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MECHANISMS OF STANDARDIZATION EFFECT ON INNOVATION



The impact of standardization on innovation processes has been discussed. The effect of standards on the growth of national economy in various countries has been surveyed. The analysis of what is primary, the innovation or the standards, has been made. The inconsistency of standardization and innovation has been considered; the reasons therefor are explained; and a method for its prevention has been proposed.

Key words: standardization, innovation, quality, impact, and products.

Today, the world advanced economies actively raise their economic level with a focus on the promotion of R&D activities, in particular, the cutting-edge innovative technologies and new management approaches. The countries generating new ideas and knowledge underlying the state-of-the-art technologies, products and services get an edge over competitors.

The standardization is known to be a means of ensuring compatibility, interoperability, harmonization, reliability of hardware and information systems, compliance with safety and environmental requirements, consistency of characteristics and properties, as well as quality of products, works and services. Therefore, today, the standardization becomes increasingly important insofar as it interrelates the design solutions, promotes the cooperation among the industries, and facilitates the effective introduction of high-end technologies in production. It sets the benchmark towards which the producers of goods and services should be targeted while improving their technologies.

Now, the standards are developed at the early stages of product creation inasmuch as the com-

ponents of many products are designed, manufactured, assembled, and packed around the world. That is why, the methods for monitoring and measuring, the materials and the numerous regulatory requirements for products have to be planned and standardized as early as possible.

In addition, the use of standards contributes to successful transition from idea to its realization, implementation of new product, and facilitation of innovation activities, with the standards being incorporated into the R&D activities.

Innovation is a targeted search of systemic changes in the corporation, which can lead to the improvement of product quality and diversification, the use of new patterns of production, management approaches, and operating conditions, the improvement of workforce qualifications, and the expansion of goods and services in new and existing markets [1].

Thus, the progress of innovation requires a balanced cooperation and competition among the corporations, with the standardization being a factor that can provide this balance. Below, one can find the answers on questions «What are the mechanisms and the effect of standardization on the innovation processes?» and «How does the use of different types of standards contribute to innovation?»

ANALYSIS OF SURVEYS AND PUBLISHED MATERIALS

While analyzing the publications on this subject it was found that the matter has not been studied comprehensively. This paper deals with a survey on how investments in standardization effect the growth of economic indices and, consequently, the innovation.

For example, standardization is an essential aspect of German economic policy, which ensures the status of Germany as a leading industrial nation in strengthening, shaping and increasing the transparency of strategic regional and global markets in Europe and worldwide in the most important business sectors. In Germany, innovations are supported at the very early stages due to the effective cooperation between the research centers and the business and the standardization. The contribution of standardization gained a positive trend and within the five-year period from 2002 to 2006, reached EUR 16.77 billion. Germany spends on standardization EUR 800 million, i.e. it means that EUR 1 invested in standardization generates a profit of EUR 20 [2].

The macroeconomic studies of the impact of standards on the growth of the national economy have showed [3] that:

- ✦ In France, standardization contributes directly to the economic growth by 0.81%, i.e. to an increase in GDP growth by almost 25%;
- ✦ In New Zealand, the standards are a powerful economic lever and may eventually lead to an annual growth in GDP by 1.0%, i.e. by EUR 2.4 billion across the economy;
- ✦ In Canada, an increase in the number of standards accounted for 17% of the growth pace in labor productivity and for about 9% of the growth pace in output, in 1981–2004. If it had not been for this growth in standards in this period, real GDP would have been less by EUR 62 billion;
- ✦ In Australia, an increase in the number of standards in 2002 by 1% entailed a rise in labor productivity by 0.17% (in addition, the standards along with the costs of research and development could be seen as a contribution to the

knowledge base: a 1% increase in knowledge leads to an increase in productivity by 0.12%);

- ✦ In Germany, where the standards make a more significant contribution to the national economic growth than the patents or licenses, the economic benefits of standardization constitute approximately 1% of GDP (the export-oriented industries apply the standards for entering new markets and simplifying technological modifications);
- ✦ In the UK, according to a survey of 2005, every year, the standards make a contribution of EUR 2.5 billion to GDP. Due to the standards the labor productivity grew by 13%, therefore, they contribute to innovation and technology transfer thereby ensuring sustainable growth and profitability [4].

The research [5] dealt with the effect of standards on economic growth in some countries. The results are given in Table. The data show that since 1992, the overall economic efficiency of standardization has been stabilized at the level of around 0.7–0.8% of GDP. This means that standardization contributes to the stabilization of economic growth.

Hence, the standards have a material impact on the economic indices, which leads to the emergence and spread of innovation.

This research is aimed at identifying the general mechanisms of the effect of standardization on innovation process.

THE RESULTS OF RESEARCH

The modern market is characterized by short-term life cycle of products and services, insofar as

**International Survey of the Effect
of Standards on the Economic Growth**

Country	Period	GDP growth	Effect of standards
Germany [2]	1960–1996	3.3%	0.9%
France [6]	1950–2007	3.4%	0.8%
United Kingdom [7]	1948–2002	2.5%	0.3%
Canada [8]	1981–2004	2.7%	0.2%
Australia [9]	1962–2003	3.6%	0.8%

the emergence of new types and modifications thereof requires market launch of the products of higher quality at a favorable price in a short period of time in the relevant market segment.

The standardized product gets a competitive advantage over the non-standardized one due to possible shift of its production from the advanced economies to less developed ones. *On the one hand*, it contributes to the improvement of economic relations between the two countries and the development of countries with low economic level of production, but, at the same time, it can also pose a threat to innovator's own competitiveness, because it allows other manufacturers to use the technology and manufacturing processes of the developer. We believe that this can be prevented by focusing the standardization activities on the industries in which the national innovation potential is the highest. However, *on the other hand*, standardization of products gives advantages for the consumers by providing access to information about characteristics and methods of test of products and services and making them transparent to the world.

The question arises: «Which of the innovation and the standards should be primary?» In some cases, the standards precede the innovation setting out the criteria for design and performance that satisfy the consumer requirements. In other cases, the innovative idea that has found its place in the market may underlie a new standard which subsequently will reflect an agreed time-tested solution. The question «When the new idea should be standardized?» should be an integral part of the planning and the product development strategy.

The manufacturers who are actively involved in the development of national and international standards have a significant advantage over their competitors thanks to the use of new technologies and methods of control, since their product is of higher quality and meets the present-day requirements of the market.

It is a well-known fact that the small businesses have to be more active in the market, flexible and ready to rapid reorientation. Therefore, of-

ten, it is just small companies that become pioneers of new products and new technologies in various industries. In addition, the money received from the sale of innovative product covers the costs of development and use of innovations, stimulates development of new ideas and is a source of funding for new innovation process. These companies should understand that to be successful in their industry they have to standardize the idea as soon as possible. The common standards allow the manufacturer to prove (e.g., using the present-day methods of measuring performance, risk assessment, and their impact on the result) that their innovative products really have a high quality.

During the analysis, the mechanisms by which the standards effect the innovation have been identified [10]. Schematically, this relationship is showed in Fig. 1.

The mechanisms of standardization effect on innovations are as follows [11]:

- ✦ The standards contain information about the technologies and test methods that can be used to create new ideas (in the case where the standards are publicly available, it contributes to the effective dissemination of technologies in all sectors, helps to focus efforts on the real innovations instead of developing products that have been already standardized);
- ✦ The standards effect the innovations by reducing the information inconsistency (if the product is standardized, the information is less contradictory for the consumer who is willing to pay more for such a product, which leads to an increase in the probability of new innovations);
- ✦ The free available standards facilitate the entry of new participants and new members to the market, which is a powerful driving force for innovation;
- ✦ The standards govern a variety of products (usually, reduction of diversity saves money that is invested in the production, which leads to a decrease in the cost of products until the necessary critical mass for innovation is achieved);
- ✦ The standards contribute to the creation of international glossaries that allow the research-

ers around the world to easily find a common language in the development of joint projects and the innovators to differentiate their products and services in the market, i.e. to save time and money on real innovation.

For each of the above mechanism the government support of innovation is very important. Below, one can see how the use of each type of standards can contribute to the development of innovative products (Fig. 2). From this scheme it follows that:

- ✦ The safety and environmental standards allow the innovators to meet the product safety performance requirements or to improve them. These standards help to avoid contact with dangerous products in the market and to monitor the environment conditions, i.e. they lobby the interests of consumers;
- ✦ The compatibility standards are necessary for modifications and improvements to existing products, services, and methods of control. They

are the basis for the development of innovation and facilitate the access to the international market of new products. In some cases, when absolutely new types of products and services are created it is necessary to develop new standards before the product release;

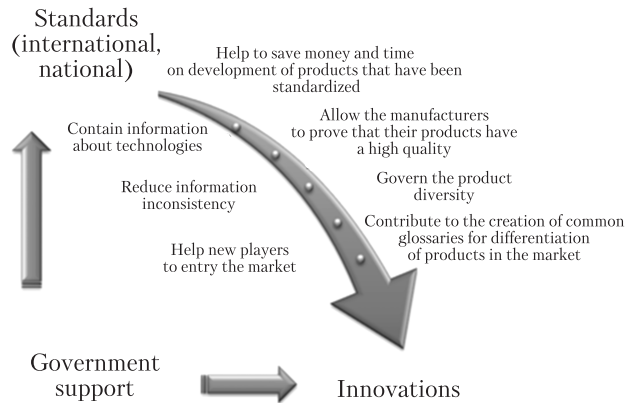


Fig. 1. Relationship between Standardization and Innovation

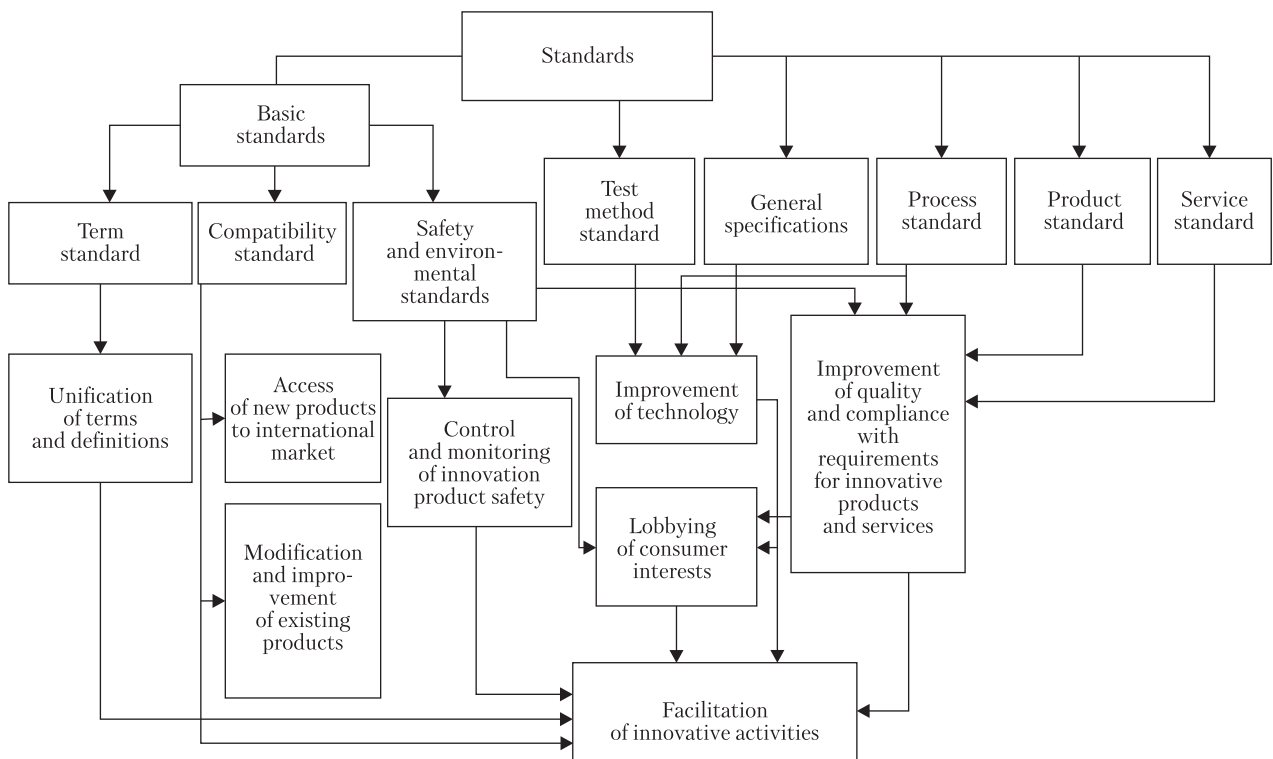


Fig. 2. Effect of different types of standards on innovation

- ✦ The test method standards and general specifications allow the innovators to exhibit their products in a good light, to offer or to improve their technology;
- ✦ The standards for products, services, and processes help the innovators to prove that the product really has the characteristics and quality which meet the world standards. They also contribute to the improvement of enterprise operation thanks to the development of modern patterns of production and the creation of new products and services;
- ✦ The standards for terms and definitions help the manufacturers to unify the notation and terminology and to differentiate new products and services in the market; also, they help the consumers to make the right choice when placing the orders.

It should be noted that often the standardization and the innovation are considered to be contradictory processes. While the innovation seeks novelty and exclusivity, the standardization tends to predictability and uniformity. At the same time, the standardization is an important contributor to the innovation and helps to confirm the product compliance with required characteristics, to use and to implement new technologies, to expand markets, and to get an access to the world market. All these advantages are impossible unless the standards are elaborated by the best professionals in the industry and contain not only the general knowledge, but also the know-how. At the same time, the standards that do not meet modern requirements hamper the innovation, and the minimum quality characteristics can reduce its significance. In addition, reducing the incentives for innovation by establishing minimum quality standards may also impair the user social protection. The standards should be nullified as soon as they become outdated [2]. The regular review and reissue of standards ensure the diversification of products and makes it possible to take into consideration the latest developments in the field of technology and materials.

CONCLUSIONS

1. Only with standardization process the innovation becomes a procedure which makes it possible to determine the development and use of innovative products by millions of consumers. Standardization makes knowledge about innovative technologies transparent and publicly available.

2. The elaboration of standards supported by the company's management policy focused on innovation and understanding of the impact of intellectual property rights is a key tool for the technical examination of the company and the assessment of prospects for penetration of its products to the world market, as well as for the introduction of innovative technologies.

3. The innovation-based enhancement of standardization effectiveness as an effective tool of economic development is impossible without the active government support.

4. One of the main tasks of the government policy in the sphere of innovation should be to encourage the technical committees and enterprises of all forms of ownership to develop national and international standards, especially, in the field of new technologies, which will allow the country to take its rightful place in the world market.

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МЕХАНІЗМИ ВПЛИВУ СТАНДАРТИЗАЦІЇ НА ІННОВАЦІЇ

Обговорюється вплив стандартизації на інноваційні процеси. Наведено результати дослідження впливу стандартів на ріст національної економіки різних країн. Проведено дослідження, що є первинним — інновації чи стан-

дарті. Розглянуто суперечливість стандартизації й інновацій, пояснено причини такої суперечливості й запропоновано спосіб, як можна цього уникнути.

Ключові слова: стандартизація, інновація, якість, вплив, продукція.

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МЕХАНИЗМЫ ВЛИЯНИЯ СТАНДАРТИЗАЦИИ НА ИННОВАЦИИ

Обсуждается влияние стандартизации на инновационные процессы. Приведены исследования влияния стандартов на рост национальной экономики различных стран. Проведено исследование, что является первичным — инновации или стандарты. Рассмотрена противоречивость стандартизации и инноваций, объяснены причины такой противоречивости и предложен способ, как можно избежать этого.

Ключевые слова: стандартизация, инновация, качество, влияние, продукция.

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