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INNOVATION MANAGEMENT AND NEW PRODUCT DEVELOPMENT

Abstract

The paper analyze some general aspects about innovation process in the economic reality. The authors emphasize the benefits of innovation (built the infrastructure all over the world; changed the world from an agrarian society to an industrial society; overspecialized some professions and erases some professions etc.) and the main four factors which have a great influence over the innovation process (process, resources, infrastructure and culture). Another important aspect is the correlation between innovation and economic growth.

Key words: *innovation, productivity, economy, new products*

UPRAVLJANJE INOVACIJAMA I RAZVOJ NOVOG PROIZVODA – Osnovna načela –

Резиме

Рад анализира поједине основне аспекте иновационог процеса у економској реалности. Аутор наглашава предности иновација (изградња инфраструктуре у целом свету; глобална трансформација из аграрног у индустријско друштво; усавршавање једних и, с друге стране, укидање

других професија итд.) и главна четири фактора, који имају велики утицај на иновациони процесс (процес, извори, инфраструктура и култура). Следећи битан фактор је корелација између иновације и економског раста.

Кључне речи: *иновација, продуктивност, економија, нови производ.*

There is no doubt that innovation is one of the most important factor foe economic development, which makes the difference between a successful economy and an ordinary one. At the beginning of the third millennium innovation has become key driver of economic performance. Some of the recent features of this transformation are the growing impact of information and communication technologies on the economy and society; the increasing interactions between science and industry, leading to a more rapid development of new products or services and processes and a shift to more knowledge-intensive industries and services; faster technology diffusion; and rising skill requirements. The ability to harness the potential of new scientific and technical knowledge and to diffuse such knowledge widely has become a major source of competitive advantage, wealth creation and improvements in the quality of life. In order to reap the benefits from these changes, governments will have to put the right policies in place and, in particular, will need to address the following important questions to the society : What can be learned from the most successful countries on how government policies can best contribute to increased innovation performance ?

Nevertheless, the benefits of innovation are multiple. To be more specific, those innovations had the following effects:

– Built the infrastructure all over the world;

– Changed the world from an agrarian society to an industrial society;

– Overspecialized some professions and erases some professions

– Revolutionized communication, erasing barriers of time and place;

– Determine a change in life style (for example, the longevity of the people was doubled, even there are some regions with problems, especially in Africa);

– Provided opportunities for personal development

– Reduced work schedule and offer more possibilities for spare time

– Overpowered us with a large amount of data and information

The benefits of innovation are obvious. Even though, the critical disadvantage may be that society, as a whole, has not increased its intellectual capability to cope with the demands of new technologies and the changes created by those technologies. In these days we are able to process billions of bits and a huge amount of date, but we have limited ability to distinguish the useful from the useless. We purchase all types of gadgets that often force us to question the impact on effectiveness and efficiency (iPod is one of the most significant example, because it was created when there was no such a demand on the market). Life has become simpler in many ways, and at the same time more complex. Are all our organizations ready to apply the basics of innovation ?

In order to emphasize the role of innovation in the future companies, we may present a recent study made in the USA on a 700 companies sample (from which 60% pro-

duced industrial goods, 20% long use goods and 20% consumption goods). According to this study, almost 1/3 (28%) from the growth of these companies is due to the new products. Even more, 35% from the turnover is due to some products that did not exist 10 years ago.

According to the marketing theory, the life cycle of a product comprises 4 phases: the initiation phase, the development phase, the maturation phase and the decline phase.

No matter what option we make, the company should hold a research department \ to respond for the innovative process. If the products are not improved and if new products are not created, the company's profit and profit will diminish, the market quota will decrease and the company's activity will restrain.

Although the development of the new products contributes to the growth of a company's profit, this activity has several risks.

– In 1973, RANK XEROX invented the office printer (3 years before Jobs and Wozniak), but it failed to be commercialized, although it represented a real success from a technical point of view;

– The BOWMAR company was the one that invented the pocket numerical calculator, that eventually bankrupted;

– The POLAROID Company registered 68 million USD loses for the consumables of the instant photo cameras.

According to certain studies made at a worldwide level, it is appreciated that the failure rate of the new products is of about 35%, which classifies the innovation activity on the first places, among the most risky activities of a company. Given the present conditions, this risk is more and more stressed as long as the products' life period is shorter following the quick technological changes.

Except this high risk, the development of the new products is an expensive activity. In this sense, any company allocates important financial resources for: the research activity, the engineering, the marketing researches, products testing. Following the fact that many products do not go through all the stages (from need identification to consumer), a great part of these investments will never be recovered. A study made in the USA in 1995 showed that only 1 product of 7 goes through all the stages. Therefore, the incomes brought by a new product should not only cover all its expenses and investments but also those necessary for the making of other 6 products.

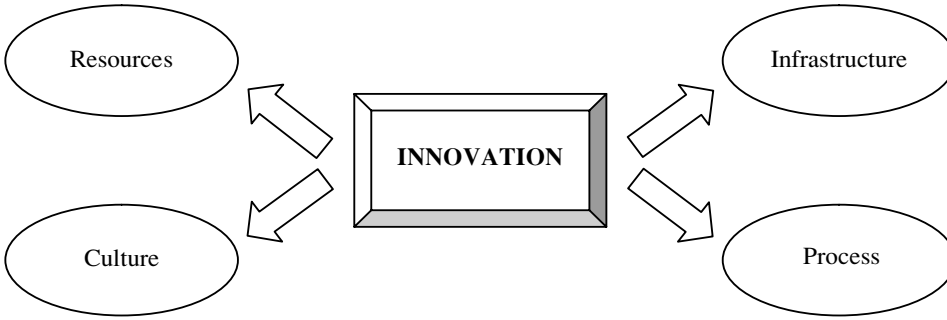
In the present days innovation may be considered as a science. All sciences not only have a theoretical base to explain the cause and effect of the phenomena encountered but also a structural taxonomy to relate elements of the discipline.

It is important to understand how innovation works and what steps we can take to reproduce it. We need to start generating practical theories of Innovation with associated taxonomies of structure and a language of use. All such theories will have common elements. They will be an integrated process because Innovation is an integrated process, they will be constructive because they build upon experience, they will be deterministic because every step is logical and reproducible and they will be fast and forward moving.

The underlying basis for all such theories is the continuum of history from past to present and from theory to practice.

The four factors that have a great influence over the innovation process are : resources (material, financial, human), the culture (tradition), the process and the infrastructure. The following figure is a suggestive in order to explain this influence.

Figure no. 1



All four factors are very important in the innovation process. In order to achieved better results, it is essential to integrate these four elements into a cohesive, systematic approach. Each of these elements interacts with the others to form an effective and efficient means for pursuing innovation. Innovation cannot take place if one or more of these four elements are missing. Obviously, each of these elements will not meet all the expected requirements. Resources require a supporting infrastructure and a supporting infrastructure requires resources. A supporting culture and an effective and efficient process provide organizations with a means for expanding innovation throughout the organization.

Defined as the development, deployment and economic utilisation of new products, processes and services, innovation is a major driver of economic growth. Innovation influences growth at both the microeconomic and macroeconomic levels. At the microeconomic level, innovation enables firms to respond to more sophisticated consumer demands and stay ahead of their competitors, both domestically and internationally. Innovation surveys for 12 European countries indicate that more than 30% of annual revenues in the manufacturing sector derive from new or improved products. Innovation is also important in the services sector, although innovation in services appears to draw less on formal research & development than is the case in manufacturing.

At the macroeconomic level, innovation contributes to the three drivers of output growth: capital, labour and multifactor productivity. Countries that registered above-average growth performance in the last years generally drew more people into employment; accumulated more capital; improved the quality of their workforces; and, in many cases, improved productivity. The contribution of innovation to productivity growth has long been recognised: increased productivity reflects greater overall efficiency in the use of labour and capital and is driven by technological and non-technological innovation – improved management practices, organisational changes, and improved ways of producing goods and services in response to evolving consumer and societal needs. However, innovation also creates new products that become part of the capital stock used by firms in generating their own economic output.

Arguably, a country's innovative capacity is more important to its economic growth – and to its ability to sustain growth over the long term – than is any particular technological breakthrough or industrial sector. While development appears to have been a key driver of growth in the 1990's, other technologies – biotechnology, nanotechnology or something entirely different – may create new industries and reinvigorate established

industries in the future. Countries that experience the highest levels of growth are likely to be those that can most rapidly develop new products, processes and services based on these new technologies and apply them most efficiently to other sectors of the economy.

In these days, characterized by an extraordinary advanced technologies we are discussing about innovation in specific areas : computer hardware and software, the Internet, e-commerce and all the electronic gadgetry that is supposed to make life easier and more productive. Arguments cannot be made against this perspective of innovation, but innovation includes more than these limited technological accomplishments. From this point of view, we must say that most innovation does not reach the public eye (for example, the public seldom recognizes innovation in the chemical and pharmaceutical industries, in manufacturing processes, in the building of local and national infrastructure, in space exploration, in agriculture, in medicine, and even in government and academic organizations). The individuals only see the results. Yet, important companies which have neglected innovation have had a profound negative impact on its people, communities, and even the national economy. Although technological innovation drives most organizations, the proof of technological innovation resides in the marketplace. Technological innovation without comparable levels of innovation from all sectors of an organization significantly reduces the benefits from investing in innovation and the chance of success for those products or services.

Radical innovation by a few organisations, together with incremental technological and organizational innovation by an increasingly large number of firms and working teams, will therefore remain essential to ensuring the sustainability of economic growth over the long term. It will also be important for ensuring sustainable economic growth – that is, growth that preserves the environment and natural resources – and to a host of other social objectives, such as improved health (OECD, 2001).

Innovation involves all entities of an organization, with no ex exceptions. All companies departments (production, sales, human resources, financial etc.) must be under the innovation process. Furthermore, executives and managers cannot be excluded, since they cannot expect innovation from others if they are not the innovators in some sphere of the organization's purposes and objectives. Every employee has the potential to be the innovator. Every external contact has the potential to support the innovation process. The sources are unlimited. The critical issue lies in recognizing the opportunities. The innovator knows that the shortest distance between two points is not a straight line.

Innovation can take many forms, ranging from radical innovations that create new products, processes and services to incremental innovations that improve upon existing offerings. Although attention often focuses on the initial introduction of new products, processes or services, incremental innovation and technology diffusion – which improves upon initial innovations and spreads them throughout the economy – provide equally important economic benefits over the long term. The sources of new ideas that drive innovation are also varied: innovation may stem from new science and technology or from new forms of organisation, new skills, new forms of marketing and ways in which demand manifests itself in the marketplace. Most successful innovation involves a combination of these factors, with specific patterns reflecting characteristics of different industries, their customers and the means by which firms can protect and appropriate the returns from their innovative.

Innovation has taken on significantly greater prominence in recent years. People from academia and universities, business and industry, government, and the nonprofit sector have spent a great deal of time attending conferences on innovation, hiring the experts,

and talking about it. However, it is necessary to emphasize an important aspect : innovation involves more than gaining knowledge, promoting continuous learning, or thinking deep thoughts – it involves translating knowledge and thinking into action. Learning is absolutely essential but must be followed by doing.

As we said earlier, most innovations take place incrementally. Even though a concept may be recognized as a potential breakthrough, innovation success comes about incrementally over time. Innovations generally are not planned. The managers cannot call a meeting and decide they want to innovate. Planning is forbidden for the innovator, not because of lack of interest but because until the concept has been defined (which very often includes experimentation in its broadest sense and verification and validation of a long list of parameters) very little is known about the interaction between the technology and the market.

Therefore, the innovation must always be oriented to the market, to the consumers needs. In these conditions, the new products (results of the innovation process) are vital to the economical growth and for the profit decrease in any company. For example:

• In 1910, the main mean of urban transportation was the tram, powered by animal force (pulled by horses). This mean of transportation was relatively fast, cheap and its future was guaranteed. But, economy grew, the demographic growth also took place and the interdependence between the cities was accentuated so an increase in the need of urban transportation was noticed.

• In 1950, IBM (International Business Machines) realized the necessity of fast and precise business information processing. Thus it was created the first computer, a point from which it was only a step until a large part of the market was conquered. But in 1957, DEC (Digital Equipment Corporation) has developed a specialized minicomputer that functioned at minimum costs. Therefore, a new market was born (one comprising billions of dollar) in which the DEC Company had the largest market share.

• In the medical electronics area, the General Electric Company has registered a great success with the computerized tomography scanner, which reduces the time needed to obtain the results and the duration of the exposure to the radiations.

If we want to describe an innovative person, we may say that it is the person who has the courage to introduce changes in his daily work, even it risks its personal career. According to Tom Peters1 "people who cannot live without change become the innovators". In his book he describe the optimal environment for innovation : recognizing small wins, committing the organization to lifelong learning, getting beyond rational analysis and looking at failure as a part of life. Furthermore, he explain that there are no formulas for developing an innovative organization. There are just principles that need to be followed in order to introduce innovations on time. The innovation from organizations such as Intel, Hewlett-Packard, Apple, Compaq, Sony did not come about through some orderly set of plans. In each of these organizations innovation came about by focusing on the marketplace, on the consumers needs. Innovation involves a process but is not dominated by process. It is a mistake for industrial organizations to emphasize technology and not to test the technological innovation on the market.

This theory may also be applied to academia, government, and nonprofit organizations. Each lives in the province of the marketplace. Although academia, government and

[1] Tom Peter Tom, Robert H. Waterman, Jr. – "*In Search of Excellence*" in 1982

other social entities are slow in responding to market forces, the nonprofit organizations clearly now realize that their future depends on providing services that meet user needs – needs of their supporters and their clients.

* * *

To be efficient and to achieved results, the innovation process must be simple and focused. Therefore, it should do one thing only, otherwise it confuses people. Innovations start at a small level, usually from an idea (ex. the simple idea of putting the same number of matches in a matchbox made possible the automatic filling process and gave Sweden a world monopoly on matches for more than 50 years). Even so, the innovations must be valorized through an important investment process, which can transform the idea to an improvement of the lifestyle for the masses.

In the present days innovation represents one of the most important economic aspect which can explain the gap between economies of two or more countries. In the advance economies (U.S.A., European Union, Japan, Canada etc.) there is an important process of innovation at different level; in the same time, these economies have an important flux of new products, as a result of the innovation process.

REFERENCES

1. Achilladelis, B., A. B. Robertson, and P. Jervis (1971) – "*Project SAPPHO: A Study of Success and Failure in Industrial Innovation*", 2 vols. London: Centre for the Study of Industrial Innovation
2. Baily, M.E., E.J. Bartelsman and J. Haltiwanger (1996) – "*Downsizing and Productivity Growth*", in David Mayes (ed.), *Sources of Productivity Growth*, Cambridge University Press.
3. Cameron, G. (1998) – "*Innovation and Growth: A Survey of the Empirical Evidence*", mimeo, July.
4. Cohen, W.M. and D.A. Levinthal (1990) – "*Absorptive Capacity: A New Perspective on Learning and Innovation*", Administrative Science Quarterly 35, pp. 128-152.
5. European Technology Assessment Network (1999) – "*Report on Promotion of Employment in Research and Innovation Through Indirect Measures*", European Commission, Brussels.
6. Eric von Hippel (1998) – "*The Sources of Innovation*", Oxford University Press
7. Griliches, Zvi, (1987) – "*Patents and Productivity*", Chicago: University of Chicago Press,
8. OECD (1999*a*) – "*Managing National Innovation Systems*", OECD, Paris.
9. Peter F. Drucker (2002) – "*The Discipline of Innovation*", The Innovative Enterprise
10. Stokes, D. (1997) – "*Pasteur's Quadrant: Basic Science and Technological Innovation*", Brookings Institution, Washington DC.
11. UNICE (2000) – "Stimulating Creativity and Innovation in Europe: The UNICE Benchmarking Report 2000", Brussels, Belgium.