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ANALYSIS OF IMPLEMENTATION FACTORS OF MANAGEMENT SYSTEMS – CASE OF THE REPUBLIC OF CROATIA

Abstract: *Management systems can serve as a foundation for more efficient and effective organizational management. By certifying their management system, an organization demonstrates its commitment to excellence and focus on meeting interested parties' requirements. However, certification is determined by the decision of the organization's management, which can be influenced by various factors such as the organization's size, the market in which it operates, market opportunities, availability of financial resources, the organization's product portfolio, and more. Therefore, the aim of this research is to identify the factors that influence the management's decision to initiate the certification process and certify the management system. The research was conducted on a sample of 320 business entities registered in the Republic of Croatia. The research instrument was a questionnaire, and the research results can be used to compare different countries in the Western Balkans region or European Union member states.*

Keywords: *management system: certification; ISO standard; regression*

1. Introduction

The implementation of a management system is a strategic decision made by an organization's management and is voluntary, unlike mandatory requirements such as those imposed by legal regulations (Kaur et al., 2021). It is important to note that implementing a management system does not necessarily imply certification. However, if the organization's management decides to pursue certification, it incurs certain financial costs associated with formal certification, maintaining the certificate through regular audits and recertifications, as well as costs related to education, redefining existing processes, and introducing new ones (Fonseca et al., 2017). Despite these costs, implementing and certifying a management system can enhance competitiveness in the market, establish a foundation for continuous process improvement and increase stakeholder satisfaction, particularly that of customers. Over the long term, these factors can lead to increased efficiency and effectiveness due to the imperative of continuous improvement (Kafel & Sikora, 2011). Given this context, the aim of this research is to identify factors that may influence the decision-making process regarding the implementation or certification of management systems.

The article is divided into a total of seven chapters. The first chapter is an introductory chapter describing the context and challenges of management system certification. The second chapter comprises a compilation of existing research in the field of management systems and the authors' perspectives on factors that can influence the implementation and certification of management systems. The third chapter describes the methodology used and the research instrument, while the fourth chapter analyzes research conducted by the ISO organization on the number of certified management systems. The fifth chapter analyzes the obtained results. The sixth chapter is the discussion chapter, and the seventh chapter is the concluding chapter where the limitations of the conducted research are described and recommendations are proposed for future researchers in this or similar fields.

2. Management system

A management system can be defined as a formalized system that defines and documents processes, procedures, and responsibilities to achieve compliance with requirements in an efficient and effective manner (Allassaf et al., 2014). Generally

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speaking, a management system emphasizes the importance of feedback, which serves as the basis for organizational management to make decisions regarding further development and direction. In other words, a management system is based on the PDCA (Plan-Do-Check-Act) cycle, which is supported by the content of management system certification standards. With the introduction of Annex SL, these standards have become standardized and are based on planning, operationalizing objectives, measuring performance, and ultimately taking action to improve (Gueorguiev, 2022).

Key role in every management system is played by the organization's management, which needs to ensure the resources necessary for the smooth functioning of the management system, including infrastructure, superstructure, and competent staff (Kazmi & Naarananoja, 2014). This can have an impact on the existing design of organizational processes, necessitating the redesign of existing processes and the introduction of new ones, which further emphasizes the importance of management and the need for management to define a clear vision and management policy (Silva et al., 2021). Depending on the long-term goals defined in the organization's strategy, management's decision on the implementation or certification of a management system and the type of management system to be implemented and certified may vary. The decision may also involve implementing or certifying two or more management systems, resulting in an integrated management system where integration challenges may arise. It is important to emphasize that the implementation and certification of a management system can significantly change organizational culture, leading to employee resistance, highlighting the importance of management commitment and sponsorship in implementation and certification projects (Priede, 2012).

Although organizations may encounter significant challenges during the implementation and certification phase, implementing and certifying a management system can bring advantages to the organization in terms of (Bravi et al., 2019):

- Enhanced reputation: primarily relates to the possibility of integrating management systems and creating a sustainable integrated management system based on quality management, environmental management, energy management, and occupational health and safety management.
- Performance improvement: due to the need to analyze stakeholder satisfaction, established

KPIs, etc. By identifying areas in processes where resources are being wasted, opportunities for improvement can be identified on one hand, and on the other hand, risks of inefficiency and ineffectiveness can be reduced. Potential performance improvements can be achieved by reducing the risk of future resource wastage and eliminating the causes of resource wastage.

- Increased competitiveness: management system certification can serve as a basis for developing new products based on stakeholder requirements gathered, meeting demands, forming partnerships, increasing business efficiency, etc.

In addition to the key benefits of implementing and certifying a management system, it is important to emphasize the product quality creation cycle philosophy that stems directly from the principles of customer focus and relationship management. The product quality creation cycle can impact the design quality and conformity quality, and when considering the requirements contained in environmental management systems, energy management systems, and occupational health and safety management systems, the sustainability component is highlighted. Therefore, in product design, a different and potentially unconventional approach can be taken, allowing for offering differentiated or diversified products to the market, which can influence the organization's revenue and market positioning.

Ultimately, it is important to highlight the quality of management, which can be enhanced through the implementation and certification of management systems, leading to reduced long-term costs of (non-)quality.

3. Methodology

The conducted research is based on primary and secondary research methods. Primary research was conducted on a sample of 320 organizations from the Republic of Croatia. A random sampling method was used for the research, and the research instrument was a survey divided into two parts. The first part of the survey relates to general organizational data, while the second part of the survey pertains to data on implemented management systems. The survey questions were of multiple-choice type. The obtained research results were refined by excluding incomplete responses and responses that took less than 5 minutes to complete.

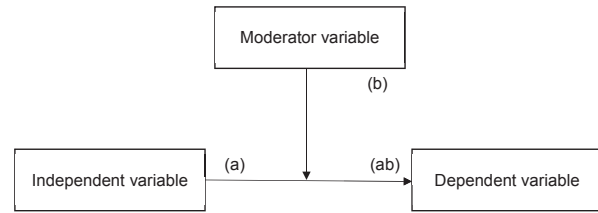
Secondary research is based on annual research results from the ISO organization regarding the number of issued certificates. To analyze the context of the Republic of Croatia (RH) in terms of the number of issued certificates, the obtained results for neighboring countries Serbia, Slovenia, and Bosnia and Herzegovina were considered due to similarities in economies and geopolitical relations at the end of the 20th century.

The data collected from primary research were tested using a linear regression model. Figure 1 illustrates the research model, which utilized moderator variables, as shown in Table 1, to analyze which of the moderator variables influences the certification of management systems.

The obtained research results, including statistical data analysis, are presented in tabular form. Descriptive and synthesis methods were used to evaluate the obtained results. IBM SPSS v.22 software was used for statistical analysis.

Table 1 shows the abbreviations used during the result analysis. To simplify interpretation and facilitate analysis using IBM SPSS v.22, each survey question was assigned an acronym.

The results of the conducted research are presented both in tabular and graphical form. The graphical representation displays the results in relative numbers, while part of it is presented in



Source: The image is the work of the author.

Figure 1. Illustration of the research model

absolute figures. The significance level used was $\alpha = 0.05$.

4. Analysis of issued management system certificates in selected countries

ISO organization conducts annual research on the number of issued management system certificates. The latest available research was conducted in 2022, and the research results are presented in Table 2, which also includes a comparative analysis of the number of issued certificates in Slovenia, Serbia, and Bosnia and Herzegovina.

For a full comparison, it is necessary to consider the number of active business entities during the research period. In 2022, there were approxi-

Table 1. Overview of Abbreviations

Abbreviation	Meaning
BRZAP	Broj zaposlenih (Number of employees)
GPROM	Godišnji promet (Annual turnover)
ZUPA	Županija (County)
SEKT	Sektor (Sector)
STRVL	Vlasništvo nad organizacijom (Ownership of the organization)
PRIH	Godišnji prihod organizacije (Annual revenue of the organization)
KUPC	Dominantni kupci organizacije (Dominant customers of the organization)
STAR	Starost organizacije (Age of the organization)
SUSTUP	Implementirani sustav upravljanja (Implemented management system)

Source: The table is the work of the author.

Table 2. Number of Issued Certificates

Country	Number of Issued Certificates			
	ISO 9001:2015	ISO 14001:2015	ISO 45001:2018	ISO 50001:201
Croatia	2.879	1.337	502	310
Serbia	3.541	1.921	1.469	103
Slovenia	2.178	630	175	41
Bosna and Herzegovina	959	256	110	23

Source: Adapted by the authors from ISO Survey of Certifications to Management System Standards - Full Results

Table 3. Analysis of the Share of Certified Management Systems Relative to the Total Number of Active Business Entities

Country	Number of Issued Certificates			
	ISO 9001:2015	ISO 14001:2015	ISO 45001:2018	ISO 50001:201
Croatia	1,69%	0,79%	0,30%	0,18%
Serbia	1,74%	0,95%	0,72%	0,05%
Slovenia	0,99%	0,27%	0,07%	0,02%
Bosna and Herzegovina	0,87%	0,23%	0,10%	0,02%

Source: The table is the work of the authors.

mately 203,000 active business entities in the Republic of Serbia (RSZ, 2024), approximately 235,000 active business entities in the Republic of Slovenia (AJPES, 2024), and a total of approximately 110,000 active business entities in Bosnia and Herzegovina (BHAS, 2024). During the same period, Croatia had approximately 170,000 active business entities (DZS, 2024). Table 2 shows the analysis of the share of certified management systems relative to the total number of active business entities.

The data from Table 3 indicate that the country with the highest proportion of business entities having certified quality management systems is Serbia (1.74%), followed by Croatia (1.69%). On the other hand, concerning certified environmental management systems, the highest proportion of certificates was issued in Serbia (0.95%), followed by Croatia (0.79%). Furthermore, the highest proportion of issued certificates for health and safety management systems was in Serbia (0.72%), followed by Croatia (0.30%). Regarding issued certificates for energy management systems, the highest number was in Croatia (0.18%), followed by Serbia (0.05%).

The results show that the highest number of certificates issued is for quality management systems, while the number of certificates issued for energy management systems is the least represented. Additionally, there is a difference in the number of issued certificates between Croatia and Slovenia, both of which are European Union member states operating in a common market.

5. Research results

The study included a total of 320 organizations operating in the Republic of Croatia. Out of the total number of organizations that participated in the study:

101 organizations (31.6%) are categorized as micro organizations, 48 organizations (15%) are categorized as small organizations, 86 organiza-

tions (26.9%) are categorized as medium-sized organizations, 84 organizations (26.3%) are categorized as large organizations.

Regarding ownership structure, 10 organizations (3.1%) are fully state-owned, 5 organizations (1.6%) are majority state-owned, 207 organizations (64.7%) are fully privately owned domestic companies, 12 organizations (3.8%) are fully owned by foreign entities, 17 organizations (5.3%) are privately owned with majority domestic ownership, 15 organizations (4.7%) are privately owned, with a majority of foreign ownership.

The majority of organizations, 79 (24.7%), have been operating in the market for 6 to 10 years, while 64 organizations (20%) have been operating for more than 16 years. On the other hand, 60 organizations (18.8%) have been in the market for 11 to 15 years, and 19 organizations (5.9%) have been in the market for less than two years.

Out of the total number of organizations, 132 organizations (41.3%) engage in business-to-business transactions, 134 organizations (41.9%) engage in business-to-consumer transactions.

Regarding revenue generated in the fiscal year 2023, 98 organizations (30.6%) had revenue of less than 265.000 EUR, 83 organizations (25.9%) had revenue greater than 1.320.000 and less than 6.630.000 EUR, 53 organizations (16.6%) had revenue between 265.000 and 1.320.000 EUR, 85 organizations (26.6%) had revenue greater than 6.630.000 EUR.

The largest number of organizations, 44 (13.8%), are engaged in retail and wholesale trade, followed by organizations categorized in the accommodation and food service activities sector, 31 (9.7%), and organizations in the manufacturing sector, 26 (8.1%). The least represented organizations in the study are categorized in the Public administration and defense sector, 2 (0.6%), followed by organizations in the education sector, 5 (1.6%), and organizations in the real estate business sector, 8 (2.5%).

These are the general findings from the research study conducted among 320 organizations in Croatia, providing insights into their categorization, ownership structure, market presence, business transactions, and revenue distribution across different sectors.

5.1 Analysis of certified management systems

Table 4 provides an overview of the certified management systems implemented by organizations participating in the study. The results indicate that the quality management system is the most commonly implemented management system in Croatia (29.7%), followed by the health and safety management system (24%) and information security management system (23%). However, it should be noted that the majority of organizations do not have any implemented management system, accounting for 106 organizations (33.1%).

This analysis presents the prevalence of different certified management systems among organizations in Croatia, highlighting the most commonly

Table 4. Overview of Implemented Management Systems

Implemented Management System	Number of Organizations	Percentage of Organizations with Implemented System
ISO 14001:2015	12	3.8%
ISO 27001:2022	23	7.2%
ISO 45000:2018	24	7.5%
ISO 50001:2018	4	1.3%
ISO 9001:2015	95	29.7%
None Implemented	106	33.1%

Source: The table is the work of the authors.

implemented systems and the significant portion of organizations without any certified system.

Table 5 provides an overview of the number of implemented management systems by sectors. The largest proportion of organizations that have implemented a management system (6% of them) are categorized in the sector of professional, scientific, and technical activities, while the smallest

Table 5. Overview of Implemented Management Systems by Sectors

Sector / Implemented Management System	ISO 14001:2015	ISO 27001:2022	ISO 45000:2018	ISO 50001:2018	ISO 9001:2015	No Management System
Agriculture, forestry and fishing	1	0	0	0	8	7
Mining and quarrying	0	0	0	0	1	1
Manufacturing	1	1	2	1	13	8
Electricity, gas, steam and air conditioning supply	1	0	2	0	0	1
Water supply	0	0	0	0	0	0
Construction	0	2	4	1	3	11
Wholesale and retail trade	0	0	0	0	0	0
Transportation and storage	0	2	1	1	1	10
Accommodation and food service activities	3	2	4	0	15	7
Information and communication	1	6	0	0	10	11
Financial and insurance activities	0	2	0	0	8	2
Real estate activities	0	2	0	1	1	4
Professional, scientific and technical activities	3	4	0	0	19	4
Administrative and support service activities	0	0	1	0	6	5
Public administration and defense	0	0	0	0	0	0
Education	0	0	0	0	0	5
Human health and social work activities	0	2	7	0	3	0
Arts, entertainment and recreation	1	0	2	0	3	8
Other service activities	1	0	1	0	4	22

Source: The table is the work of the authors.

proportion of organizations with implemented quality management systems is found in the sectors of electricity, gas, steam, and air conditioning supply, water supply, wholesale and retail trade, and finally the education sector.

The highest number of organizations that do not have any implemented management system are categorized in other service activities, with 22 organizations (6.87%), followed by organizations from the construction sector, with 11 organizations (3.43%), and the transportation and storage sector, with 10 organizations (3.12%).

5.2 Factors influencing the decision on management system certification

This table presents the results of testing the adequacy of the model used. The coefficient of determination (R^2) for the model is 0.607, indicating that the results cover 60.7% of the variance of the moderator variable. The significance of the model (p) is 0.000.

Table 6. Model Adequacy Overview

R	R ²	Adjusted R ²	p
0.779	0.607	60.7	0.000

Source: Table created by the authors.

The results in Table 7 show the analysis of factors influencing the decision to certify management systems. Ownership is highlighted as the factor with the greatest impact on decision-making. In other words, ownership is one of the significant factors influencing management's decision to certify the implemented management system ($\beta=0.479$; $\alpha=0.000$).

Further examining the ownership structure and certification decision, out of the total number

of organizations shows that: 122 organizations (38.12%) in partial or full domestic ownership have certified management systems, 28 organizations (8.75%) in partial or full foreign ownership have certified management systems, 11 organizations (3.43%) in state ownership have certified management systems.

Additionally, customers or the market are identified as another significant factor influencing organizational management to decide on management system certification ($\beta=0.347$; $\alpha=0.000$).

Out of the total number of organizations, 89 (27.81%) have a certified management system and operate with legal entities, while 70 organizations (21.87%) exclusively operate with natural persons and have a certified management system.

Other examined factors do not significantly impact the decision to certify management systems.

Analyzing the certified management systems, organizations in partial or full domestic ownership have the following certifications: 71 organizations (58.19%) have a certified quality management system according to ISO 9001:2015, 4 organizations (3%) have a certified energy management system according to ISO 50001, 17 organizations (14.16%) have a certified health and safety management system, 18 organizations (15%) have a certified information security management system, 11 organizations (9.16%) have a certified environmental management system.

On the other hand, organizations in partial or full foreign ownership predominantly have certified quality management systems: 23 organizations (85.15%) have certified quality management systems, 4 organizations (15.18%) have certified information security management systems.

Examining the market with which organizations collaborate: 59.55% of organizations (53) with a certified quality management system collaborate

Table 7. Analysis of Factors Influencing Management Decision on Certification of Management Systems

Variable	B	σ	Beta	t	α
BRZAP	0.235	0.125	0.120	1.880	0.061
GPROM	-0.262	0.155	-0.108	-1.688	0.092
ZUPA	0.007	0.017	0.015	0.397	0.692
SEKT	-0.036	0.022	-0.064	-1.588	0.113
STRVL	0.760	0.093	0.479	8.176	0.000
PRIH	-0.184	0.151	-0.060	-1.217	0.225
KUPC	1.371	0.191	0.347	7.179	0.000
STAR	0.064	0.084	0.039	0.763	0.446

Source: Table created by the authors.



with business entities, 2.24% of organizations (2) with a certified energy management system collaborate with business entities.

Among organizations collaborating with private individuals: 60.00% (42) have a certified quality management system, 2.85% (2) have a certified energy management system, 22.85% (16) have a certified health and safety management system, 7.14% (5) have a certified information security management system, 7.14% (5) have a certified environmental management system.

It's important to note that all organizations in foreign ownership have certified management systems, while 54.46% (122 out of 224) of organizations in majority or full domestic ownership have certified management systems.

6. Discussion

Through the conducted research, it was identified that in Croatia, the majority of organizations with implemented and certified management systems are domestically owned, while a smaller portion is foreign-owned. These results should be viewed in the context of the number of organizations in Croatia that are under foreign ownership compared to those under domestic ownership. In this context, it's notable that 95% of organizations under foreign ownership have certified management systems, indicating a developed awareness among foreign owners regarding the importance of management system certification. On the other hand, 41% of domestically owned organizations included in the study have certified management systems. Additionally, a higher proportion of organizations with certified management systems collaborate with businesses than those collaborating with individuals.

The results of the research can be interpreted not only in terms of the potential lack of awareness about the importance and benefits of management system certification but also in terms of the lack of financial resources for certification implementation. However, considering that Croatia had 24 certification bodies as of 2020, the lack of consultants and certification bodies cannot be a reason for the obtained results.

Despite challenges related to certification issuance, the results indicate that customer orientation and meeting customer requirements are factors influencing organizational management's decision to certify management systems,

which is of utmost importance. The fundamental reason for this is the premise that organizations exist and operate because of customers or interested parties and meeting their demands. Consequently, conditions are created to analyze customer satisfaction and other interested parties to design products or services that align with market demands, leading to a favorable impact on business outcomes. Differentiation and diversification are potential foundations for creating greater value for customers and distinguishing oneself from competitors in a shared market. This stance is supported by the results of this research, as organizations operating within the European Union have a higher proportion of obtained management system certifications, which require demonstrating a focus on customers and meeting their defined requirements, among other criteria.

7. Conclusion

The research conducted on a sample of organizations in the Republic of Croatia has indicated that ownership and the market segment, specifically customers, are two factors influencing the management's decision to certify management systems. On the other hand, the secondary research revealed that organizations operating within the European Union's common market have a higher number of management system certifications compared to those that do not operate within such a framework.

This research can serve as a basis for future researchers in this field to conduct similar studies in European Union countries, particularly in the Western Balkan countries, aimed at identifying factors that may influence certification decisions. Furthermore, it is recommended to incorporate other management system certifications into such research to obtain a broader context and understand which factors influence the decision to implement specific management systems.

The conducted research is limited by the availability of data on issued management system certifications in 2023, as this data is not yet accessible. In other words, the analysis was conducted based on factors influencing certification decisions in 2023, which may not be the case in 2022. However, despite this limitation, the obtained results can be considered relevant due to the research's representativeness for the territory of the Republic of Croatia.

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