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## ECONOMIC EFFICIENCY OF INTERNATIONAL STANDARDIZATION

*The article reveals the aspects of economic efficiency of international standardization. The system of international standardization, as well as the contribution of international standardization in the increase of the national economy is analyzed; statistical data as to the most efficient international standards are provided.*

**Keywords:** international standardization; international standards; efficiency; economic efficiency; national economy; gross domestic product (GDP); compliance certificate.

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## ЕКОНОМІЧНА ЕФЕКТИВНІСТЬ МІЖНАРОДНОЇ СТАНДАРТИЗАЦІЇ

*У статті розглянуто аспекти економічної ефективності міжнародної стандартизації, зокрема, розглянуто систему міжнародної стандартизації, досліджено внесок міжнародної стандартизації в зростання національної економіки, наведено статистичні дані щодо найбільш ефективних міжнародних стандартів.*

**Ключові слова:** міжнародна стандартизація, міжнародні стандарти, ефективність, економічна ефективність, національна економіка, валовий внутрішній продукт (ВВП), сертифікат відповідності.

**Форм. 1. Табл. 2. Літ. 20.**

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## ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ МЕЖДУНАРОДНОЙ СТАНДАРТИЗАЦИИ

*В статье рассмотрены аспекты экономической эффективности международной стандартизации, в частности, рассмотрена система международной стандартизации, исследован вклад международной стандартизации в рост национальной экономики, приводятся статистические данные о наиболее эффективных международных стандартах.*

**Ключевые слова:** международная стандартизация, международные стандарты, эффективность, экономическая эффективность, национальная экономика, валовой внутренний продукт (ВВП), сертификат соответствия.

**Introduction.** The implacable expansion of international ties does not let standardization get locked within a country. International standardization is of prime importance for successful economic, technical, scientific, and intellectual cooperation of the countries (Kuzmina, 2011).

International standards absorb new achievements of science and technology of the leading countries, depicting the interests of the majority of them and thus taken as a basis while developing national and regional standards (Salukhina, 2010).

The problem of economic efficiency of international standardization is very important as standardization at the international level not only promotes fast practical implementation of scientific achievements, but also helps to define the most efficient economic and perspective directions of development of national economies.

**Analysis of the research and publications.** Economic efficiency of international standardization is a new line of research in the history of international standardization. Among national scientists involved in the study of various aspects of economic efficiency of both national and international standardization are O. Bikbulatova et al. (2012), L. Bozhenko (2006), T. Kuzmina (2011), N. Salukhina (2010) etc. Scientists' efforts led to the development of the theories and practical recommendations related to general theoretical issues. A significant contribution to the study of the important aspects of economic efficiency of international standardization is made by such foreign scientists as I. Lifitz (2004), V. Bielobragin (2012), N. Belianska (2010), K. Vukherer et al. (2012), L. Basch (2011) and many others.

**Parts of the problem to be solved.** Despite the rising attention of Ukrainian scientists to the efficiency of the national standardization system, not enough attention is paid to international standardization. National scientists underresearched the economic effects of international standardization; the most efficient international standards remain ignored. All this determines the necessity of research of the objective theoretical and statistical data as to economic efficiency of the international standardization system within the national economy.

**The aim of research** is to reveal the peculiarities of the system of international standardization and the analysis of its economic efficiency within the development of national economy.

**Key research findings.** According to the definition provided in the Law of Ukraine on Standardization, international standardization is the standardization carried at the international level and open for participation by relevant authorities of all countries.

The purpose of international standardization is the promotion of unrestricted flow of products and services between certain countries provided the mutual efficiency of such cooperation is ensured (Bozhenko, 2006).

Several (2 or more) sovereign states may participate in international standardization. The result of international standardization is international standards adopted by international standardization organizations.

The system of international standardization consists of the aggregate of the standardization organizations and the results of their work: international standards, technical regulations, recommendations, standard documents and a number of the other scientific, economic, technical, social data.

The official organizations of the international standardization system are:

- ISO (International Organization for Standardization);
- IEC (International Electrotechnical Commission);
- ITU (International Telecommunication Union).

These organizations are globally authorized to issue international standards (Kuzmina, 2011).

International standards are the source of the most important information as they contain standards and rules based on the achievement in different fields of economics, technique, technology, practical experience, and recognized by consensus, as many experts from different countries of the world are involved in such work. International standards help to harmonize relations with different countries in terms of economic and scientific issues as well as to avoid extra expenses for obtaining certificates and conduct of repeated tests (Bikbulatova, 2012).

International organizations, as a part of their activity, are closely interconnected by organizational and procedural means, which largely ensures the integrity and harmonization of the standards developed by the latter (Kuzmina, 2011).

Apart from the above specialized organizations, standardization-related problems are faced by approx. 500 international organizations (Salukhina, 2010). ISO is the most significant among them. It cooperates with the specialized bodies of the United Nations Organization (UN), European Economic Community (GATT/WTO), International Atomic Energy Agency (IAEA), and other international organizations, both public and private (Sydoruk, 2007).

The main purpose of ISO is to ensure the development of standardization and adjacent fields with the purpose to promote the international exchange of goods and services, as well as the development of cooperation in economic, technical, scientific, and intellectual fields.

The significance of ISO is proved by the fact that currently 163 countries hold different membership status thereof, which is approx. 98% of the global population and more than 90% of economic sectors (Kuzmina, 2011).

ISO has about 3,000 structural subdivisions, 224 technical committees, 2,500 working groups, and more than 19,000 standards (Salukhina, 2010).

ISO standards are not obligatory, and every country may decide whether to use them or not. The forms of use of the ISO standards differ. They may be incorporated into the national standardization system; used on the basis of bi- or multilateral agreements etc. The highest achievement of the national committee is the adoption of ISO standards as national.

In the course of the standards development, the ISO experts comply with 3 main principles directed to ensure work efficiency:

- standardization shall comply with the requirements of industrial sectors;
- approval shall be via consensus;
- use of the standards shall be voluntary (Kuzmina, 2011).

ISO standards mainly contain the requirements to products safety, interchangeability, testing methods, and do not contain the requirements to specific products which are provided in Technical Specifications (TS) and product agreements.

The perspective ISO work directions are as follows:

- harmonization of close ties with commodity market;
- reduction of costs for products due to the increase in efficiency of operation of administrative authorities, use of human resources, optimization of works organization, development of IT and telecommunications;
- effective promotion to the WTO members due to the conversion of products technical specifications to ISO standards;
- inducement to the creation of new standards in industry and improvement of the relations with the WTO;
- ensuring flexible planning of the creation of new standards subject to fast change of market conditions;
- standardization research in non-governmental sectors of industry;
- integration in IT field (Bozhenko, 2006).
- efforts to increase efficiency of the activity of domestic standardization authorities.

Economic efficiency of international standardization is confirmed by the extensive use of international standards in the fields of national economy at macro- and micro-levels. Thus, the study of the contribution of international standardization to the growth of the national economy proves that, on average, the increase by 1% of the number of international standards as the national ones leads to the increase by 0.33% of sales turnover (Vitkin, 2009).

This is very important when such global challenges as the sustainable development which does not deplete natural resources, and unstable financial markets made countries, organizations, and regulative authorities look for the opportunity to reach better results via expenses reduction (Vukherer, Alioshyn, Ture, 2012).

At the macrolevel, international standards are a powerful tool in enhancing the competitiveness of the country at the world market, giving the possibility to produce faster, with lesser expenses, and for a larger number of the countries. International standards, developed by world experts, serve as a stable basis for the development of innovations, as well as facilitate market entry for new products. They cause countries, organizations, regulatory authorities, and research institutes should not "reinvent the wheel", but should invest funds in other priority directions (Vukherer, Alioshyn, Ture, 2012).

The aggregate effect from standardization is approx. 1% of GDP. Table 1 proves the influence of standardization on macroeconomic indices in Germany, France, Canada, Great Britain, and Australia.

The calculations for 1996–2010 contain the famous model of Cobb-Douglas production function:

$$Q = AL^aK^b, \quad (1)$$

where  $Q$  – the total production;  $A$  – the total factor productivity;  $L$  – the labor input;  $K$  – capital input;  $a$ ,  $b$  – output elasticities of capital and labor, respectively (Aronov, Versan, Chaika, 2012).

**Table 1. The Degree of Influence of Standardization on Macroeconomic Indices**  
(Aronov, Versan, Chaika, 2012; DIN, 2000)

Index	Research					
	DIN 1999 Germany	DIN 2010 Germany	DTI, Great Britain	SCC, Canada	CIE, Australia	AFNOR, France
Contribution to GDP, %	0.9	0.7	0.3	0.2	0.8	0.8
Impact on labor productivity, %	30.1	-	13.0	17.0	-	27.1

Totally, on the basis of such research results, it is possible to confirm that standards exert a stabilizing influence on economic growth. The obtained effect from standardization is herewith estimated as 0.2% of GDP for Canada and 0.8% of GDP for France and Australia. Standardization also positively affects the growth of labour productivity (contribution from 13% to 27%) (Aronov, Versan, Chaika, 2012).

At the macrolevel, international standards help organizations meet the needs of their customers with a focus on the optimization of internal processes of enterprises. Consumers, in turn, may be confident that international standards promote the efficiency and product safety (Vukherer, Alioshyn, Ture, 2012).

Thus, economic problems of international standardization are smoothly connected with scientific and technical progress and economy of different fields. As economic efficiency shall always be treated from the position of the goals set, it is possible to confirm that the efficiency from economic standardization means the ability to reach the set goals in national economies, thus introducing the procedure of product development and provision of services of optimal quality with minimum losses, expenses and efforts.

Economic efficiency of the top-level standards is much higher than the economic efficiency which can be obtained from the development and introduction of the standards of lower level. Thus, the economic efficiency of international standards may be several times higher than the economic efficiency from the development and introduction of the standards of certain enterprises or firms, as the application area of the latter is comparatively much lower (Bozhenko, 2006).

Annually, ISO report presents data from the compliance certificates of 6 ISO standards: quality management systems (ISO 9001), environmental management system (ISO 14001), field management systems (ISO/TS 16949 and ISO 13485), food safety management system (ISO 22000), and information security management system (ISO/IEC 27001).

In such context, it is possible to underline that such standards are the most efficient from the point of view of international experts. The total number of the issued certificates for management systems based on the above standards as of 2010 was 1,457,912, i.e. the increase by 6.23%, as compared to 2009 (Tab. 2). The certificates are issued in 178 countries of the world (Belobragin, 2012).

ISO standards of 9000 series are widely used in such fields as industry, trade, management, organizations of transport and road complex, construction, education, and healthcare.

ISO standards of 9000 series are recognized as an important tool for reaching the main goal of firms under market, namely, consumer satisfaction. ISO standards of 9000 series contain the main requirements on the development of the overall (total) quality management (Total Quality Management – TQM) in industry and service sector (banks, hospitals, restaurants etc.) (Salukhina, 2010).

ISO standards of 9000 series in quality management systems are widely used in Europe, USA and Japan. The number of companies which introduce these standards in the countries of Asia and Latin America is about to boost. More than 90 countries have national standards which are equivalent to the ISO standards of 9000 series. The global leaders in this field are China, Italy, Japan, Spain, Great Britain, USA, India, Germany, and the Republic of Korea (Salukhina, 2010).

As of the end of 2010, the total number of the issued certificates under the basic ISO standard of 9001:2008 series, was 1,109,905. The increase of the issued certificates compared to 2009 is 4%. The change of the calculation method can be the reason for decrease in the number of the certificates: instead of the general number of the certificates issued since 1993, some countries (e.g., USA and Japan) provide the number of valid certificates in the reports (Belobragin, 2012). In Ukraine, the number of valid certificates under the ISO basic standard of 9000 series as of 31 December 2010 is 3,462 (ukrndnc).

**Table 2. Number of Certificates issued to Management Systems**  
(Belobragin, 2012; ISO, 2010)

Year	2006	2007	2008	2009	2010
<b>ISO 9001</b>					
Total certificates	896929	951386	982832	1064785	1109905
Δ absolute increase	123062	54557	321346	81953	45120
Δ% increase	16	6	3	8	4
Number of countries	170	175	176	178	178
<b>ISO 14001</b>					
Total certificates	128211	154572	188815	223149	250972
Δ absolute increase	17048	26361	34243	34334	27823
Δ% increase	15	21	22	18	12
Number of countries	140	148	155	159	155
<b>ISO/ TS 16949</b>					
Total certificates	27999	35198	39320	41240	43946
Δ absolute increase	10952	7199	4122	1920	2709
Δ% increase	64	26	12	5	7
Number of countries	78	81	81	83	84
<b>ISO 13485</b>					
Total certificates	8026	12985	13234	16424	18834
Δ absolute increase	2961	4959	249	3190	2410
Δ% increase	58	62	2	24	15
Number of countries	81	84	88	90	93
<b>ISO 22000</b>					
Total certificates		4132	8206	13881	18630
Δ absolute increase			4076	5675	4749
Δ% increase			99	69	34
Number of countries		93	112	127	129
<b>ISO/ IEC 27001</b>					
Total certificates	5797	7732	9246	12934	15625
Δ absolute increase		1935	1514	3688	2691
Δ% increase		33	20	40	21
Number of countries	64	70	82	117	117

ISO standard 14001:2004 "Environmental Management System" is relevant for the organizations wishing to carry business in the ecologically acceptable form.

The main goals of the introduction of the environmental management system at an enterprise and its certification are:

- reduction of negative impact on the environment;
- increase in ecological efficiency of enterprise activity;
- increase in economic efficiency of enterprise activity;
- wastes decrease and their processing.

Such certificate help an enterprise (especially with hazardous production) receive credit from a Western bank: financial experts always consider the minimization of the risk of the environmental disaster at an enterprise (Salukhina, 2010).

The general information regarding the number of the issued certificates for compliance with ISO 14001:2004 are provided in Table 2. As of the end of 2010, 250,972 environmental management systems in 155 countries i.e. 12% higher than in ISO report for 2009, were certified. High indices of certificates' increase in terms of ISO 14001:2004 are reached by Great Britain – 3,434, Italy – 2,522, Czech Republic – 1,945, Republic of Korea – 1,838, Spain – 1,820, Brazilia – 1,488 (Belobragin,

2012). In Ukraine, the number of valid certificates of ISO 14001:2004 series as of 31 December 2010 p. is 103 (ukrndnc).

ISO/TS standard 16949:2009 "Quality management systems" – particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations. The aims for setting special requirements to the quality management systems in the automobile manufacturing are as follows:

- ensuring a constant improvement;
- emphasis on the avoidance of defects;
- constant decrease in variation and costs.

According to the International Organization of Motor Vehicle Manufacturers, 43,946 compliance certificates were issued in 84 countries as of the end of 2010 (increase by 7%). The highest rate of increase of the number of the compliance certificates to ISO/TS standard 16949:2009 for 2010 were demonstrated by China – 2,129, India – 319, Republic of Korea – 157, Thailand – 90, Brazil – 61, Taiwan – 57, Italy – 46, Turkey – 40), Czech Republic – 33, Ukraine – 26, Russia – 24 (Belobragin, 2012).

ISO standard 13485:2003 "Quality management systems" sets requirements on the quality management systems in medical devices sector. 18,834 compliance certificates to ISO standard 13485:2003 were issued in 93 countries as of December 2010 (increase by 2,410 or 15%) as compared to 2009. The highest rate of increase of the certificates belong to Italy – 772, USA – 617, Great Britain – 550, Germany – 272, Republic of Korea – 157, Switzerland – 144, Pakistan – 136 (Belobragin, 2012).

ISO 22000:2005 standard plays an important role in the rising efficiency of international standardization. The standard sets the requirements to food safety management systems.

ISO 22000:2005 standard is specially developed for the organizations of all types (which participate in the whole food supply chain) to enable them introduce food safety management systems. This is due to the fact that food reaches its consumers through supply chains which connect numerous organizations of different types from various countries. Such organizations include producers of raw materials and food, the companies which ensure the transportation and storage of ready products, retail trade, including the producers of equipment, packaging materials, supplements and other ingredients (Salukhina, 2010).

In 2010, there were 18,630 certificates issued under ISO 22000:2005 in 138 countries. The increase is by 4,749 or 34%, as compared to 2009. CIS countries have the following indices under the above standard: Russia – 191, Ukraine – 121, Moldova – 19, Kazakhstan – 11, Georgia – 10, and Azerbaijan – 4 (Belobragin, 2012).

ISO/IEC 27001:2005 standard sets the requirements on the information security management systems. ISO/IEC 27001 standard ensures the efficient structure of information security management system as it is sensible to all needs and business requirements of the organization in the security field and can develop with the purpose to raise the security level based on the rising Internet threat. According to the report issued by the International Organization for Standardization, in 2010, 15,625 compliance certificates to the requirements of ISO/IEC 27001:2005 standard were issued in 117 countries, the increase is by 2691 (21%) as compared to 2009. High

increase indices of the certificates are demonstrated by China – 498, Czech Republic – 265, Spain – 228, Great Britain – 211, and Germany – 104. CIS countries have the indices as follows: Russia – 72; Kazakhstan – 3; Moldova – 2; Ukraine, Belarus, Kyrgyz Republic and Tajikistan – 1 (each) (Belobragin, 2012).

**Conclusions.** On the basis of the mentioned above, the following conclusions may be drawn:

- international standardization system promotes an unrestricted flow of the products between certain countries subject to the obligatory mutual efficient cooperation;

- standardization at the international level is a powerful tool in rising the efficiency of national economies at both macro- and microlevels;

- economic efficiency of international standards is much higher than the economic efficiency of national standards, as well standards of certain enterprises and organizations;

- the above statistical data prove that in Ukraine the number of management systems certificates which meet the requirements of the most economically efficient standards is much smaller than the average number in Europe; thus, the priority of international standards must serve as the basis for the economic policy of Ukraine in the field of standardization.

Further research must be directed at studying the experience of advanced countries as to the efficient introduction of international standards, the use of which in Ukraine would bring large benefits and would give the possibility to enter a higher level of the development.

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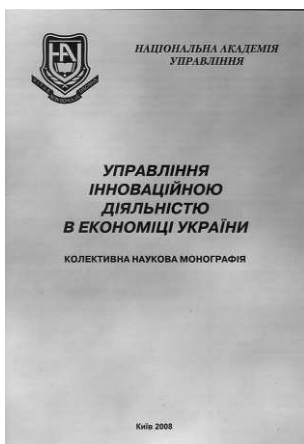
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## КНИЖКОВИЙ СВІТ



### СУЧАСНА ЕКОНОМІЧНА ТА ЮРИДИЧНА ОСВІТА ПРЕСТИЖНИЙ ВИЩИЙ НАВЧАЛЬНИЙ ЗАКЛАД НАЦІОНАЛЬНА АКАДЕМІЯ УПРАВЛІННЯ

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**Управління інноваційною діяльністю в економіці України: Колективна наукова монографія / За наук. ред. д.е.н., проф. С.А. Єрохіна. – К.: Національна академія управління, 2008. – 116 с. Ціна без доставки – 18 грн.**

Монографія присвячена управлінню інноваційною діяльністю в економіці України. В основу викладу матеріалу монографії покладені багаторічні дослідження науковців в галузі економічної теорії, фінансів та банківської справи, які були апробовані на сторінках авторитетного журналу «Актуальні проблеми економіки» в 2004–2007 роках. В монографії обґрунтовано основні інноваційно-інвестиційні напрямки та проблеми розвитку економіки України та управління даними процесами.