be able to convert the scientific knowledge into practice in both engineering and economic terms. Fourth, the funding, skilled labor, time, space, and other resources needed to develop the technology must be available. Finally, entrepreneurial initiative is needed to identify and pull all the necessary elements together.

Five approaches for the evolution of innovation management in a chronological order of development:

1. Technology push theory of engineering: According to this theory, innovation is derived from science. New or improved products and processes are brought into the light of existence as a result of an invention or research development, for which an application has to be found.
2. Market pull theory of innovation: In this theory, innovation is derived from market needs. New or improved products and processes arise as a result of the company's marketing effort which involves understanding their customers' problems and identifiable unsatisfied needs.
3. Chain-link theories: This approach tackles innovation derived from linkages between actors in markets. It gives attention to linkages between research and the market via engineering, production, technology development, marketing and sales.
4. Systems of innovation: At the end of the 1980s and during the 1990s, a technological networks theory of innovation management was developed by a new group of experts under the label of "systems of innovation". This view stressed the importance of sources of information that are external to the firm: clients, suppliers, consultants, government laboratories, government agencies, universities, etc.
5. Social network theory of innovation: This theory points out the growing importance of knowledge as a production factor. According to this theory, innovation is derived from social networks. Knowledge-based innovation requires not one but many kinds of knowledge. Also, it requires the convergence of many different kinds of knowledge retained by a variety of actors.

### KNOWLEDGE – BASED ECONOMY: A CHANGING ENVIRONMENT

In the modern world economy, significant changes have taken place: economies all over the world are seeking for the most appropriate and effective ways that could provide them with the strengths and opportunities necessary to obtain and sustain a competitive advantage over their rivals. In this competitiveness race, improvement of the processes used and commodities produced is of great importance for economic growth, in the face of uncertainties generated by domestic and international competition. Changes in the pattern of economic growth and productivity have been interpreted as a movement towards knowledge-based economy. Currently, output and employment are expanding fast in high-technology industries, as well as in knowledge-based services. More resources are spent on the production and development of new technologies, in particular on information and communication technology. At the same time, major shifts are taking place in the labor market in particular the increased demand for skilled labor. Globalization and worldwide competition has shifted the comparative advantage of economies towards the factor of knowledge and innovation, where productivity based on the endogenous development capabilities plays a rather important role, as far as growth and competitiveness enhancement are concerned. These changing conditions have imposed a great number of challenges in every sector



of economic activity. Corporations seek to find new resources and opportunities to develop their capabilities and become more competitive than their rivals. Firms in every industry, and especially those related with high technology, have found themselves struggling to acquire and accumulate new knowledge, apply it to their business, and then profitably commercialize the newly produced technology.

In the modern knowledge economy, growth depends extensively on the presence or the formation of a network and environment favorable to innovation, which is based on the endogenous development capabilities. Even though the firm-specific factors are important determinants of innovation activity, technological opportunities and favorable entrepreneurial environment have a positive effect on innovation activity, as well. Technological change, innovation and technology creation and diffusion are an important factor to economic progress. Developments in the theory of economic growth have renewed the interest for the role of innovation in the development process, underlining the interaction between the investment in innovative activities, technological change and economic growth. Technology and innovation play an important role in economic growth and technology has become one of the most important factors in the models of growth. The role on innovation is multiple: as motive force it directs the enterprises to ambitious and long-term objectives, it leads to the renewal of methods of production, as well as industrial structures and the appearance of new sectors of economic activity.

### **ECONOMIC DEVELOPMENT AND INNOVATION: A MULTI – FOLD RELATIONSHIP**

Innovation refers to the creation and successful market implementation of a new or improved product or production process and it involves two kinds of action, a) Research, namely the production of information and b) Development, namely the embodiment of the acquired information into new commodities and processes. The Research & Development (R&D) process as a whole is the non-commercial generation of scientific knowledge and its transformation into commercial technology engaged in the business procedures of the organization, in order to meet the market needs and lead to financial success. In business terms, innovation includes 'the search for, discovery, development, improvement, adoption, commercialization of new processes, new products, and new organizational structures and procedures and it is a process that involves uncertainty, risk taking, probing, experimenting, and testing. Above all, innovation is a cumulative activity that involves building on what went before, whether it is inside the organization or outside the organization. Innovative actions are considered to be rather important to economic growth, development and welfare. Firstly, they stimulate investments which introduce new commodities and processes, which improve the living standards of the society. Moreover, they lead to new developments, which increase the comparative advantage of an economy and affect positively the trade performance and competitiveness of a country worldwide. These effects result in a greater level of economic growth.

### **ENTREPRENEURSHIP AND INNOVATION: ANOTHER MULTI-FOLD RELATIONSHIP**

Innovation is important to an individual firm for two main elements: Firstly, a corporation, which undertakes R&D programs, acquires new information and knowledge to embody in the new commodities, as well as new production and marketing processes, ready to be employed in product and process innovation. As a result, through innovation, a company is able to develop directly new products and processes and bring them to the market acquiring an advantage over its competitors. Secondly, it can enhance the ability of the firm to develop and maintain capabilities to absorb and expand technology information available by external sources, and identify, assimilate and exploit new knowledge and technology produced elsewhere. There are two reasons, which pursue companies to engage in investments that augment their R&D activities:

The first objective, which companies try to achieve, is the reduction of the production cost of their current product set and the development of new products, which can contribute to the firm's profitability. This incentive would be applied even if the firm was not in an innovation race against its rivals, and even if it was to take R&D investment decisions in isolation. This incentive is called 'the stand-alone' or 'profit' incentive to R&D investments. The second objective is the provision of the firm with a strategic advantage over its competitors by either increasing its market share relative to its rivals, or introducing a competitive threat to them, through the development of a better process or product, so the firm may have the opportunity to foreclose the market and reap the highest amount of benefits. This incentive is called 'competitive' or 'replacement threat' incentive as the desire of the firm to be the first innovator in an industry and not to be replaced by its rivals in its current market position, and emphasized to the difference between the firm's profits if it innovates before its competitors, and its profits if one of its competitors innovated first.

In the modern knowledge economy, growth depends extensively on the presence or the formation of an environment favorable to innovation, which is based on the endogenous development capabilities. Even though the firm-specific factors are important determinants of innovation activity, technological opportunities and favorable entrepreneurial environment have a positive effect on innovation activity, as well and entrepreneurship is generally considered to be of great importance for economic development as a source of economic growth by a great number of researchers. Entrepreneurship is a process of exploiting opportunities that exist in the environment or that are created through innovation in order to create value. Entrepreneurship refers to activities undertaken in order to convert ideas into economic opportunities. These activities include factors such as opportunity seeking, risk and uncertainty bearing, innovativeness, coordination, capital supply, decision making, ownership and resource allocation. Then, entrepreneurship focuses on creating the adequate economic opportunities in order to introduce new ideas in the market. In accordance to these characteristics, entrepreneurship could be mainly considered to be the exploitation of technological opportunities by profit seeking agents, process which actually leads to economic growth and development.

Innovation is characterized by two features: uncertainty (risks) and accumulation. As far as the innovation process is concerned, the necessary information is asymmetrically available, which makes it rather difficult and costly to collect and exploit it. Moreover, the necessary inputs, as well as their attributes are difficult to be defined and, as a consequence, it becomes, also difficult to evaluate their potential effects and results. Furthermore, innovation process requires cooperation and collaboration of a great number of different actors, which, to a large extent, incorporates high transaction cost and high uncertainty level. Because of these qualities of knowledge, namely uncertainty, asymmetries and high transactions cost – entrepreneurship becomes more important in a knowledge-based economy, since entrepreneurship activities are closely related with uncertainty, risk, investment, return and profits and of course with innovative actions. Success in R&D does not lead automatically in financial business success. New commodities and processes do not yield any benefits, unless they are commercialized. Profitable commercialization requires that the innovative firm had a blend of all the appropriate complementary assets, services, and technologies, which can transform the generated knowledge into commodities produced and sold on competitive terms.

The relationship between entrepreneurial culture and economic Growth is considered to be rather strong and entrepreneurial economies are more innovative and subsequently grow faster and since early, differences in economic success have been related to the presence or lack of entrepreneurial activities. More specifically, entrepreneurs are important for the growth of firms since they provide the vision and imagination necessary to carry out opportunistic expansion. It is claimed that entrepreneurship generates innovations. On the other hand, as mentioned before, due to information asymmetries, uncertainty and high cost features of innovation, entrepreneurship becomes more important in a modern economy since it may provide one of the mechanisms by which new economic knowledge is disseminated into different networks. Entrepreneurship generates growth because it serves as a link between innovation and change. Thus, by serving as a vehicle for knowledge transmission and spillover, entrepreneurship plays a key role in the link between knowledge and growth. On the other hand, entrepreneurship is the factor which energizes and combines the production functions in order to create and disseminate innovations, which leads to improvements in productivity and economic development.

### **CONCLUSION**

The importance of entrepreneurship and innovation activities has been emphasized by economic literature. Much of the recent work on economic growth can be viewed as refining the basic economic insights of classical economists. The recent debate on the determinants of output growth has concentrated mainly on the role of knowledge, typically produced by a specific sector of the economy, and furthermore in the role of entrepreneurship and the implications on economic growth. The main themes of this paper are: Knowledge Economy, Innovation Activities, and the Role of Entrepreneurship and the main questions is: How can we estimate the effects of entrepreneurship and innovation activities in the knowledge-based economy? The Role of Entrepreneurship and Innovation in the Context of Knowledge Economy are highlighted in the paper.

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