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COST VALUATION OF SPECIAL FOOD PRODUCTS SAFETY AND QUALITY INTEGRATED MANAGEMENT SYSTEMS

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In order to guarantee the appropriate level of safety and quality of food products, integrated management systems are now actively used. To prevent the emergence of economic problems, to understand the financial value of all the organization's assets, it is important to assess their value, in particular, management systems. Integrated safety and quality management systems of special food products are defined as the object of the research. Their implementation makes it possible to ensure compliance with legislation, increase consumer satisfaction, and business excellence.

The main international act regulating methodological aspects of assessment is the International Valuations Standards (IVS). It defines the terminology, procedure of organization, assessment, approaches, methods, reporting of results. It was established that when evaluating integrated management systems, it is recommended to use a cost approach. This is justified by the need to determine the amount of funds to ensure compliance with legislation, meeting the needs of consumers and stakeholders. It is appropriate to use methods of reproduction and substitution. The cost of the mentioned systems of the organization was determined by the method of reproduction, which as of the beginning of October 2023 amounted to UAH 167.6 thousand and UAH 34.7 thousand, respectively.

Recommendations for estimating the cost of integrated management systems have been devised. Their main content is the need to take into account the level of changes in the market rate of the currency, in which the value is estimated, the coefficient of moral aging, based on the service life. Their consideration made it possible to estimate the cost of the investigated systems at UAH 144.6 thousand and UAH 30.0 thousand, respectively. This could contribute to more effective management of the organization's resources, investment in financial management systems

Keywords: cost estimation, integrated safety and quality management systems, special food products

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1. Introduction

One of the basic rights of consumers, defined by international and national legislation [1, 2], is the provision of appropriate conditions for meeting the needs of goods of the appropriate level of safety and quality. In order to guarantee this, in modern practice, integrated safety and quality management systems are actively used in production and ensuring the market circulation of products. It is appropriate to note that the mandatory implementation of food safety management systems by all responsible market participants is determined at the legislative level [3–6]. The safety and proper quality of products are of particular importance when consumers consume (use) special food products, including those intended for special medical purposes and weight control, baby food, dietary supplements. Based on the increased needs of target consumers of these products, the need to ensure their specific consumer properties, the use of specially designed management systems (MS) by market operators becomes an indisputable condition for their success.

In order to ensure optimal conditions for successful business, it is necessary to take into account and use all available resources and opportunities for business as efficiently as possible. At the same time, a full understanding of the market value of the organization, all its assets, liabilities, and operational liabilities becomes important. To productively achieve this, an evaluation activity is necessary, which will allow the organization to optimize financial reporting, the process of managing assets, and attracting investments.

Taking into account the intangible nature of MS, represented mainly in the form of the results of the application of management, design, technological documentation, knowledge, abilities, skills of personnel, they are considered objects of intellectual property rights of organizations [7, 8]. Estimating the value of such objects, represented in the form of product safety and quality management systems, will make it possible to better understand their value, role, and significance in the general structure of management, use of resources. Accounting, evaluation of the value and efficiency of these objects, including developments regarding product safety and quality

ty management systems, ensuring the appropriate competences of personnel, are currently extremely rare among product market operators. This determines the relevance of the analysis of methodological aspects of this activity.

The results of our work will be useful for representatives of the practical domain, in particular, business entities that conduct their activities in the field of production and ensuring the circulation of special food products. The results reported here will contribute to understanding not only the importance of the specified management systems for ensuring safety, increasing the level of product quality, but also understanding their financial value, prospects for increasing capital investments in this activity. The results of relevant scientific research will allow for more effective financial and economic management of enterprises in the field of special food products, and in addition – to better understand and apply the methodological apparatus of market assessment of the value of these intellectual property objects.

2. Literature review and problem statement

The authors of paper [9] researched existing methods for evaluating intellectual property objects, provided the features of the use of intangible asset management mechanisms by business participants. An improved methodology for evaluating the results of intellectual activity and equivalent means of individualization of a legal entity, its products, works and/or services is also proposed. However, the main focus is on determining the material cost for monetizing the results of intellectual activity, attracting investments, and does not take into account the need to ensure compliance with regulatory requirements and increase consumer properties of products.

In study [10], the approaches and specific methods of evaluating the intellectual property of organizations were analyzed, their advantages and disadvantages were investigated, and practical recommendations for its implementation were presented. At the same time, the given results apply to trademarks, patents, copyrights, trade secrets, certain know-how and, first of all, do not take into account the technical and organizational aspects of the objects of intellectual property evaluation.

The author of [11] conducted an analysis of existing approaches and methods for estimating the value of intangible components of an enterprise's capital, models used by scientists for their implementation, identified their shortcomings, and developed a cost methodology. However, the results reported in the work primarily concern personnel, technical and organizational (structural) resources of the organization, which are not fully applied to safety and quality management systems.

In [12], the mechanism for determining the value of property rights to intellectual property objects and its features is analyzed. It is substantiated that this process is a component of the evaluation activity, and the evaluation is carried out precisely in relation to property rights to intangible objects. However, the data refer mainly to the legislative aspects of the assessment, in particular for the implementation of technology transfer, but do not take into account the peculiarities of the organization's MS processes.

In [13], it was analyzed to what extent ensuring safety is important for all subjects operating in the market, and it is noted that safety is a strategic and determining value for

the functioning of the organization. It is noted that business owners and their management are legally obliged to ensure and maintain the activity of food safety management systems at an effective level. However, the research does not reveal the aspects related to the financial assessment of the cost of their operation, intellectual rights to them.

Scientists [14] conducted an analysis of the cost system to ensure the functioning of the quality management system (QMS), its impact on product quality through monitoring, analysis, and assessment of production costs. Thanks to the conducted comprehensive assessment, the impact of investments on quality assurance due to the implementation of QMS based on the international standard ISO 9001 in the selected organization was investigated. However, the work determined only the amount of direct costs for the quality management system, its share in the total costs of the organization, which does not allow for a full assessment of its financial value.

The author of [15] investigated how the use of QMS affects the improvement and compliance of products to customer needs, the effectiveness of business management in general, in particular, the increase in the value of the organization and its strategic importance. At the same time, in the study, the value of the quality management system is analyzed only from a strategic and managerial point of view and is not evaluated from a financial point of view.

In order to create proper conditions for conducting economic activities for organizations, in particular, operators of the market of special food products, accounting for available resources and their reflection in financial statements are important. One of the objects of ownership of these market participants are the safety and quality management systems of products, which determines the need to assess their financial value. With this in mind, it is appropriate to define and implement methodological principles and an algorithm for estimating the cost of safety and quality management systems for special food products. This will allow stakeholders to obtain objective information about the value of organizations, their level of competitiveness, investment attractiveness, and understand the ability of products to meet the needs and expectations of consumers.

3. The aim and objectives of the study

The purpose of this study is to determine the cost assessment of safety and quality management systems for special food products. This will contribute to the understanding of the importance and financial value of these systems as intangible assets of enterprises, more effective management, investment in them, which, as a result, will increase the level of consumer properties of products and consumer trust.

To achieve the stated goal, the following tasks were defined:

- to analyze the essence, principles, and significance of integrated management systems for the safety and quality of food products;
- to determine the methodological principles of evaluating the value of property of organizations;
- to determine the main approaches and methods of assessing the cost of integrated safety and quality management systems;
- to devise recommendations for evaluating the cost of integrated safety and quality management systems for

special food products, in particular products for enteral nutrition.

4. The study materials and methods

Integrated safety and quality management systems of special food products were identified as the object of our scientific research.

The hypothesis of the research was the statement that in order to ensure the productive work of enterprises that are operators of the market of special food products, to protect their intellectual property, it is necessary to estimate the cost of integrated management systems for product safety and quality. In turn, this will ensure the reflection and increase of the market value, investment value of these organizations, will allow more thorough use and management of intangible assets.

Information on the role and importance of food safety and quality management systems, basic approaches to assessing their financial value, and international guidelines for the implementation of this activity were used for the methodological support of the study. Publicly available normative, scientific data, works of leading specialists in the researched field were also used.

When conducting scientific research, general scientific methods of comparative analysis and synthesis, holistic approach, comparison, grouping, abstraction, systematization, isolation, optimization were applied.

5. Results of studies on the assessment of the cost of integrated management systems for the safety and quality of special food products

5.1. Results of research into the essence, principles, and significance of integrated food safety and quality management systems

It has been established that in order to ensure operation, food market operators are obliged to develop, implement, and apply permanent procedures based on the principles of the hazard analysis system at critical control points (HACCP). Based on this, the use of food safety management systems (FSMS) based on the provisions of the international standard ISO 22000 [16] has become mandatory among food enterprises. This practice is especially important in the production and market circulation of special food products.

It has been studied that the essence of the application of FSMS is to identify hazards (physical, chemical, biological), establish their critical limits, monitor compliance, and identify deviations at critical control points (CCP) during the planned process [16]. The analysis of the main operational advantages of the introduction and use of FSMS reveals that they are the ability to stably supply food products that meet the requirements of customers and the prescribed norms, taking into account the risks of the appearance of dangerous factors.

The implementation of FSMS, individually developed in accordance with the specifics of the food market operator, is based on 7 universal principles of management systems defined by ISO [16], a combination of interactive information, system management, application of prerequisite programs, principles of HACCP. The latter

are considered to be the analysis of dangerous factors, identification of critical control points, their limit values, management of the control system, determination of corrective actions in case of exceedances, verification, documentation of procedures, record keeping, evaluation of the effectiveness of FSMS [16].

It has been analyzed that FSMS should be based on the use of a process approach using the PDCA (plan – execute – check – act) cycle at 2 complementary levels: the first applies to the management system, the second – to the principles of HACCP (Fig. 1) [16].

It was established that the use of this cycle should occur together with the application of risk-oriented thinking. This contributes to reducing the occurrence of risks, increasing the level of safety through identification, prevention, and control of dangerous production factors. The combination of organizational and operational planning and control of FSMS allows for the analysis of all positive and negative factors of influence in order to establish a response to the consequences of risks. For the effective functioning of FSMS, all stakeholders that influence the results of operations should be involved in the response [16].

In accordance with the prescribed norms [16], the organization must determine external and internal factors that affect the achievement of the goal, strategic direction, effectiveness of FSMS and, as a result, the achievement of expected results. For this, the need for monitoring and analyzing data on internal and external factors, which are also obligations to ensure compliance, is established. Taking into account the specifics of special food products, it was established that considerable attention should be paid to the selection of raw components, the technological process, in particular equipment, personnel, and conditions of storage and sale.

An important role in the organization of the work of FSMS is defined for top management, leadership, responsibilities for formation, documentation, implementation of food safety policy, its understanding, implementation by staff, accessibility for interested parties [16]. The top management is responsible for establishing, informing, and understanding the responsibilities and powers of the personnel to achieve the expected results of FSMS [16].

To ensure the success of organizations, the use of QMS based on the provisions of international standards ISO series 9000 is common in business practice. The main one in this series of standards is ISO 9001:2015 “Quality management systems. Requirements” [17], which defines the conceptual basis of the functioning of the QMS. The provisions of ISO 9001 should be generally taken into account and reflected in the individual quality guideline for each organization. The terminological base for the use of ISO 9001 is defined by the ISO 9000 standard.

It has been studied that the implementation of QMS, based on the provisions of the ISO 9001 standard, is considered the most rational means of increasing the productivity of organizations in modern conditions. The provisions of ISO 9001 [17] are fundamental in the application of all management systems and make it possible to effectively optimize the activities of organizations. The standard [17] provides that the implementation of QMS is based on 7 main principles: customer orientation, leadership, staff involvement, process approach, improvement, decision-making based on factual data, relationship management.

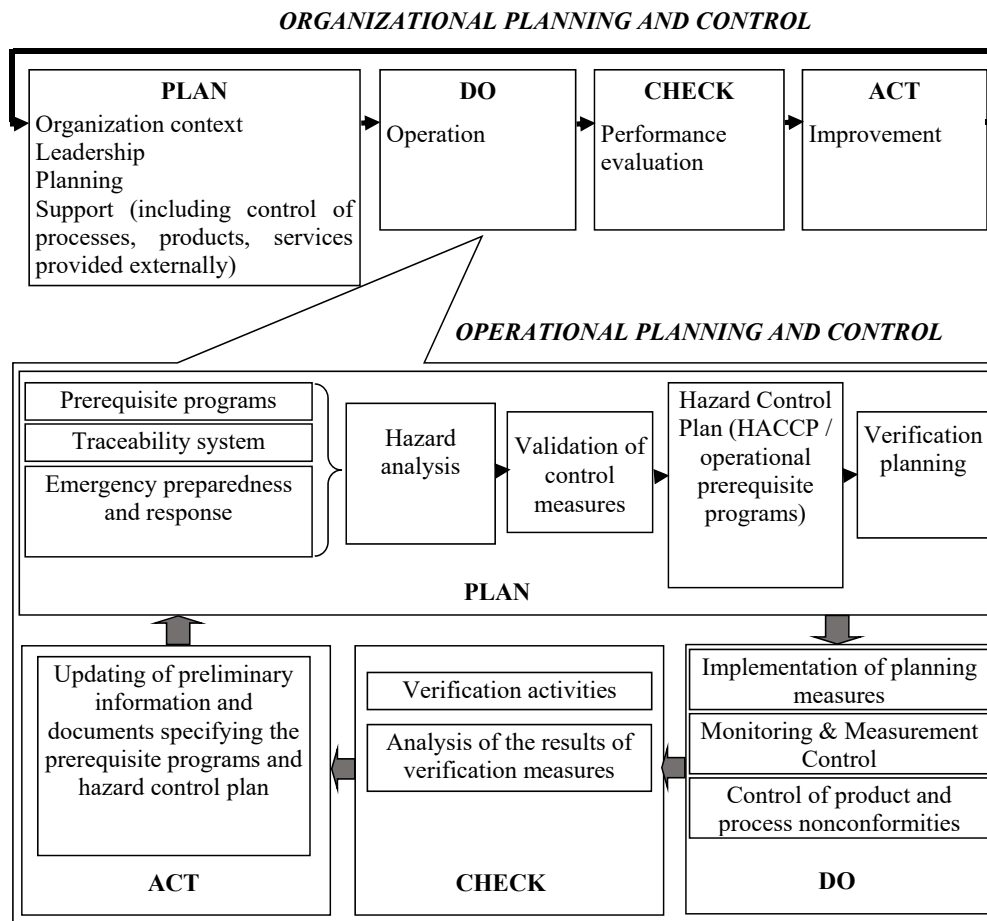


Fig. 1. The structure of Plan-Do-Check-Act cycle at the two levels

It has been studied that the process approach, according to which the activity of the organization consists of interdependent processes, has a conceptual meaning in the application of QMS. The application of this approach is implemented through systematic activities regarding the determination of processes, their sequence, interaction, and connections. At the same time, the quality of the implementation of a certain process is determined based on the difference in the properties of the work object at the input and output. Process and system management is achieved using a cycle of planning, execution, verification, improvement actions (PDCA cycle) [17].

It is stipulated [17] that in order to establish procedures for confirming, verifying, and improving QMS, organizations should conduct audits of their activities, the procedure for which is defined in ISO 19011. The use of these measures makes it possible to assess the level of QMS effectiveness based on confirmation of the achievement of established results, analysis, and elimination of the causes of non-conformities, performing corrective actions, preventing the emergence of problems, identifying ways for further improvement [17].

Taking into account the peculiarities of the functional properties of special food products, in particular for special medical purposes, when managing their safety and quality, the practice of using the norms of good manufacturing practices (GMP) is widespread [4, 6, 18, 19]. It has been studied that the use of the prescribed GMP norms is implemented in the process of comprehensive activities aimed at ensuring compliance with safety and quality. At the legislative and

regulatory level [6], it is provided that its provision is based on risk-oriented thinking and is carried out at all stages of work. The specified measures are applied to all dependent factors, in particular, production raw materials, equipment, manufacturing process, release, packaging, personnel, compliance with sanitary and hygienic norms, protocol, documentation, monitoring, analysis, evaluation, tracing, recall of defective products [4, 6]. The primary goal of the management system defined by the GMP standards is the production of products whose properties will meet the requirements of the registration dossier.

5. 2. Results of research on methodological principles of assessing the financial value of ownership of organizations

It has been established that the International Valuations Standards (IVS) [20] are the main generally recognized regulatory document at the global level, regulating the process of carrying out value assessment activities. It was investigated that in the document [20] the general provisions defining this activity are set out in the glossary, concept, general standards 101–103 regarding the scope of work, research, and compliance, reporting on the results obtained. It was analyzed that the norms presented in IVS [20] are intended for application in the assessment of assets, liabilities, current and future requirements for assets, liabilities.

The glossary of the International Valuations Standards [20] provides the meanings of the main terms used in the field of value estimation. For proper general

understanding, the meanings of key definitions are defined, including “cost”, “fair value”, “fair market value”, “investment value”, “price”, “valued asset”, “valuation”, “valuation approach”, “method assessments”. It is provided [20] that, for ease of understanding, the term “assets” is defined to cover liabilities and groups of assets, except where otherwise expressly stated or liabilities are absent.

It was determined that the evaluation process requires the evaluator to formulate unbiased judgments regarding the reliability of input data and assumptions. To ensure the reliability of the results, it is necessary that the formulated judgments contribute to ensuring transparency, minimizing the influence of subjective factors. During the assessment, the argumentation of the analysis should be ensured, the conclusions should be clear, logical, and understandable [20]. Also, appropriate control measures and procedures for ensuring the necessary degree of objectivity, which are defined by the Code of Ethical Principles of Professional Evaluators, must be applied during the evaluation.

It has been established that IVS international standards [20] provide requirements for the competence of entities that carry out cost assessment. It has been analyzed that the assessment should be carried out by a person or a group of persons who have the necessary qualifications, ability, and experience to conduct it in an objective, impartial, ethical, competent manner, possess the appropriate technical skills, knowledge of the subject, market(s), and purpose. In the absence of such competencies to perform all aspects of the evaluation, specialists in certain aspects of the overall task may be brought in to assist. In such a case, this should be indicated in the final report, and the evaluator should have the technical skills, experience, and knowledge to understand, interpret, and use the results of the work of the involved specialists [20].

In the analysis of IVS 101 “Scope of work” [20], it was determined that before the assessment, the executor must ensure that the customer understands that he will receive all information about the restrictions on the use of the results before the final formulation, design of the report. It is stipulated [20] that the client(s) must first be notified of the scope of the work, including information about the appraiser(s), the client, other possible users, the asset(s) being appraised, the purpose of the appraisal, the currency, the basis/basis for determining the value, time, nature, sources of information.

Examining the requirements of IVS 102 “Research and compliance” [20] shows that assessment tasks, relevant studies, including assessment reviews, must be carried out in accordance with the prescribed principles, meet the purpose, conditions defined in the scope of work. It was also analyzed [20] that in order to ensure the reliability and reliability of the provided information, it is necessary to take into account the purpose of the assessment, the significance of the information for the conclusion, knowledge of the specifics of the subject, the presence of sources independent of the asset and/or the recipient of the assessment.

As a result of the analysis of the content of IVS 103 “Reporting” [20], it was determined that the evaluation report should contain information necessary for its correct understanding or

review. The final report should provide users with a clear understanding of the evaluation results, be fit for purpose, contain information on the scope of work performed, intended users, purpose, applied approaches, methods, used input data, conclusion(s), and their justification. The report should contain data on the scope of the audit, information on the assessment, input data, conclusions on the audit, including the arguments used, and the date of registration [20].

It has been investigated that there are also regulatory documents that regulate the principles of financial value assessment at the regional and national levels. Thus, at the European level, they are defined by the European Business Valuation Standards (EBVS) [21], at the national Ukrainian level by the Decree of the Cabinet of Ministers of Ukraine “On approval of National Standard No. 1 “General principles of property and property rights valuation” [22]. It has been established that the Ukrainian standard [22] presents the definition of “valuation principles”, defined as “the basic rules of property valuation, which reflect socio-economic factors, the regularities of the formation of property value, laid as a basis for methodical approaches.” It was determined [22] that property evaluation is carried out in compliance with the principles of utility, supply and demand, replacement, expectation, marginal productivity of the contribution, and the most effective use.

5.3. Results of studies of the main approaches and methods of estimating the cost of integrated safety and quality management systems

Based on the analysis of IVS 210 “Intangible assets” [20], it was established that an intangible asset is a non-monetary asset that manifests itself due to its economic properties. It is recognized that it has no physical substance but confers certain rights and/or the ability to receive economic benefits to its right holder. Specific intangible assets are defined, described, and distinguished by their form of ownership, functions, market positions, and image.

It has been studied that the standard [20] provides for several types of intangible assets that belong to one or more of the categories (or goodwill) and are related to: marketing, customers, art, contractual obligations, technologies. It has been established that the latter, which include FSMS and QMS, arise from contractual or non-contractual rights to use patented or non-patented technology, databases, formulas, designs, software, processes, or recipes.

It was determined that according to the recommendations of IVS [20], the approaches and methods shown in Fig. 2 are used.

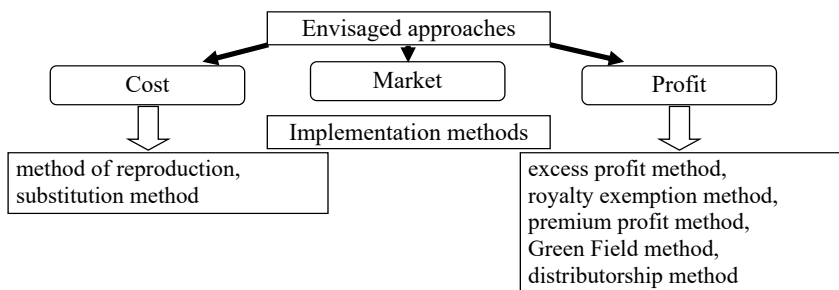


Fig. 2. Approaches and methods provided for valuation of intangible assets by International Valuations Standards (IVS)

Since FSMS and QMS are specialized technological solutions for optimizing the activities of food market operators, in particular special ones, the analysis of objects similar to the ones evaluated indicates a limited number of such proposals. In view of this, it is recommended to use a cost-effective methodological approach to the assessment procedures. It was studied that according to the cost approach, the value of an intangible asset is determined on the basis of the replacement value of a similar asset or an asset that provides a similar utility potential. This approach is implemented using methods of reproduction or substitution [20]. Since intangible assets such as FSMS and QMS do not have a physical form, they usually derive value from their function/utility. Thus, evaluation by the method of reproduction involves determining the amount of funds that the organization spent on their creation, and replacement – necessary to replace them with a similar asset with the same utility, efficiency of use.

Based on the above, it was established that since FSMS and QMS of each organization, in particular operators of the market of special food products, are unique objects, the use of the method of reproduction in assessing their value is the most acceptable.

The evaluation of objects by the method of reproduction is carried out by establishing the necessary costs of the organization to create a new exact copy of the systems, protecting the rights to them, taking into account the prices at the current moment according to the formula [23]:

$$B = \sum B_c \times k_i \times k_c, \tag{1}$$

where B is the cost of the object,

B_c – costs of the organization for the creation of the object,

k_i – indexation coefficient based on price inflation at the time of evaluation,

k_c is the coefficient of moral aging.

Based on this formula, the cost of FSMS and QMS of the PP Golden Farm (Ukraine) organization, which is engaged in the production of special food products, as of the beginning of October 2023, was calculated. At the same time, it was based on the information that these systems were created at the beginning of 2018, and the funds spent on their implementation were as follows (Table 1).

Table 1

The amount of funds spent on the organization’s FSMS and QMS

Name of expenses on MS	The amount of funds spent for MS for a given year, UAH thousand					
	2018	2019	2020	2021	2022	2023
<i>FSMS</i>						
Acquisition of a set of implementation services for MS	74.0	–	–	–	–	–
Making changes to the technological process, relevant documentation	12.3	–	–	–	–	–
Periodic staff training	–	1.5	2.5	2.8	3.5	4.5
<i>QMS</i>						
Documentation development for QMS	16.2	–	–	–	–	–
Staff training	4.0	–	–	–	–	–

It was also established that the official inflation rate in Ukraine for 2018 was 1.098, 2019 – 1.041, 2020 – 1.050, 2021 – 1.100, 2022 – 1.266, and currently 2023 – 1.028. It was determined that according to the recommendations for determining the coefficient of moral aging of intellectual property objects [24], when applying the current versions of the requirements, this indicator is 1.

Using the data in Table 1, information on the coefficients of inflation and moral aging by the method of reproduction, the value of FSMS and QMS of the “Golden-Farm” PE was determined, which is UAH 167.6 thousand and UAH 34.7 thousand, respectively. As of the date of the research, the value of USD 1 was determined by the National Bank of Ukraine at UAH 36.60, and the average on the interbank market was UAH 36.71.

Given the absence of legal requirements regarding the need for certification of the mentioned MSs, they are not certified in this organization. At the same time, it is appropriate to note that their certification will make it possible to ensure a higher level of trust of interested parties. It was determined that the certification of the MS, in most cases, is carried out for the stipulated period of 3 years, while a certification audit is conducted to issue the certificate, and a supervisory audit is carried out every year during the stipulated period of its validity.

Another method provided for estimating value based on the cost approach is the substitution method. When applying this method, the principle is used, which assumes that the maximum value of the object will be determined by the minimum price of the purchase and implementation of an asset of similar utility.

To determine the cost of similar MSs under study, a search and analysis of development proposals presented on the market was carried out (taking into account the cost of making the necessary changes to the technological regulatory documentation for FSMS). Thus, by the method of substitution, it was determined that the cost of FSMS and QMS is about UAH 180 and 40 thousand, respectively. Indication of this approximate value is determined based on the need to take into account a very significant set of factors that must be calculated based on the specific features of the production process, individual for each organization, product range, and its properties.

An income approach is also used when valuing intangible assets, including food safety and quality management systems. At the same time, the value of the specified object of evaluation is estimated based on the current amount of income received, cash flows or cost savings provided by the use of this intangible asset during the period of its economic use [20]. It has been investigated that the implementation of this approach is implied when using the following assessment methods:

- surplus profit – involves determining the current value of cash flows provided by the use of an intangible asset, after excluding the share of cash flows obtained from other assets necessary for obtaining funds (“additional assets”). Quite often used for valuation where there is a requirement for the buyer to allocate the total price paid for the business between tangible assets, identifiable intangible assets, and goodwill;

- exemption from royalties – is applied based on establishing the value of hypothetical annual royalty payments to third parties that could be saved by owning a certain object of intellectual property;

– premium profit or “with and without” method – the value of an intangible asset is determined by comparing two options. According to the first, the business organization uses the object of an intangible asset, according to the other, it does not apply it (but all other factors remain constant);

– green field – the value is estimated using cash flow forecasts, which assume that the only asset of the enterprise on the valuation date is an intangible asset. All other tangible and intangible assets must be purchased, built, or leased;

– distributor method (distributive) – valuation of an intangible asset is carried out by using data on the market profit obtained by distributors from the distribution of products, and not on the development of production or an object of intellectual property. It is used mainly in relation to client bases, contacts with consumers.

It was determined that the market approach is used to estimate the value of intangible assets, including product safety and quality management systems, based on establishing market activity [20]. However, the assessment of the value of FSMS and QMS, in particular operators of the Ukrainian market of special food products, including taking into account the war in Ukraine, based on the income approach will not reflect their real value.

5.4. Recommendations on the evaluation of the cost of integrated management systems for the safety and quality of special food products

Based on the results of an analytical study of sources [6, 16–18, 20, 24], the following recommendations have been devised and proposed for the evaluation of the cost of integrated management systems for the safety and quality of special food products:

– after receiving the agreed application for the assessment, determine the purpose of its assessment;

– clarify and verify the provided data about the organization(s)-customer(s) of services, determined for the evaluation of the management system;

– familiarize yourself with the object of evaluation, collect and initial analysis of the necessary initial data on the safety and quality control of special food products, their documentary regulatory support;

– ensure that the customer(s) understand that he/she will receive all information about restrictions on the use of the results before the final formulation, design of the evaluation report;

– inform and agree with the service customer(s) information about the estimated scope of work, appraiser(s), possible stakeholders, appraised asset(s), purpose of appraisal, currency used, basis/basis for determining value, time, nature, sources used information;

– ensure the necessary participation in the conclusion and signing of the contract for the provision of services for the assessment of the value of MS of the operators of the special products market;

– create the necessary proper conditions for work in the organization where the assessment is conducted, in particular with regard to premises, equipment, consumables;

– conduct a preliminary collection of information about the organization and the identified MS(s);

– identify the management system(s) being evaluated, in particular the features and specifics of functioning, application, regulatory, documentary support, level of approval, number of employees involved, identity, level of protection of intellectual property rights;

– check the degree of implementation of the specified management system(s) of norms regarding the organization's activities, the level of application in the implementation of technological and other foreseen processes;

– identify the object of the evaluation, the rights to its use, possible restrictions that may arise during the evaluation, the use of its results;

– decide on the approaches, methods, evaluation procedures that will best meet the purpose stipulated in the evaluation contract, in particular, its algorithm, the formulas used, and their application;

– take into account the level of changes in the market rate of the currency in which the assessment was carried out, relative to the exchange rate of the main currencies of the world (USD, EUR). It is also suggested to take into account the relationship of this indicator with the official indexation coefficient and, in case of a significant discrepancy, to take this indicator into account during calculations;

– when determining the coefficient of moral aging of the assessed MSs, including their compliance with the current versions of regulatory documents, use the following values depending on the term of their operation:

- 1) from 1 to 3 years – 1;
- 2) from 3 to 5 years – 0.95;
- 3) from 5 to 7 years – 0.85;
- 4) from 7 to 10 years – 0.7;
- 5) from 10 to 15 years – 0.5;
- 6) from 15 to 20 years – 0.3;
- 7) from 20 to 25 years – 0.2;
- 8) more than 30 years – 0.1;

– make accessible documentation of the determined results and information;

– draw up a report (conclusion) on the evaluation of the cost of the organization's system on a certain specified date, ensure its approval, transfer to the customer(s) a copy of it in the agreed form, confirming receipt, and keeping the copy in the service provider organization.

The recommendations can be taken into account and used both by organizations interested in evaluating the value of their MS safety and quality of special food products, and by property appraisers.

Taking into account the developed recommendations, when evaluating the value of the studied MSs due to the change in the rate of the evaluation currency (UAH) determined by the NBU in 2022, the indexation coefficient was increased to 1.286. Also used is the proposed aging coefficient of 0.85. As a result, when using the method of reproduction and the provided proposals, it was established that the cost of FSMS and QMS of the “Golden-Farm” PP is UAH 144.6 thousand and 30.0 thousand, respectively.

6. Discussion of results of investigating the methodological bases of estimating the cost of integrated management systems

On the basis of our analysis, it was investigated that in order to ensure the necessary and favorable conditions for market functioning, organizations, in particular in the field of production and circulation of special food products, actively use management systems. The main among them are FSMS, QMS, and among the enterprises that produce and ensure the market circulation of food products for spe-

cial medical purposes – management systems based on the norms of good manufacturing practices (GMP).

Summarizing the analyzed material on the principles of the implementation of FSMS, proposals for the creation of FSMS for organizations that are operators of the market of special food products were developed and scientifically substantiated:

- determine the responsible persons, their powers, and duties, ensure their competence, in particular with regard to the specifics of certain special products;
- analyze and describe the risks associated with certain special food products, taking into account the way they are consumed or used;
- build a block diagram of the technological process of manufacturing, circulation of special products, which gives a clear picture of all stages, verify it;
- identify and analyze dangerous factors associated with special products, determine their critical control points (CCP);
- determine in the organization the basic conditions and actions necessary to maintain a proper hygienic environment in the food chain, which will ensure the safety of certain special products for consumption;
- foresee the critical limits of the defined CCP and their control procedures;
- ensure the application of corrective actions in case of possible deviations of dangerous factors QMS the limits provided for them;
- check the correctness and reliability of the operation of FSMS, taking into account the need to ensure the functional properties of the goods;
- ensure proper documentation of all production processes.

In the course of the study, it was found that despite their intangible nature, integrated product safety and quality management systems are also valuable assets for organizations, which determines the importance of assessing their value. Taking this into account, the need to define and implement methodological principles and an algorithm for estimating the cost of safety and quality management systems for special food products is appropriate. This will allow interested parties to prevent the emergence of economic problems, to obtain objective information about the market value of organizations, their level of competitiveness, investment attractiveness, and to better understand the ability to offer products that will meet the needs of consumers.

Based on the results of the research, it was established that all operators of the food market, in particular in the field of special food products, are legally obliged to implement and use FSMS based on the provisions of the international standard ISO 22000. The essence of their use to ensure the safety of food products is determined by the identification of dangerous factors, establishment of the necessary critical limits, analysis of conformity and application of predetermined corrective actions in case of violation of norms. It was determined that the implementation of these measures is based on the universal principles of ISO management, in particular, the process approach using the PDCA cycle at the levels of organizational and operational planning and control, interactive information (Fig. 1). It has been established that the combination of organizational and operational planning and control of FSMS allows for the analysis of all positive and negative factors of influence, determining the priority of achieving the specified goals for the proper

response to the consequences of adverse risks. The role of senior management, leadership, involvement of all involved personnel and stakeholders, which will contribute to better performance, is also explored in the proper functioning of the FSMSCP.

The importance of the use of FSMS by operators of the market of special food products has been determined, which is due to ensuring safety, consumer confidence, reducing costs for processing, recalling, disposal of dangerous products, and attracting new customers and partners.

It has been investigated that the use of QMS based on the international standards ISO 9000 series is quite common among business organizations. It has been analyzed that it is an effective tool for satisfying consumer needs by ensuring the appropriate level of product quality. The implementation of the provisions of the ISO 9001 standard, which is a certification standard for the development of quality guidelines for the organization, is of primary importance in the implementation of QMS.

It was analyzed that ensuring the functioning of QMS is achieved in an important way with the help of a process approach, according to which the activities within the organization are divided into processes that form a complete system. Its application makes it possible to clearly define the stages of problems and shortcomings, to achieve systematic improvement of the organization's activities. It was found that the management of processes and the system as a whole is achieved by using a cycle of measures for planning, execution, verification, improvement actions. To ensure success, the organization must constantly improve the quality of its activities, in particular, increase the consumer properties of products, analyze, and evaluate the efficiency of work, for which comprehensive audits of activities are provided.

The advantages of using QMS are the ability to improve work efficiency, customer satisfaction, staff productivity, establish profitable market relations, ensure competitiveness, and sustainable development.

It was determined that the application of a complex system of safety and quality management based on GMP norms is implemented through comprehensive activities aimed at guaranteeing compliance with the prescribed product properties. The use of this system is based on risk-oriented thinking, implemented at all stages of activity by applying dependent factors. They are considered to be production raw materials, equipment, the technological process of production and production of products, their packaging, the competence of personnel, compliance with sanitary and hygienic standards, reporting, documentation, monitoring, analysis, evaluation, tracing, recall of defective products. The application of safety and quality management systems based on GMP norms makes it possible to guarantee a consistently appropriate level of production, minimize the costs of recalling non-compliant products, compensate for losses, increase consumer loyalty and the level of profit.

Based on the analysis of the regulatory framework for property valuation, it was established that the International Valuations Standards (IVS) are the main generally recognized document at the international level [20]. The provisions of this document are intended for use in the assessment of assets, in particular intangibles, liabilities, current and future requirements for assets, liabilities. It has been studied that IVS [20] defines the terminology for property valuation, the procedure for its organization, conduct, reporting, establishes approaches, methods, contains recommendations

for determining the value of assets, in particular intangible assets (Fig. 2). Based on the analysis of general IVS standards [20], the evaluation algorithm, the process of its implementation, compliance assurance, and reporting of results have been determined.

The presence of regulatory documents regulating cost estimation at the regional European and national Ukrainian levels was also investigated. It was determined that the provisions of the European Business Valuation Standards (EBVS) [21] and the National Standard “General Principles of Valuation of Property and Property Rights” [22] almost completely correspond to IVS norms [20]. This indicates the harmonization of the provided European and domestic norms with international ones for optimal recognition of the results of work on property valuation. The Ukrainian standard [22] presents the definition of “principles of valuation”, it is determined that the valuation is carried out on the basis of the principles of utility, supply and demand, substitution, expectation, marginal productivity of the contribution, the most effective use. Despite the lack of specifying these provisions in the international and regional document, their application is determined de facto. It should be noted that, additionally, the peculiarities of intellectual property valuation at the national Ukrainian level are also determined by National Standard No. 4 “Evaluation of Intellectual Property Rights” [23].

Based on the results of the study IVS 210 “Intangible assets” [20], it was established that an intangible is a non-monetary asset that manifests itself due to its economic properties. It has been studied that despite the lack of physical expression, it provides certain rights and/or the opportunity to receive economic benefits to its right holder. According to the results of the analysis of the provisions of IVS 210 [20], it was analyzed that, in general, the use of cost, market and income approaches is provided for the assessment of the value of FSMS and QMS as intangible assets. It was determined that the methods of reproduction and substitution, market – comparison with the cost of similar objects, revenue – excess and premium profit, exemption from royalties, green field, distribution method are used for the implementation of the cost approach.

On the basis of the analyzed material and taking into account the need for the development and implementation of FSMS, which is defined by law for food market operators, a cost approach is defined as a priority for assessing the cost of these management systems. It has been studied that this approach is considered a priority and is most widely used when estimating the cost of FSMS, in particular special ones [13, 14]. This is due to the need to implement legislative norms regarding this product, the importance of ensuring an increased level of safety and quality of the mentioned products, taking into account the peculiarities of the physiological needs of the target category of consumers.

A recommended and widely used method for evaluating the FSMS and QMS is the reproduction method. In particular, organizations must first determine and take into account the costs of ensuring the competence of the employees involved, the development of appropriate documentation, the purchase and maintenance of additional equipment, and the recording of specified management and technological processes. Based on the results of the determination of the cost of FSMS and QMS of operators of the market of special food products by the method of reproduction, it was established that the cost is established, mainly, based on the amount of

initial costs of the enterprise. Important are the values of indexation coefficients based on price inflation at the time of evaluation, moral aging of MS. As a result of the application of the reproduction method, the cost of FSMS and QMS of the organization that produces special food products was practically calculated, amounting to UAH 167.6 thousand and UAH 34.7 thousand, respectively.

It has been established that the substitution method is also used to estimate the cost according to the cost approach. Based on the results of determining the cost of similar MSs under study (taking into account the need to make changes to the technological documentation for FSMS), it was established that it is higher, about UAH 180 thousand and UAH 40 thousand, respectively. This is connected, first of all, with a decrease in the exchange rate of the national currency relative to the foreign one, which, in many cases, is the basis for calculating the cost of services for the development of the MS.

In some cases, in particular, if the organization conducts work in different areas, and the activity related to food products is a parallel area of work, it is possible to use the revenue approach for the assessment of QMS. Its use is appropriate when the food product market operator already has an active FSMS but wants to expand the range and needs to develop and include in them new solutions for new products. However, the evaluation of the cost of the MS, in particular given the conditions of war, the income-based approach is not recommended.

On the basis of the researched information, the following recommendations were developed and proposed regarding the evaluation of the cost of integrated management systems for the safety and quality of special food products. In particular, when evaluating the safety and quality management systems of operators of the specialty food market using the reproduction method, it is proposed to take into account the level of changes in the market rate of the currency in which the value is assessed with the main currencies. This will help avoid cases where the cost of MS will artificially change as a result of underestimating the inflation rate determined by the state.

When assessing the cost of food safety and quality of special food products, it is also suggested to apply the coefficients of moral aging of the evaluated food products, based on the term of their operation. This will contribute to taking into account the level of compliance with modern requirements, taking into account the compliance with the latest technological solutions when assessing the cost of the system. It will also make it possible to stimulate manufacturers to implement more modern standards of MS and, as a result, increase their level of competitiveness.

Based on the results of the comparison of the received data on the cost of the investigated FSMS and QMS on the basis of the proposed recommendations, it was established that their cost compared to the traditional methodology of determination is lower. This is due to the use of the proposed recommendations for estimating the value of MS with regard to the coefficient of moral aging of MS, the level of changes in the market rate of the currency in which the assessment was carried out, relative to the officially determined indexation coefficient. Due to this, the information will be more objective and reflect the current state.

Summarizing our data, it is appropriate to note that this study is focused on optimizing the process and results of determining the value of the analyzed MSs as important

intangible property objects. The obtained results will make it possible to ensure and increase the effectiveness of the implementation and use of the assessment of safety and quality of special food products. Achieving this will be ensured by taking into account the specifics of the development and operation of the mentioned MS, international recommendations and best practices, rational and scientifically based selection of measures used in assessing their cost.

It is appropriate to note that when implementing the results of the study, it is necessary to take into account the limitations regarding the individual characteristics of each MS, in particular, regarding the technological specificity, scope of activity, number, and qualifications of personnel, which should be reflected in the assessment. Disadvantages of the research can be considered the impossibility of applying the results, achieving expectations from their use in cases of bankruptcy of organizations, emergency situations and other force majeure circumstances.

The perspective of further scientific research is the development of programs for evaluating the FSMS and QMS of operators of the special food products market, analyzing the experience gained, and spreading the best practices. This will contribute to increasing the efficiency of the evaluation of the specified systems.

7. Conclusions

1. It has been analyzed that the essence of FSMS is the analysis of dangerous factors that may occur in products, the establishment of their critical control points, the causes of their occurrence, compliance monitoring, detection of deviations, followed by removal of dangerous products. The use of this management system ensures the ability to stably supply consumers with safe food products, taking into account the risks of the appearance of dangerous factors, reduce the costs of processing, recall, disposal, and attract new customers and partners. The essence of QMS is determined by the creation and implementation of the necessary set of defined managerial, organizational and technical measures applied to improve the activities of the quality-oriented organization based on the prescribed principles. The importance of applying the QMS is determined by the organization's focus on quality, contributing to the formation of a culture that results in behavior, attitudes, and activities that add value by meeting the needs and expectations of customers and other stakeholders. It was determined that the best practice is the application of a comprehensive safety and quality management system based on GMP standards to ensure compliance with the expected consumer properties of products. This will make it possible to guarantee a consistently appropriate level of quality, minimize costs for compensation, increase consumer loyalty, business image, and profit level.

2. It has been established that the International Valuations Standards (IVS) are the main international document

that defines the methodological aspects of value estimation. This act defines the terminology for property valuation, the procedure for its organization, conduct, reporting, applied approaches, methods, contains recommendations for determining the value of assets, in particular intangible assets. A general recommended evaluation algorithm, the process of its implementation, compliance assurance, and reporting of results have been established. Documents regulating the assessment of value at the European and national Ukrainian level have been defined, the provisions of which are almost harmonized with international ones.

3. Based on the analysis of the International Evaluations Standards (IVS), it was found that for the evaluation of the cost of integrated safety and quality management systems, it is recommended to use a cost approach, first of all. This is justified by the need to determine the amount of funds to ensure compliance with legal requirements, meeting the needs of consumers and other stakeholders. Based on this, it is effective to use the method of reproduction, when the organization needs to identify all the costs of creating and maintaining the effective functioning of the mentioned systems. Also, in some cases, it is appropriate to use the replacement method when estimating the cost of FSMS and QMS.

4. Based on the results of our research, recommendations were devised and proposed regarding the evaluation of the cost of integrated management systems for the safety and quality of special food products. Their main content is the need to take into account, when assessing the value of MS, the level of changes in the market rate of the currency in which it is assessed, the coefficients of their moral aging, based on the period of operation.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study and the results reported in this paper.

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Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the presented work.

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