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# Technological audit in the system of optimization of innovative activity

***Abstract:***

*Object:* The need for technological audit is growing as the development of mergers and acquisitions, the emergence of plans for the development of industries due to the development of new technologies and the emergence of new tasks for Kazakhstan enterprises. The relevance of technological audit is due to the high degree of depreciation of fixed assets, which contains significant risks.

*Methods:* Methods of cognition — generalization, comparison, classification, observation, description and detailing, and methods of statistical analysis; the methods of scientific research based on the axiomatic method and the method of generalization and classification.

*Results:* The article discusses the theoretical aspects of technological audit as an internal part of the audit of the enterprise. The authors indicate that technological audit concerns the analysis of technologies, experience, products and knowledge that are available at the enterprise and that can potentially be commercialized.

*Conclusions:* The main purpose of the technological audit is revealed: collection, systematization, analysis and comprehensive assessment of information, issuance of recommendations and proposals for rationalizing the use of production facilities of the enterprise based on the results of the assessment. The article presents the general structure and main stages of technological audit. The use of direct and indirect indicators for the evaluation of technologies and production systems is shown.

***Keywords:*** technological audit, industry, innovation, state audit, internal and external audit, legislative and regulatory acts, state financial control, experience of foreign countries, public administration system.

## *Introduction*

The innovative potential of the state, covering the complex of material and production, intellectual, technological resources that are needed for the implementation of innovative activities, refers to the category of state wealth. The national innovation strategy must be based on the principles of recognizing the leading model of innovative formation of the country's economy, the effective use of its own technological potential and intellectual property.

In our country, the appeal to market views has sown a newfound position towards intellectual belonging, as if to a huge economic and technological potential that can guarantee the development of the country's economy. For effective financial growth, the industry must organize a stable and self-developing mechanism that causes the application of innovations and ensures their effective use.

As an effective mechanism for changing the investment climate and activating innovation policy in the technological and industrial sphere, it can designate a technological audit. technological audit allows you to foreshadow the trading opportunity of newly minted developments, to manage the entire process of promoting technologies to the markets. In Kazakhstan, the concept of performing technology audits and teaching t-managers about the trade application of intellectual property is being developed. the transformation of technological developments into an innovative product suitable for production and the market seems to be one of the most labor-intensive stages that combine science with the consumer. We still have little skill in managing technology entrepreneurship, there are no suitable technologies and regulatory materials that regulate the application and evaluation of the highest technologies during their commercialization. For a technological audit for the priority selection of innovative plans, it seems to be the main condition for optimizing innovative activity in this area.

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Hypothesis. We proceed from the fact that, based on an analysis of the current socio-economic situation in the Republic of Kazakhstan, a technological audit for the priority selection of innovative projects is the main factor in optimizing innovative activities in this area.

***Literature review***

Audit is an independent documented control by auditors and audit organizations of financial statements and other documents of economic entities in order to assess the veracity of financial and economic operations, their compliance with state legislation, focused on protecting the interests of owners, detecting assistance to economic entities in increasing the economical productivity of their activities.

British scientist R. Dodge believes that «an audit is an independent control and expression of judgment on the economic report of an enterprise».

An important way to assess the possibilities of innovative formation of an organization, its current technological state and health is a technological audit. Technological audit of a company is an audit of technological processes, methods, methods and procedures used in an organization to assess their effectiveness and efficiency.

According to Adams, "an audit can be defined as an activity that provides a necessary service to a company in order to confirm the apparent likelihood of a published financial statement of a limited liability company". To determine the essence of technological audit, we consider the existing definitions given by various authors.

Technology audit refers to the analysis of technologies, the analysis of experience, goods and knowledge that is in a research institute, laboratory, institute and which may possibly be commercialized. In our opinion, such an establishment is a little incomplete, for no reason as a technological audit can be carried out not only at an institute, laboratory, university, but also in all kinds of organizations.

According to M. Duhamel, P. Franzetti, a technological audit is an operation for an objective assessment of the innovative potential as an object of technology transfer. A common feature of the three above definitions is «assessment» — one of the main data of the audit. In a recent manual, technology audit refers to a complex study of an organization focused on discovering technologies and making an unbiased assessment of their potential as a technology transfer target.

The characteristic specificity of the provided definition is that technology audit is focused not only on assessing the potential of innovations, but also on conducting a complex examination of systems in order to discover technologies and assess their potential.

According to the technology audit manual, a technology audit is the discovery of a technology suitable for transfer or international technology cooperation. The imperfection of this definition, in our opinion, is that the assessment of the potential of innovations is not considered.

Technological audit B.S. Old, describes as an activity aimed at the commercialization of academic research, the assessment of innovative activities of enterprises from a financial point of view through the analysis of technologies, experience, features of products researched or available in enterprises that are specialized for implementation.

In our opinion, this definition seems to be quite complete, as it covers the key goal of a technology audit and lists its key characteristics.

The Law of the Republic of Kazakhstan «On State Support for Innovation Activities» describes the opinion «innovation and technology audit», which means a unified analysis of the level of technological formation of the company and its innovative potential.

The main purpose of technological audit is to collect, systematize, analyze and comprehensively evaluate information, issue recommendations and proposals for rationalizing the use of production capacity of an enterprise based on the results of an assessment.

Summarizing the above approaches to the interpretation of the definition of «technological audit», we propose to understand the technological audit as an independent, documented, unified assessment of the organization, the purpose of which is to establish the value of the technological formation of the organization, identify schemes and impartially put their potential as an object of technology transfer.

A technology audit is a research method focused on assessing (a) technological capability, (b) operations, and (c) the needs of the small and medium business or organization. In addition, it is a method of uncovering strengths and weaknesses by characterizing and evaluating the company's key know-how (marketing, management, finance, human resources, etc.). This is an analysis process that leads to clear proposals (action plan).

Technology audits are drawn up by external consultants in close collaboration with company management and personnel. Its base is supposed to have a structure: collection of information — investigation — compilation — report.

Then effectively ending it will lead to the intention of actions leading to scientific and technical improvement, the acquisition of important technologies and / or experience. This is a good starting point for the further formation of the firm, provided that it is laid out by highly experienced consultants and thoroughly accepted by the management of the company. It should be emphasized that the technological audit itself cannot solve the basic problems, i.e. bring immediate benefits, correct errors and eliminate coordination difficulties.

The overall objective of technology audit is to assess the ability of companies and organizations to integrate new technologies, work with technology partners and preferably determine what they need in order to effectively integrate these technologies into the company.

In particular, technology audit should allow characterizing the innovation needs of SMEs from different points of view:

– Designation of products/markets, ensuring the competitive and stable progress of the company;

– Scientific and technical areas that call for attention: automation, information technology, biotechnology, chemistry, packaging, etc.

– Functions/problems of a corporate nature that call for innovative solutions: performance, quality, energy, ecology, agility, etc.

– Status of technology transfer, such as: training, partnerships for technology formation (national and international), technical assistance, intellectual property rights, subsidies, etc.

– Sources and channels of innovation that can be used and relationships that can be developed: customers, suppliers, industrial centers, universities, experimental laboratories, etc.

There are no «universal» stereotypes for performing a technology audit. although the overall structure consists of:

A. Preparatory work:

– Gathering fundamental information about the firm, sector, relationships with other firms and technology providers.

B. General abbreviated diagnosis:

First interview/visit to the firm to convene corporate data, either based on a pre-set questionnaire texture, or based on an open survey (usually with the general manager of the company);

– Consideration of data/initial diagnosis;

– Brief presentation of the initial diagnosis to the head (s) of the SME, reaction, discussion, conclusion on topics for a more complete analysis;

C. Further information collection with additional interviews, depending on the subject chosen, covering:

– Management / administration (organization- strategy — investments);

– Production operations (productivity — material flow / flow diagram — flexibility — automation — maintenance — safety);

– R&D department (subjects of interest — type of R&D activities — internal / external R&D);

– Quality department (organization — standards — quality control procedures);

– Human resources management (capabilities — availability — continuous education/training);

– Marketing / Sales (marketing plan — marketing strategy — market share -competitors — distribution points — use of information technologies for sales);

D. Summary report on the analysis of data and on the synthesis leading to an action plan for resolving specific technological problems as surfaced from the technology audit.

E. Presentation of the report to the firms' management board, validation of conclusions, finalization of the action plan.

F. Follow up visits (of the consultants) and discussions with management on the implementation of the action plan by the SME.

Alternative solutions to the technology audit could be:

1. Self-evaluation audit, technique to be implemented by the firm itself without the help of an outside expert. This technique would normally lead to the decision for the firm to follow up and continue with a normal technology audit.

2. Benchmarking, where an analysis of the company strengths and weaknesses is performed, a technology profile is established and it is then compared with leading companies in the sector and / or an average (a norm) of companies in the sector. This technique requires that the experts carrying it out have in their possession available data needed in order to perform the comparison.

3. Innovation Management Audit, methodology for auditing and providing action plans concerning company management issues (strategic planning, human resources development, marketing, etc.)

The expected results from a carefully conducted technology audit mainly concern:

– Complete and comprehensive analysis and evaluation of the requirements of the firm for its sustainable growth;
– Through impartial SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis, by an experienced expert;
– Opportunity spotting for new products / new services / new technologies / new markets;
– Networking with technology suppliers, technological sources, other companies;
– Possible assessment of technology portfolio, intellectual property rights;
– Investigation and identification of potential funding mechanisms;
– Sign-posting to innovation and technology transfer networks for technological development through cooperation in international and national R&D programs;
– Introduction to new sources of funding.

***Methods***

The methodological basis of the study was such general scientific methods of cognition as generalization, comparison, classification, observation, description and detailing, as well as methods of statistical analysis. Using these methods allowed us to make theoretical generalizations and formulate specific recommendations on technological audit.

***Results***

In recent years, which are characterized by the rapid development of technology, which has the character of a socio-technological revolution, the role of technological auditing in the activities of any organization has increased significantly.

A schematic view of the steps that are normally followed while carrying out a technology audit is shown and described below in Figure 1:

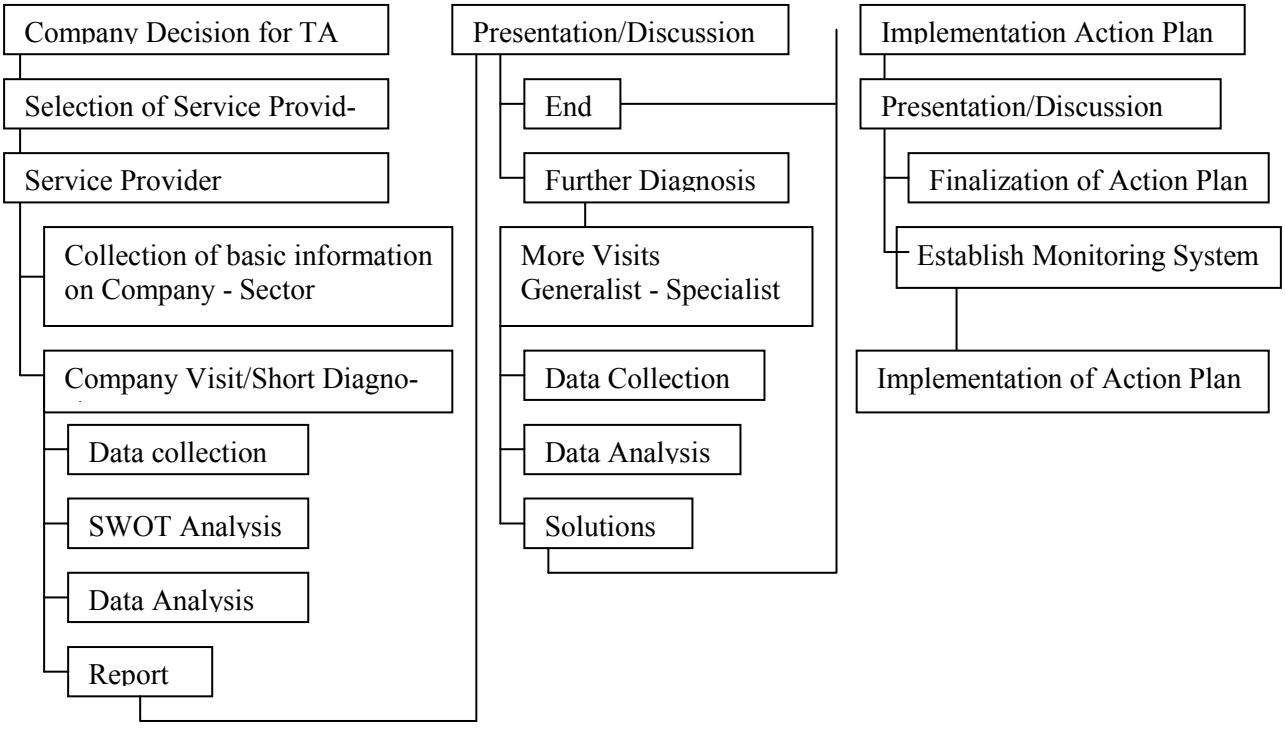


Figure 1.The steps of technology audit

*Note — compiled by the author based on sources*

Also proposed audit steps are presented in Table 1. It also contains tools used per step for the proper implementation of the technique. Of course many of the service providers have their own tools, but these do not differ significantly.

From the level of material and technical base of the enterprise, the degree of use of its production potential depends on all the end results of management, in particular, the volume of output, the level of its cost, profit, profitability, financial condition, etc.

Table 1. Steps followed for technological audit

| № | Steps and specific tools |
|---|---|
| 1 | Desire / wish of firm to carry out technology audit<br>- Firm may be enticed through promotional campaign from projects such asInnoregio or RIS type programs. |
| № | Steps and specific tools |
| 2 | Selection of intermediary organization / expert to carry out the technology audit |
| 3 | First contact / visit of expert to firm<br>- Discussion on procedure / benefits of technology audit;<br>- Presentation of steps. |
| 4 | Preparatory work by expert on collecting basic information on<br>- The firm;<br>- The sector. |
| 5 | General short diagnosis<br>Company interview with questionnaire (example questionnaire with contents in the annex), normally with the General Manager aiming at<br>- Collecting general company data;<br>- Shaping company technology profile;<br>- Performing a SWOT analysis;<br>- Identifying technological areas for further analysis. |
| 6 | Data analysis by expert — report on first diagnosis (example report with the contents in the annex) |
| 7 | Presentation of first diagnosis report to General Manager and company management<br>- Discussion, verification of findings;<br>-Finalization on the subjects for further analysis with / without additional experts (specialists). Further analysis may cover issues, such as: Production operations, R&D, Quality, Product Development, Human Resources Management, etc. |
| 8 | Additional visits / interviews to department heads, as chosen in step 7. These visits may be done either by the generalist, the specialist or jointly<br>- The advisors may have their own methodology, but typical areas are used. |
| 9 | Final report of the technology audit, compiled by the experts, which should cover:<br>- Subjects analyzed;<br>- Methodology used;<br>- Problem areas identified;<br>- Solutions proposed by the expert (s);<br>- Steps to be taken for implementing the solutions (action plan). |
| 10 | Presentation of report by expert (s) to company management aiming at:<br>- Discussing issues identified;<br>- Discussing solutions proposed / identifying alternative solutions;<br>- Discussing / finalizing action plan;<br>- Setting up a monitoring system for plan implementation with / without the aid of the experts. |
| *Note — Designed by the author according to the Technology Audit — A tool for Change? (Davies, L.B., Duff, E.J.)* | |

The methodological basis of the work performed was an integrated and systematic approach to the research, general scientific methods of structural and factor analysis, synthesis, classification and systematization as applied to the problems of technological audit of innovation activities in the scientific, technical and industrial sphere.

Thus, it is possible to single out the following benefits from conducting a technology audit for a company:

– the company receives an action plan;
– prepared recommendations helps it to improve its business, expand connections, develop new markets and, thus, leads to an increase in work efficiency.

There exist a lot of indicators and instruments for evaluating technologies and production systems. In general they can be divided into direct and indirect ones (Figure 2): indirect indicators for assessing the technological standard are concentrated on the evaluation of the input, the output or on input/output relations of the production process. Direct indicators are focused on the evaluation of the process of manufacture itself. An overview of the most important indirect indicators gives Figure 2.

All these indicators are more or less useful for the evaluation of an individual firm's technological standard. But they either take account only of single aspects of the technological standard or do not consider the production system itself-especially indirect indicators that concentrate on the output — and its environment. Sometimes it seems very difficult to work out such indicators (e.g. unit value of exports and imports, innovation shift, technological intensity) and to show the connection of an indicator with the value of the manufacturing system. Finally for most evaluation actors the strategic implications are missing.

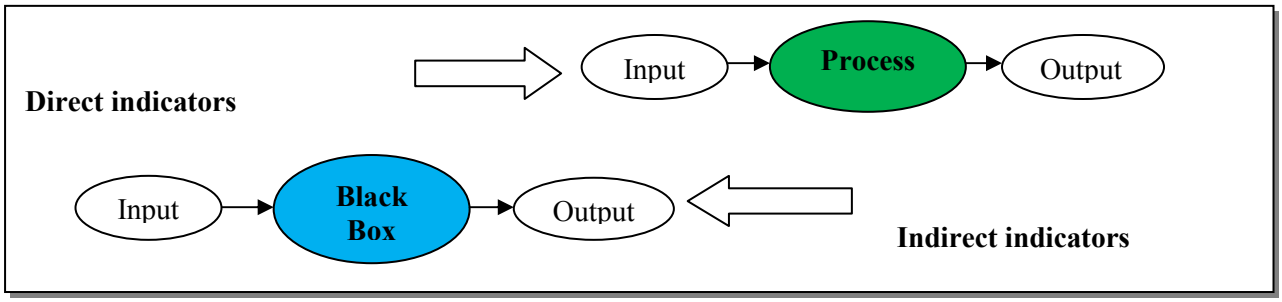


Figure 2. Indicators for evaluating the technological standards

*Note — compiled by the author based on sources*

A lot of technical audits also have been carried out in the past, but they have focused solely on R&D rather than on technology and the standard of the production system as a whole. Other approaches of a technical audit are mainly concentrated on the corporation's exploitation of technology and on the construction of so called historiography. These should show the successes and failures of a companies and its competitors' investments.

Auditors have developed a tool of technological audit. It integrates some of the indicators described as well as approaches with industry indicators and supports the development of first steps to improve the strategic position of the firm. The technical audit displays:

– the present technical standard of a company relative to its main competitors and relative to the international standard of technology;

– the technical standard required by the strategies at SBU (strategic business unit) and/or corporate level;

– ways to get from the present to the planned standard within a given time and cost limit.

Table 2. Examples for indirect technology indicators.

| 1 *Output* | 2 *Input* | 3 *Input/output* |
|---|---|---|
| 4 - Technology intensify | 9 - Investment intensify | 15 - Energy/out put |
| 5 - Increase of production | 10 - Vintage factory | 16 - Labour productivity |
| 6 - Unite values of imports/ exports | 11 - R&D intensify | 17 - Capital productivity |
| 7 - Product life cycle | 12 - Skill intensity | |
| 8 - Innovation/shift | 13 - Wage rate | |
| | 14 - Technology life cycle | |

*Note — Designed by the author according to the Methodological Guidelines for conducting a series of regional technological audits of small and medium-sized enterprises (Duhamel, M., Franzetti, P.)*

The more detailed the technological audit and the sooner implemented, the greater is the chance to achieve and/or maintain a leading market position. There is a negative correlation between time and exactness or costs of the results of such a process. This is the reason why we should start at a lower level of exactness of a technological auditing process. As time sees by we have to improve the exactness by learning from previous audits.

In this regard, technological audit is also considered as:

1. Technological audit is an evaluation, whose results suits have to be written down in a document. This is the only way to make sure that the results and suggested actions can be controlled after a certain period of time.

2. Technological audit is a global evaluation, considering all technical, economical, organizational, ecological and social aspects of production. It should also be an independent evaluation by at least two persons in order to reflect different points of view.

3. The evaluation must be in a systematic order. The used methods have to be consistent and duplicable. Only this procedure can guarantee the pre-conditions for a learning process of the people who are involved into the technological audit.

4. The evaluation has to be periodical to guarantee the necessary continuity of the process. The stronger the innovation dynamic (the shorter the technology's and product life cycle) and the stronger the competition, the shorter is the time between, rite technological audits.

5. Technological audit has three main investigation topics:

– The analysis of technological developments and trends: This analysis should show the potential chances and dangers (e.g. potential substitutions) which may result out of new technologies. One result of this activity should be a list of key technologies of an industry.

– The integration of technological development within SBU and corporate strategies: At the very beginning it is important to get knowledge of the technological requirements of the strategies at SBU and corporate level and to visualize the according technological strengths and weaknesses of a company's production system. The evaluation has as a reference the competitors' and the international standard of technology. The latter may be seen as the current state of the art. An important information source would be the data collected by the analysis of the technological developments and trends. The comparison with the main competitor and with the international standard of technology indicates opportunities and threats. One further task is to find out synergies which are caused in the overlapping of different capabilities in the field of technology and which may result in new strategies.

– Tile management of the production system: The findings of the two previous points have to lead to strategic consequences and new functional policies in the production system.

6. According to this a final point in a technological audit is a plan of action. This plan shows exactly how priorities are set and responsibilities are distributed within the framework of a detailed and realistic time schedule. Precisely defined steps (and often unusual ones) have to be taken to benefit from the opportunities and to solve problems on time.

The next question that arises is that of the responsibility for the technological audit. Who should be involved into the process and how should it he organized?

Technical audit is carried out at least at two levels which mean it has to take into-consideration the production manager's point or view the SBU's and/or general manager's point of view in any case.

Only a dialogue between these two levels can establish mutual integration of both points of view and thus lead to competitive advantage. A «leave it to the experts» approach can have as severe consequences as if technology and manufacturing is managed only by general management. Frohman suggests that the top managers responsible for running the company or business should have technical education and work experience in their industries. Both, general manager and production manager should be comfortable with and fluent in technical topics as well as strategic management. In order to achieve that aim the production manager often has to increase his management knowledge and the SBU and/or general manager his basic knowledge about technology and manufacturing. These are the preconditions for an effective dialogue.

At the next stage the communication has to include a dialogue with the chief controller, the marketing manager etc. in order to assure a sufficient coordination of the functional policies and their integration into corporate strategy.

The identification of the technological trends and developments and the international technological standard lies within the range of tasks of the production management. He frequently works in cooperation with a consultant, the R&D department or a staff of technology experts. The main task of the SBU or general manager in cooperation with the marketing manager is to identify the leading international competitors.

The next step in the process is to evaluate the technological standard of a company's production system relative to its main competitors and relative to the international standard. Therefore the SBU or general manager and the production manager have to identify the most important criteria for strengths and weaknesses of the production system in their industry.

Afterwards they have to weigh the different criteria according to their importance for the competition in the specific industry. The weighting particularly depends on the stage of development of the production system, the strategies aimed at, the resources of the company and the product life cycle. E.g. the flexibility of the system in the stage of diffusion is not so important as in the stage of saturation.

Now the SBU or general manager and the product manager separately have to evaluate the production system relative to the main competitors and relative to the international standard on a scale from 1 to 10. 1 is the lowest and 10 the highest score to achieve.

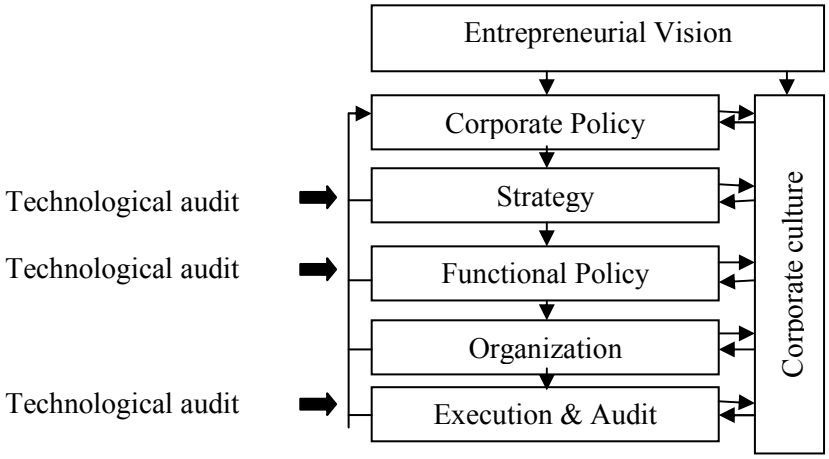


Figure 3. The influence of technological audit on the stage concept of management

*Note — compiled by the author based on sources*

The relative result shows the priorities for the actions. It should be noted that neither the relative valuation nor the sum of the relative valuations are the most important result of the audit sheet, but are profile items. They point to weaknesses that need to be improved and strengths that should form the basis for the strategic positioning of a company or SBU.

The technological audit also influences the stages of management (Figure 3).It follows from the above figure that the results of the audit largely determine the stage of «strategy development» and «functional policy». But the technological audit is an integrated part of the general controlling and management audit of a company or SBU, too.

Now let us have a look at an example of an audit sheet. The SBU and/or general management's attitude towards the production system may be different compared to that of the production manager. They have to consider all relations between the company and the environment or between the SBU's and their environment.

***Discussion***

Based on the analysis of the current socio-economic situation of the Republic of Kazakhstan and the urgent need to raise the scientific, technical and industrial sphere, which plays a crucial role in the country's economy and its sustainable development, it is determined that technological audit for the priority selection of innovative projects and their performers should become the most important factor in optimizing innovation activities in this area. A methodology of technological audit based on the use of information technologies has been developed, an algorithm for collecting, storing and selecting information on specific technologies has been proposed, and a comprehensive comparative analysis of commercial proposals based on market indices has been carried out on the basis of formed matrices of predicted values of multicriteria factors of innovation.

The proposed economic and mathematical models for analyzing the criteria of novelty of the developed technologies and methods for analyzing the forecast values of consumer demand for technologies and integral indicators of innovation quality have the following functionality:

1. Automated collection and storage of information from users of the regional network about high-tech technologies promoted on the market.

2. Operational assessment of the degree of commercialization of technologies based on the methods of formalization and processing of automated credentials.

3. The ability to analyze the criteria of innovative developments taking into account the dynamics of market conditions.

The method of technological audit provides for various modes of operation: using expert data during the promotion of projects to the market and based on the results of the actual commercialization of completed projects.

The developed methodology of technological audit can be used:

- predict the commercialization of scientific and technical projects;
- to monitor and obtain operational information on the state of the scientific and technical sphere at enterprises of all forms of ownership.
- assistance to research and production enterprises in promoting new technologies to the market.

Technological audit allows you to predict the commercial potential of new developments, manage the entire process of technology promotion to markets. The main result of the work is the development of a methodology for conducting technological audit using economic and mathematical models based on information technology.

The use of certain criteria for the selection of innovative projects and their performers, established in the work, should contribute to the optimization of innovation activities.

To systematize innovative projects and facilitate their subsequent technological audit, it is advisable to use an appropriate data bank.

***Conclusions***

Activation of innovation activity is a prerequisite for successful competition of Kazakhstan enterprises in the foreign market, but in this process it is not quality that is most important, but the quality of innovation, since investing in unpromising projects does not bring any benefit to the company. The number of innovative work carried out in our country is already quite large, and the use of technological audit in their conduct will lead to their qualitative improvement.

Based on the analysis of the approaches to the interpretation of the essence of the concept being studied, the definition of a technological audit is scientifically substantiated, which means an independent, documented, comprehensive assessment of an organization whose purpose is to determine the level of technological development of an organization, identify technologies and objectively assess their potential as an object of technology transfer.

The novelty of the proposed definition is to identify, as characteristic features technological audit of such characteristics as independence and documentation.

This definition, in contrast to the generally accepted ones, makes it possible to justify the purpose of technological audit.

As part of the technology audit study, its key objective was defined, which is to assess the ability of an organization to integrate or transfer new technologies. Technology audit allows identify technologies that have the potential for commercialization, identify ways and means of bringing these technologies to the market.

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**Н.Б. Куттыбаева, Г.А. Райханова, Р.Е. Жапарова, Г.М. Кожабатчина, М.Н. Акмолда**

**Инновациялық қызметті оңтайландыру жүйесіндегі технологиялық аудит**

***Аңдатпа***

*Мақсаты:* Технологиялық аудитке деген қажеттілік бірігу мен жұтылу, жаңа технологиялардың дамуына және қазақстандық кәсіпорындар үшін жаңа міндеттердің пайда болуына байланысты салалардың даму жоспарларының пайда болуына қарай өсуде. Технологиялық аудиттің өзектілігі негізгі құралдардың тозуының жоғары деңгейіне негізделген, бұл айтарлықтай тәуекелдерді қамтиды.

*Әдісі:* Авторлар жалпылау, салыстыру, жіктеу, бақылау, сипаттау және нақтылау сияқты таным әдістерін, сонымен қатар статистикалық талдау әдістерін қолданды. Ғылыми зерттеу әдістері аксиоматикалық әдіске және жалпылау мен жіктеу әдісіне негізделген.

*Қорытынды:* Мақалада кәсіпорын аудитінің ішкі бөлігі ретінде технологиялық аудиттің теориялық аспектілері қарастырылған. Авторлар технологиялық аудит кәсіпорындағы технологияларды, тәжірибені, өнімдер мен білімді талдауға қатысты екенін және оларды коммерциялауға болатындығын көрсеткен.

*Тұжырымдама:* Технологиялық аудиттің негізгі мақсаты ашылған: ақпаратты жинау, жүйелеу, талдау және кешенді бағалау, бағалау нәтижелері негізінде кәсіпорынның өндірістік қуатын пайдалануды ұтымды ету бойынша ұсыныстар мен шешімдер берілген. Мақалада технологиялық аудиттің жалпы құрылымы мен негізгі кезеңдері ұсынылған. Технологиялар мен өндірістік жүйелерді бағалау үшін тікелей және жанама көрсеткіштерді пайдалану көрсетілген.

*Кілт сөздер:* технологиялық аудит, өнеркәсіп, инновациялар, мемлекеттік аудит, ішкі және сыртқы аудит, заңнамалық және нормативтік актілер, мемлекеттік қаржылық бақылау, шет елдердің тәжірибесі, мемлекеттік басқару жүйесі.

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## Технологический аудит в системе оптимизации инновационной деятельности

***Аннотация:***

*Цель:* Потребность в технологическом аудите растет по мере развития слияний и поглощений, появления планов развития отраслей в связи с развитием новых технологий и появлением новых задач для казахстанских предприятий. Актуальность технологического аудита обусловлена высокой степенью износа основных средств, что содержит значительные риски.

*Методы:* Авторы использовали такие методы познания, как обобщение, сравнение, классификация, наблюдение, описание и детализация, а также методы статистического анализа. Методы научного исследования были основаны на аксиоматическом методе и методе обобщения и классификации.

*Результаты:* В статье рассмотрены теоретические аспекты технологического аудита как внутренней части аудита предприятия. Автор показал, что технологический аудит касается анализа технологий, опыта, продуктов и знаний, которые имеются на предприятии и которые потенциально могут быть коммерциализированы.

*Выводы:* Раскрыта основная цель технологического аудита: сбор, систематизация, анализ и комплексная оценка информации, выдача рекомендаций и предложений по рационализации использования производственных мощностей предприятия на основе результатов оценки. В статье представлена общая структура и основные этапы технологического аудита. Показано использование прямых и косвенных показателей для оценки технологий и производственных систем.

*Ключевые слова:* технологический аудит, промышленность, инновации, государственный аудит, внутренний и внешний аудит, законодательные и нормативные акты, государственный финансовый контроль, опыт зарубежных стран, система государственного управления.