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Integrated management system at higher education institutions: Case study from Poland

Abstract

Integrated management systems in enterprises are of interest to researchers, but at higher education institutions (HEIs) this issue has not been the subject of in-depth research to date. The main purpose of this article is to explore the integration process of standardized management systems (MS), namely quality MS (compliant with ISO 9001), environmental MS (ISO 14001) and energy MS (ISO 50001) at HEIs. The objectives are: (1) examining the reasons for integrating standardized MSs at HEIs, and (2) identifying the stages of the standardized MS integration process at HEIs corresponding to the Plan-Do-Check-Act (PDCA) cycle. To achieve this goal, a case study research strategy was adopted. One case, namely the University of Applied Sciences in Nysa, Poland, was analyzed. Multiple sources were used to obtain the data, and these were documentation, archives, interviews and participant observations. It was concluded that the main reason why the authorities of the analyzed HEI made the decision to integrate quality, environmental and energy MSs was to improve the university's performance. This research made it possible to identify activities carried out at the HEI in the process of MS integration which correspond to all stages of the PDCA cycle.

Keywords: higher education institution, integrated management system, ISO 9001, ISO 14001, ISO 50001

Introduction

Standardized management systems enable organizations to meet challenges by applying best practices and confirming, through certification, that these practices are properly firmly established in them. The most widespread management system (MS) standards are those published by the International Organization for Standardization (ISO). Over the last two decades, the number of certified MSs compliant with particular ISO standards has grown rapidly. The total number of selected valid certificates in 2020 was as follows: ISO 9001: 916 842 valid certificates, ISO 14001: 348 218, ISO 45001: 190 429, ISO/IEC 27001: 44 486, ISO 22000: 33 735, ISO 13485: 25 656 and ISO 50001: 19 721 (ISO, n.d.). According to the ISO Survey 2020 (ISO, n.d.), in 2020, worldwide, the total number of valid certificates increased by 18% as compared to 2019. This increase is noticeable for the most popular MS standards in the world, i.e. ISO 9001, which saw an increase of 4%, and ISO 14001, which saw an increase of 12% (ISO, n.d.).

Organizations in various sectors of the economy, ranging from industry (e.g. manufacture of wood products, chemical products, pharmaceuticals), through agriculture (e.g. fishing and forestry) to services (e.g. hotels and restaurants, transport, public administration, education) strive to obtain certificates confirming that their MS complies with the selected standard. The number of standardized MSs deployed in the organization may vary. Some of them implement only one MS, while others have several. As organizations may have multiple standardized MSs, they manage them either separately or in an integrated manner (Bernardo et al., 2018). The formation of integrated management systems (IMS) is justified, as implementing these MSs standards in parallel often requires duplicating management tasks (Trierweiller et al., 2016). The scope of integration typically involves management systems for quality (ISO 9001), environment

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(ISO 14001) and occupational health and safety (ISO 45001) (Dahlin & Isaksson, 2017). However, also other combinations are possible, depending on the needs of the organization (Bugdol & Jedynak, 2015).

HEIs around the world implement a variety of standardized MSs. To date, numerous publications have examined HEIs' MSs that are compliant with ISO 9001 (e.g. Ab Wahid, 2019; Basir et al., 2017; Karapetrovic et al., 1998) and ISO 14001 (e.g. Price, 2005; Sari & Kamalia, 2019; Sammalisto & Brorson, 2008). However, studies on MSs compliant with ISO 50001, to the best knowledge of the authors, are rare (e.g. Pasvorarotkool & Mongkon, 2020).

The literature review shows that whereas IMSs in enterprises have attracted considerable interest of researchers (Beckmerhagen et al., 2003; Bernardo et al., 2018; Domingues et al., 2017; Trierweiller et al., 2016), studies of IMSs in HEIs are rare and treated as a side issue (e.g. Gheorghe et al., 2018; Holm et al., 2015). For example, Holm et al. (2015) focused on education for sustainable development, while Gheorghe et al. (2018) made little reference to IMS covering MSs for quality, environment and occupational health and safety. Thus, these studies present IMSs in a fragmentary way. The lack of publications on IMSs at HEIs covering MSs for quality (ISO 9001), environment (ISO 14001) and energy (ISO 50001) indicates a research gap. With this in mind, following the suggestion made by Holm et al. that there is a need for an extensive overview of recent developments in MSs at HEIs (Holm et al., 2015), the authors decided to conduct research that fills this gap. Therefore, the main aim of this article is to explore the process of integration of standardized management systems, namely quality MS (compliant with ISO 9001), environmental MS (ISO 14001) and energy MS (ISO 50001) at HEIs. The objectives are: (1) examining the reasons for integrating standardized MSs at the HEI and (2) identifying the stages of the standardized MS integration process at the HEI corresponding to the Plan-Do-Check-Act (PDCA) cycle.

This article consists of four parts, which are preceded by an introduction. Firstly, the main findings from the literature review on IMSs in organizations are presented. Secondly, the case study research method is explained. The results of the study are outlined in the following section. The article ends with the discussion and the conclusions.

Benefits and stages of integration of standardized management systems in organizations

Integrated management systems are defined in different ways, as 'integration' has different meanings (Beckmerhagen et al., 2003). In the opinion of Beckmerhagen et al. (2003), "Integration of management systems can be defined as a process of putting together different function-specific management systems into a single and more effective integrated management system" (p. 213). In the specification PAS 99:2012 (BSI, 2012), a more precise definition of IMS is proposed, according to which IMS "integrates multiple aspects of an organization's system and processes to one complete framework, enabling an organization to meet the requirements of more than one management system standard" (p. 2). The MSs that are subject to integration, mentioned above, include quality MS, environmental MS, occupational health and safety MS, information security MS, energy MS, risk MS, social responsibility MS and other MSs. As MSs standards present different structures and requirements, MSs integration is challenging. To solve this problem, ISO developed Annex SL (ISO, 2023), the framework for a generic MS.

The goal of MSs integration is for the organization to benefit from the process. Studies prove that the amalgamation of MSs has numerous advantages:

- cost reduction (Beckmerhagen et al., 2003; Kafel, 2016; Khanna et al., 2010; Zeng et al., 2011; Zutshi & Sohal, 2005),
- reduction in the duplication of policies, procedures and records (Beckmerhagen et al., 2003; Kafel, 2016; Khanna et al., 2010; Zutshi & Sohal, 2005),
- simpler MSs with unified objectives, processes and resources (Beckmerhagen et al., 2003; Ejdys, 2011; Kafel, 2016; Zeng et al., 2011; Zutshi & Sohal, 2005),
- improved effectiveness and efficiency (Beckmerhagen et al., 2003; Kafel, 2016; Zutshi & Sohal, 2005),
- improved communication (Ejdys, 2011; Kafel, 2016; Zutshi & Sohal, 2005),
- increased customer and employee satisfaction (Kafel, 2016),
- a positive market image (Ejdys, 2011; Zutshi & Sohal, 2005).

After analyzing fifteen studies, Satolo et al. (2013) presented a list of ten advantages of MSs integration (from the most popular to the least popular), and these were cost reduction, bureaucracy reduction, elimination of redundancy, improvement of effectiveness and efficiency, harmonization of documentation, simplification of standards and requirements, increased competitiveness, resources and objective alignment, improved compliance with regulations, and a better work environment. This is consistent with the observation by Dahlin and Isaksson (2017), that for most researchers integration is beneficial in terms of cost reduction, operational advantages and improved customer satisfaction.

Some researchers only present the benefits of MS integration, whereas others classify these benefits (Ejdys, 2011; Satolo et al., 2013). The classification of benefits proposed by Ejdys (2011) is noteworthy due to its holistic approach. Ejdys divided the advantages of integration of MSs into two basic categories: external benefits, related to adapting to the requirements of the external environment, and internal benefits, related to the improvement of internal processes of the organization. In the first category, Ejdys listed

ensuring compliance with applicable legal regulations, meeting market requirements, and improving the image of the organization on the market. The second category consisted of direct and indirect (i.e. economic) benefits. Direct benefits fall into the following five areas (Ejdys, 2011): operational management, process improvement, product quality, environmental protection, and work safety.

The integration process of MSs should be conducted carefully. Beckmerhagen et al. (2003) propose using the PDCA cycle approach for this purpose, because the structures of standardized quality MS, environmental MS and energy MS are similar and based on the PDCA model. Therefore they can be combined and seamlessly integrated into one management system (Beckmerhagen et al., 2003; Fichera et al., 2020; Trierweiller et al., 2016). The PDCA cycle (see Table 1) provides an repeatable process used by organizations to achieve continuous improvement. The PDCA cycle has its roots in Total Quality Management which is a holistic management philosophy that endeavors continuous improvement of organizations (Kaynak, 2003).

To sum up, the above-mentioned benefits are an incentive to integrate multiple parallel MSs in other organizations. The article assumes that in the process of deciding whether to integrate specific MSs takes account of the expected benefits. Integration of MSs ought to be planned and implemented in a structured way, to make sure that the organization benefits from the integration. Therefore, it should follow the PDCA approach (BSI, 2012).

Case study research methodology

The case study research strategy was adopted in the article. Its choice resulted from the stated objectives and the formulated research questions. Case study research allows to describe and explain a specific phenomenon. It also enables answers to research questions typical of qualitative research, i.e. how? and why? a given process takes place (Yin, 2015). One case was selected, which is justified when a unique case is analyzed (Budzanowska-Drzewiecka, 2022). The case study research strategy adopted in the article consists of several steps (Budzanowska-Drzewiecka, 2022): (1) specifying research issues, (2) case(s) selection, (3) collecting and organizing data, (4) analyzing data, (5) conclusions, and (6) making comparisons with the literature on the subject.

In this paper, the research issue concerns the process of integrating standardized management systems

Table 1

What the letters PDCA stand for from the perspective of different standardized MSs

	Quality MS	Environmental MS	Energy MS
Plan	Establish the objectives of the system and its processes, and the resources needed to deliver results in accordance with customers' requirements and the organization's policies, and identify and address risks and opportunities	Establish environmental objectives and processes necessary to deliver results in accordance with the organization's environmental policy	Understand the context of the organization, establish an energy policy and an energy management team, consider actions to address risks and opportunities, conduct an energy review, identify significant energy uses (SEUs) and establish energy performance indicators (EnPIs), energy baseline(s) (EnBs), objectives and energy targets, and action plans necessary to deliver results that will improve energy performance in accordance with the organization's energy policy
Do	Implement what was planned	Implement the processes as planned	Implement the action plans, operational and maintenance controls, and communication, ensure competence, and consider energy performance in design and procurement
Check	Monitor and (where applicable) measure processes and the resulting products and services against policies, objectives, requirements and planned activities, and report the results	Monitor and measure processes against the environmental policy, including its commitments, environmental objectives and operating criteria, and report the results	Monitor, measure, analyze, evaluate, audit and conduct management review(s) of energy performance and the EnMS
Act	Take actions to improve performance, as necessary	Take actions to continually improve	Take actions to address non-compliance and continually improve energy performance and the EnMS

Source: "ISO 14001:2015. Environmental management systems. Requirements with guidance for use", ISO, 2015a (https://www.iso.org/standard/69426.html); "ISO 9001:2015. Quality management systems. Requirements", ISO, 2015b (https://www.iso.org/standard/62085.html); "ISO 50001:2018. Energy management systems. Requirements with guidance for use", ISO, 2018 (https://www.iso.org/standard/69426.html).

compliant with ISO 9001, ISO 14001 and ISO 50001 at HEIs. Two research questions were formulated:

RQ1: Why do HEI authorities decide to integrate standardized management systems?

RQ2: How is standardized management system integration progressing, based on stages in the Deming PDCA cycle at the HEI?

The research subject was defined as an 'Integrated Quality, Environment and Energy Management System' (IQEEMS) which was implemented at the University of Applied Sciences in Nysa (UASN), Poland. To the best of the authors' knowledge, it is the only HEI in which IMS covering standardized MSs for quality, environment and energy has been implemented.

Poland is a participating member of the European Higher Education Area, which implies that Polish HEIs offer education at Bachelor's, Master's and Doctoral levels. In the academic year 2020/21, there were 368 HEIs in Poland, and they educated 1,218 thousand students (Statistics Poland, 2022). Depending on the supervisory body, HEIs are categorized as public and private. Additionally, Polish HEIs include universities, universities which have a defining word or phrase in their name (e.g. universities of technology, pedagogical universities, etc.), public higher vocational schools, and private HEIs.

The University of Applied Sciences in Nysa, Poland, is a public higher vocational school established in 2001, with seven faculties in its structure: Faculty of Jazz, Faculty of Safety Science, Faculty of Economic Sciences, Faculty of Medical Sciences, Faculty of Technical Sciences, Faculty of Health Sciences and Physical Culture, and the Faculty of Neophilology. UASN offers first-cycle studies (Engineering and Bachelor's studies) and second-cycle studies (Master's studies). The number of students in 2021 was 1,802 (The number of students in 2021 was 1,802 (https://radon.nauka.gov.pl/), and there are 155 academic staff at UASN (as of 1 October 2020) (University of Applied Sciences in Nysa, 2020). The main strategic goals of UASN are: (1) the highest quality of education, (2) modern and effective management of the university, and (3) the leading role of the university in the development of the region. Within each of these goals, numerous specific objectives were formulated (University of Applied Sciences in Nysa, 2020).

The UASN received three certificates confirming that:

- it applies the quality MS and meets the requirements of ISO 9001:2015 (issued by PCC-CERT, Poland),
- it applies the environmental MS and meets the requirements of ISO 14001:2015 (issued by PCC-CERT, Poland),
- it applies the energy MS and meets the requirements of ISO 50001:2018 (issued by Staunchly Management and System Services Ltd, England).

The scope of the certificates is the same in all MSs and covers consulting services, pro-innovative consulting services, training services, and information services. It does not cover all areas of the UASN's activity. The certificates were issued in 2020, by the Polish and English certification bodies.

To answer the research questions, necessary data were collected. Yin (2015) describes six sources of data in case study research: documentation, archives, interviews, direct observations, participant observation, and physical artefacts. In this study, the authors used documentation, archives, interviews with the UASN authorities and participant observations. The documents and archives that were analyzed include: 'Integrated Quality, Environment and Energy Management System Manual', 'Quality Manual', processes and procedures, forms, documents required by particular standards, 'Quality and Environmental Policy', 'Energy Policy', resolutions and ordinances of UASN authorities regarding an IQEEMS, management review reports, audit reports, and relevant policies and strategies. In turn, interviews with the UASN authorities concerned the rationale behind integrating MSs. Also, during this research, particular effort was made in order to maintain an objective view of the results obtained. The authors conducted discussions on the objectivity of the data and tried to remove from the analyzes data about which there were objectivity concerns.

Findings

The expected benefits of integrating standardized management systems at UASN

The first research question concerned the rationale behind integrating standardized management systems at the University of Applied Sciences in Nysa. In general, the decision to integrate the quality MS, environmental MS, and energy MS was driven by the potential benefits the UASN authorities expected to achieve.

The benefits expected by the UASN authorities were analyzed in two stages. The first one concerned the advantages of implementing specific quality, environmental and energy MSs, and the second one related to potential benefits of integrating these systems.

There are two types of potential benefits of implementing specific MSs, presented in Table 2, and these are external and internal benefits. External benefits relate to the requirements of the UASN external environment. They include ensuring compliance with applicable legal regulations or meeting stakeholders' requirements. Internal benefits include those related to people, internal processes and the natural environment. The UASN authorities have identified the expected advantages of specific MSs implementation in the management areas of quality, environment and energy. Only in the case of quality management were no internal benefits referring to natural environment identified.

According to data, the UASN authorities decided to integrate quality MS, environmental MS and energy MS, because this was the most rational and beneficial solution for the organization. The reasons for integrating standardized MSs in the order established by

Table 2
The expected benefits of implementation of quality, environment, and energy MSs by various management areas at UASN

Categories of expected benefits	Subcategories of expected benefits	Management areas		
		Quality management	Environmental management	Energy management
External benefits	–	• Improving UASN activities to ensure UASN efficient performance and compliance with applicable legal regulations	• Improving effects related to environmental protection required by stakeholders	• Compliance with legal requirements related to air quality
Internal benefits	People	• Developing and constantly improving employee qualifications as well as their involvement in performed tasks	• Building environmental awareness among students and employees	• Building employees' awareness of energy efficiency
	Processes	• More professional activity with regard to didactic, scientific, commercial and administrative processes • Storing and using knowledge of students', employees' and clients' needs and expectations to improve internal processes • Conducting systematic audits and system reviews as well as taking corrective and preventive actions	• Achieving measurable environmental objectives • Identifying, analyzing and evaluating risks related to environmental aspects • Implementing the 'Environmental Protection Program and the Waste Management Plan'	• Constant improvement of the UASN energy result by reducing unit energy consumption • Supporting purchase of modern solutions which decrease total energy needs • Optimization of energy carrier consumption through periodic inspections of machinery and equipment
	Natural environment	–	• Protecting air quality and minimizing noise pollution • Proper water and wastewater management • Proper waste management • Monitoring noise emission, light intensity, temperature and humidity levels in the working environment	• Lower dust and gas emissions • Lower environmental impact • Lower consumption of energy carriers, water and heat

Source: authors'own work based on internal UASN documentation.

the UASN authorities, from the most to least important, were as follows: (1) to improve the university's performance, (2) wish to adjust resources and goals, (3) the need for documentation harmonization, (4) the need to comply with legal regulations, (5) an attempt to simplify standards, (6) measures to reduce costs, (7) desire to reduce bureaucracy, and (8) the need to improve competitiveness. These reasons, which are also expected benefits, led to the decision to implement the IQEEMS in 2019. This decision was made despite the weaknesses of MSs integration that have appeared. To mention a few: a long time spent both on the development of the IMS documentation and on employee training as well as the costs related to the implementation and certification of the IMS.

Stages of the management systems integration process at UASN

The second research question required collecting data on how integration of the standardized management systems at UASN progressed. This process was completed in 2020. The authors attempted to incorporate the collected data into the Deming Plan-Do-Check-Act cycle.

The first activity in the Deming cycle is '**Plan**'. Within this stage, the objectives of the quality, environment, and energy MSs were established. Moreover, the annual objectives of the IQEEMS were set. Next, the processes were created and the resources were specified. Finally, the risks and opportunities were identified and addressed.

The objectives of the quality, environment and energy MSs are included in the internal UASN documentation, namely in the 'Quality and Environment Policy' and the 'Energy Policy'. They are presented in Table 3. The objectives are formulated in a general way, while the documentation on MSs includes more detailed descriptions of the objectives, along with performance indicators. These objectives are compatible with the requirements and guidelines presented in the ISO 9001, ISO 14001 and ISO 50001 standards and consistent with the relevant UASN policies. They are also measurable, monitored, communicated and updated as necessary.

Apart from that, the UASN authorities set annual objectives for IQEEMS. For example, the following objectives have been set for the 2022/2023 academic year: (1) establishing cooperation with three new enterprises, (2) launching a new study program, (3) implementing two new projects connected to the Regional Center for Knowledge Transfer and Innovative Technologies, (4) reducing the consumption of liquid fuels by 5%, (5) reducing energy consumption by 5%, (6) reducing thermal energy consumption by 5%, and (7) being registered in the GreenMetric register. The annual objectives set for IQEEMS relate to the areas of quality, environment and energy.

Next, the main, supporting and managing processes were established. The main processes include the Didactic process, Research process, and Service activity. Among the supporting processes are: (1) Information management, (2) Continuous improvement, (3) Non-compliance control, (4) Personnel management, (5) Maintenance of facilities and equipment, and (6) International cooperation, promotion, customer and graduate satisfaction. Furthermore, three management processes were established, which were University management, Environment management, and Energy management.

Next, the resources needed to deliver results aligned to the customers' requirements were specified. The UASN authorities provided financial, human and natural resources as well as infrastructure, work environment, knowledge, and information. As people are the most valuable and critical resource, it is worth noting that UASN employees had substantive knowledge regarding MSs. Having analyzed the resources needed to deliver required results, the Rector appointed a Representative for IQEEMS.

Finally, the UASN authorities considered actions aimed at identifying and addressing risks and opportunities. Addressing both risks and opportunities establishes a basis for making IQEEMS more effective and preventing any adverse effects. A 'Risk Assessment Sheet' was developed based on the established processes. This sheet contains information about identified risks and opportunities, the extent of these risks and opportunities, the probability of occurrence, and the effects. It also states

Table 3

Objectives of the quality, environment, and energy MSs at UASN

Name of document	Objectives of specific MSs
Quality and Environmental Policy	• Improving the UASN processes in order to ensure that UASN tasks are implemented in an efficient, competent and timely manner • Collecting and using knowledge about the needs and expectations of customers, which is necessary to improve the services provided • Improving customer service • Constant improvement of qualifications and raising employees' awareness through systematic training • Maintaining and improving the quality and environmental MSs through systematic audits and reviews of the system, as well as implementing corrective and preventive actions • Improving the effects with regard to environmental protection • Compliance with legal requirements • Building environmental awareness among UASN stakeholders
Energy Policy	• Improvement of the UASN energy result and its continuous improvement • Purchase of modern solutions that reduce energy demand • Optimizing the consumption of energy carriers by conducting periodic inspections of machines and devices • Preference for innovative technological solutions aimed at reducing energy consumption • Ensuring appropriate and transparent energy carrier contracts • Continuous raising of employees' awareness with regard to energy efficiency and management of energy carriers • Hiring staff with appropriate professional qualifications • Communicating all aspects related to energy consumption inside and outside the UASN • Improving the Energy Policy • Conducting cyclical reviews and energy audits in order to assess and improve energy performance • Staff training • Monitoring and reporting measurements related to objectives

Source: authors' own work based on internal UASN documentation.

measures for mitigating the risk. For example, in the 'Environment management' process, the risk of 'Exceeding standards and legal requirements with regard to environmental protection' was identified. The level of this risk was defined as 5 (calculated by multiplying the probability of occurrence and effects), with the probability of occurrence at 3 and the effects at 5 on a 1–5 scale. Additionally, the following measures were proposed for mitigating the risk: performing environmental audits, supervising the implementation of contracts, waste segregation, and staff training.

As part of the 'Plan' stage, a detailed schedule of integration activities was developed. The first part of this plan concerned the integration of the environmental MS with the quality MS already functioning at UASN. The second part related to the integration of these two systems with a third one, namely the energy MS.

In the next PDCA phase, '**Do**', organization should implement what has been planned. In the case of UASN, the measures envisaged in the schedule of integration activities were carried out. Environmental and energy MSs were integrated with quality MS to finally create the IQEEMS (Table 4).

The two stages set out in Table 4 were of particular importance and of the the longest duration. The first was 'Development of IQEEMS documentation'. The documentation was prepared by the Representative for the IQEEMS in cooperation with the selected employees. The documentation included an organizational structure diagram, 'Quality and Environmental Policy', 'Energy Policy', list of environmental aspects, list of applicable regulations, environmental emergency plans, and the 'Integrated Quality, Environment and Energy Management Systems Manual'.

Also, the principles of internal and external communication regarding the IQEEMS were defined. Communication was necessary to popularize and to inform the academic community and interested parties about the IQEEMS. The second significant step was 'Implementation of new regulations'. The key was to ensure that people at UASN were competent through appropriate education, training or experience, and that individuals were aware of policies and goals. For this purpose, training sessions were organized for the UASN authorities and representatives of organizational units as well as for all employees and academic teachers.

In the PDCA '**Check**' step, the broad performance of an organization is measured and monitored. The MSs integration process at UASN also was monitored and measured. Once the IQEEMS documentation had been drawn up and new regulations implemented, the effectiveness of IQEEMS was verified by means of an internal audit and management review (Table 5).

Table 4

Integration of environmental and energy MSs with quality MS at UASN: 'Do' stage

No.	Activity	Description	Execution time
1	Initial environmental audit and assessment of compliance	The initial audit was carried out and document compliance with the regulations was assessed	One month
2	Drafting IQEEMS documentation	The documentation for the environmental MS in accordance with ISO 14001 and of the energy MS in accordance with ISO 50001 was produced and merged with the documentation of the quality MS in accordance with ISO 9001; Also the principles of IQEEMS communication were established	Three months
3	Implementation of new regulations	IQEEMS regulations were implemented and employees responsible for specific areas were trained	Four months

Source: authors' own work based on internal UASN documentation.

Table 5

Integration of environmental and energy MSs with quality MS at UASN: 'Check' stage

No.	Activity	Description	Execution time
1	Internal audit	An internal audit was carried out to determine whether the IQEEMS is effectively implemented and maintained and whether it complies with the planned arrangements, namely with ISO 9001, ISO 14001, ISO 50001, UASN internal regulations, and applicable law	One month
2	Management review	Data from MSs areas were collected and analyzed; arrangements were made with regard to making the IQEEMS more effective and possibly making changes	One month (simultaneously with point 1)
3	Certification audit	A certification audit in accordance with the procedures of an independent accredited certification body was carried out.	Two months

Source: authors' own work based on internal UASN documentation.

To ensure monitoring and measurement, internal process indicators were developed and presented in a table. This table contains information about the indicators' names, indicator descriptions, expected values, the person responsible for monitoring and measurement frequency, comments, and obtained values. For example, one of the indicators was named 'Elimination of inappropriately supervised documentation' and described as the 'Number of identified cases of use of outdated documents'. The expected value was defined as zero, and the Representative for the IQEEMS was assigned as the responsible person. The measurement frequency was set as 'once a year'.

Finally, activities to improve the IQEEMS were undertaken at UASN. They represent the '**Act**' stage of the PDCA cycle. These actions were mainly the outcome of the IQEEMS management review report prepared in 2020. The document stated the key areas in which the IQEEMS should be improved. More specifically, the following actions were proposed:

- organizing customized workshops on the IQEEMS for UASN employees,
- integrating IQEEMS with UASN information security requirements,
- UASN participation in the international UI Green Metric World University Ranking.

Because management reviews take place every year, the subsequent reports also contain further improvement guidelines. Since 2020, a series of corrective and preventive actions have been undertaken at UASN and their effectiveness confirmed.

Discussion

The number of certified standardized MSs in organizations is growing (ISO, n.d.). However, it is difficult to operate multiple parallel MSs (Zeng et al., 2011). This is due to the complexity of management, lowering of management efficiency, and increasing management costs (Zeng et al., 2007). To avoid these problems, enterprises integrate single MSs, and this has many advantages (Beckmerhagen et al., 2003; Bernardo et al., 2018; Ejdys, 2011; Kafel, 2016; Khanna et al., 2010; Satolo et al., 2013; Zeng et al., 2011; Zutshi & Sohal, 2005). The benefits observed in enterprises are an incentive to integrate multiple parallel MSs in other organizations, including in HEIs. This article assumes that the process of deciding whether to integrate specific MSs takes account of the expected benefits.

The analysis shows that the benefits expected at the examined HEI are largely in line with the list of ten advantages of MSs integration proposed by Satolo et al. (2013). The similarities relate, in particular, to cost reduction, bureaucracy reduction, increased effectiveness and efficiency, harmonization of documentation, simplification of standards and requirements, increased competitiveness, resources and objectives alignment, or improved compliance with regulations. However, the importance attached to these expected IMS benefits is different in both cases. In the first case, Satolo et al. (2013) in their research show that the most significant advantage is cost reduction. In the second case, for the examined HEI's authorities, it was improvement of the university performance. This may be due to the fact that Satolo et al. (2013) in their research focused on enterprises which strive to maximize profits, while the mission of universities covers areas of research, education and cooperation with the external environment. Thus, the notions of efficiency and performance in these two types of organizations are understood in slightly different ways.

Even though ISO 9001, ISO 14001 and ISO 50001 MSs were designed to suit almost any organization irrespective of its type, size, complexity or industry, applying it to an HEI is quite a unique process. The analysed HEI first implemented and certified quality MS. Next, the HEI authorities decided to implement and certify environmental and energy MSs and integrate these three systems. This approach is also consistent with the position presented by Abad et al. (2011), according to which most organizations introduce the specific MSs progressively, often implementing quality MS first, then environmental MS, and integrating other MSs. Importantly, quality MS, which operated at the examined HEI for several years before MSs integration, was a strong foundation that helped implement IMS. Beckmerhagen et al. (2003) point out that building IMS on the ISO 9001 foundation is recommended and a well documented approach in literature.

The analysis also shows that the process of integrating standardized MSs at the examined HEI is consistent with the model devised by Beckmerhagen et al. (2003). In the first step, 'Plan', Beckmerhagen et al. likewise proposed establishing objectives, creating processes and specifying resources. The 'Do' phase includes creating the structural organization, assigning responsibilities, training, making communication decisions, and drawing up documentation. In the model, the 'Act' stage is understood as undertaking corrective and preventive actions as well as internal and external auditing. Such activities were also identified at the examined HEI. Finally, the 'Act' stage relates to taking measures to improve. This step was mentioned in the model and implemented in the examined HEI, but with one difference, as Beckmerhagen et al. (2003) call it *business planning*.

This article is not free of limitations. The first limitation concerns the research method used, which is not generalizable in the conventional sense. In this study, the danger of a false generalization stems from the fact that only one case was analyzed, which was UASN. Therefore, in future research, it would be interesting for the authors to extend the analysis to include other HEIs with IMSs. The next limitation refers to data collection. The authors used documentation, archives, interviews with the UASN authorities and participant observations. It would be valuable to extend the sources of data collection and to include interviews with the UASN employees, especially to get to know their views about the advantages and weaknesses of MSs integration at UASN. The authors plan to conduct such interviews in future research.

Conclusions

This paper helps to gain a better understanding of the rationale behind the standardized MSs integration at HEIs and the MSs integration process based on stages corresponding to the Plan-Do-Check-Act cycle.

The first conclusion concerns the reasons for the integrating quality, environment and energy management systems. The main reason why the authorities of the analysed HEI made the decision to integrate these three MSs was to improve university performance. This argument, as well as other reasons described in the Findings section, constitute at the same time the expected benefits of the integration. However, the question of whether these benefits will be seen remains open at the examined HEI, because its authorities have decided to check it as part of the next certification cycle, i.e. after three years of system operation. At that time, it will be possible to determine what benefits of IMS have been observed in practice. Before that happens, some advantages have already been noticed at the examined HEI, resulting both from the implementation of one of the three specific MSs (more efficient administrative processes, developing an 'Environmental Protection Program and the Waste Management Plan', greater environmental awareness among employees and students, reduction of energy consumption) and IMS as a whole (reduced bureaucracy through creating a single 'Integrated Quality, Environment and Energy Management Systems Manual' and harmonization of documentation). In the authors' opinion, the need for MSs integration was justified by the benefits it brought.

The next conclusions relate to the stages of the integration process, which correspond to the PDCA cycle. The conducted research made it possible to identify many activities carried out at the analysed HEI in the MSs integration process. In the first step, 'Plan': (1) the objectives of the quality, environment, and energy MSs as well as the objectives of IMS were established, (2) the processes were created, (3) the resources were specified, and (4) the risks and opportunities were identified and addressed. In the 'Do' phase, all actions planned in the schedule of integration activities were acomplished. IMS documentation was drawn up and new regulations were implemented. In the 'Check' stage, the broad performance of an organization is measured and monitored. Thus the effectiveness of IMS was verified by performing an internal audit as well as conducting a management review. A certification (external) audit conducted in accordance with the procedures of independent accredited certification bodies confirmed that the analysed HEI meets the requirements of ISO 9001, ISO 14001 and ISO 50001. Finally, the 'Act' stage refers to taking actions to improve. In this step, a series of corrective and preventive activities were taken. The actions identified in the research are part of all stages of the PDCA cycle. Therefore, the management systems were integrated at the examined HEI in accordance with the PDCA cycle.

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