AN IT AUDIT AS A TOOL FOR STRATEGIC ENTERPRISE MANAGEMENT
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The aim of the article is to formulate and develop the theoretical and methodological principles of an IT audit as a tool for strategic enterprise management. A scheme for converting economic information into data is presented. It is established that an IT audit (an audit of information technology) is an independent audit (examination) by an auditor (a competent specialist or a group of specialists) of the enterprise IT environment in order to obtain complete and objective information (reliable facts, qualitative and quantitative estimates) about its current state (the state of the given subsystem of the enterprise), form an objective audit report and provide recommendations for improving the IT environment. It is established that the main stages of the IT audit are 1) preliminary IT diagnostics; 2) IT infrastructure audit; 3) IT department audit; 4) IT security audit; 5) monitoring the implementation of IT audit recommendations. It is proved that conducting an IT audit on the basis of best practices in the field of information technology management of an enterprise (institution, organization) guarantees the observance of such modern management approaches as system approach, process approach, functional approach, process and structural approach as well as the principles of strategic management of the enterprise. The prospect for further research in this field is the study of the state of regulatory and legal support for an audit of information technology in Ukraine and member states of the European Union.

Keywords: enterprise, IT-audit, information technologies, information system, strategic management.

Fig.: 2. Formulae: 2. Bibl.: 32.

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**Introduction.** The modern practice of doing business in Ukraine proves that today, under conditions of the rapid development of scientific and technological progress and deepening of the informatization of processes, the development of any enterprise directly depends on information technologies used in management systems. In such circumstances, carrying out an IT audit as a component of the audit system of an enterprise (institution, organization) is very relevant and important.

**The analysis of recent researches and publications** shows that a significant scientific and practical contribution to the solution of certain problematic issues (aspects) in the field of IT audit was made by such scientists as M. Astakhova [1], M. Benko [2], I. Holiash [3], O. Grebeshkov [4], V. Guzhva [5], I. Danyliuk [6], M. Denysenko [7], S. Ivakhnenkov [8], F. Moskalenko [9], I. Noga [10], A. Ogneva [11], G. Pawlowski [12], L. Pysmachenko [13], O. Pugachenko [14], K. Redchenko [15], R. Us [16–17], G. Chumachenko [18], A. Yanchev [19], and others.

**Identification of uninvestigated parts of the general problem.** Paying tribute to the high level of scientific developments [1–23] in this direction, it is worth noting that today insufficient attention is paid to an IT audit as a tool of strategic enterprise management (within the theory and practice of economics and enterprise management). All this has substantiated the relevance of the presented research, determined its theme, purpose, and prospects.

Therefore, **the aim of the article** is to form and develop the theoretical and methodological principles of an IT audit as a tool for strategic enterprise management.

**Economic information**

(a collection of information on socio-economic processes that serve to manage these processes and collectives of people in the production and non-production spheres)

1. Classifying
2. Coding
3. Modeling elements

**Data**

(information presented in a formalized form, accepted for processing by automatic means with the possible participation of humans)

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**Presentation of basic material of the research.** Based on the results of the studies [6; 16], it was found that today (in the context of the growing need for organizations to build an effective IT management system), there is a quite significant attention of business and specialists (both theorists and practitioners) in Ukraine to an IT audit (as a new type of audit of organizations), since the results of its conduct can provide answers to a number of questions, in particular: 1) whether the IT environment meets the goals (expected results) of a business (enterprise); 2) whether investments in IT are rational and economically justified; 3) whether the enterprise receives competitive advantages using the implemented IT; 4) what economic risks associated with IT threaten the enterprise and how they affect the results of its activities and the formation of prospects, etc. [6; 16, p. 84].

In the context of this, on the basis of research results of scientific works [5; 7; 10; 12; 16–18; 24–27], it is established that:

1. Information technology should be understood as an integral system of techniques and methods for collecting, accumulating, processing, storing, transferring (exchanging), representing, and using information [5, p. 19]. The scheme for converting economic information into data is presented in Figure 1.
2. Information technologies at enterprises are divided into: 1) office automation technologies; 2) information processing technologies; 3) information management technologies; 4) information technologies for supporting decision-making; 5) information technologies used in expert systems [18] (G. Chumachenko).
3. Information technologies of an enterprise (supporting, functional ones [18]) alongside with information resources, hardware, software (special information analysis one), and intelligent technological systems to achieve IT goals form an information system (or information support system) for making management decisions (current, future, operational, development ones) in the management system [7; 10; 12; 24; 27].
4. An IT audit (audit of information technologies) is an independent audit (examination) by an auditor (a competent specialist or a group of specialists) of the enterprise IT environment for the purpose of obtaining complete and objective information (reliable facts, qualitative and quantitative estimates) about its current state (the state of the given subsystem of the enterprise), forming an objective audit report, as well as providing recommendations for improving the IT environment [16; 17; 24].
5. An IT audit (as a component of the enterprise audit system) provides an opportunity to assess the state of affairs at the current stage of implementing and/or using information systems and technologies, a list of deficiencies, inconsistencies, possible risks associated with them and recommendations for their elimination [14, p. 227].

Within the studying of the work [2] (M. Benko, V. Sopcenko), it is established that an IT audit is divided into internal audit and external audit. The main elements of an internal IT audit are objects of the internal audit information system and the internal audit staff, and those of an external IT audit are objects of the external audit information system and the external audit staff [2].

At the same time it is also worthwhile to note the scientific work of S. Ivakhnenkov [8], which states that the main...
directions of the audit of information systems that provide for the use of information technologies are: 1) technical audit; 2) information security audit; 3) estimative audit of information systems and software; 4) audit of implementation and re-engineering projects; 5) audit of effectiveness of the information system [8].

In turn, O. Pugachenko [14] argues that an IT audit covers such areas of examination as: 1) state of computer information systems and the possibility of expanding their available functions; 2) level of data archiving and storage; 3) level of control procedures for monitoring the operation of the computer data processing environment; 4) software analysis and availability of licenses as well as the ability to respond flexibly to changes in legislation in terms of setting (restoring) software; 5) issues of information security (restriction of unauthorized access), etc. [14, p. 225].

In view of this, I. Holiash and S. Sachenko [3, p. 92] focus attention on the fact that as a result of an IT audit, recommendations are made aimed at enhancing enterprise security in the field of IT application. According to the scientists [3], the recommendations should address such key areas as: 1) developing a system for appropriate information support for jobs; 2) establishing specific schemes for the collection, accumulation, processing, storage, exchange and use of information; 3) creating effective control over the operation of the software and its users; 4) re-monitoring changes in the software; 5) implementing measures to preserve the confidentiality of data, etc. [3, p. 92].

It is established that the IT audit quality directly depends on the level of professionalism of audit services that is formed on the basis of 1) rational formation of the base of audit knowledge; 2) compliance with the basic principles of International Standards on Auditing and the norms of the Code of Professional Ethics for Auditors [19, p. 52].

Taking into account the aforesaid, it is also worthwhile to pay attention to the materials of the Ukrainian company “Baker Tilly in Ukraine” [24], according to which it is clear that the main stages of an IT audit are: 1) preliminary IT diagnostics; 2) IT infrastructure audit; 3) IT department audit; 4) IT security audit; 5) monitoring the implementation of IT audit recommendations (Fig. 2).

Here (see Fig. 2, Stage 1), based on the results of previous studies on the problem cited in the works [10; 12; 25–27], it is determined that 1) Diagnostics of effectiveness of using information technology in management of the enterprise ($D_{IT}$) is the process of identifying, analyzing and evaluating the efficiency, economy and flexibility of using information technologies in enterprise management for the purpose of making well-grounded management decisions (current, future, operational, development ones) in the management system aimed at:

![Fig. 2. Stages of an IT Audit](source: [24] (Materials of the Ukrainian company “Baker Tilly in Ukraine”)
increasing integral level of efficiency of the enterprise’s functioning (EF) as a structural component of its competitiveness in the systems for determining the result «information-resource-time-opportunities (threats)», «goal-means-result», and «effect-result», based on performance principles (quality in quantitative assessments, reliability, target orientation, transparency, complexity, temporal orientation, formalization, integration), evaluation metrics, evaluation rules, analytical business indicators, rules of interpretation [10, 12; 25];

- obtaining the maximum possible annual economic effect from the use (implementation) of IT (alongside with information resources, technical means, software (special information analysis one) and intellectual information retrieval, accounting and expert systems), which is denoted as the increment in net profit (ER) in the formula (1):

\[ D_{IT} \rightarrow (E_f \uparrow, E_n \uparrow); \]

\[ E_f = f(E_{m}, E_{n}, E_{mt}, E_{ct}); \]

\[ E_n = P_a \sum_{i=1}^{12} K_i, \]

(1)

where \( E_f, E_n, E_{mt} \) — structural components of \( E_p \) respectively — financial and economic, commercial, technical means, and technological, and social efficiency of the enterprise in conventional units;

\( P_a \) — additional profit of the enterprise, hrn.;

\( \sum_{i=1}^{12} K_i \) — amount of taxes that must be paid from additional profit, hrn. [10; 12; 27].

2) In the basis of the demands to the quality of implementation \( D_{IT} (Q^{IT}) \) are interrelated parameters (business indicators), which can be described by the function presented by the formula (2):

\[ Q^{IT} = f(a, b, c, d, e, f, g), \]

(2)

where \( a \) — level of efficiency;

\( b \) — level of productivity;

\( c \) — level of confidentiality;

\( d \) — level of integrity;

\( e \) — level of accessibility;

\( f \) — level of compliance;

\( g \) — level of reliability [10; 12; 26].

At the same time, it is established that in the process of IT auditing (see Fig. 2) it is necessary to use the best practices in IT management, documented in the form of generally accepted standards, instructions, recommendations, such as:

1) ITGI COBIT; 2) ISACA IT Audit and Assurance Standards; 3) INTOSAI IT Audit Committee Guides; 4) ISO 9000x, ISO 20000x, ISO 27000x, ISO 31000, ISO 38500:2008; 5) IFAC IT Committee Guidelines; 6) OGC ITIL; 7) SEI CMMI; 8) Hewlett-Packard ITSM; 9) Microsoft MOF; and others [24].

Taking into account the foregoing, it should be noted that in the scientific work [1, p. 322], M. Astakhova presented a draft computer model of the co-functioning of the audit and accounting program, the main elements of which are: data import, analytic survey, systematization, and audit report. At the same time, it has been established that the application of the proposed computer model in practice (in comparison with the manual one) makes it possible to obtain a number of advantages and additional opportunities, namely 1) possibility of increasing the audit sampling of information, which will improve the quality of audit findings; 2) increase in the level of effectiveness of the audit due to the reduction of the terms of inspection and work effort; 3) possibility of determining deviations of actual values from the planned targets and establishing the main factors that affected the deviation; 4) possibility of reconciling and interrelating the reporting forms received from the computer accounting program with the data obtained from the audit program [1, p. 323].

Thus, the use of an IT audit in the management system gives an opportunity for enterprise managers 1) to determine the role and place of information technologies in the overall organizational structure and their contribution to the achievement of business objectives; 2) assess the level of conformity of IT strategy with the overall business strategy, the level of maturity of IT processes and IT risk management [24].

Conclusions and prospects for further research. The results of the study [1-32] make it possible to formulate the following conclusions and proposals of a theoretical and practical nature, namely

An IT audit (an audit of information technology) is an independent audit (examination) by an auditor (a competent specialist or a group of specialists) of an enterprise’s IT environment in order to obtain complete and objective information (reliable facts, qualitative and quantitative estimates) about its current state (the state of the given subsystem of the enterprise), form an objective audit report and provide recommendations for improving the IT environment.

The main stages of an IT audit are: 1) preliminary IT diagnostics; 2) IT infrastructure audit; 3) IT department audit; 4) IT security audit; 5) monitoring the implementation of IT audit recommendations.

Conducting an IT audit on the basis of best practices in the field of information technology management of an enterprise (institution, organization) directly guarantees the observance of such modern management approaches as system approach, process approach, functional approach, process and structural approach as well as the principles of strategic management of the enterprise.

The prospect for further research in this field is the study of the state of regulatory and legal support for an audit of information technology in Ukraine and member states of the European Union.

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