

ECONOMICS OF INNOVATION AND INFORMATION TECHNOLOGIES

The article is devoted to one of the actual problems of economics – innovation as one of the main strategies of a firm. The procedure of developing new processes and products is described. It is stressed that innovation is an often-used method of gaining competitive advance.

Статья посвящена одной из актуальных проблем экономики – инновации как одной из основных стратегий фирмы. Описывается процедура разработки новых процессов и продуктов. Подчеркивается, что инновация – это часто используемый метод достижения конкурентного преимущества.

Key words: innovation; information technologies; research and development; invention; diffusion.

Ключевые слова: инновация; информационные технологии; исследование и развитие; изобретение; диффузия.

Globalisation is an abstract concept. It does not refer to a concrete object, but to a social process. Globalisation is a complex process that involves political, economic, socio-cultural changes. Many see it as a primarily economic phenomenon, involving the increasing interaction, or integration, of national economic systems through the growth in international trade, investment and capital flows. One can also point to a rapid increase in cross-border social, cultural and technological exchange as a part of the phenomenon of globalisation.

A German academic Ruud Lubbers defines globalization as a process in which geographic distance becomes a factor of diminishing importance in the establishment and maintenance of cross-border economic, political and socio-cultural relations [1].

Economic globalization is a historical process, the result of human innovation and technological progress. It refers to the increasing integration of economies around the world, particularly through the movement of goods, services, and capital across borders. The term sometimes also refers to the movement of people (labour) and knowledge (technology) across international borders. There are also broader cultural, political, and environmental dimensions of globalization.

The term “globalization” began to be used more commonly in the 1980s, reflecting technological advances that made it easier and quicker to complete international transactions – both trade and financial flows. It refers to an extension beyond national borders of the same market forces that have operated for centuries at all levels of human economic activity – village markets, urban industries, or financial centres.

There are countless indicators that illustrate how goods, capital, and people have become more globalized. The growth in global markets has helped to promote efficiency through competition and the division of labour. Global markets also offer greater opportunity for people to tap into more diversified and larger markets around the world. It means that they can have access to more capital, technology, cheaper imports, and larger export markets.

The broad reach of globalization easily extends to daily choices of personal, economic, and political life. For example, greater access to modern technologies, in the world of health care, could make the difference between life and death. In the world of communications it would facilitate commerce and education, and allow access to independent media.

Globalization can also create a framework for cooperation among nations on a range of noneconomic issues that have cross-border implications, such as immigration, the environment, and legal issues. At the same time, the influx of foreign goods, services, and capital into a country can create incentives and demands for strengthening the education system, as a country’s citizens recognize the competitive challenge before them.

Perhaps more importantly, globalization implies that information and knowledge get dispersed and shared. Innovators – be they in business or government – can draw on ideas that have been successfully implemented in one jurisdiction and tailor them to suit their own jurisdiction. Just as important, they can avoid the ideas that have a clear track record of failure [2].

Interest in technology, technological change and innovation as a strategy of firms is probably as old as firms themselves. But an intensification of interest in this issue in Europe in recent times stems from concern that a technology gap may be opening up between EU firms on the one hand, and Japanese and US firms on the other. What is meant by technology gap is a disparity in the levels and rates of change of technology.

Technology has been defined in a number of different ways. Some economists define it in terms of information about input combinations. In Germany it is generally regarded as a body of knowledge and skill applicable in the production of goods. Others consider it as the systematic organization of the production process. We accept a wide definition, including all the above, that is one that incorporates both the technical, production engineering information and the organizational aspects.

Another concept that has different definitions is high technology. While it would be preferable to define this in terms of new and innovative products and processes, this is, in practice, very difficult to measure. No data are kept on new and innovative products or processes; it is not clear whether such data could be kept in any comprehensive way. As a result, it is more usual to define a high technology industry as one with a high level of research and development (R&D).

This leads to the identification of high technology industrial sectors as those which have three characteristics:

- a higher than average investment in R&D, with a R&D to production ratio of over 4%\$;
- a greater propensity to obsolescence due to a higher than average introduction of new products and processes;
- a greater share of government outlays on R&D.

Industries that correspond to these characteristics are: aerospace, office machinery and computers, electronics, pharmaceuticals, precision and measuring instruments, and electrical machinery. The problem with this definition is that it excludes advanced technology activities in traditional industries like clothing, textiles and furniture.

A key technology is the specific knowledge that enables a firm to keep up with or ahead of its competitors. A core technology is a technology the mastery of which is essential to the development of an industrial sector.

The idea of a widespread application across many sectors leads to the notion of a generic technology or a pervasive technology. Generic technologies are most evident in the mechanical engineering, chemicals, and office equipment sectors.

A strategic technology is one that enables a nation to keep its economic independence vis-a-vis the rest of the world.

The procedure of developing new processes and products has traditionally been divided into three stages: invention, innovation, diffusion [3].

Invention is understood as the creation of a new idea, or of a new way of combining technical operations.

Innovation is seen as the transformation of the idea into practical use; it is the application in new, improved or just different products or processes. Innovation is an often-used method of gaining competitive advance.

Having the product for sale and having a very effective method of providing it are some of the greatest strategic advantages a company can have. New products or processes do not remain unique to a company for long. Many companies introduce innovative products or new processes to provide their goods or services. If they bring these to market quickly, they may gain competitive advantage and market share.

New products provide great opportunities for profit before close alternatives and before price competition reduces the company's margin. Competitors will follow quickly to keep from yielding competitive advantage and losing market share. Companies require flexibility if they are to introduce new products rapidly and to change their product mixes often.

The design of the goods or services that a company offers in the market has strategic importance for at least several reasons. Design directly impacts the company's success in the marketplace. The effects of design are interrelated and affect many parts of the company. Design is guided by objectives and policies that are best addressed when a company considers the types of goods and services it will offer and the level of quality it intends to provide. A product's design and reputation affect perceptions of the company held by employees, customers, and the public.

The exterior appearance of a manufactured product affects the initial attention of potential buyers and the pride of ownership for those who do buy. The internal components of a product affect its performance, reliability, and durability, and the customers' long-term satisfaction. The number, type, and complexity of a product's components also affect the type of suppliers with which a company must deal and the amount of work and operating costs a company will have.

Diffusion is the process by which the use of an innovation spreads and grows. The diffusion of an innovation can be inter-industry or spatial. Within a single nation, a new product or process, generated in a given industry, can spread across the industrial structure of that nation. Improvements in machine tools or in

computers, for example, will lead not only to process improvements but also to product upgrading within the user industries.

Innovation and diffusion of this type can occur almost simultaneously as, for example, where increased precision in production of a product arising from a particular innovation necessitates the introduction of the same or similar innovation in the firms supplying sub-components.

Spatially, and specifically internationally, diffusion is enhanced by transfers through foreign direct investment, joint ventures, licensing, and other strategic alliances. Diffusion can be both inter-industry and simultaneously international, as for example, when it is by-product of normal market operations, such as the purchasing of capital equipment or of intermediate inputs into a production process. In addition to imitation, scientific exchanges, specialist publications, and the inter-firm mobility of employees at various levels, all also enhance the diffusion process.

The diffusion of innovations across economies can be rapid or slow. The time required for the adoption of an innovation by imitators can vary from one year (packaging beer in tin cans), to twenty years (continuous annealing of tin-plated steel). The lag depends on the height of entry barriers and on the nature of the innovation.

Other factors in the diffusions of innovations include the nature of the innovation, the internal structures of firms, relations between firms, and legal protection for the innovator.

Legal protection of innovators is usually in the form of patents. Patents are devices aimed at protecting the innovator against quick diffusion; they also constitute an indicator of innovative performance. One risk faced by the innovating firm is fast imitation before the costs of innovation have been retrieved, sometimes referred to as the "free-rider problem". The more effectively patents can prevent free riding, the lower will be the rate of diffusion.

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