

**VII INTERNATIONAL
CONFERENCE
QUALITY SYSTEM
CONDITION FOR
SUCCESSFUL BUSINESS
AND COMPETITIVENESS
PROCEEDINGS**



KOPAONIK, 27/11.-29/11/2019

**ASSOCIATION FOR QUALITY AND STANDARDIZATION OF
SERBIA**

VII INTERNATIONAL SCIENTIFIC CONFERENCE

**QUALITY SYSTEM CONDITION FOR
SUCCESSFUL BUSINESS AND
COMPETITIVENESS**

PROCEEDINGS

Kopaonik, 27/11 – 29/11/2019

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P R E F A C E

Dear Colleagues, Ladies and Gentlemen,

I take great pleasure in welcoming you to the 21st National and 7th International Scientific Conference on QUALITY SYSTEM CONDITION FOR SUCCESSFUL BUSINESS AND COMPETITIVENESS, organized by the Association for Quality and Standardization of Serbia.

We have entered our third decade and are proud of our commitment and successful performance in the field of quality in the Republic of Serbia and the region

We use our rich two-decade experience to further improve the quality status of Serbia in all spheres increasingly involving new actors in our work.

This year we are organizing the 21st National and 7th International Scientific Conference in cooperation with:

- Faculty of Veterinary Medicine, Belgrade University – co-organizer*
- Quality Centre, Faculty of Engineering Sciences, Kragujevac University*
- Quality Centre, Faculty of Mechanical Engineering, University of Montenegro, Podgorica*
- Middle and South East European Countries Quality Initiative*
- Technology College of Applied Studies, Krusevac,*

with the support of

- Ministry of Economy of the Republic of Serbia*
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- Accreditation Body of Serbia*
- Serbian Association of Employers*
- Serbian Chamber of Commerce*
- Chamber of Commerce and Industry of Serbia*
- Institute for Standardization of Serbia*

The large number of papers submitted for the presentation at the conference cover a wide range of topics: Quality system condition for successful business and competitiveness; Improving quality infrastructure; Management system: quality, environment, occupational health and safety, energy, food safety, information security...); Development and establishment of a management system (in theory and practice); Models of business excellence; Engineering and quality management; Knowledge management; Product and service quality; Audit and certification; Global quality; Quality culture; Management systems in the public sector; Quality, risks and opportunities; Information system in the function of management system development; Motivation and quality; Organizational behaviour, leadership and management; Quality – theory and practice; Quality and social responsibility; Innovations and quality; Measurement, control and quality in production; Quality improvement tools; Quality 4.0 and industry 4.0. After the conference, all papers will be submitted for indexing.

On this occasion, sticking to our roundtable tradition, we will organize discussions as follows:

- Development of Quality Infrastructure in Serbia - Risks and Opportunities, aimed at forming the Quality Infrastructure Council of the Republic of Serbia that would consist of experts on quality and represent an advisory body for state institutions in order to improve the current situation;*

- *Quality and crisis management, with the aim of preventing the emergence of a crisis by preventive actions, and if it does occur, to recognize and adequately and successfully manage it in a timely manner*
- *Food and beverage quality in Serbia, with special emphasis on the quality of wines and rakias on the Serbian market*

The Association for Quality and Standardization of Serbia strives to award its deserving members or organizations through the recognition criteria, but unfortunately, not always unmistakably.

This year, as well as every subsequent year, we will give recognition to those who have contributed to the success of the conference.

For the next year, we announce the award for those organizations with the most training hours per employee, since the success of an organization mostly depends on its knowledge. The award criteria will be published in a timely manner so that those interested can participate in the competition.

The success of a conference depends on all the participants, therefore, I take the opportunity to thank all the authors and co-authors of the papers, the co-organizer, those whose cooperation over many years has meant a lot to us, those who have given us support, the general sponsor – the Faculty of Business Studies and Law, Belgrade, other sponsors and donors, media patrons, as well as all the participants from Serbia and abroad.

I would like to wish us successful work and a good time at the largest gathering devoted to quality.

Yours sincerely,

***Professor Zoran Punoševac, PhD
Organizing Committee Chairman***

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INTEGRATION OF THE MANAGEMENT SYSTEM USING PROCESS APPROACH OF THE ORGANIZATION

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Matija Kovačić, mag.ing.traff.²

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***Abstract:** The development of management system standards challenges their harmonization. Optimizing the requirements of norms of integrated management system becomes imperative because, without optimization, the organization uses its resources to meet the requirements that do not result in a direct increase in the satisfaction of the interested parties. The process approach is imposed as the optimal choice because of the ability to use KPIs to identify compliance with the set requirements, but also the requirements that ISO 9001 sets to the organization. Many models of development integrate management system have been developed. Some of them serve only as a framework for the creation of norms i.e their harmonization and some of them in an insufficient way suggest the integration of the management system. All that leads to the new requirement for developing a new model of integration*

***Keywords:** business processes, integrated management system, ISO norm, optimization;;*

***JEL Klasifikacija:** L25*

1. INTRODUCTION

The growing importance of sustainable development as well as the growth of the market demands forced the need for organizational adaptation. In order to meet stakeholder requirements, the organization establishes certified management systems (Abrahamsson, et al., 2010). Through the standardization of management systems, the organization strives to meet the identified requirements of the stakeholders in an optimal way, since limited resources are available to meet its requirements (Micek, 2019). One of the ways in which an organization can optimize the use of available resources is the implementation of the process approach, which is also the requirement of ISO 9001.

In order to harmonise standards for management system, the ISO organization develops annex SL that evens the content of the norms and make easier to implement once harmonized standards in the management system. Previous ISO standards that are not in compliance whit annex SL challenges the organization because of the fact that all standards are differed not only in terms of requirements

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but also in form (Integrated standards, n.d.). However, there are also a number of other frameworks that attempt to integrate the management system, and one of such frameworks is PASS 99, DS 8001, AENOR, etc. (Micek, 2019). Despite the existence of various systems that seek to create an integration framework, there is a challenge in meeting and optimizing requirements of the management system standards.

The need for optimization of the management system stems from the fact that any norm of the management system on the organization sets different requirements for fulfilling which organizations must invest resources. Fulfilling all the requirements of the norms in each process extends the process time cycle, as well as reducing the efficiency and effectiveness of the process, which is why there is a need for a different approach to design and to optimize the management system. Implementation of the process approach as well as its application is one of the possible solutions for that challenge

2. SYSTEM THEORY AND PROCESS APPROACH

The system theory sees the organization as a system that is in constant interaction with the organizational environment as well as the inner elements of the organization are in constant mutual interaction. Understanding process approach is impossible without understanding the system theory. Process are in constant mutual interaction so are the components of the system that are the part of the system theory.

In the context of a business organization, the organization consists of the following subsystems:

- Subsystem of sensors: collecting information and data from organizational environments,
- subsystem for analyzing the collected information: such as the finance and accounting department, or controlling,
- the decision-making subsystem: makes decisions related to organizational operations,
- control subsystem: who controls, goals and their compliance with the plan,
- a storage subsystem: who stores the records, procedures, and other types of documents (Johnson, et al., 1964).

Described subsystems are similar to the ISO 9001 where the subsystem of the sensors can be identified with the organization of the organizational context, a subsystem of analyzing the collected information are similar to the ISO 9001 to point 6 and 7 in which the organizational context is used for planning and defining objectives. All that applies to the storage subsystem that is similar to the ISO 9001 point 7.5 that refers to documentation while the subsystem of decision-making can be identified with points 5 and 8 of the ISO 9001 norm. The control subsystem can be identified with points 9 and 10 of the same standard.

The system consists of a series of subsystems, and system theory emphasizes that the maximum system performance is achieved with the optimal effect of its components. If the business process decomposes to subprocesses, it can be recalled parallel to the theory of the system. The optimum performance of the process steps achieves the maximum performance of the entire process. It is important to emphasize that the points of performance measurement in process need to be defined. KPI points that, in accordance with system theory, identify whether the performance of the process is in accordance with defining goals in the plan or not.

3. MANAGEMENT SYSTEM, STANDARDIZATION AND SUSTAINABILITY

The organizational management system encompasses a set of processes and policies that provide organizational management in plans to ensure the fulfillment of the goals that arise from stakeholder demand. In line with ever-increasing requirements of the environment, new management systems are being developed to ensure the fulfillment of the identified goals. Furthermore, for all management systems are developing standards to ensure efficiency of such

systems. ISO organization as the umbrella organization develops a series of standards for management systems certification and some of them are presented in table 1.

The number of organizations that implement certified management systems has grown from 1998 to 2017 by an average of 3.25% (Johnson, Kast, Rosenzweig, 1964). Accordingly, to that fact, there is a need to develop a model of system management integration as well as a model that will enable optimization of it.

Table 1: List of some of the standards that shape the management system

Standard	Management system that certificate
ISO 45001:2018	Health and safety management system
ISO 9001:2015	Quality Management System
ISO 14001:2015	Environmental management system
ISO 50001:2018	Energy management system
ISO 27001:2013	Information security management system
ISO 31001:2018	Risk management system

Source: Author

Increasing the number of standards that organizations can implement in their business as a consequence has the growing challenges of interlinking implemented standards. One way in which to strive to equalize and integrate implemented standards is by using the annex SL (Gueorguiev & Sakakushev, 2016) described in Chapter 4.

Today's organizations create management systems that are in line with the imperative of sustainable growth and development. Accordingly, organizations create environmental management systems and an energy management system that determines ecological sustainability, a health and safety management system that determines social sustainability, a quality management system that determines economic viability, etc. (Almeida, et al., 2014). Implementation of the management system depends on the context of the organization as well as the core process of organization.

The imperative of sustainable development stemming from the scarcity of organization resources and motivates organizations for implementation of standards. That leads to rational use of resources. Sustainability is viewed through three fundamental components, economic, ecological and social component. The economic component implies the achievement of a positive business result. Social sustainability implies inclusion and care for organized employees, while ecological sustainability implies care for the environment (Lele, 1991). The research carried out by Ferreira and Gerolamo (2016) has shown a positive correlation between the standards of management and sustainability, in particular ISO 14001. Norm ISO 9001 does not have a significant impact on sustainability. The relationship between sustainability and ISO 45001, or OHSAS 18001 norms are also discovered (Ferreira & Gerolamo, 2016). However, it should be noted that the research did not cover other standards of the management system.

4. INTEGRATION OF THE MANAGEMENT SYSTEM IN THE ORGANIZATION

Professional and scientific papers emphasized several different concepts of integration. Jørgensen et al. (2006) maintains alignment as a way of adopting standards-based requirements. That creates a system that is based on accountability and resulting in cost reductions. In such system all procedures are contained in the same document. Another way is to integrate all requests in all processes, thus creating a system of quality management focused on employees, customers and continuous improvement of the process (Jørgensen, et al., 2006). However, with the rise in the number of standards governing the management systems and the challenge associated with documenting, modeling and managing the system itself, there is a need for developing new ways

and approaches to integration that combines all process-based management functions (Drljača, 2019). Accordingly, the process approach is imposed as a solution to optimize and create a management system as described in Chapter 6 and due to the process properties that enable the performance measurement that the process develops in predefined points that can be used to measure compliance with the identified requirements of interested parties.

Jørgensen et.al (2006) speaks of three levels of integration in the organization that enhances compatibility with other management systems. Coordinated and coherent integration is genuinely process oriented to tasks in the management system. Last level is a strategic and inherent, which implies the creation of a learning culture, continuous improvement of the process as well as the involvement of interested parties in addressing the challenges of the internal and external environment (Jørgensen, et al., 2006)

Which methodology of organization integration will use depends on its context:

- conversion: involves adding new processes to the existing management system, that are adapted to requirements related to health, safety, environmental protection, etc.,
- merging the System: an organization that has multiple management systems can integrate through merging documentation that describes the requirements,
- system engineering access: it involves designing and upgrading the system to meet the specific requirements set for it. The advantage of this approach is manifested through the creation of a coherent system based on organizational needs and is not strictly determined by the requirements of norms (Čekanová, 2015).

The first professional and scientific papers that talk about integration, the integration of the management system, have looked through three basic aspects: integration of goals, process integration and resource integration. Through later research, these three aspects of integration have been extended to human resources, organizational policies, records control, auditing and assessment (Simon, et al., 2012). The creation of an integrated management system provides a number of benefits that are reflected in higher employee productivity, greater efficiency, greater satisfaction level of stakeholders, increased profitability, improved relationship with suppliers, etc. (Bernardo, et al., 2015) On the other hand, there are a number of challenges and some of them are the lack of specialized auditors, specialized consultants, insufficient number of documents that can be used as a guideline for integration, diversity across standards, etc. (Simon, et al., 2012). Given that one of the requirements of class 9 ISO standards is set by organizations application process approach, this is one of the solutions that can be used for integration i.e optimizing the management system integration.

Given the challenge of a large number of standards that organizations can implement in the management system. But, whit larger number of standards the challenge of integration is also growing, given the fact that the ISO organization does not issue integrated standards, but standards that form individual management systems. But no matter, more than thirty standards are uniform in content whit annex SL, which can greatly facilitate their implementation (Kounis, 2018). Which model of organization management, system integration will depend depends on the needs and context of the organization.

5. MODELS OF SYSTEM MANAGEMENT INTEGRATION

The organization has several different options for the integration of the management system. However, some of the models described serve solely as a framework for creating a norm or a reference that directs the organization to the creation of an integrated management system. Following models for integrating management system standards are most relevant:

- systematic approach: it uses resources that comply with the same goals that are being pursued in order to create mutual compatibility between the management system

- process. It helps in aligning different goals of different management systems. It can appear as an integration based on ISO 14001 or ISO 9001,
- system evolution: it is based on a comprehensive assessment of all management systems as well as the changes through which they have passed and creates a new management system based on estimates of existing management systems. This model is considered the initial integration model,
 - IMS Matrix: Shows overlapping of the various functions that management systems have in the organization. The IMS matrix challenge is different in terms of the compatibility of certain functions that management systems have. On the one hand, the emphasis is on the possibility of a simple integration of the quality management system and the environmental management system,
 - EFQM: a model developed by the European Quality Foundation. Model help organizations define quality management systems as well to improve the process. Defines nine criteria. It should not be seen as a model of integration, but as a reference for the creation of an integrated management system,
 - ISO 72: 2001: A model that defines all common elements that management systems have as well as suggesting rationalizing and creating the order between them. This allows organizations to review, compare and revise standards. In addition, it provides guidelines for establishing and maintaining a management system to ensure compatibility. It should be emphasized that model is not used by organizations to create an integrated management system but is used in standards creation,
 - integration based on process integration: the basic objective is to prepare a common documentation before organization starts with integration. The main goal is to continually improve the process. Initially, common documents are defined, resulting in process integration and partial integration of the process, after which other documentation integrates into the system. It can be used as a complement to the IMS matrix,
 - individual models: PASS 99; come from the United Kingdom, the first true model for integration in the world that meets the requirements set by ISO 72: 2001 and has allowed organizations to implement a system management integration framework. DS 8001; comes from Denmark, helps transition organizations from individual management systems into an integrated management system (Başaran, 2017).

As the number of norms issued by the ISO organization grows, the challenge of their alignment and the challenge of integration is growing. Annex SL is aimed at eliminating differences in the content of a particular standard. The ISO organization with Annex SL defines a form that consists of ten characteristic points that must contain each norm: scope, normative references, terms and definitions, organizational context, leadership, planning, support, leadership, operationalization, performance evaluation and improvement. The organization has significantly fewer challenges it faces because of annex SL which implies much easier implementing and creating of integrate management system (Bsigroup, n.d.) However, despite the advantages offered by the SL Annex, the organization can optimize its management system based on the process approach and its core features.

Despite the development of the SL annex, the large number of standards issued by the ISO organization requires considerable amount of time to harmonize standards. In addition, language-related issues are also encountered in harmonization, but there is an important shift in perception of risk and its perception in the context of decision-making (Bsigroup, 2019).

6. OPTIMIZING THE REQUIREMENTS OF AN INTEGRATED MANAGEMENT SYSTEM USING PROCESS ACCESS

Chapter 2 describes the connection between system theory and process approach, and it has been defined that business processes consist of subprocesses with defined KPIs in which the performance measurement process is being carried out. Without measuring performance, organizations cannot identify whether stakeholder requests are met or not.

Given the fact that there are a large number of interested parties in organizational environments that set different demands of the organization, the organization must create a context based on which it can identify the strength that the interested parties have. Completely meeting all the requirements of the interested parties is not possible and for the organization means the use of a large number of resources. According to system theory, achieving optimum satisfaction will result in maximum so the organization must meet optimum satisfaction of all stakeholders. However, the demands of the interested parties are not the only ones that the organization must take into account. The organization also must identify the requirements that the norms of the management system have (Micek, 2019).

It is necessary to emphasize that the complete fulfillment of the requirements of the management system norms of an organization is not economical since it also requires a large amount of resources as well as it can slow down process cycles. In depending on the organization's core process and the management systems depends the requirements of the norms that the organization must fulfill in its process. Given this fact, it is necessary to optimize the requirements of the integrated management system for which the process approach is an ideal solution due to the decomposition of the process into subprocesses, each of which may have different requirements imposed on it by the norms of the management system. Figure 2 shows a model for optimizing a management system using a process approach.

It is an imperative for an organization to create her context in order to identify the requirements that are placed on the organization. Organizational context is also used for planing in which is defined all the resources that are needed to carry out the process. In addition, the plan also defines control points in which the process will be measured in accordance with the defined plans or not. However, with the identification of compliance with the requirements of stakeholders, the organization in the KPI points identifies compliance with the requirements of the norms. The requirements of the norm that an organization must satisfy depends on the type of process, IE the subprocesses as well as the implemented management systems.

How an organization will define KPI points depends exclusively on its processes, but definitely it is not recommended to define generic KPI points. It should also be emphasized that the organization does not implement this concept exclusively on its core process, but also on support processes, i.e., management processes.

This model of optimizing the requirements of the integrated system eliminates the need to meet requirements that are not related to the context of the process, which may result in a lesser need for unnecessary spending of organizational resources.

The generic model of integrated management system is shown in Figure 3. Shown model is in accordance with the Annex SL in view of the fact that it defines the common content of all ISO norms. In addition, the generic model complies with the PDCA, which enables continuous improvement of the process, which is one of the requirements of a quality management system (Micek, 2019).

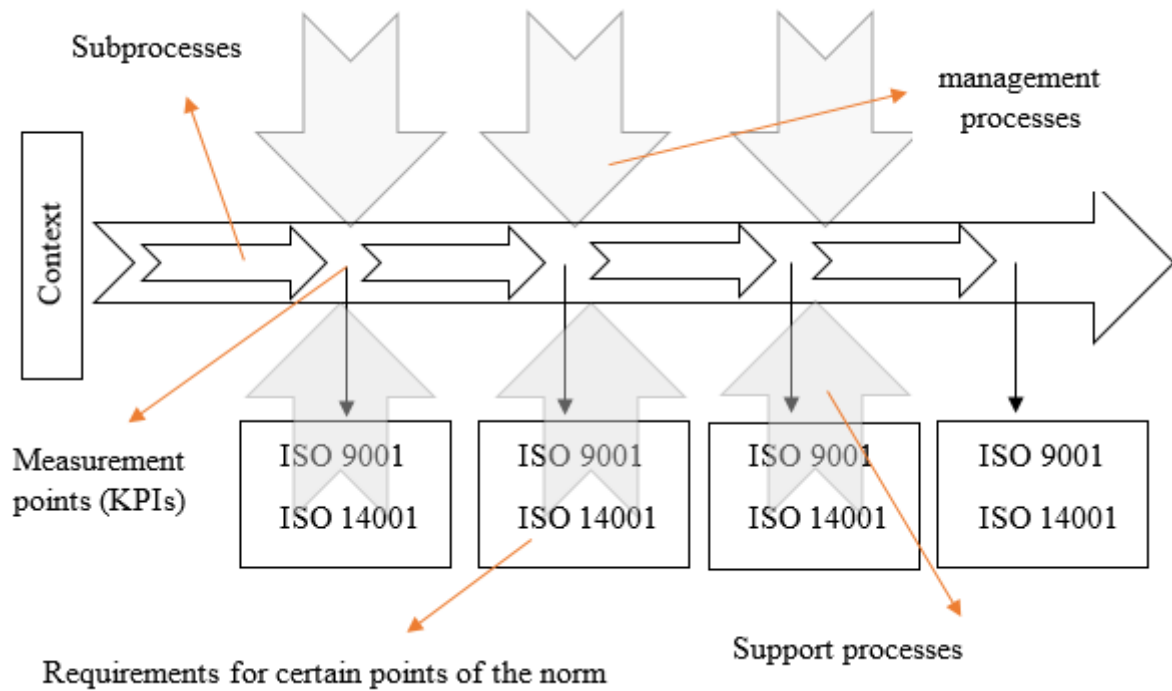


Figure 2: Optimizing Integrated Management System Requirements

Source: Micek, B. 2019. *Optimiziranje integriranog sustava upravljanja pomoću procesnog pristupa – diplomski rad. Sveučilište Sjever. Koprivnica*

The generic model shown in Figure 3. Start of the process requires the creation of an organizational context. This is also the first phase of the PDCA methodology, while the second phase refers to the operationalization or execution of the planned activities. The third phase of the model implies performance control and compliance checks with stakeholder requirements, while the fourth stage involves proposing improvements in accordance with measured process performance (Micek, 2019).

In the third phase, the control phase, it is imperative to measure four process parameters, efficiency, effectiveness, cost-effectiveness and process stability. Any process that is not stable is not efficient due to the fact that there are inconsistencies in the process that result in the need to invest additional resources to eliminate identified non-compliance. Accordingly, spending more resources than the planned amount means that the process is not effective, and the failure to meet targets and spending a larger amount of resources than the planned amount indicates a non-economic process (Buntak, et al., 2016)

Once adopted, the integrated management system needs to be evaluated to determine its maturity. With growth of the maturity of a management system its optimization is at a higher level, which results in better performance of such a system. Table 3 shows an example of possible classification of the maturity of the integrated management system.

The maturity level of an organization's integrated management system depends primarily on the organization's ability to recognize the requirements set for an integrated management system and to implement these requirements in its plans as well as the organization's ability to identify the requirements of all stakeholders and the requirements of the standard itself and optimize them (Micek, 2019).

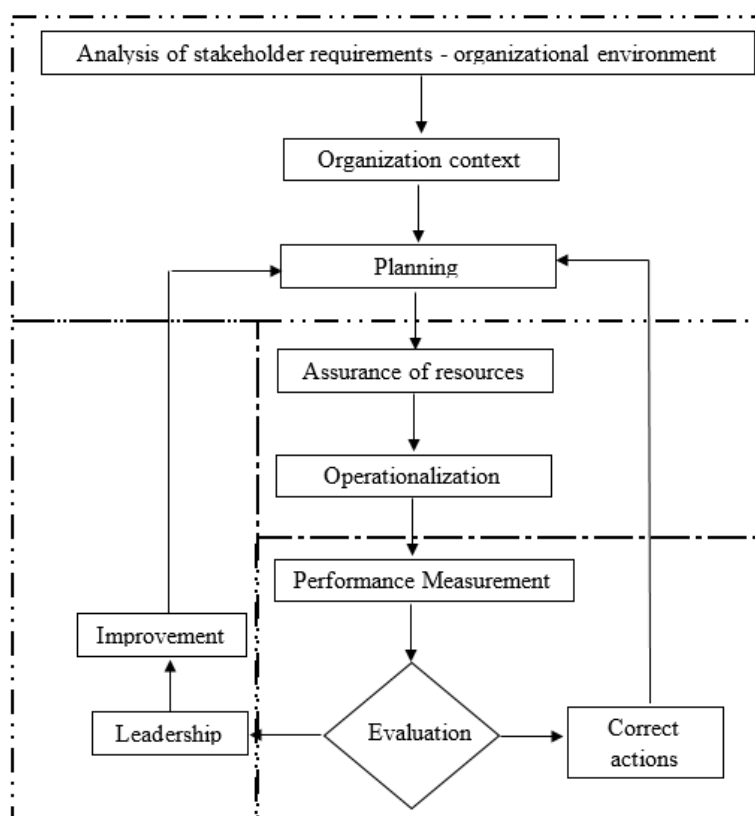


Figure 3: Generic model of integration of management system

Source: Izvor: Micek, B. 2019. *Optimiziranje integriranog sustava upravljanja pomoću procesnog pristupa – diplomski rad. Sveučilište Sjever. Koprivnica.*

Table 1: List of some of the standards that shape the management system

Maturity	Description
0	There is no integrated management system
1	There is an integration of the management system but is not recognized and is not formalized
2	There is an integrated management system that has been recognized and full integration activities have been launched
3	There is an integration of the management system that is recognized and realized through the relevant documentation
4	There is an integration of a management system that is recognized, documented and implemented through processes that take place in the organization
5	There is an integration of the management system in the organization, it is recognized and documented, implemented through the process orientation and amplified in the process structure of the organization

Source: Micek, B. 2019. *Optimiziranje integriranog sustava upravljanja pomoću procesnog pristupa – diplomski rad. Sveučilište Sjever. Koprivnica*

7. CONCLUSION

The research is based on the results of a secondary research that pointed to the lack of an integrated model of the management system as well as its optimization. With the increase in the number of organizations that implement the norms of the management system, there is a growing need for the development of a single framework that will enable the harmonization of all norms. In addition, given the growth of stakeholder demands and the growing and faster changes in organizational

environments, organizations need to develop a model by which the identified requirements will be met, thereby maintaining the existing level of competitiveness but also increasing their potential to develop a new competitive advantage. Different models of management system integration were based on different needs at the time in which they are created. Some of the models, such as EFQM, are viewed exclusively as a guideline to the integration of the management system, but not as a way of creating an integrated management system. However, using the EFQM as a guideline for the development and creation of an integrated management system, the organization strives to develop business excellence, which is the basis of competitiveness. The process approach emphasized as an imperative in the ISO 9001: 2015 standard enables the optimization of the requirements of the integrated management system, which consequently brings in a lesser need for resource use. Optimizing the demand is based exclusively on the process under consideration, or the transformation that takes place in the process. Depending on the context of the organization as well as the context of the process, the implemented management systems and associated standards depend on the requirement of the norm that must be fulfilled in the process, that is, the subprocess which is evaluated using the KPI points. Once integrated management system has been established, it must be evaluated by the maturity of integration for which a scale of 0 to 5 is applied, where 0 is the absence of integration, and 5 is complete integration. Future researchers in this area are advised to test the proposed optimization model for the requirements of an integrated management system in an organization.

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