

# Quality Format of Innovational Model for Development Economy in Ukraine: Standardization and Certification

Oksana Bondar-Podhurska  
 Department of management  
 Higher Educational Institution of  
 Ukoopsilka "Poltava University of  
 Economics and Trade"  
 Poltava, Ukraine  
 bondarpodgurskaa@gmail.com,  
<http://orsid.org/0000-0001-7792-4023>

Alla Glebova  
 Department of Tourism and  
 Administration  
 Poltava National Technical Yuri  
 Kondratyuk University  
 Poltava, Ukraine  
 alliahglebova@gmail.com,  
<http://orsid.org/0000-0002-7030-948X>

Olha Yudicheva  
 Department of Commodity and  
 commercial activities in the  
 construction  
 Kyiv National University of  
 Construction and Architecture  
 Kyiv, Ukraine  
 olga.iudicheva@gmail.com,  
<http://orsid.org/0000-0003-4421-3318>

**Abstract – The Index of innovative development of the Ukrainian Economy for 2007-2017 is calculated on the basis of the additive model, the principal components method and the sliding matrix, as novelty. The tendency of its decrease and the problem of commercialization results of scientific and technical activity as an indicator to improve the quality management of products are singled out. Therefore, we proposal the implementation of ISO 50001:2011, which will reduce greenhouse gas emissions and other environmental impacts, as well as reduce energy costs through the systematic management of energy resources. The ISO 8000 "Social Responsibility" standard is recommended, which will help to increase the investment attractiveness of the economy, create opportunities for entering the stock markets and create transparency of business processes in Ukraine. The legislative experience of transition national producers to implementation of HACCP procedures is analyzed. This is an awareness of the global problem of food quality and safety. The requirements of the international standard ISO 22000 apply to all types of food industry. The legislation of Ukraine in the field of sanitary measures is poorly adapted to the requirements of the European Union. These problems are reforming the system of state control and supervision over food safety. In order to harmonize national legislation with the requirements of the European Union, three transitional periods of adaptation different duration have been identified. The authors propose simultaneous application of the above standards of quality and safety management, which will affect the qualitative parameters of the innovative model of the development economy in Ukraine.**

**Keywords – innovative model for development economy, the index innovation development, quality, standardization, certification.**

## I. INTRODUCTION

Economic development of Ukraine has recently shown negative developments in the national economy. This is accompanied by a steady decline in industrial output, an increase in unemployment, a significant increase in the budget deficit and external borrowing, a sharp deterioration in the level and quality of life population, a reduction in

investment in fixed assets, and massive migration of highly skilled personnel.

The raw material market and traditional technologies do not allow to ensure the competitiveness of the national economy. In the world practice, an innovative model of economic development is used to solve these problems. It allows in the conditions of globalization and informatization of society to ensure sustainable development, to form long-term competitive advantages of the national economy, to solve the problems of improving the satisfaction of vital interests the country's population, ecology, health care, quality of food [1,2].

The analysis of literary sources [1-4] made it possible to conclude that there are no specific conditions when mastering the innovative way of developing a national economy. This made it possible to raise issues concerning the need for a qualitative format an innovative model of Ukraine's economic development.

## II. RESULTS OF STUDIES

The index of Ukraine's innovation development shows its steady decline, which is a negative trend. This makes it necessary to review the format of implementation the economic development model in the context improving the quality of the national standards that are being applied.

So, we are talking about improving the processes of standardization and product certification. The index of innovation development in Ukraine for 2007–2017 is calculated on the basis of the additive model, the input parameters which are the share of patents for inventions in Ukraine among the countries of the world (%), the percentage scientists from the total number of employees (%), the share volume of scientific and scientific work performed work in GDP (%), share of enterprises that implemented innovations (%), share of implemented innovative products in the volume of industrial (%), introduced new technological processes per 1 scientist, units per person, state share in finance Innovation activity of

industrial enterprises (%),% of GDP for R & D. The dynamics of the change in the index Ukraine's innovation development for 2007-2017 is presented in Fig. 1.

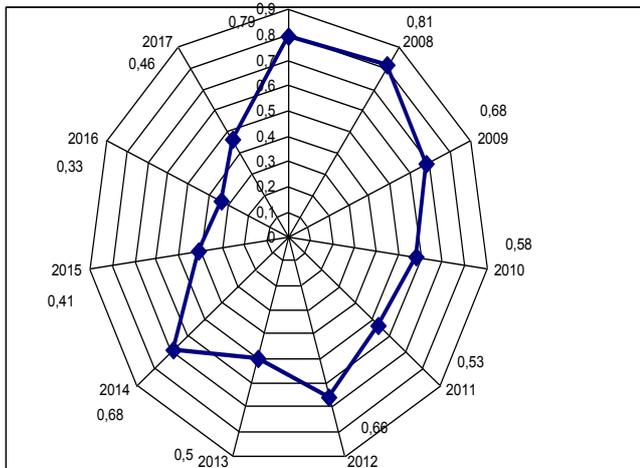


Fig. 1. Dynamics of the index innovation development in Ukraine 2007-2017

Source: own calculations and using the MS Excel software package.

Thus, the dynamics of the index innovation development in Ukraine for 2007–2017 indicates a tendency for its decline in the reporting 2017 by 0.335166 compared with the base year 2007, is 1.73 times, which negatively affected level of satisfaction of vital interests population's. The analysis trends of the index innovation development in Ukraine allowed to distinguish three periods: 1) 2007-2010 – the period of experience global crisis (2007 – 0,792575 to 2010 – 0,578136); 2) 2011-2014 is the period of rehabilitation after the financial and economic crisis of 2008 (2011 – 0.532945 by 2014 – 0.6888871), when Ukraine has begun positive changes in the innovative development; 3) 2014-2017 is the formation of the trend decline, caused by numerous conflicting situations (2014 – 0,678871 to 2017 – 0,457409).

The results of the analysis allowed to state that the greatest weight falls on the indicator, which reflects the proportion of the realized innovation products in the volume of industrial, and taking into account its current tendency to decrease, while simultaneously increasing the share of enterprises that introduced innovations by 2.8% in 2017. Compared to 2007, the problem of commercialization results of scientific and scientific-technical activities was actualized. At the same time, it is worth paying attention to the volume of scientific and technical work being carried out in Ukraine during 2007-2017: basic research as a primary cause of future problems tends to decline [5]. The result of the assessment of all activities is the proportion of the volume of scientific and scientific and technical work performed in GDP 2000-2015 for Ukraine (Fig. 2).

There is a significant steady decrease in the proportion of this indicator. And this depends on the quality of the national standards, that is, the processes of standardization and certification. Standards allow to organize the process of management oriented to the introduction of innovation, forming appropriate requirements for competences («skills» and «soft»), skills and staff positions, continuous self-

improvement and self-development. In addition, they can partially improve the commercialization process by expanding the ability to search markets and customers in foreign markets and funding sources.

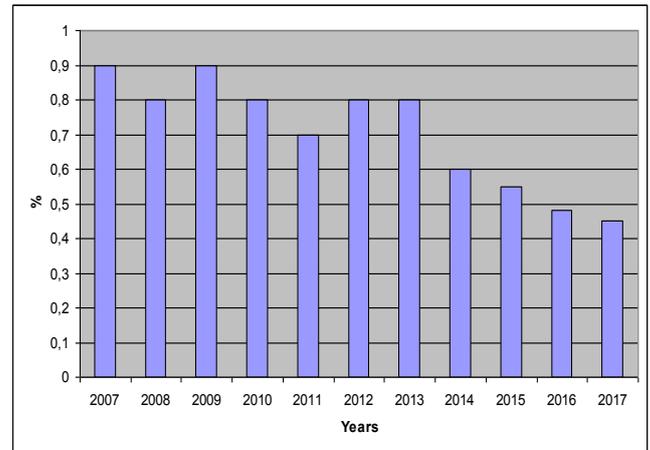


Fig. 2. Dynamics of the share of the volume of scientific and scientific and technical work performed in GDP 2007-2017 for Ukraine, %

Source: constructed by authors with the help of software package MS Excel, based on data from the Ukraine's State Statistics Service [5].

To solve these problems at the present stage ISO quality management systems are used. There are standards of different generations. One of the most popular standards of the International Organization for Standardization is ISO 14001 «Environmental Management Systems. Requirements with guidans for use», which is a list of requirements for the system environmental management in the organization. The implementation of ISO 14001 enterprises is aimed not only at the improvement of the environment, but also on the safety and health of employees. Effective food control systems are essential to protect the health of consumers. They are also vital in enabling countries to assure safety and quality of food products for international trade and to verify that imported food products meet national requirements. The legal framework for food safety in the European Union Member States is currently in process. Serious food safety incidents during the nineties urged the European Union and other countries across the world to review their food safety systems and to look for better ways to protect consumers against unsafe food. In 2000 the European Union launched its White Paper on Food Safety as a start for a new legal basis for appropriate food and animal feed production and food safety control. The Codex Alimentarius Commission continues to develop international standards, guidelines and recommendations to reduce food safety risks. The Codex Alimentarius developed risk analysis, the integrated food chain approach and HACCP. The risk analysis paradigm, including risk assessment, risk management and risk communication have been incorporated as general principles in EU law and form the legal basis of the food safety systems in the Member States. In the White Paper of the EU the entire food production chain (including animal feed) is held responsible for the safety of food. The Governments of the Member States verify that this responsibility is adequately met by the producers to protect the health and well-being of consumers. The document contains 84 action points that

have to be processed into community law to strengthen the food safety systems of the Member States. Within this framework, the EU introduced the General Food Law in 2002, defining general food safety principles and food safety procedures. Once this Regulation was in place, the European Food Safety Authority was set up. This organization started its activities in 2003, by focusing on risk assessment and scientific advice in the field of food safety questions. The White Paper has helped to strengthen and synchronize hygienic conditions and practices throughout all the EU Member States. This year an integrated EU Hygiene Package was completed in which the existing rules on hygiene were incorporated.

The European Union has established a specific legislation to harmonize official control procedures in the Member States. It also regulates the provisions that countries outside the EU should fulfill for entering the EU markets with their food products. Although control procedures are largely harmonized, the structure and set-up of control organizations is quite different across the European Union. The variety in national political and economical conditions have led to differences in the way Community legislation was transposed in national law and in operational systems for food production and inspection. Therefore, there is a large variety of food safety control systems throughout the Member States. In certain countries the responsibility of food control is decentralized and mandated to regions or provinces, whereas in other countries food safety control is in the hands of just one central organization. In recent years many countries in the European Union have established a National Food Safety Authority. Again, the responsibilities and tasks of this organization may vary from one country to another. The main task is usually enforcement of food control regulations, but risk assessment and scientific advice, and risk communication are also often included.

Risk management remains basically a prime responsibility of governments to protect consumers against food safety hazards. Risk management is based on risk assessment and scientific evidence, but also other aspects of food production could be taken into consideration like environmental protection and animal welfare. An effective food safety management system may be a combination of direct governmental supervision based on food safety requirements prescribed by law and private food safety control systems. Certification of production processes by accredited organizations may help producers to reduce risk levels and to convince Governments and consumers of the safety and quality of their produce. The confidence of consumers strongly depends on the quality of the certification body. In many western countries the private sectors have established their own additional quality requirements and certification schemes for specific product groups. These non-official requirements may improve certain quality aspects of products, but such higher demands may also hinder the access of businesses to markets [6]. The next is the ISO 22000: 2005 system, the HACCP, a food safety management system. The word HACCP is an English abbreviation "Risk Analysis and Critical Control Points" – Hazard Analysis and Critical Control Points. This management system was developed by the World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO). The requirements

of the international standard ISO 22000 are acceptable to all types of organizations in the food sector. Their goal is to introduce food safety management. The main idea is to increase the level of knowledge to those places where the gaps in control can be critical, which will affect the safety of food products and to ensure that the products do not harm the consumer. This standard applies to virtually all food-processing enterprises. Ukraine, like most other countries of the world, is aware of the global nature of food quality and food safety and considers it a priority. A large number of different diseases are caused by the consumption of low quality and dangerous food products, foodborne outbreaks are detected in different countries at a certain frequency, which indicates the need for changes in safety approaches. A proven and reliable way to protect consumers is to use the HACCP system as a food safety management system, which involves risk analysis and control of critical points. This system ensures the safety of products at all stages of the food chain, it helps to identify all critical points that can negatively affect the safety of the finished product, as well as eliminate these critical points and constantly monitor them.

Ukrainian legislation in the field of sanitary measures adapts to the requirements of the European Union. This concerns the reform of the system state control and food safety oversight. The introduction of state control in the field of sanitary and phytosanitary measures "from the lawn to the table" ensures the implementation of the basic provisions the Law of Ukraine "On the Basic Principles and Requirements for the Safety and Quality of Food Products" [7]. In order for Ukrainian producers to switch to the use of HACCP procedures (systems of analysis hazardous factors and control at critical points of analysis), this Law defines a transitional period.

Implementation of innovations is planned to be carried out in stages. The first stage should last for 3 years from the day following the day of the publication this Law, that is, from September 20, 2018. During this time, the HACCP procedures should use all the capacities that operate with food products, which include raw animal ingredients Origin (except for small capacities). The duration of stage 2 is four years. During this time, the HACCP procedure should be implemented at all facilities that carry out activities with foodstuffs, which contain no raw ingredients of animal origin (except for small capacities). Stage 3 – Five years during which the HACCP system should be implemented at low capacities [8]. Transition periods enable market operators to reorient themselves to new requirements and, if necessary, bring food production into line with new requirements. The Ministry of Agrarian Policy and Food in Ukraine has prepared Requirements for the development, implementation and application of constantly functioning procedures based on the principles of the Food Safety Management System (HACCP) [9] for the rapid adaptation of Ukrainian legislation to the legislation of the European Union.

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. For successful implementation of a HACCP plan, management must be strongly committed to the HACCP concept. A firm commitment to HACCP by top management provides

company employees with a sense of the importance of producing safe food. HACCP is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing, and merchandising to preparing food for consumption. Prerequisite programs such as current Good Manufacturing Practices (cGMPs) are an essential foundation for the development and implementation of successful HACCP plans. Food safety systems based on the HACCP principles have been successfully applied in food processing plants, retail food stores, and food service operations. The seven principles of HACCP have been universally accepted by government agencies, trade associations and the food industry around the world. The following guidelines will facilitate the development and implementation of effective HACCP plans. While the specific application of HACCP to manufacturing facilities is emphasized here, these guidelines should be applied as appropriate to each segment of the food industry under consideration. The production of safe food products requires that the HACCP system be built upon a solid foundation of prerequisite programs. Examples of common prerequisite programs are listed in . Each segment of the food industry must provide the conditions necessary to protect food while it is under their control. This has traditionally been accomplished through the application of cGMPs. These conditions and practices are now considered to be prerequisite to the development and implementation of effective HACCP plans. Prerequisite programs provide the basic environmental and operating conditions that are necessary for the production of safe, wholesome food. Many of the conditions and practices are specified in federal, state and local regulations and guidelines (e.g., cGMPs and Food Code). The Codex Alimentarius General Principles of Food Hygiene describe the basic conditions and practices expected for foods intended for international trade. In addition to the requirements specified in regulations, industry often adopts policies and procedures that are specific to their operations. Many of these are proprietary. While prerequisite programs may impact upon the safety of a food, they also are concerned with ensuring that foods are wholesome and suitable for consumption. HACCP plans are narrower in scope, being limited to ensuring food is safe to consume.

The existence and effectiveness of prerequisite programs should be assessed during the design and implementation of each HACCP plan. All prerequisite programs should be documented and regularly audited. Prerequisite programs are established and managed separately from the HACCP plan. Certain aspects, however, of a prerequisite program may be incorporated into a HACCP plan. For example, many establishments have preventive maintenance procedures for processing equipment to avoid unexpected equipment failure and loss of production. During the development of a HACCP plan, the HACCP team may decide that the routine maintenance and calibration of an oven should be included in the plan as an activity of verification. The format of HACCP plans will vary. In many cases the plans will be product and process specific. However, some plans may use a unit operations approach. Generic HACCP plans can serve as useful guides in the development of process and product HACCP plans; however, it is essential that the unique conditions within each facility be considered during the development of all components of the HACCP plan. In the development of a HACCP plan, five preliminary tasks need

to be accomplished before the application of the HACCP principles to a specific product and process. The five preliminary tasks are given in figure 3.

In accordance with these requirements, the application of the HACCP system is to: identify possible hazardous factors; establishing where and how dangerous factors can be eliminated, warned or brought to an acceptable level; development of appropriate measures and personnel training; implementation of practices in practice and documenting procedures. These standards provide the following benefits: reduce costs, increase competitiveness and minimize risks. Strengthening the effect of the proposed standards on the way implementing an innovative development model may be due to the use of such a tool as corporate social responsibility, which is associated with integration into international ISO standards.

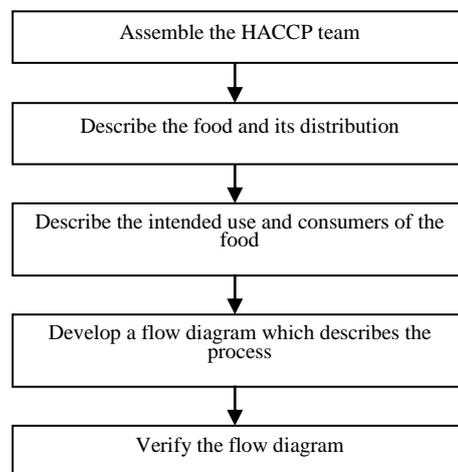


Fig. 3. Preliminary tasks in the development of the HACCP plan for Ukraine

Source: adapted by the authors on the basis of processing the source [10].

So, ISO 8000: 2014 Standard «Social Responsibility», which is a voluntary standard that is focused on compliance with labour laws and environmental standards. It is suitable for enterprises that want to receive orders from the state, to be popular in society, and clearly defines the requirements for social protection: child labour, forced labour, health and safety, freedom of association and the right to negotiate a collective agreement, discrimination, disciplinary measures, working time, pay, management system. That is, this standard is aimed at providing "ethics" in running business, improving the quality of life employees.

The content of SA 8000 is reviewed every five years. The standard should respond to the changes and expectations of stakeholders, as well as facilitate the implementation of new solutions. It should be emphasized, that the quality of workplace relations should be considered as one of the most important CSR areas. In addition, corporate social responsibility is realized at the expense of the standard ISO 26000: 2010 «Manual on Social Responsibility» [11-14].

This standard has been prepared by experts from more than 90 countries and 40 international or regional organizations. The standard highlights the following aspects: accountability, transparency, ethical behaviour, interaction with stakeholders, adherence to norms (legal and international), and human rights. Along with this, the standard allows to regulate environmental aspects of innovations.

The commitment of the organization to the welfare of society and the environment has become a central criterion in measuring its effectiveness. This is a reflection of the need to support healthy ecosystems, social justice and good organizational management. In the end, the organization's activities depend on the health of the world's ecosystems and are scrutinized by various stakeholders [7].

Corporate social responsibility has been further reflected in ISO standards for energy efficiency. Thus, the standard ISO 50000 was formed. The American Standard ANSI / MSE 2000: 2008, the Korean standard KS A 4000: 2007 and the standards of a number of European countries in the area of energy management have been taken as the basis for the development of the European standard EN 16001. The main standard of this series is ISO 50001: 2011 «Energy Management Systems. Requirements and guidelines for use».

ISO 50001: 2011 («Energy management systems - Requirements with guidance for use») is an international standard created for the management of power systems. It sets requirements for the development, implementation, maintenance and improvement of the energy management system in order to increase the efficiency of energy management (energy efficiency, power consumption in a system based approach based on the PDCA cycle, energy security) [15].

The ISO 50001 standard is one of the tools of energy management that helps to create the basis for integrating energy efficiency into the practice of enterprise management, more efficient use of available energy resources.

The standard allows achieving transparency in the field of energy resources management and assessing the priority of the introduction of new energy-saving technologies. The conceptual framework of ISO 50001 is a management system with mechanisms for monitoring, planning, analysis, control and corrective actions.

The ISO 50001 standard helps organizations more effectively use existing energy-intensive assets; ensures transparency and simplification of information on the rational use of energy resources; promotes the implementation of best practices in energy management and stimulates the rational use of energy; provides assistance in evaluating the objects and priority of the introduction of new energy-saving technologies; creates conditions for increasing energy efficiency in relation to deliveries; improves energy management in greenhouse gas emission reduction projects; promotes integration with other management systems of the organization, such as quality

(ISO 9001), environmental systems (ISO 14001) and occupational safety management systems (OHSAS 18001).

Compliance with the requirements of ISO 50001 has a number of direct and indirect benefits of organizational, financial and reputational nature. In addition, the fact of compliance with the international standard plays an important role in the competition.

It is possible to achieve such effects by implementing the system of energy management in accordance with ISO 50001 in all spheres of activity: economical is to increase the competitiveness of the enterprise by reducing the cost of production; reduction of unproductive costs; ensuring investment attractiveness and increasing the value of the enterprise; corporate is strengthening corporate culture of the enterprise by bringing employees of all levels to the process of energy saving, joining the team to achieve a common goal; image is the creation of an image of a successful, progressive and perspective company; organizational is ensuring the transparency of enterprise management and improving the level of manageability; Involvement of all categories of workers in energy saving and their motivation; the synergistic effect of balancing energy consumption and distributing rights and powers between divisions.

- Thus, the quality management system has created the preconditions for the formation of the concept of social responsibility, which can be integrated into the innovative model of the Ukrainian economy. Main directions of work: development of traditions of honest business;
- refusal from shadow operations;
- approval of relations based on civic responsibility, honesty, mutual trust, high moral and ethics;
- ensuring employment by preserving existing and creating new jobs;
- reduction of ecological pollution of the environment and rational use of natural resources;
- interaction with local authorities and public organizations for the development of the local community, improvement, participation in the implementation of social and environmental projects;
- charity is the material provision of scientific, cultural, educational, sporting programs and activities;
- development of social capital (the introduction of business relations based on civil responsibility, honesty, mutual trust, high moral and ethics);
- ensuring the quality and safety of products;
- observance of consumer rights;
- creation of healthy and safe working conditions (increasing the level of mechanization and automation, reducing the proportion of heavy and harmful works);

- decent wages on the basis of increase of its productivity and participation of employees in profits of enterprises;
- observance of workers' rights in the field of social and labor relations; creation of favorable conditions for the reproduction and development of human capital and its rational use;
- development of social partnership;
- introduction of economic democracy (involvement of employees in the management of enterprises);
- providing employees with an additional "social package" and various social services;
- protection of nature and conservation of resources, organization of environmentally safe production;
- the creation of a favorable moral and psychological climate in the enterprise;
- the formation of an initiative and creative attitude to work; group and individual responsibility for the results of joint activities.

Thus, the combination of the above standards will increase not only the quality of innovative products, the transparency of the enterprise management system, investment attractiveness in the stock markets, will help minimize reputational risks, but will become the guarantor of the successful implementation a sustainable innovation socially oriented development of the Ukrainian economy.

### III. CONCLUSIONS

The Innovation Development Index of Ukraine 2007-20017 was first calculated in the context of the triangle of competitiveness of the economy. The tendency of its decline and the main reason for this were singled out. The novelty of the study is to consider standardization and certification as drivers of economic growth within the innovative model of Ukraine's development.

The role and significance of international quality system standards ISO 50001:2011, HACCP 22000: 2005, ISO 8000: 2014, in the context of the innovative model of economic development of Ukraine is substantiated. These standards will allow us to create an information set to evaluate the innovative model of economic development, taking into account the qualitative component, to gain additional benefits, to increase the level of environmental, economic, food and energy security.

We propose at the same time to apply the above standards, which will affect the qualitative parameters of the innovative model of the development economy in Ukraine.

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