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## **AUDIT OF QUALITY MANAGEMENT AT A SMART COMPANY: INDEPENDENT EXPERTISE VS. ARTIFICIAL INTELLIGENCE**

**Article info:**

Received 21.11.2021.

Accepted 17.08.2022.

UDC – 005.6:004.8

DOI – 10.24874/IJQR17.01-01



**Abstract:** *The goal of this article is to substantiate the important role of audit of quality management at a smart company from the position of the comparative analysis of the advantages of independent expertise and artificial intelligence (AI). The authors perform a comparative analysis of using independent expertise, as a method of quality audit, and AI, as a technology of quality control at a smart company. The preferences of entrepreneurs and company managers regarding the choice between the traditional expertise of quality within the audit and digital technologies are compared. The advantages of using software based on AI for performing high-quality audits and the quality of audit examinations that are performed within the independent expertise by external auditors are also compared. The restraining factors on the path of digital technologies' development based on the use of AI in the audit activities are risks that are connected to the quality of manufactured software, completeness of the obtained data as a result of audit examination, and simplicity and expedience of using information technologies in the sphere of audit of quality management. The offered recommendations on implementing information technologies with the use of AI means for audit will allow increasing quality management and its audit and could ensure qualitative audit reports.*

**Keywords:** *Audit, Quality Management, AI, Quality Expertise, Digital Technologies, Smart Company*

### **1. Introduction**

From the Global Positioning System to face recognition, AI has drastically changed every aspect of our life.

Organisations of the public sector also use the advantages of powerful algorithms for a more perspective determination and elimination of “red flags”, before they appear in important issues.

AI could be used in civil construction, business, etc., but the development of the AI system raises the risk of possible replacement of humans and incorrect use of the AI system in different spheres. Accordingly, there is a necessity to develop various policies and ethical norms on the use of AI for solving everyday problems and decision-making. Besides, the development of AI could lead in the future to reconsideration of the need for specific jobs and the possibility of replacing human labour in certain sectors of the

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economy. It should be emphasized that AI is especially used in business organizations in which the management can make better decisions with the help of modelling. In other words, certain departments in organizations will be restructured with the help of AI.

During the implementation of the AI system in various departments of an organization, including during quality audits, it is possible to raise the efficiency of business processes and increase satisfaction with the organization's services or products.

In the case of a "manual" audit, usually, there's access to the corresponding referencing information of the company, received during previous audits, but auditors still are vulnerable to optimism, which is regarded as a common thing in the planning processes by a researcher. Erroneous planning in many types of audits, including the participation of public authorities, usually leads to projects' taking more time, bringing fewer results, and becoming more expensive than was initially planned.

Professional scepticism is the key element of a high-quality audit since it guarantees that the auditor's opinions will be less distorted by personal prejudices. According to the standards of audit, professional scepticism includes the presence of inquisitive thinking and critical evaluation of the audit data. However, there is no generally accepted definition of professional scepticism.

## **2. Literature review**

Artificial intelligence (AI) is a new scientific discipline that is aimed at creating new theories and mechanisms, applications, and systems based on AI, which are similar to humans. As a scientific discipline, AI includes different types of systems with characteristics similar to human ones and systems which are – in the context of behaviour – similar to human ones. Moreover, AI includes systems with rational thinking and systems that were created to look like humans (Putica, 2018).

The main purpose of developing an AI system is to create a system that could replace humans in the context of the image of thinking and create alternatives for decision-making. Besides, apart from replacing humans, AI is also aimed at decision support and support for data analysis in organizations.

AI could also be connected to automatized systems, which can think or possess a high level of intellect, depending on which system can make decisions and adapt its behaviour given the characteristics of the environment (Buntak et al., 2020).

In practice, AI is often connected to robots, which have a drive system for movement and sensors that are used by the system for scanning the environment.

Besides, in the course of the development of science and technologies, AI finds new opportunities in various types of software, which are mainly used for data analysis and as the basis for decision making, e.g., for analysing scenarios, various types of modelling, etc. (Tourki et al., 2013).

As for the definition of the notion of "intellect" and types of intellect, there are several different classifications: wide intellect, which is connected to the system's capability for management in the environment; linguistic intellect, which is connected to the use of words, i.e., speaking different types of languages and understanding symbols in a language; social intellect, which is connected to dealing with social situations; and cognitive intellect, which is connected to solving complex problems, etc. (Vučijak et al., 2013).

## **3. Methodology**

To test the hypothesis of this paper, the authors compare arguments in favour of using the AI technology for conducting quality audits or expertise that is conducted by external auditors.

Despite the quick development of information technologies (IT), in particular in the sphere of audit, which faces the market of

diverse modern means, there are a lot of gaps, which lead to the following question: should companies in the sphere of professional audit services invest in AI?

The statements could be different, from the belief that IT is not ready at all to the belief that AI has been long used in their services. At the end of the day, for an audit company (and any other modern company), the issue of whether to invest in AI or not is not the issue at all – this is a requirement of modern time. The question is formulated differently – which means, with the use of AI technologies – could provide the best effect? To answer this question, we must know how AI is embedded in the technological infrastructure and processes of the company; in the opposite case, partners and managers in audit will not be able to make effective decisions. Of course, we have to understand what “real” AI, technological learning, and the level of their influence on audit quality in the organization are.

Before implementing AI, one should understand how it could improve the business and bring additional value. Analysis of the current business processes with the use of the below criteria could be very useful in this research:

- 1) How many audits must be conducted in the company / are conducted in the company during a year?
- 2) What is the average volume of one audit examination, measured by the number of checked transactions?
- 3) What are the expenditures for an audit?
- 4) Which risks are faced by the company in the course of the quality audit?

From the position of large companies, at which at least several audits per year are conducted, the advantages of the transition to AI are extensive, but this does not mean that they, like others, should not treat AI seriously.

For smaller participants of the market, the main obstacle in the past was large expenditures, which sometimes fully blocked

access to new technologies.

However, today we observe a new tendency of “equality”: when developers of AI technologies allow companies of any size to select the best solutions for them.

The highest value of AI consists in its application in the processing of large arrays of data and completion of most transactions with the help of analysis, which, at the same time, goes beyond the limitations of methodologies and traditional statistical methods of information processing, since there is no statistical sample as such in AI technologies and it is not mandatory. The finances and time needed for audit are reduced substantially, and new methods of reflecting full information and risks of significant mismatches of data appear.

All these factors reduce the risks of provision of incorrect audit conclusions on the customer's financial reports (and, accordingly, regulators' claims in case of the customer's bankruptcy).

As with any new technology, companies have to take into account personnel training and the necessity for technical support from the developers of AI technologies. The key spheres of preliminary analysis of AI include the method of new technology receiving data from customers' systems and how its work processes are transferred to audit processes and the provision of feedback to customers.

Each of these spheres has its costs, so the time for adaptation is needed not only for the managers of an audit company but also for the potential corporate customers (Šoško et al., 2019).

It is also necessary to understand how AI works on the whole.

Investing in new technologies is an important issue – therefore, it is necessary to realize what the company receives apart from support from manufacturers of AI means and costs for their implementation.

It is not enough to know that the selected software uses AI and training programs – it is necessary to understand how this takes place,

for the additional value is not created without this (Tadic et al., 2009). Unlike other "traditional" solutions in the audit of quality, which existed up to now, in the case of solutions based on AI, it is possible to ask manufacturers the following questions:

- 1) How is the problem of the "black box" solved? Any manufacturer could state that its product contains AI, while it is not so. On the other hand, it could be present but works not in a transparent way – so it is difficult to understand what is going on at all. Each respectable developer must be able to explain how it uses AI in its solution, and the solution should be qualitative – to explain the analysis and its results to the user.
- 2) AI implements new methods of determination of risk and creation of value for customers, and this means that the manufacturer must be able to explain its algorithms and how these algorithms are connected to risk analysis and reporting. The manufacturer must also show how these algorithms go beyond the limits of traditional tests, which are based on the rules and statistical methods (this is the true value of AI).
- 3) Does the manufacturer have specialists with experience of work in the sphere of AI and programmed learning? Manufacture of such products requires an effective collaboration of scholars on data, experts on programmed learning, and, of course, programmers.
- 4) Are there any specific results of applying program solutions of the given manufacturer? When a manufacturer does not want to share such examples, the chances of achieving success with him are small.

Implementation of technologies that are game-changers in business, requires innovative approaches to studying the

opportunities, before making any decisions. AI-based solutions have the potential for ensuring an unprecedented level of risk control, so audit managers should carefully choose a supplier that would provide them with the largest competitive advantage in the current environment.

Also, there is a direct connection between the quality of software products on an audit of quality based on AI technologies and the effectiveness and quality of the obtained audit results.

## **4. Results**

### **4.1. Analysis of preferences of company managers in types and responsibility for the quality of audit**

According to the last report KPMG Guardians of Trust (KPMG, 2020), as a result of a survey among 2,200 managers of international companies, who make decisions on information technologies and business, it turned out that only 35% of them has a high level of trust to their organization's analytics. Company managers start doubting the data and analytics. The research shows the existence of a clear necessity for active management of analytics to build trust.

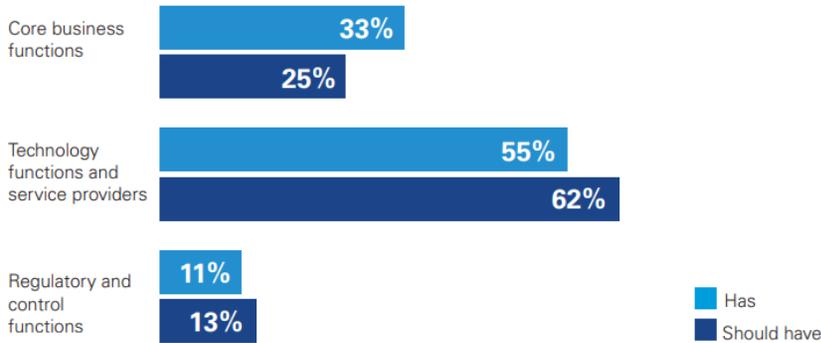
Another aspect of the problem of reliability of data and connected risks is determining the ones responsible and the level of responsibility.

The level of trust of those making decisions in their analytics varies depending on the geographical location.

As shown in Figures 1 and 2, only 33% of respondents state that responsibility lies with managers, i.e., CIO and functional managers. Besides, as for the question of who should be responsible for wrong business decisions that are based on the obtained analytics, respondents answered that more responsibility should be moved from business managers to technological offices.

**Where does responsibility lie?**

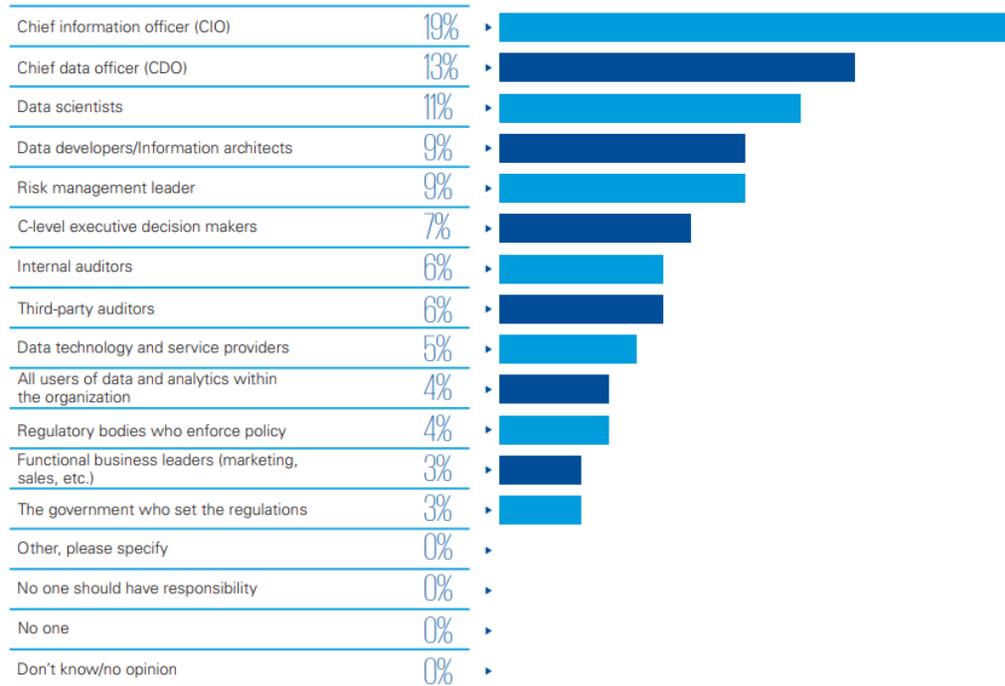
If a poor business decision (one resulting in significant financial loss/loss of customers, etc.) is made based on insight from advanced analytics, who currently bears primary responsibility for this decision today? Who should have responsibility?



Base: 2,190 global IT and business decision makers with involvement in setting strategy for data initiatives at their organizations

**Figure 1. Where does responsibility lie?**  
Source: KPMG (2020)

Who in your organization has primary responsibility for ensuring the trustworthiness/accuracy of advanced analytics and models?



Base: 2,190 global IT and business decision makers with involvement in setting strategy for data initiatives at their organizations

**Figure 2. Lack of confidence in management**  
Source: KPMG (2020)

As shown in Figure 2, CIO has the most votes of respondents (19%), but they also provided a wide spectre of other responsible offices. Thus, 13% of respondents consider CDO responsible for wrong analytics, 11% -data scientists, and 9% - data developers. As for the technological function, most of the respondents expect that technical specialists will ensure the reliability of analytics and will accept wider responsibilities.

The traditional framework of IT management was considered as subsets of corporate management. In practice, they concentrate on efficiency management and rely on the processes performed by the IT department.

Ultimately, there are large spheres of risks and responsibilities that cannot be effectively managed with the help of the traditional models of management.

For organisations that undergo a quick digital transformation, the need for a search for new means of work, which would balance the striving for expert technical control, and the reality of the main business becoming more digital is obvious.

#### **4.2. Analysis of the potential of AI in the process of audit of quality and the activities of the United States Government Accountability Office (GAO).**

In the modern world, which is based on the use of digital technologies and information, a traditional approach to the work on determining fraud, which is based on the retrospective inspection by auditors, becomes more and more ineffective.

The system “pay up first” is very resource-intensive and does not allow for the full determination of the entire spectre of known and supposed fraudulent operations.

Fortunately, dissemination of data, together with progress in the sphere of calculation capacities, started a golden age of AI, when algorithms and models can detect abnormal regularities, behaviour, and relations – with speed, scale and depth that was not possible

ten years ago.

It should be noted that AI does not replace the professional opinions of experienced auditors during the determination of potential fraudulent activities. At the same time, AI can check large arrays of data with very high precision, but human intelligence is still an important element for determining the specific (for the contexts), compatible and nuanced data that come from algorithmic results.

This symbiotic connection means that AI will help the Supreme Audit Institution (SAI) and will change its work. This will require various skills for using the potential of AI to raise effectiveness and efficiency.

GAO strives to use the power of AI to improve government control and fight against fraud. The innovative laboratory of GAO, created in 2019 within the Agency's new department, which deals with the scientific and technical evaluation and analysis, performs experiments on AI in cases of its use for audit inspections (Table 1).

In the course of achieving progress, GAO tries to exchange successful experiences and lessons gained with wider circles that deal with the issues of accounting. At the same time, the Innovation Lab, together with all corresponding interested parties, is at the early stages of development of the system of control over the activities of AI, which could help direct the development of solutions in the sphere of AI, with the observation of common general methods and standards for auditors.

Table 1 also shows how the Innovation Lab of GAO develops the corresponding analytical capabilities connected to fraud, which could potentially become the basis for future solutions in the sphere of AI.

Each case of the use is aimed at the quick determination of hidden correlations, behaviour, interrelations, regularities, and anomalies, which might show the presence of the risk of fraud.

**Table 1.** Potential of AI and the current work of the Government Accountability Office (USA).

Capabilities of AI	Description	Current work of GAO
Clustering of society	Segmented operations and subjects are divided into groups and determine the deviations	Reflecting the comparative attributes of data with the help of graph databases, the Innovation Lab models the communities of connected persons, documents, and rules of financial accounting with the use of properties inherent to graph networks. Then, the specific clusters of interests are analysed for the specific indicators of risk: deviation from the norm and inconsistent behaviour.
Processing of natural language	Analysis of the volumes of text information for determining the corresponding schemes of fraud	The Innovation Lab uses thematic modelling by checking a large number of public comments and messages in social networks, the release of liability announcements, among other sources, and systematization of this information in the corresponding fraudulent schemes and classification with large speed, consistency and precision.
Forecast targeting	Automatization of routine and manual processes of audit to reduce cognitive tensions	GAO uses forecast models based on the data on trade to determine importers that might not perform their liabilities on tariff payments, based on the historical models and indicators of risk. Then this information is systematized by location, to help interested parties to determine a strategy for the reduction of risks.
Resolution on the legal standing	Identity check and mitigation of improper payments, with the use of personalized approach	Innovation Lab works with various interested parties on the improved methodology of dispute resolution and compilation of relational maps, to develop the potential of checking the identification data in view of the risks in the regime that is similar to real-time and to help solve the problem of improper payments.

Source: compiled by the authors based on INTOSAI (2020).

Before starting the search for analytical solutions for control and fight against fraud, GAO could be guided by the important legal, public, ethical, and operational reasoning, which is especially topical for AI. Besides, GAO could receive valuable information on the experience of organisations of private and public sectors and their conclusions.

The important arguments in favour of using AI for audit of quality are as follows:

- algorithms of AI do not see the difference between fraudulent and sham transactions. Instead, these algorithms determine anomalies, e.g., unusual operations between accounts. To analyse these anomalies and determine the potential fraud, there's still a need for specialists in this sphere. To pass

the inspection, audit establishments, which hope to implement solutions on the fight against fraud, could consider a range of guiding principles, including how solutions could be implemented in the sphere of AI:

- thoroughly trained and tested: Thorough training and testing of AI algorithms are a necessity for minimizing the model's errors. AI solutions that generate an excessive number of warnings, e.g., by marking the too large number of legitimate transactions as potentially fraudulent, could overload the organization and its ability to investigate potential fraud.

- clear, logical and smart: clearly determined and precisely documented algorithms of AI are very important. It is necessary to ensure logical modelled dependencies between variables, smart initial assumptions, and simple language of the initial data of the model and algorithm.
- fitting the audit: to conform to the generally accepted government standards of audit, it is very important to thoroughly document the applied methods of AI. Here belong the parameters belonging to the applied models and sets of data and the substantiation of inclusion of any patented methods, i.e., systems from external suppliers.
- manageable: control over AI algorithm is of the highest importance for ensuring constant efficiency in various operational environments. It is very important to avoid negative consequences, e.g., unintended discrimination, during the use of AI solutions.

Steps for successful implementation of AI could be combined in the following algorithm of actions:

- 1) determining the goals and coordinating efforts: determining how specific goals of the program could help satisfy the organization's needs, recommended at the early stages of analytical program development.
- 2) Soliciting support: organizational support for data analysis and evaluation of the organization's ability to increase the effectiveness of achieving goals is very important. The creation of a department that is responsible for the development of analytical potential is one of the methods of institutionalization of knowledge.
- 3) Understanding current abilities: at the initial stage, organizations can

perform an inventory of existing resources, to better understand the abilities and determine the top-priority spheres for their improvement. The key resources include the personnel's experience, software and hardware, and sources of data.

- 4) Attracting users and experts for the work: inclusion of the required specialized experts in analytical projects could help in the development of the model and getting support from final users of the model.
- 5) Starting from the simple, stage-by-stage increase of potential: first, organizations could strive to develop a minimum viable product for the achievement of the set goals. By determining and obtaining quick and early success, an organization can build the business for the gradual development of further opportunities, creating a basis for implementing more complex solutions in the sphere of AI.
- 6) Transitioning to work: as soon as the minimum viable product is developed, its movement into the production environment acquires the decisive role. It is important to document the updates of the AI algorithm.

In 2018, GAO published "Artificial Intelligence: Emerging Opportunities, Challenges, and Implications" (GAO USA, 2018), which defined a range of AI-connected opportunities, problems, and spheres that should be considered in the future for performing research and making political decisions.

Let us also dwell on the vision of AI in Microsoft. The company's mission always consisted in providing each person and each organization the opportunity to achieve more. Microsoft treats AI as the fundamental method of developing human inventiveness.

Microsoft is focused on trying to combine EQ, or “emotional intelligence”, with traditional IQ, for the company to be able to create computers that would understand us in a more “warm and sensitive” way.

How does Microsoft treat the ethical consequences of AI from a strategic point of view? The company thinks of a wider context, which includes justice, accountability, transparency, and ethic: the AI FATE approach.

Ethics is one of the components of the equation, which is aimed at keeping humans in the focus of attention. The company is also focused on ensuring justice and eliminating prejudice.

Who should be responsible for the creation of a standard of trust and expectations from AI?

We are not sure that someone is responsible. That's why Microsoft, together with IBM, Google, Amazon and other companies, created a Partnership on AI. Partnership on AI includes more than 40 leading technology companies and about 30 non-profit organisations.

What advice could be given to company managers when they look into the future in which the advantages of AI are used? We think that the best advice is to think seriously about what they are going to use AI-based software for and what they want to achieve.

## **5. Conclusion**

Thus, as a result of the performed research, it is possible to make the following conclusions. The offered hypothesis on the expedience of using technological means for the audit of quality management based on AI could be confirmed by the following arguments.

AI automatizes many tasks, which were performed manually in the past (e.g., the input of data) and can analyse 100% of their volume without human help, which was irreplaceable during the writing of tests and main rules until recent times.

The difference between “audit of the future” and AI is that AI changes the very notion of reasonable assurance since it can understand the integrity of the data register and detect anomalies, using not the prescribed rules but risks. It is possible to say that there is a risk-oriented approach in its ideal organization.

With a reasonable guarantee of quality, messages about suspicious transactions based on risks (“red flags”) are lighted (as a signal that they require careful study) depending on their selection in the whole array of data.

Thus, AI detects unusual payments or other actions that were not previously detected during traditional independent expertise performed by external auditors.

Humans and, in particular, auditors, believe the professional opinion and random sample, and this could take a lot of time or imply the possibility of missing important data (or both at the same time). AI quickly processes entire financial information and detects risks that were impossible to detect during the checks by “live” auditors.

Systems that are based on AI can constantly learn and adapt to new accounting and new information.

Because more and more data pass through software solutions and are processed, AI analyses all data and find the necessary correlation based on hundreds of various indicators.

In addition, the use of software based on AI reduces the work performed by the audit company and its customers. Implementation of accounting entries for analysis requires minimum expenditures for the workforce; then, analysis is started and brought down to zero, when auditors traditionally require the physical presence of the customer in a company, to ask questions on the current audit of quality management. In their turn, auditors could use their free time for a more thorough study of details, which will allow them to compile a more detailed financial picture on accounting and quality. However, an important question arises: Will the audit program that is based on AI replace human

auditors? We do not think so, for it is impossible to fully replace the acquired experience and professional opinions of auditors, and it is impossible to learn all the aspects of interrelations between audit companies and their customers.

Solutions for AI, in particular in audit activities, work together with humans, automatizing and accelerating big and complex tasks, and software surely helps in decision-making, when the process reaches the stage of detecting significant differences and risks.

Program solutions based on AI in the sphere of audit of quality (but also for the entire audit activities) are the transformation activities, so any company, when selecting these means, should carefully consider all pros and cons, especially during the development of a strategy of activities for the long-term. However, in modern conditions, the question "to implement or not to implement" should not be the main one. We think that AI already improves the coverage and quality of audits around the world, taking it to a completely new level. That's why companies should determine which solutions are the best for them – and thus determine their future.

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