

UDC 657.6: 004

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## **ORGANIZATIONAL AND METHODOLOGICAL SUPPORT FOR EVALUATION OF COMPANIES' IT-PROCESSES**

DOI: 10.14308/ite000688

*The article deals with the organizational and methodological basis for evaluation of efficiency of information systems and IT-processes for the purpose of their application in practical activity of internal control units and auditing firms aimed at satisfaction of informational needs of companies and functional enhancement of their information resources. The customers of services, reviewed in this article, are companies, which want to get an expert analysis on the usage state of information systems and technologies and to evaluate their efficiency in the course of realization of the main strategy, as well as companies, which try to escape from loss of competitive advantages in business and to reveal lost possibilities of use of information systems.*

*The means of satisfying companies' information needs for evaluation of IT-processes efficiency include control and auditing actions aimed at evaluation and analysis of the following objects: principles of IT governance, IT architecture, information infrastructure and IT services, needs for software applications and investments in IT. The subject-matter of audit actions for evaluation of efficiency of information systems and IT-processes is financial and non-financial information, which forms the system of corporate management of a company in terms of information technologies management, and relevant strategic thinking and financial planning. The program, main metrics and the detailed list of auditing procedures for evaluation of information systems and IT-processes are presented. Auditing procedures are best to be performed by such major criteria as compliance of IT-processes with strategic development; influence of information technologies at the level of organizing business processes; value due to the use of information technologies; evaluation of results (satisfaction level) from the use of IT.*

**Key words:** *companies, auditing services, IT-processes, information technologies governance, information technologies, internal control, evaluation of IT-processes.*

### **Introduction**

Intensification of a competitive struggle have put forward demands for efficiency upgrading in companies' work. Implementation of up-to-date IT-processes has to reflect corporate principles, ideas, goals, companies' traditions and to contribute introduction of developed strategies, which leads to the improving of management efficiency and increasing it's commercial value. Stereotyped thinking of CEOs and negligent work of colleagues in using IT causes a range of risks and disadvantages in corporate management. For example, for the last 10 years there were failed large IT investments, particularly:

- initiatives, connected to the implementation of ERP-systems (Enterprise Resource Planning), which remained unfinished;
- initiatives in the field of e-business, which were poorly designed or poorly implemented;
- experiments on automation of databases analysis, which resulted in receiving a lot of new data, but only a small part of them appeared to be actually valuable.

According estimations of researchers P. Weill and J. Ross [1], the part of failures in IT is more than 70% of all IT projects. While some unsuccessful investments in IT are the result of technical problems, most of them indicate inability of companies and their managers to develop and manage new processes that would allow applying new technologies effectively.

Due to this fact, commercial and even nonprofit organizations are trying to apply such mechanisms of organization, integration, regulation and control, which will provide the coordination in the work of information and other resources. One of these mechanisms is represented by auditing services for evaluation of IT-processes, which are provided by auditor organizations through the request and upon the initiative of companies.

### **Analysis of Recent Research and Publications**

In contemporary economic literature there is a number of scientific works dealing with the urgent problems of interconnection of audit, control and their influence on the system of companies' management: A. Arens et al. [2], F.F. Butynets [3], V.P. Panteleyev [4], I.I. Tsyhylyk [5], V.F. Maksimova [6], T.A. Kalinska [7] and others.

Professor F.F. Butynets indicates that "the functions of audit are the major lines of scientific, cognitive and educational order, which determine its essence, subject matter, social implication, tasks and objectives in the science of commercial control" [3]. Hence, audit has ample opportunities for functional activation of the key resources in the system of corporate management, which demand further study.

The problems of efficiency of information technologies' application and management are dealt in the works of P. Weill and J. Ross [1], M. Broadbent and E. Kitzis [8], G. Walker [9], W. Van Grembergen, and S. De Haes [10], O.V. Spivakovsky et al. [11] and others.

Researches of the domestic scientists dealing with issues of quality management in the field of information systems and technologies are carried out within public organization ISACA (Information Systems Audit and Control Association, Inc.). This organization is the developer of standards Cobit 4.1 [12] and Cobit 5 [13]. One of the main directions of IT control, evaluation and management in these standards is the solution of questions about formation quality metrics and the quality measures characterizing functioning of information systems in the companies.

A number of advantages for corporate management in information technologies can be found in the strategies of COBIT (Governance Control and Assurance for Information and Related Technology), which were developed also by the IT Governance Institute. The components of COBIT provide integrated methods for attaining organization's goals based on risks management and the events of information control. Yet, such a powerful instrument of IT tasks' management requires significant investments and well-trained skilled human resources, which is not always within the power of a number of companies.

Audit of IT-processes is in great demand from customers and is included into the third cluster of audit and consulting services. Activity arrangement according to the most profitable cluster areas helps such powerful company as "PricewaterhouseCoopers" to recognize and understand business of its clients better and provide additional services to them [1].

In Ukraine audit services are "young" type of audit activity having a small market yet. However, rapid growth of this industry (growth of quantity of audit companies as well as growing information demands of audit users, who use the newest informational technologies more and more), require theoretical and organizational research of audit services to evaluate the effectiveness of IT-processes.

In particular, there is no integrated methodology for conducting an audit of using IT. There are no specified indicators or criteria, which are advised to be used while evaluating. Scientists have not cleared up the stages of estimation of IT efficiency as well as necessary audit procedures. Therefore, an optimal choice of methodical support of audit services suitable for efficiency (compliance) estimation of informational systems and technologies is still an issue.

**The purpose of this article** is to develop organizational and methodological support for controlling and auditing activities for evaluation of companies' information processes.

### **Results**

Information technologies as the complex of processes and resources provide companies with information needed to administrate business processes, focusing on major business goals. In addition, efficient IT management is necessary for enterprises, as its results lie in encouraging

employees' skills for rational and best possible application of IT, as well as in providing correspondence of their behavior in terms of IT to corporate long-term vision and values [14].

The question arises: how is it possible to evaluate the correspondence of information processes, which are being used with the primary activity of companies? how is it possible to determine efficiency of information technologies management?

Efficient IT governance has to be addressed to the solution of the three main issues:

1. Which decisions should be made for providing efficient IT governance and application?
2. Who has to make such decisions?
3. In what way will these decisions be implemented and how will the control over their execution be held? [1]

Ample opportunities for the best possible solution of the third issue are provided by application of auditing services as a method of efficiency evaluation and control over the use of information systems (technologies) in offices.

The reasons, that determine the industry needs for auditing services in evaluation and monitoring of application of information technologies, are as follows:

- the need for IT in companies' activity;
- lack of control over expenses and investment in IT;
- variations in external market environment;
- lost opportunities in the course of application of IT;
- the allocation of duties in the hierarchy of IT management and control over them;
- limited capacity and a tendency to template behavior of the top management;
- existence of various information systems and new approaches to their application.

The analysis of companies' demands for auditing services connected with IT resources allows classifying them in this way:

1. IT audit on compliance to business requirements;
2. IT audit on functional completeness and compliance to specifications;
3. IT audit by nonfunctional criteria;
4. audit of processes of IT development and deployment;
5. audit of processes of IT maintenance and technical support;
6. audit for evaluation of company's cumulative cost and return of investment in IT;
7. audit of the problems with information system and the proposed solutions.

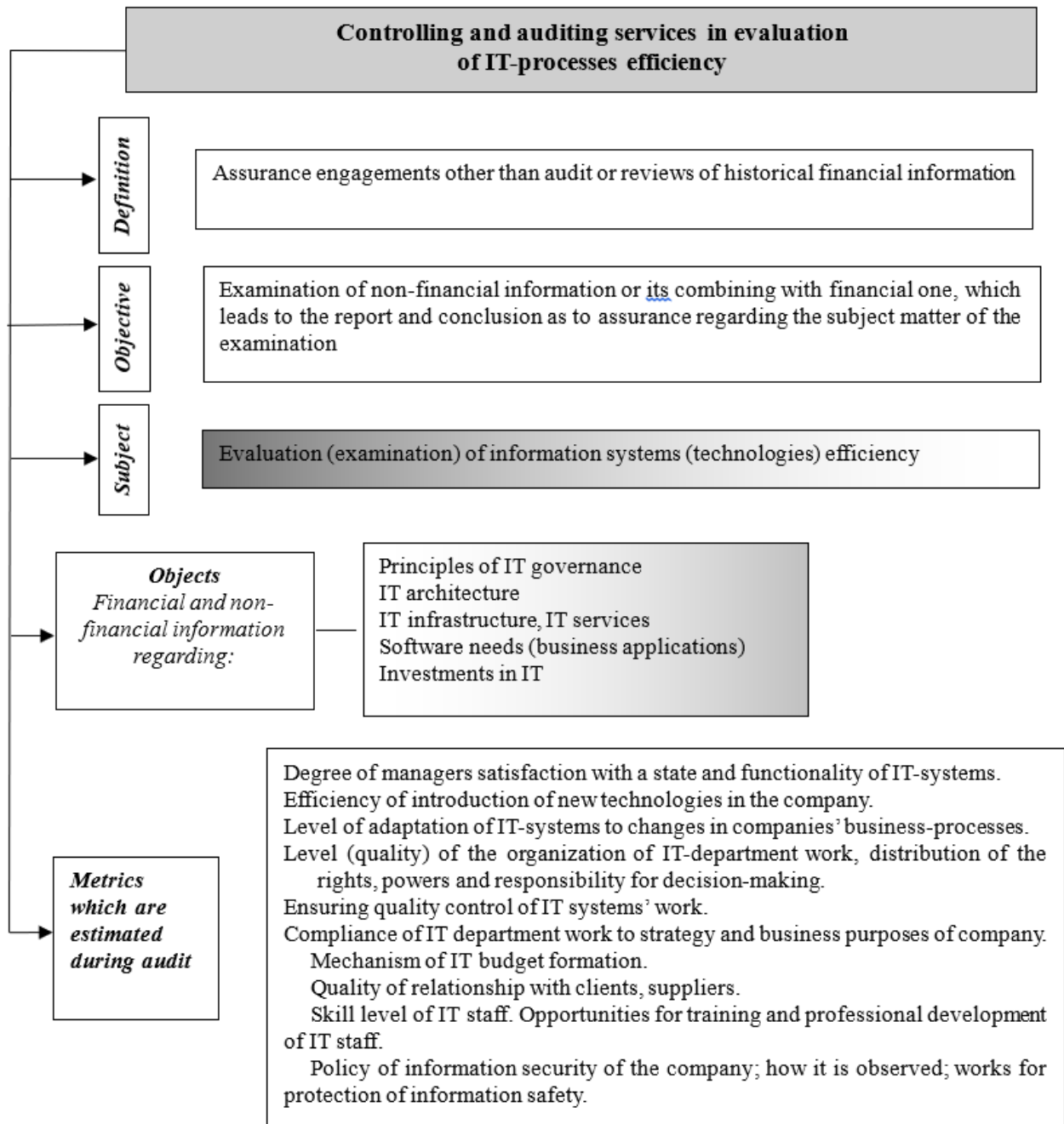
According to International Standards on Auditing, Assurance and Ethics [15], which were adopted by the decision of the Audit Chamber of Ukraine [16] as national for domestic auditing activities, the tasks, which are being performed by an auditor, comprise various services, which may fall within the scope of assurance engagements by International Auditing and Assurance Standards Board.

According to the conceptual framework of assurance engagements, engagements are such activities which, in case of being performed by an auditor, lead to an auditor's conclusion aimed at increase in confidence of future users, who are not a responsible party, in the results of evaluation or comparison between the subject of engagement and relevant criteria.

Assurance service is an independent professional service, provided by Certified Public Accountants (auditors), with the goal of improving information or the context of information so that decision makers can make more informed, and presumably better, decisions [17]. Assurance services provide independent and professional opinions that reduce the information risks.

According to International Standards on Auditing, auditing services for evaluation (examination) of IT-processes efficiency are classified among assurance engagements other than audit or reviews of historical financial information, and are included into the list of services which can be provided by auditors (audit firms); the list was adopted by the decision of the Audit Chamber of Ukraine #182/5 in September, 2007 [16].

More specific definition of auditing services for evaluation of companies' information processes is given in Fig.1.



*Fig. 1. Controlling and auditing services in evaluation of IT-processes efficiency (author's construction)*

The main task of auditing services for control of information processes is to evaluate independently and objectively if information technologies provide necessary services.

As a result of auditing procedures, a report containing the conclusion about assurance regarding the matter of the examination is issued. The objects of audit in this particular case are companies' financial and non-financial information regarding the principles of IT governance, IT architecture, IT infrastructure and services, software needs and investments in IT.

IT services, the functioning of which is examined by an auditor, include:

- information communication network services;
- providing and management of high-level computing hardware (such as servers and mainframes);
- shared client database management;

- study and expert knowledge development aimed at exposure of advantages of new technologies for business;
- creation of a local corporate network (intranet) [18, 19].

These services may be provided by internal departments of an enterprise or through external sources. The internal IT infrastructure of a company is often connected to external industrial infrastructures such as the systems of bank payments as well as to public infrastructures such as Internet and telecommunication networks.

The abovementioned five objects of audit cannot be considered separately. Only a complex approach to these objects of audit will enable a reasoned conclusion as for assurance and client's information needs satisfaction as for the use of IT. To fulfill this task, each of the five objects should be placed under evaluation by the following criteria:

- compliance of IT with strategic development (preferable behavior);
- the level of organization and IT;
- the problem of value due to the use of IT;
- result achievement (satisfaction level) from the use of IT.

Table 1 proposes the detailed list of auditing procedures for evaluation of IT-processes efficiency, which comply with the abovementioned approach.

Table №1.

*Auditing procedures for evaluation of IT-processes*

<b>Objects of control and audit</b>	<b>Auditing procedures</b>
Principles of IT governance	Identification of the operational model of a company.
	Determination of the role and place of IT in business operations.
	Establishing the principles of preferable behavior towards IT.
	Establishing the principles and demands for IT financing.
	Carrying out questioning of chief executive officer (CEO), chief information technologies officer (CIO)
IT Architecture	Determination of the information that establishes the basis for key business processes of a company. In what way is data integration performed?
	Identification of technical opportunities for data standardization at company level aimed at supporting the efficient use of IT, facilitation of standardization and integration of business processes.
	Identification of types of activities, which require standardization at all levels supporting data integration.
	Technological alternatives, which regulate a company's approach to performing IT initiatives.
IT infrastructure and IT services	Identification of IT resources both available and needed.
	Estimation of possibility of available IT services to provide operational activity and achievement of strategic aims of a company.
	Estimation of IT services, determination of quality of information infrastructure support from the viewpoint of its reliability, safety, steadiness and timeliness.
	Analysis of IT services from the viewpoint of providing integrity, accessibility, confidentiality, and reliability of information.
	Existence of a plan for the up-to-date support of main technologies.
	Are there any infrastructural services performed by outsourcers?
Software needs	Estimation of needs and possibilities for realization of new software

<b>Objects of control and audit</b>	<b>Auditing procedures</b>
(business applications)	applications (from the viewpoint of market and company's business processes. Is their success rate being researched (experimentally researched)?
	Determining the level of needs satisfaction for business departments of a company in terms of architecture standards. In what cases do business needs authorize deviations from standard?
	Who determines necessary organizational changes of software applications for increase in business value?
Investment in IT	Establishing strategically important ways of improving company's processes; do IT investments comply with strategic views and principles of a company, do IT investments encourage achievement of strategic aims?
	Determining demands and expectations of an enterprise from the resources invested in IT.
	Determining the correlation between the received results from the implementation of IT and the results a company expects to get after investments.
	Estimation of current and submitted IT investment portfolios. Are these portfolios in accordance with a company's strategic aims?
	Contrastive analysis of IT investments relevance of a whole enterprise and investments of separate business units.
	Estimation of appropriate profit from IT investments at an acceptable level of a company's expenses and risks.
	Determining the correlation between IT investments and a company's processes organization. Estimation of correspondence of IT investments with organizational principles of a company.
	Do IT investments encourage the development of a company's organization?
	Do IT investments comply with other planned tasks and initiatives?
	Is there a clear mutual understanding in the company as for expected profits from IT investments?
	Establishing responsibilities of the staff for results obtained from investments.
	Existence of measures for evaluation of investment results.
	Existence of sufficient technical and administrative resources for achieving necessary productivity.
Existence of sufficient resources for organizational changes aimed at improving productivity.	

The program of controlling and auditing actions for the evaluation of company's IT processes and resources is presented in table 2.

Table №2.

*Program of controlling and auditing actions for evaluation of IT-processes*

<b>Stage</b>	<b>Actions</b>
Stage 1. Constituting conditions and form (contract) of audit.	Internal control unit and managers of company (or auditing firm and a client) coordinate a plan and a program of auditing; volume, time and costs of controlling and auditing actions are determined.

Stage	Actions
<p><i>Stage 2.</i> Examination of planning and organization.</p>	<p>Auditor gets familiar with the following characteristic of IT processes:</p> <ul style="list-style-type: none"> <li>• information on the aims and growth directions of a company, existence of a strategic plan of IT development;</li> <li>• determining the direction of technological development of a customer, IT projects management;</li> <li>• organizational structure of a company, interrelations between information and other key resources;</li> <li>• IT architecture;</li> <li>• IT investment management;</li> <li>• IT staff management;</li> <li>• the influence of IT on quality management process;</li> <li>• IT risks management.</li> </ul>
<p><i>Stage 3.</i> Evaluation of the system of monitoring and internal control.</p>	<p>Auditors examine the efficiency of the system of internal control and monitoring, determine the compliance of IT using with regulatory demands of a company, and evaluate the level of supplying corporate management with information technologies.</p>
<p><i>Stage 4.</i> Examining IT purchase and introduction.</p>	<p>The business-processes which must be evaluated:</p> <ul style="list-style-type: none"> <li>• taking decisions about automation;</li> <li>• purchase and introduction of software applications;</li> <li>• purchase and support of technological infrastructure;</li> <li>• performing operational activities, connected with IT;</li> <li>• information resources supply.</li> </ul>
<p><i>Stage 5.</i> Evaluation of IT operation and support.</p>	<p>Auditors perform the auditing procedures concerning evaluation and analysis of the following IT processes:</p> <ul style="list-style-type: none"> <li>• information systems and data security arrangements;</li> <li>• determining and management of the level of service support and operation of information systems; technical support management;</li> <li>• performing the task of IT services steadiness;</li> <li>• configuration control;</li> <li>• problem management;</li> <li>• data management;</li> <li>• determination and allocation of expenses;</li> <li>• training of IT-users.</li> </ul> <p>In the course of analysis, the scope and quality of available resources are examined in more detail.</p>
<p><i>Stage 6.</i> Compilation of auditing report and conclusion.</p>	<p>The final stage of auditing is characterized by the revision of received materials, audit evidences and auditor's working papers aimed at preparing a report on efficiency assurance and appropriateness of information processes.</p>

The presented program allows receiving results for evaluation and analysis of information systems and IT processes from the viewpoint of their cost for a whole company's business on condition that expenses are rational and risks are reasonable.

Therefore, the subject-matter of audit for assurance engagement on evaluation (control) of efficiency (appropriateness) of IT-processes is financial and non-financial information, which forms the system of corporate management of a company in terms of information technologies management, and relevant strategic thinking, financial planning.

On the one hand, the abovementioned auditing services as a specific method of control are the means of functional activation of information resources in an enterprise, since the result of their performance is a report and conclusion on the efficiency of available IT services, and, therefore, objective exposure of lost opportunities of IT, unused resources. After agreeing with a customer, auditing firm may take part in the development of recommendations for IT processes improvement.

On the other hand, in the context of a more complete disclosure of the potential of audit, this type of auditing services gives a possibility not only to objectively evaluate a real situation in a company, the resource base of its strategic plans and IT projects, but also to provide their controllability and manageability.

### **Conclusions**

The analysis of companies' orders for auditing services connected with IT resources allows classifying them on: IT audit on compliance with business requirements; IT audit on functional completeness and compliance to specifications; IT audit by nonfunctional criteria; audit of processes of IT development and deployment; audit of processes of IT maintenance and technical support; audit of evaluation of company's cumulative cost and return of investment in IT; audit of information system problems and preparing solutions for them.

The means of satisfying companies' information needs for evaluation of IT-processes efficiency (information communication technologies) include auditing services aimed at evaluation and analysis of the following objects: principles of IT governance, IT architecture, information infrastructure and IT services, needs for software applications and investments in IT. Auditing procedures in regard to these objects are best to be performed by such major criteria as compliance of IT with strategic development (preferable behavior); influence of IT at the level of organizing business processes; value due to the use of IT; evaluation of results (satisfaction level) from the use of IT.

The program and a list of auditing procedures for evaluation of IT efficiency for the purpose of its application in practical activity of auditor companies and internal control (audit) units aimed at satisfaction of informational needs of companies and functional activation their information resources have been presented.

The proposed organizational and methodological principles of auditing services in evaluation of IT-processes may be useful for application in practice of audit firms and internal control of companies.

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Стаття надійшла до редакції 25.10.2018.

The article was received 25 October 2018.

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### **ОРГАНІЗАЦІЙНО-МЕТОДИЧНЕ ЗАБЕЗПЕЧЕННЯ ДЛЯ ОЦІНЮВАННЯ ІТ-ПРОЦЕСІВ КОМПАНІЙ**

В статті представлено організаційно-методичне забезпечення оцінки ефективності інформаційних систем та ІТ-процесів для застосування в практичній діяльності служб внутрішнього контролю компаній та аудиторських фірм з метою задоволення зростаючих інформаційних потреб компаній та функціональної активізації їх інформаційних ресурсів. Замовниками аудиторських послуг, розглянутих в даній статті, постають компанії, які хочуть провести експертизу стану використання інформаційних систем і технологій та оцінити їх ефективність в ході реалізації основної стратегії, а також компанії, що намагаються запобігти втраті конкурентних переваг в бізнесі й виявити втрачені можливості експлуатації інформаційних систем.

Засоби задоволення інформаційних потреб компаній щодо оцінки ефективності ІТ-процесів включають контрольні та аудиторські дії, спрямовані на оцінку та аналіз наступних об'єктів: принципів ІТ-управління, ІТ-архітектури, інформаційної інфраструктури та ІТ-сервісів, потреб в програмних додатках та інвестицій в ІТ. Предметом аудиторських дій по виконанню завдання з оцінки ефективності інформаційних систем та технологій є фінансова та не фінансова інформація, яка формує систему корпоративного управління компанії в частині, що відповідає за управління інформаційними технологіями та пов'язане із цим стратегічне мислення й фінансове планування. Представлено програму, основні характеристики й детальний перелік аудиторських процедур щодо оцінки ефективності інформаційних систем та ІТ-процесів. Аудиторські процедури доцільно проводити за такими основними критеріями, як відповідність ІТ-процесів стратегічному розвитку компанії; вплив

інформаційних технологій на рівень організації бізнес-процесів компанії; вартість від використання інформаційних технологій; оцінка результатів (ступінь задоволеності) від використання інформаційних технологій.

**Ключові слова:** компанії, аудиторські послуги, ІТ-процеси, управління інформаційними технологіями, інформаційні технології, внутрішній контроль, оцінка ІТ-процесів.

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### **ОРГАНИЗАЦИОННО-МЕТОДИЧЕСКОЕ ОБЕСПЕЧЕНИЕ ДЛЯ ОЦЕНИВАНИЯ ИТ-ПРОЦЕССОВ КОМПАНИЙ**

В статье представлено организационно-методическое обеспечение оценивания эффективности информационных систем и ИТ-процессов для применения в практической деятельности служб внутреннего контроля компаний и аудиторских фирм с целью удовлетворения растущих информационных потребностей компаний и функциональной активизации их информационных ресурсов. Заказчиками аудиторских услуг, рассмотренных в данной статье, выступают компании, которые хотят провести экспертизу состояния использования информационных систем и технологий и оценить их эффективность в ходе реализации основной стратегии, а также компании, которые стремятся предотвратить потерю конкурентных преимуществ в бизнесе и выявить упущенные возможности эксплуатации информационных систем.

Средства удовлетворения информационных потребностей компаний по оценке эффективности ИТ-процессов включают контрольные и аудиторские действия, направленные на оценку и анализ следующих объектов: принципов ИТ-управления, ИТ-архитектуры, информационной инфраструктуры и ИТ-сервисов, потребностей в программных приложениях и инвестиций в ИТ. Предметом аудиторских действий по выполнению задания оценки эффективности информационных систем и технологий является финансовая и не финансовая информация, которая формирует систему корпоративного управления компании в части, отвечающей за управление информационными технологиями, соответствующее стратегическое видение и финансовое планирование. Представлены программа, основные характеристики и детальный перечень аудиторских процедур по оценке эффективности информационных систем и ИТ-процессов. Аудиторские процедуры целесообразно проводить по таким основным критериям, как соответствие ИТ-процессов стратегическому развитию компании; влияние информационных технологий на уровень организации бизнес-процессов компании; стоимость от использования информационных технологий; оценка результатов (степень удовлетворенности) от использования информационных технологий.

**Ключевые слова:** компании, аудиторские услуги, ИТ-процессы, управление информационными технологиями, информационные технологии, внутренний контроль, оценка ИТ-процессов.