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Before the Storm – Auditing Artificial Intelligence Management Systems

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Abstract:

Organizational management systems cover various aspects such as quality, environment, occupational health and safety, information security, innovations, and recently – artificial intelligence. The artificial intelligence management systems are based on the international standard ISO/IEC 42001:2023 and organizations can be certified if they meet its requirements.

Auditing management systems is implemented in accordance with the guidelines of ISO 19011:2018, and the bodies providing audit and certification of management systems have to satisfy the requirements of ISO/IEC 17021-1:2015. The fourth edition of ISO 19011 is expected to be published in 2025, as well as the first edition of an entirely new standard that focuses on the bodies providing audit and certification of artificial intelligence management systems.

This paper presents the expected directions of change in auditing artificial intelligence management systems.

Keywords: Educational Organizations, Auditing, ISO 19011, Artificial Intelligence Management Systems, ISO/IEC 42001.

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INTRODUCTION

Artificial Intelligence is used in multiple industrial sectors and aspects of daily life. This is also true for educational processes applied at all levels of education – from kindergartens and elementary schools, through professional high schools and colleges, to universities and research centers. These are a number of ISO standards that can help develop, implement and improve the following management systems:

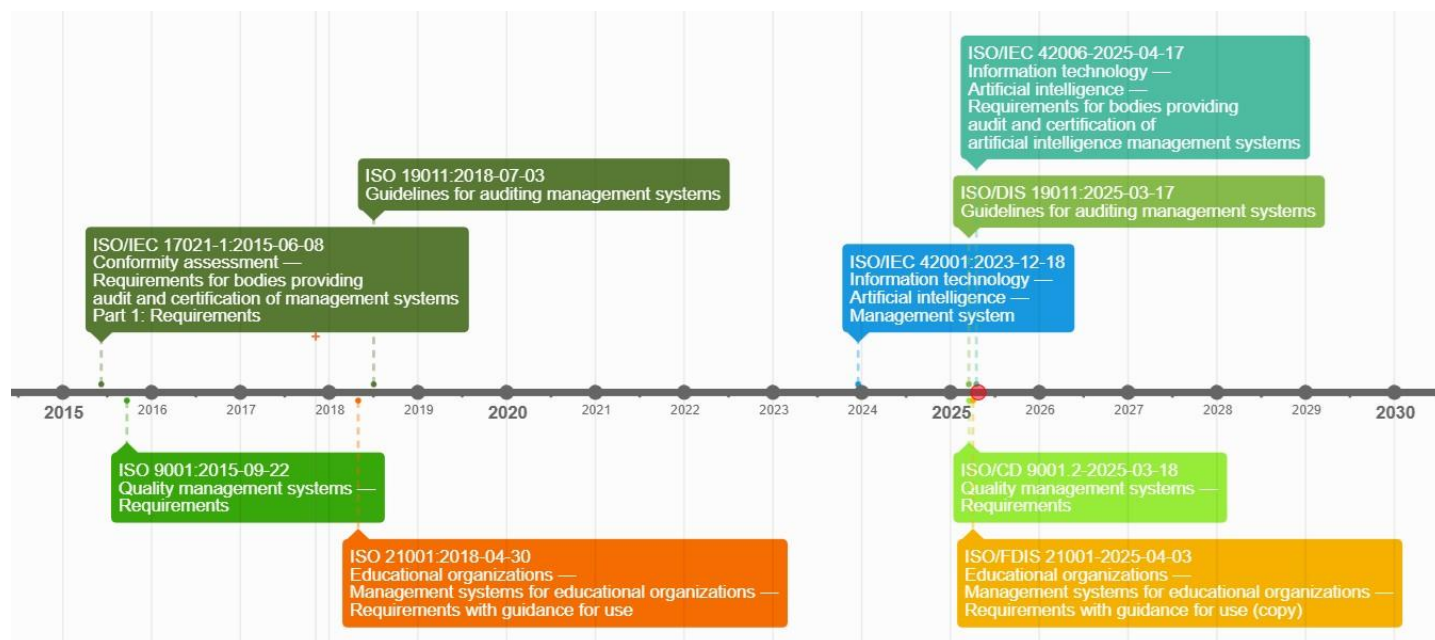
- ISO 9001 with requirements for quality [1];
- ISO 21001 with requirements and guidance for use by educational organizations [2];
- ISO/IEC 42001 with requirements for Artificial Intelligence Management Systems (AIMS) [3].

When such management systems are developed it is expected that periodically they are audited either by internal auditors, or by external auditors, all of them following the guidelines of ISO 19011 [4]. The first option to establish the degree of conformity to the requirements in all of the abovementioned standards is to use Clause 9.2 “Internal Audit”. The standard ISO 17021-1 is normally used by bodies providing auditing and certification of management systems [5]. There are other parts of this standard that specify additional competence requirements in various domains, e.g., ISO/IEC 17021-3:2017 for auditors of quality management systems. Currently, ISO is about to publish a standard that will define the competence requirements for auditors of AIMS.

This paper focuses on the international standards related to auditing AIMS in educational organizations, e.g., universities.

DISCUSSION

The best practices formulated in international standards published by ISO are updated periodically every 5 years in order to stay relevant to the business environment and technological advances. The chronological development in the period 2015-2025 of the standards discussed in this paper is presented below (see Fig. 1).



Фиг. 1. ISO standards related to quality management, educational organizations, auditing and artificial intelligence.

By the beginning of 2025, the following editions of the ISO standards of interest are current:

- ISO 9001:2015 – the fifth edition of this standard with requirements for a quality management system was published on 2015-09-22. An amendment to ISO 9001 dealing with climate action changes was published on 2024-02-23 [6]. The project for the sixth edition of ISO 9001 was registered on 2023-11-16. The relevant draft of Technical Committee TC 176 was registered on 2024-04-24. This Committee Draft (CD) was referred back to the Working Group (WG) on 2024-07-23. A second corrected and updated version of ISO/CD 9001 was registered on 2025-01-16 only to be referred back to the WG on 2023-03-18 [7].
- ISO 21001:2018 – the first edition of this international standard with management system requirements with guidance for use by educational organizations was published on 2018-04-30. It can be applied in universities either as a standalone standard or by integration with ISO 9001 which is traditionally more popular and widely used. Similar to ISO 9001, ISO 21001 was also amended on 2024-02-23 [8]. As of 2025-04-03 a ballot that should last 8 weeks was initiated. It should approve or reject the final draft of the second edition of ISO 21001 [9].
- ISO/IEC 42001:2023 – the first edition of this international standard with requirements for an artificial intelligence management system (AIMS) was

published on 2023-12-18. At present, there is no official statistics about the number of certified AIMS. Nevertheless, any organization that provides or uses products or services that utilize AI systems can benefit from the implementation and certification for conformance to ISO/IEC 42001.

The process approach, the PDCA cycle and a suggested integration of ISO/IEC 42001 with ISO 9001-based management systems are presented in [10, 11, 12].

Upon completing the cycle of establishing, implementing, maintaining and continually improving an AIMS, the educational organization (university) is expected to audit it using ISO 19011 [4]. The third edition of this key international standard was published on 2018-07-03. A decision to revise it was made on 2023-10-02. At the moment, this standard is at the Draft International Standard (DIS) stage, and on 2025-03-17 a ballot of 12 weeks was initiated. The publicly available information about ISO/DIS 19011 [13] outlines the main differences between the current third edition of ISO 19011 and the upcoming fourth edition:

- *“Expansion of guidance on remote auditing methods through the introduction of guidance contained in ISO/IEC TS 17012 “Conformity assessment - Guidelines for the use of remote auditing methods in auditing management systems”;*
- *Expansion of Annex A to provide guidance on remote auditing methods and virtual locations.”.*

There are several reliable information sources that can help the universities transition to the new edition of ISO 19011 even before its official publication, probably by the end of 2025.

Of course, the first option will be to acquire and carefully examine the latest edition of ISO/IEC TS 17012 [14]. This task is less problematic due to the fact that the overall structure of ISO/IEC TS 17012 is identical to the structure of ISO 19011. The definition of “remote auditing method” provided in ISO/IEC TS 17012 is: *“method used for conducting audit activities from any place other than the location of the auditee”*. This is also applicable to auditing virtual locations where the operations of the organization are implemented in an online environment. The remote auditing method brings along additional risks and opportunities in comparison to traditional auditing methods. The two annexes to ISO/IEC TS 17012 provide useful information such as:

- Annex A: types of audits using remote auditing methods, technological considerations, and examples of implementation of methods (auditing documented information, auditing the organization’s digital twin, use of surrogate auditors, document reviews, personnel interviews, and witnessing of activities);
- Annex B: generic useful practices, managing the audit programme, and conducting the audit.

Another useful source of information is the website of the ISO 9001 Auditing Practices Group (APG). Two documents by APG can help practitioners and shed light on remote audits:

- “Guidance on Remote Audits” [15];
- “Guidance on Auditing Digital Processes” [16].

An additional and even more profound perspective on the auditing process is the one of accreditation and certification bodies. The International Accreditation Forum (IAF)

is the global accreditation institution that provides a set of mandatory and informative documents that shape the context of accreditation, audit and certification of management systems. The following documents are applicable to this paper:

- IAF MD 4:2025 - IAF Mandatory Document for the Use of Information and Communication Technology (ICT) for Conformity Assessment Purposes [17];
- IAF MD11:2023 - IAF Mandatory Document for the Application of ISO/IEC 17021-1 for Audits of Integrated Management Systems [18], and
- IAF ID12:2023 - IAF Informative Document for the Principles on Remote Assessment [19].

If an organization chooses and embarks on the path to certify its AIMS for conformity to ISO/IEC 42001 it would be more successful if it is familiar with ISO/IEC 17021-1 [5]. Other parts of ISO/IEC 17021, namely from Part 2 to Part 15, define competence requirements for auditing and certification of various types of management systems.

A similar standard dealing with the auditing of AIMS - ISO/IEC 42006, is under publication as of 2025-04-17 [20]. The draft (DIS) and final draft (FDIS) of the ISO/IEC 42006 standard define in Clause 7.1 the specific auditor team competences (knowledge and skills) in respect to AIMS:

- Artificial Intelligence (AI);
- Technical aspects of the activity to be audited;
- Management systems (ISO/IEC 42001) and management business practices, concepts and the interrelationship between policy, objectives and results;
- Principles of auditing (ISO 19011);
- AIMS (ISO/IEC 42001-based) monitoring, measurement, analysis and evaluation;
- Applicable normative documents and legal obligations used in the certification process.

CONCLUSIONS

This paper has presented the chronology of the ISO standards for quality management in educational organizations (universities), and the standards applied for internal and external audits of such management systems.

The latest updates and trends related to the auditing artificial intelligence management systems (AIMS) have been summarized.

Recommendations for the use of authoritative information sources are made to help professionals integrate artificial intelligence in their existing management systems.

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