

MANAGEMENT FOR QUALITY AND INNOVATIONS

Tzvetelin Gueorguiev¹

¹ University of Ruse “Angel Kanchev”, Ruse, Bulgaria, tzgeorgiev@uni-ruse.bg

Abstract:

The purpose of this paper is to outline the advantages of integrating quality management systems with innovation management systems. The paper presents the chronology of ISO standards for management systems, the evolution from quality management systems based on ISO 9001 to innovation management systems based on ISO 56002. The discussion evolves into a summary of the lessons learned from the implementation of such systems. The conclusions highlight a number of opportunities for improvement and suggestions for practical implementation of innovation management systems in universities.

Keywords: quality management systems; ISO 9001; innovation management systems; ISO 56002; university management systems.

1. INTRODUCTION

Different forms of quality control have existed since the dawn of humankind. Inevitably they have been intertwined with what we call today metrology. The science of quality management has been around for about a century and it encompasses quality planning, quality assurance and quality improvement as well as the more traditional quality control.

The factor which practically makes the difference in quality management systems is the rate of improvement- be it incremental or continual. Any innovation may be considered to be an improvement, but not every improvement is innovative.

This paper presents a chronological overview of ISO 9000 and ISO 56000 based management systems in order to better understand the significance of such management systems and the perceived benefits from their implementation.

2. QUALITY MANAGEMENT SYSTEMS AND THE ISO 9000 SERIES OF STANDARDS

Quality management systems in organizations help their top management team steer the organization in the desired strategic direction. They formally express the ways that internal processes work, interact with each other and with external

processes, the communication between functions using documented information, and other typical managerial activities.

2.1. The requirements standard – ISO 9001

The latest edition of the standard ISO 9001 Quality Management Systems – Requirements is published in 2015 and was confirmed in 2021 [2]. The first edition was published back in 1987, and was followed by revisions in 1994, 2000 and 2008.

If an organization aims to demonstrate its effectiveness and to improve its customer satisfaction, this standard presents a coherent and proven set of requirements leading it on the path to success.

The current structure of this standard follows the high level structure presented in Annex SL of the ISO Directives. This document was first published in 2012 and then revised in 2021. The requirements of ISO 9001:2015 are specified after the initial sections of the standard, titled: Foreword, Introduction, Scope, Normative references, and Terms and definitions. The core of the standard for quality management systems follows the Plan-Do-Check-Act (PDCA) cycle, also part of clause 0.3.2, by defining requirements for:

- Context of the organization;
- Leadership;
- Planning;
- Support;
- Operations;
- Performance evaluation;
- Improvement.

Clause 10 Improvement is further subdivided into: general (10.1), nonconformity and corrective action (10.2), and continual improvement (10.3).

All of these elements can serve as cornerstones for building an innovation management system.

2.2. Fundamentals and vocabulary for quality management systems – ISO 9000

This standard is valid for the whole ISO 9000 series of standards [1]. In addition to specifying the terminology and definitions related to quality management systems, ISO 9000 outlines the seven quality management principles. For many organizations these principles serve as bases on

which the top management develops the quality policy.

ISO 9000:2015 is the fourth edition of this standard which is preceded by earlier revisions in 2005 and 2000. The first vocabulary for quality was published as ISO 8402:1986 and later revised to become ISO 8402:1994 Quality management and quality assurance — Vocabulary.

ISO 9000 has 13 categories of terms including the definitions for quality management, improvement, innovation, and many others.

2.3. The ‘how to’ standard – ISO 9002

ISO/TS 9002:2016 has identical structure to the one of ISO 9001:2015. Its main feature is that this standard provides more specific guidelines for the application of ISO 9001:2015. This standard has been reviewed and confirmed in 2020 [3]. Previous ISO standards had the same number but with a different structure and meaning:

- ISO 9002:1987 Quality systems — Model for quality assurance in production and installation, and
- ISO 9002:1994 Quality systems — Model for quality assurance in production, installation and servicing.

2.4. Better than average – ISO 9004

The fourth edition of this standard is titled ISO 9004:2018 Quality management — Quality of an organization — Guidance to achieve sustained success [4]. The chronology of this standard of the ISO 9000 series is as follows:

- ISO 9004-1:1994 Quality management and quality system elements — Part 1: Guidelines;
- ISO 9004:2000 Quality management systems — Guidelines for performance improvements;
- ISO 9004:2009 Managing for the sustained success of an organization — A quality management approach.

The progress of thought provoked by the changes in the environment in which organizations operate is evident- from quality elements, through performance improvements to the latest approach of sustained success.

A measure for success can be the maturity model and the self-assessment tool presented in Annex A of ISO 9004:2018.

The guidance for achieving sustained success in respect to innovation is described in Clause 11.4. The respective maturity levels, ranging from 1 (lowest) to 5 (highest) provide qualitative indicators for innovation:

- Maturity Level 1 – limited innovation and no planning of the innovation process;

- Maturity Level 2 – innovations take into considerations the needs, expectations and requirements of relevant interested parties;
- Maturity Level 3 – innovations are planned in line with identified changes in the organization’s context, resources, and risks;
- Maturity Level 4 – innovations are prioritized, the innovation processes involve external interested parties, innovations are assessed for their effectiveness and efficiency, also in relation to organizational improvement;
- Maturity Level 5 – anticipating changes in context and preventing risks.

3. INNOVATION MANAGEMENT SYSTEMS AND THE ISO 56000 SERIES OF STANDARDS

The need for a specific standard for innovation management systems became evident at the turn of the 21st century. In 2008 the European Committee for Standardization (CEN) created a specific technical committee on innovation management- CEN/TC 389 which published the first set of international standards on innovation management – the 16555 series.

This initiative was continued by the International Organization for Standardization (ISO) which established a similar technical committee- ISO/TC 279 “Innovation management”. Until July 2022, ISO has published six standards for innovation management, part of the ISO 56000 series:

- ISO 56000:2020 Innovation management — Fundamentals and vocabulary [6];
- ISO 56002:2019 Innovation management — Innovation management system — Guidance [7];
- ISO 56003:2019 Innovation management — Tools and methods for innovation partnership — Guidance;
- ISO/TR 56004:2019 Innovation Management Assessment — Guidance [8];
- ISO 56005:2020 Innovation management — Tools and methods for intellectual property management — Guidance [9];
- ISO 56006:2021 Innovation management — Tools and methods for strategic intelligence management — Guidance.

Four additional standards are at different stages of development:

- ISO/AWI 56000 Innovation management — Fundamentals and vocabulary (an update of the standard ISO 56000:2020);
- ISO/AWI 56001 Innovation management — Innovation management system — Requirements;

- ISO/DIS 56007 Innovation management — Tools and methods for idea management — Guidance;
- ISO/CD 56008 Innovation management — tools and methods for innovation operation measurements — Guidance;
- ISO/DTS 56010 Innovation management - Illustrative examples of ISO 56000.

The similarity of the concepts behind ISO 9000 and ISO 56000, and ISO/TS 9002 and ISO 56002 is noticeable. Yet, the approach applied for developing innovation management standards is substantially different.

Instead of publishing the standard with requirements for innovation management systems-ISO 56001 first, and then giving guidance on their implementation, ISO/TC 279 has chosen a more customer-friendly approach. This “innovation” allows the potential developers, implementers and auditors of innovation management systems to establish their systems based on the guidance and supporting standards. Only when sufficient practice in maintaining such systems is in place, the requirements standard will be used to audit and possibly certify for conformance to ISO 56001.

4. LESSONS LEARNED FROM THE IMPLEMENTATION OF MANAGEMENT SYSTEMS

The implementation of management systems in higher educational organizations began by adapting ISO 9001 requirements to the actual educational environment. Naturally, the pre-existing management systems and the international and national regulatory documents served as bases for the additional requirements.

The University of Ruse is one of the pioneers in implementing an ISO 9001 based quality management system. The desire to have a less general and a more specific quality management system has been boosted by the publication of:

- International Workshop Agreements IWA 2:2003 and later IWA 2:2007 Quality management systems — Guidelines for the application of ISO 9001:2000 in education;
- ISO 21001:2018 Educational organizations — Management systems for educational organizations — Requirements with guidance for use [5].

The latter standard has been discussed in detail by the Quality Assurance Committee of the university and the relevant documented procedures have been revised as necessary.

In 2021 a decision was made that ISO will revise this standard. As of July 2022, ISO/TC 232 “Education and learning services” has initiated a ballot of the Committee Draft (CD) of ISO 21001.

If the ballot is successful, the standard will then move to the next stages- Draft International Standard (DIS), Final Draft International Standard (FDIS), and published international standard.

The Technology Transfer and Intellectual Property Centre (TTIPC) at the University of Ruse “Angel Kanhev” is integrating elements of innovation management systems. This improvement to the existing quality management systems integrates the requirements of ISO 9001:2015 and of ISO 21001:2018 with the guidance of ISO 56002:2019.

The process has started in 2020 with the election of the current manager of the TTIPC. The implementation of the ISO 56000 series of standards encompasses the following elements:

- Updated innovation vision, mission, strategy, policy, and objectives;
- Streamlined innovation management process that encompass the identification of opportunities, creation and validation of concepts, developing and deploying solutions;
- Developing and publishing a yearly innovation portfolio which contains all existing and newly registered intellectual property rights (IPR)- patents, utility models, trademarks, designs, etc.;
- Creating and continuously updating a database of IPR, including a calendar of the dates of validity;
- Performing assessments of the performance of the innovation management system, etc.

Some of the activities arising from the integrated quality, educational and innovation management system are:

- Management of intellectual property;
- Management of strategic intelligence;
- Active membership and participation in conferences, seminars, webinars and workshops;
- Organizing seminars to obtain buy-in from internal and external interested parties;
- Participation in promotional events such as the Innovative Youth Expo, etc.

Any organization shall learn its lessons both from best practices, and from failures. Some of the lessons learned so far are:

- The value added from innovation processes shall be the main principle when prioritizing innovation initiatives;
- The timeliness and customization of innovations enable successful technology transfer and generate higher return on investment;

- Engaging meetings with successful inventors and researchers extend the pool of potential new inventors;
- Innovative spirit and innovation culture are a must. The documented management system can support innovation processes, but the performance of the system is strongly impacted by the people implementing it;
- Innovation teams and partnerships generate better overall outcomes and outputs.

5. SUMMARY

In conclusion, experience with the integrated management system of the university shows that the best results and performance of the management system are achieved when:

- carefully considering the current context and emerging trends and technologies, as well as the requirements of relevant interested parties;
- successfully managing the competence, awareness and involvement of key representatives of top management, researchers, professors, laboratory technicians and administrative staff;
- actively engaging in professional organizations, projects and trainings;

- timely aligning the organization's strategic direction with international and national regulatory documents and frameworks;
- embracing change and creating the future.

6. REFERENCES

- [1] ISO 9000:2015 Quality management systems — Fundamentals and vocabulary.
- [2] ISO 9001:2015 Quality management systems — Requirements.
- [3] ISO/TS 9002:2016 Quality management systems — Guidelines for the application of ISO 9001:2015.
- [4] ISO 9004:2018 Quality management — Quality of an organization — Guidance to achieve sustained success.
- [5] ISO 21001:2018 Educational organizations — Management systems for educational organizations — Requirements with guidance for use.
- [6] ISO 56000:2020 Innovation management — Fundamentals and vocabulary.
- [7] ISO 56002:2019 Innovation management — Innovation management system — Guidance.
- [8] ISO/TR 56004:2019 Innovation Management Assessment — Guidance
- [9] ISO 56005:2020 Innovation management — Tools and methods for intellectual property management — Guidance.