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## Article

Exploring the Impact of ISO 9001, ISO 14001 and OHSAS 18001 Certification on Financial Performance: The Case of Companies listed on the Bucharest Stock Exchange

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EXPLORING THE IMPACT OF ISO 9001, ISO 14001 AND OHSAS 18001 CERTIFICATION ON FINANCIAL PERFORMANCE: THE CASE OF COMPANIES LISTED ON THE BUCHAREST STOCK EXCHANGE

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**Abstract**

The purpose of this paper is to investigate the impact of ISO 9001, ISO 14001 and OHSAS 18001 certification on the financial performance of Romanian companies listed on the Bucharest Stock Exchange (BSE). Based on audited financial statements of a population of 67 non-financial companies listed during 2013-2015 and using regression models, this paper shows, for the first time in Romania, that companies listed on BSE, implementing complex management systems (quality – environmental and/or occupational health and safety) perform better, and that their performance is directly linked to the complexity of the management systems implemented.

**Keywords:** ISO 9001, ISO 14001, OHSAS 18001, quality management, environmental management, occupational health and safety management, financial performance

**JEL Classification:** D29, L25, M19, M41

**Introduction**

To meet the quality needs of customers, as well as various environmental and labour safety requirements, in recent years, the implementation and certification of Quality Management Systems (QMS), Environmental Management Systems (EMS) and Occupational Health and Safety Management Systems: OHSMS have become a priority for organizations. Nevertheless, the continuous growth of these management systems certification in Romania suggests companies’ expectations regarding business excellence and achieving benefits that enable sustainable development.

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Implementing and certifying quality management systems and, successively, improving them by adding environmental and occupational safety components is presumed to allow for risks minimization and benefits increase, enhancing the effectiveness of processes and resource efficiency, which ultimately lead to an increase in financial performance. For the Romanian environment, the potential relationship between management systems certification and corporate performance has not yet been investigated. Most of the studies in the field focus on increasing competitiveness and customer satisfaction, and mainly target small and medium-sized Romanian enterprises. This paper aims to fill the void in the literature by analysing the impact of ISO 9001, ISO 14001 and OHSAS 18001 certification on the financial performance of companies listed on the Bucharest Stock Exchange (BSE).

A quality management system is a means to define how an organization can meet the requirements of its customers and other stakeholders of its activities (IOS, 2015a). Although there are different ways to improve a quality management system, organizations increasingly resort to quality certifications based on ISO 9001 "Quality Management Systems".

First published in 1987, ISO 9001, with the last version issued in 2015, has become a standard for certifying quality management systems recognized throughout the world (Corbett, 2006). Thus, by the end of 2015, there were 1,033,936 ISO 9001 certifications issued worldwide (IOS, 2015b).

ISO 9001 presents a set of fundamental elements that allow an organization to demonstrate its ability to provide products and services that satisfy customers' needs and meet legal requirements. Implementing and certifying a quality management system based on ISO 9001 can be associated with a number of internal benefits – improved quality, productivity and efficiency, as well as with external ones – access to new markets, increase market share and sales, which, ultimately, could lead to an increase in financial performance. There are numerous empirical research studies showing that ISO 9001 certification attracts a number of benefits including increased corporate financial performance (Corbett et al., 2005; Häversjö, 2000; Heras et al., 2002).

In 1996, the International Organization for Standardization (ISO) published ISO 14001 "Environmental Management Systems", the most important standard in the series of standards dedicated to environmental issues. The purpose of ISO 14001 was to reduce the impact of organizations' operations on the environment, but also to facilitate sustainable development and international trade, by introducing a system of standardisation recognized globally. Although certification of environmental management systems based on this standard is voluntary, the number of ISO 14001 certifications issued worldwide by the end of 2015 rises up to 319,324 (IOS 2015b).

By means of ISO 14001 certification, organizations convey to different stakeholders a signal about the responsibilities that they assume on the quality of their environmental management system (Jiang and Bansal, 2003). By projecting an image associated with care for the environment, entities hope to improve their competitiveness (Molina-Azorin et al., 2015) and financial performance by increasing productivity and reducing costs (Ullah et al., 2014).

At the international level, there is also awareness of the need for implementing and certifying management systems that would ensure a healthy and safe working environment. Issued in 1999 by the British Standards Institution (BSI), after ISO 9001 and ISO 14001,

OHSAS 18001 "Occupational Health and Safety Management Systems" has become the most common standard used for evaluating management processes related to organizations' occupational health and safety.

Implementing and certifying management systems in compliance with OHSAS 18001 enables organizations to improve their image, but also helps them to assess risks, ensure the health of employees and reduce accidents, which are expected to have a positive impact on business performance.

The three management systems (quality, environmental and occupational health and safety) can operate separately or in an integrated manner (Pardy and Andrews, 2009), within an *Integrated Management System (IMS)*. Regardless of the method chosen, adding environmental as well as health and occupational safety components to quality management systems is presumed to improve companies' operations by means of cost reductions from eliminating waste of energy and water and avoiding personnel accidents, which can ultimately lead to increased business performance.

However, the operation of three separate management systems proved to be more difficult and harder to align with the organization's strategy, due to duplication of efforts related to documentation, execution of procedures, or verification and control (Zeng et al., 2007).

Benefits can be more obvious in the case of implementing an integrated management system. In the literature, integration of management systems is associated with reducing bureaucracy (Jorgensen et al., 2005; Oliveira, 2013) and documentation (Simon et al., 2011), costs decrease (Asif et al., 2009; Oliveira, 2013), better utilization of human, technical and financial resources (Zutshi and Sohal, 2005; Abad et al., 2014), and improved efficiency, better internal communication and organizational reputation (Zeng et al., 2007).

Romanian companies, in order to be competitive on the market, to cope with changes and developments in technology and to meet the needs and expectations of customers are forced (sooner or later) to implement quality management systems but also environmental and health and occupational safety management systems and to assume certain social responsibilities. In other words, they must obtain certifications of different types (national, European and international) the most commonly used being ISO 9001, ISO 14001 and OHSAS 18001. In addition, certain sectors may use specific standards for those particular industry requirements.

The evolution of certifications obtained by Romania companies in the past 10 years for quality management – ISO 9001 and environmental management – ISO 14001 systems is shown in Figure no. 1.

Except for 2011, the upward trend of the number of certifications issued for Romanian companies from year to year can easily be observed. It is a first sign suggesting that obtaining various types of ISO Certifications has become a concern for companies that understand the need to improve continuously their activities and processes, consider customer needs, and become more transparent in environmental and social matters to meet multiple requirements.

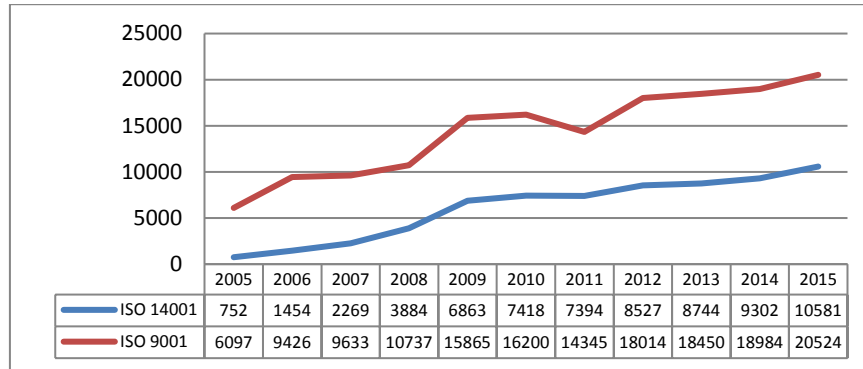


Figure no. 1. The evolution of ISO 9001 and ISO 14001 certifications in Romania

The paper is structured as follows. Section 1 presents the literature review, which highlights the relationship between management systems' certification and corporate financial performance. Section 2 describes the research methodology, indicating the targeted population, the proposed hypotheses and econometric models. Section 3 presents the research results, whereas the concluding section discusses them in the context of similar international research, highlighting original contributions of the study, as well as its limitations and potential for future research.

## 1. Literature review

There is abundant literature that explores the relationship between certification of management systems and companies' performance. The concept of "*performance*" applied in the management of companies is rather vague, as performance is defined in various ways, depending on the level of decision-making, organizational structure, or field of activity. In addition, measures of companies' performance can be expressed in financial or non-financial indicators. However, granting the polysemy of the concept of performance, evaluating companies' management primarily involves indicators that are linked to financial performance, which may come in the form of *profit* and *cash flows*, or other financial indicators derived from them.

Corporate *financial performance* is measured based on data from financial statements – balance sheet, income statement, statement of cash flows, etc., but can also refer to market data (e.g. market value of the shares), and can be defined by a variety of indicators (Benner and Veloso, 2008; Martinez-Costa et al., 2009), such as turnover (sales), return on assets (ROA), return on sales (ROS), return on equity (ROE), earnings per share (EPS), earnings before interest, taxes depreciation and amortization: (EBITDA), etc.

The relationship between quality management and corporate financial performance has been documented empirically by many authors, especially since 2000 (e.g. Heras et al., 2002; Sharma, 2005; Morris, 2006; Benner and Veloso, 2008), yet results are (sometimes) different or even contradictory.

Heras et al. (2002) conducted a comparative study which analysed the relationship between companies' profitability and ISO 9000 certification based on two equally numbered samples of companies (from the Autonomous Basque Community, Spain) for a period of five years, one sample of companies featuring ISO 9000 certification, and one sample including non-certified entities. Using return on assets (ROA) as a profitability indicator, computed as the ratio between earnings before interest and taxes (EBIT) and total assets, and the date of ISO 9000 certification, Heras et al. (2002) concluded that ISO 9000 certified companies are more profitable than non-certified ones, confirming the supposition that ISO 9000 certification is a growth driver for profitability.

Sharma (2005) analyzed the impact of ISO 9000 certification on the financial performance of 70 listed companies in Singapore, using as indicators of financial performance: return on sales (determined as the ratio between earnings before interest, taxes and extraordinary items and net sales), the increase in net sales and earnings per share (the ratio of operating profit after tax and the number of ordinary shares issued). The results of Sharma (2005) showed that ISO 9000 certification is associated with improved financial performance of certified companies by significantly increasing the return on sales (ROS), sales and earnings per share (EPS), and proving to be beneficial for the company and its stakeholders. Furthermore, Sharma (2005) observes that the effect of ISO 9000 certification was more important for return on sales than for sales growth, which suggests that enhancing the overall performance of a company is induced largely by improving internal processes due to the implementation and certification of a quality management system.

Benner and Veloso (2008) conducted a study on the relationship between quality management systems represented by ISO 9000 certification and corporate financial performance, based on American automobile dealers which included a representative sample of 75 companies, listed and registered in the US for a period of 10 years, a period that covers a full economic cycle in this industry. Benner and Veloso (2008) have used several indicators to measure the financial performance of companies – two accounting indicators (ROA and ROS) and one based on market values (Tobin's Q), and their results showed that if the majority of the firms within an industry adopts ISO 9000, later adopters no longer obtain a lasting growth of financial benefits out of this practice. The same authors also showed that ISO 9000 certification has a significant impact on the financial performance of companies – measured by Tobin'Q and ROA (but not ROS), showing that the value of market capitalization of the certified companies tends to grow steadily once ISO 9000 certification is obtained, which is explained by the fact that investors expect higher growth in future profits for companies that have adopted ISO 9000 than from those that have not adopted the standard.

However, not all studies concluded that ISO 9000 certification improve companies' financial performance. Morris (2006) falls within this category, analyzing the relationship between ISO 9000 certification and financial performance of companies in the American electronics industry – the industry with the most numerous ISO 9000 certifications in the US, using the operating profit before depreciation for measuring profitability. The results obtained by Morris (2006) did not support the hypothesis that ISO 9000 certification leads to superior financial performance, which is explained by the fact that companies may pursue ISO 9000 certification for other purposes than farming quality or financial

performance, such as aspirations for international sales, competitive pressures or customers' requirements.

Corbett et al. (2005) found that, after obtaining quality certification, companies had an outgrowth in financial performance, expressed by several indicators including: return on assets, return on sales and turnover growth, compared to other similar companies that were not certified.

A greater increase in profitability for certified companies, compared to uncertified ones, has also been identified in Denmark (Häversjö, 2000). In turn, Duarte et al. (2011), after analyzing the association between several independent variables, including ISO 9001 certification and financial performance for a sample of 3,589 Brazilian companies from different industries, noted that ISO 9001 certification did not affect profitability. However, they identified a causal relationship between quality and environmental management systems certification and revenue growth.

Starke et al. (2012) analyzed the impact of ISO 9000 certification for Brazilian companies during 1995-2006, indicating a positive effect on financial performance measured in terms of sales growth and return on sales (ROS). Fatima (2014), based on a sample of 58 Pakistani companies listed on Karachi Stock Exchange, showed that ISO 9000 certification had an overall favourable impact on companies' financial performance, although the effect was not felt for small companies.

In turn, Kafetzopoulos et al. (2015), after studying a sample of 287 Greek companies, concluded that ISO 9001 certification does not directly influence business performance, including financial performance, but has an indirect effect by increasing manufacturing quality and operating performance.

While the literature investigating the relationship between ISO 9001 certification and financial performance is quite abundant, the one exploring the effects of certifying environmental and/or occupational health and safety management systems is in its formation phase.

Thus, Hwee Nga (2009), based on a sample of 81 companies listed on Bursa Malaysia during 2005-2007, showed that ISO 14000 certified companies have average returns on equity (ROE) superior to those of uncertified entities, and argued for the need of future research that would capture the impact of the interaction of ISO 9000 and ISO 14000 certifications on companies' performance. Grolleau, Mzoughi and Pekovic (2013) analyzed the performance of French companies that have implemented quality and environmental management systems, showing that the simultaneous implementation of the two management systems may have a possible synergistic effect that generates higher levels for sales, profit and EBITDA. Instead, for Spanish companies, Heras-Saizarbitoria, Molina-Azorín and Dick (2011) showed that ISO 14001 certification has not resulted in improved financial performance.

Lo et al. (2014), using a sample of 111 companies listed in US and having OHSAS 18001 certification, showed that the implementation of a management system for occupational health and safety led to a significant increase in performance over the expected level (abnormal performance), expressed also in terms of sales growth and profitability.

Integration of quality, environmental and occupational health and safety management systems has been associated with improving the efficiency of an organization (Zeng et al., 2007).

For the Romanian environment, there is no research to date exploring the impact of implementing various management systems on financial performance. As regards the benefits of implementing and certifying management systems, the vast majority of studies focused on increasing competitiveness and customer satisfaction, the targeted companies being small and medium-sized entities (Olaru et al., 2010; Olaru et al. 2011). In the broader context of social responsibility, Miron et al. (2011) discuss the relationship between economic and social performance, suggesting a biunivocal relationship, in the sense that economic performance offers the possibility of assuming social responsibilities, with a negative impact on it on the short-term, effect which will be offset by social performance, that will ensure sustainability for economic performance and competitiveness in the long term.

This paper aims to complement the literature, by providing the first empirical evidence for large companies, listed on BSE and featuring audited financial statements, investigating the impact of ISO 9001, ISO 14001 and OHSAS 18001 certification on their financial performance.

**2. Research methodology**

The population of the study is represented by all the companies listed on BSE in the last three years (2013-2015) on both the Premium and Standard tiers, that is 82 companies (22 listed on the Premium category and 60 on Standard). As ISO and OHSAS certification has not been a concern for the financial sector until recently, companies operating in this area were excluded, resulting a total of 67 companies. In the absence of publicly accessible databases, the source data for ISO 9001, ISO 14001 and OHSAS 18001 certifications were the websites of listed companies (reports and copies of certificates) and the BSE website (management reports). The authors performed cross-checks to ensure data accuracy. The evolution of management systems certifications for listed Romanian companies for the period under review (2013-2015) is summarized in Table no. 1.

**Table no. 1. Certification of management systems of listed companies**

	<b>N</b>	<b>ISO 9001</b>		<b>ISO 14001</b>		<b>OHSAS 18001</b>	
2013	67	60	89.6%	46	68.7%	35	52.2%
2014	67	61	91%	47	70.1%	38	56.7%
2015	67	62	92.5%	50	74.6%	39	58.2%

As shown in Table 1, listed Romanian companies are greatly interested in implementing and certifying multiple management systems, a large majority (74.6% in 2015) featuring quality-environmental systems, and over half (58.2% in the last year): having quality-environmental-occupational health and safety management systems. Almost all non-financial listed companies (92% in 2015) implemented a quality management system, certified ISO 9001, and the trend of obtaining new certifications in the analyzed period is evident. This confirms the idea that companies that have already implemented a quality management system want to introduce other management systems, enabling them to



minimize risks and strengthen benefits, increasing the effectiveness of processes and resource efficiency, which ultimately could lead to an increase in their performance. Analyzing the data collected, we found that the majority of Romanian listed companies initially obtained ISO 9001 certification, and later on, successively, obtained ISO 14001 and OHSAS 18001 certifications. We also noticed that companies that have later resorted to implementing and certifying a quality management system based on ISO 9001 opted to simultaneously implement it with ISO 14001 or with both ISO 14001 and OHSAS 18001.

Data sources did not allow for establishing in every case the extent to which certified management systems operate separately or within an integrated management system (IMS).

Given that each of the three certifications is presumed to have a positive impact on the performance of the companies, the paper aims to investigate the extent to which the simultaneous functioning of multiple certified management systems can increase the financial performance of companies listed on BSE, the paper's hypothesis being the following:

- *H1: Financial performance is higher for listed Romanian companies implementing and certifying multiple management systems (ISO 9001, ISO 14001 and OHSAS 18001).*
- *H2: Financial performance of Romanian listed companies is directly proportional to the complexity of the management systems implemented and certified.*

To assess the financial performance of listed companies, we have opted for return on assets (ROA: net profit divided by total assets), one of the key performance indicators, which capture the efficiency of assets in producing profits. The source of financial data was Thompson Financials database. Financial data was not available for seven companies, which reduced the population studied to 60 entities.

The two hypotheses were tested based on the following two regression models:

$$ROA_{ij} = \alpha_0 + \alpha_1 xMS_{ij} + \varepsilon_{ij} \quad (1)$$

$$ROA_{ij} = \alpha_0 + \alpha_1 xMSscore_{ij} + \varepsilon_{ij} \quad (2)$$

Where:

$ROA_{ij}$  – Return on assets for company  $i$  in the year  $j$ , computed as

$$Net\ Income_{ij} / Total\ assets_{ij};$$

$MS_{ij}$  – Certified management systems for company  $i$  in the year  $j$ ,

*Dummy: 1 – Company with multiple management systems certifications (quality-environmental or quality-environmental-occupational health and safety).*

*0 – Company with only quality management system certification or without any of the three certifications investigated;*

$MSscore_{ij}$  – Management system score for company  $i$  in year  $j$ :

*3 – ISO9001, ISO14001 and OHSAS 18001 certifications;*

*2 – ISO9001 and ISO14001 certifications;*

1 – ISO9001 certification;

0- None of the three certifications investigated.

**3. Research results**

Table no. 2 summarizes the results of the regression analysis for the two models for each of the three years. As shown below, in none of the cases, the coefficient  $\alpha_1$  is significantly different from zero, indicating no link between the characteristics of the management systems implemented and certified by listed companies and their performance, and, consequently, suggesting the rejection of the two hypotheses of the study.

**Table no. 2. Regression results – whole population**

<i>Model (1)</i>	<b>2013</b>	<b>2014</b>	<b>2015</b>
$\alpha_0$	-.002 (-.062)	.004 (.149)	-.093 (-.778)
$\alpha_1$	-.017 (-.456)	.005 (.168)	.168 (1.246)
F	.208	.028	1.553
R <sup>2</sup>	0.004	.000	.026
Durbin Watson	1.787	1.751	2.705
N	60	60	60
<i>Model (2)</i>	<b>2013</b>	<b>2014</b>	<b>2015</b>
$\alpha_0$	-.019 (-.483)	-.011 (-.322)	-.072 (-.469)
$\alpha_1$	.002 (.141)	.008 (.601)	.047 (.778)
F	0.02	.361	.606
R <sup>2</sup>	.0003	.006	.010
Durbin Watson	1.832	1.770	2.725
N	60	60	60

*Significance level: \*\*\*0.01, \*\*0.05, \*0.1*  
*Model (1):  $ROA_{ij} = \alpha_0 + \alpha_1 x MS_{ij} + \epsilon_{ij}$*   
*Model (2):  $ROA_{ij} = \alpha_0 + \alpha_1 x MSscore_{ij} + \epsilon_{ij}$*   
 Where:  
 $ROA_{ij}$  = Return on assets for company  $i$  in the year  $j$ ;  
 $MS_{ij}$  = Certified management systems, *Dummy*: 1-company with multiple management systems certifications, 0 – Company with only quality management system certification or without any of the three certifications investigated;  
 $MSscore_{ij}$  = Management system score for company  $i$  in year  $j$ : 3 – ISO9001, ISO14001 and OHSAS 18001 certifications; 2 – ISO9001 and ISO14001 certifications; 1 – ISO9001 certification; 0-None of the three certifications.  
*Tests for detecting autocorrelation in residuals performed. Durbin Watson values within normal parameters.*

The lack of significant correlations persists even after outliers' removal. However, following their analysis, it was observed that most outliers come from companies featuring losses. In the literature (Kothari, 2001), losses are considered transient components of companies' earnings, which contradict the assumption that annual earnings are normally distributed, losses distorting analysis, especially in the capital markets field, often being excluded from investigations (Philip and Raffournier, 2010). In our case, we also bear in mind that losses, as transient elements, can be caused by exogenous events related to the business environment, without being associated with entities' management (Kothari, 2001). In addition, in the case of listed companies that incur losses, the "big bath accounting" phenomenon was reported to

occur, that is, an overstatement of these losses, as performance targets have already been missed, and such exaggerations relieve future profits of a series of expenses, enabling companies to look more profitable in the future. Consequently, this phenomenon deprives the amounts recorded as losses of their economic content.

In these circumstances, companies that incurred losses during the period analysed were eliminated, and the hypothesis were tested again based on the sample of companies featuring positive returns. Regression results are summarized in Table no. 3.

**Table no. 3. Regression results – only positive ROAs**

<i>Model (1)</i>	<b>2013</b>	<b>2014</b>	<b>2015</b>
$\alpha_0$	.012 (.994)	2.713 (2.419)	.026 * (1.964)
$\alpha_1$	.032 * (.323)	2.908 ** (2.290)	.027* (1.805)
F	5.395 **	5.245 **	3.258 *
R <sup>2</sup>	.124	.119	.081
Durbin Watson	2.327	1.855	2.356
N	40	41	39
<i>Model (2)</i>	<b>2013</b>	<b>2014</b>	<b>2015</b>
$\alpha_0$	.003 (.194)	1.581 (1.112)	.018 (1.075)
$\alpha_1$	.015 ** (2.535)	1.423 ** (2.567)	.012 * (1.898)
F	6.424 **	6.589 **	3.601 *
R <sup>2</sup>	.145	.145	.087
Durbin Watson	2.379	1.974	2.381
N	40	41	40
<p><i>Significance level: ***0.01, **0.05, *0.1</i></p> <p><i>Model (1): <math>ROA_{ij} = \alpha_0 + \alpha_1 x MS_{ij} + \varepsilon_{ij}</math></i></p> <p><i>Model (2): <math>ROA_{ij} = \alpha_0 + \alpha_1 x MSscore_{ij} + \varepsilon_{ij}</math></i></p> <p>Where:</p> <p><math>ROA_{ij}</math> = Return on assets for company <i>i</i> in the year <i>j</i>;</p> <p><math>MS_{ij}</math> = Certified management systems, <i>Dummy</i>: 1-company with multiple management systems certifications, 0 – Company with only quality management system certification or without any of the three certifications investigated;</p> <p><math>MSscore_{ij}</math> = Management system score for company <i>i</i> in year <i>j</i>: 3 – ISO9001, ISO14001 and OHSAS 18001 certifications; 2 – ISO9001 and ISO14001 certifications; 1 – ISO9001 certification; 0-None of the three certifications.</p> <p><i>Tests for detecting autocorrelation in residuals performed. Durbin Watson values within normal parameters. Results after outliers' removal.</i></p>			

With the elimination of losses, there is a clear improvement of regression models. Significant increases in the explanatory power for the period under consideration are observed (R<sup>2</sup> increases from an average of 1% to 11% for model 1, and from an average of 0.5% to 13% for model 2), and coefficient  $\alpha_1$  is positive and significantly different from 0, in all cases, indicating a direct relationship between the characteristics of the management system implemented by the listed companies and their performance. Therefore, the two hypotheses are accepted, *i.e.* there is empirical evidence supporting a possible association between multiple management systems certifications and financial performance of Romanian listed companies, and also a directly proportional increase of their performance with the complexity of the management systems implemented. The explanatory power of model 2 is higher, the type of certifications explaining on average about 13% of the variation in financial performance during the period under review, compared to 11% for model 1, which supports

the assumption that companies adding to their quality management systems (ISO 9001) environmental (ISO 14001) and occupational health and safety (OHSAS 18001) certifications have a higher incremental performance. In other words, the greater the number of management systems certifications, the higher financial performance of the certified entities.

However, there is a downward trend in the explanatory power patterns during 2013-2015 ( $R^2$  annual values feature a decreasing trend), in 2015 the association between ROAs values and management systems certifications becoming only marginally significant. This result can be explained by the increasing number of companies that implement multiple management systems during the analyzed period, knowing that the benefits of implementing such systems are not immediately noticeable, requiring a relevant period of conformity (Heras et al., 2002). Also, another explanation could be that (as proven empirically by Benner and Veloso, 2008) later implementers of management systems do not obtain the same long lasting financial benefits.

In these circumstances, we can accept the two hypotheses of our study, although the results are only valid for profitable companies listed on BSE in the analyzed period.

To test the validity of the models, we controlled for a likely source of interference – the size of the companies that can explain both the appeal for management systems certifications, and the magnitude of financial performance – that is, larger firms are those that are more responsive to ISO 9001 ISO 14001 and OHSAS 18001 certification, and they are also the ones that report higher performance. Therefore, the model included company size (SIZE) as a control variable, operationalized by the logarithm of total assets (we used logarithm as the variable SIZE is not normally distributed: skewness 5.529, std error .215). Regression results for the whole period (2013-2015) are shown in Table no. 4.

**Table no. 4. Regression results – only positive ROAs – Control for size effects (panel data)**

<b>Model (3)</b>	<b>2013-2015</b>
$\alpha_0$	.006 (.466)
$\alpha_1$	.019 ** (2.316)
$\alpha_2$	.005 ** (2.405)
$\alpha_3$	.006 (.742)
$\alpha_4$	.010 (0.211)
F	4.927 ***
Adjusted R <sup>2</sup>	.114
Durbin Watson	2.335
N	123
<b>Model (4)</b>	
<b>2013-2015</b>	
$\alpha_0$	-.009 (.476)
$\alpha_1$	.010 ** (2.601)
$\alpha_2$	.004 ** (1.867)
$\alpha_3$	.005 (.706)
$\alpha_4$	.009 (1.205)
F	5.319 ***
Adjusted R <sup>2</sup>	.124
Durbin Watson	2.357

N	123
<i>Significance level: ***0.01, **0.05, *0.1</i>	
<i>Model (3): <math>ROA_{ij} = \alpha_0 + \alpha_1 x MS_{ij} + \alpha_2 x SIZE_{ij} + \alpha_3 x D2_{ij} + \alpha_4 x D3_{ij} + \epsilon_{ij}</math></i>	
<i>Model (4): <math>ROA_{ij} = \alpha_0 + \alpha_1 x MSscore_{ij} + \alpha_2 x SIZE_{ij} + \alpha_3 x D2_{ij} + \alpha_4 x D3_{ij} + \epsilon_{ij} + \epsilon_{ij}</math></i>	
Where:	
<i>ROA<sub>ij</sub></i> = Return on assets for company <i>i</i> in the year <i>j</i> ;	
<i>MS<sub>ij</sub></i> = Certified management systems, <i>Dummy</i> : 1-company with multiple management systems certifications, 0 – Company with only quality management system certification or without any of the three certifications investigated;	
<i>MSscore<sub>ij</sub></i> = Management system score for company <i>i</i> in year <i>j</i> : 3 – ISO9001, ISO14001 and OHSAS 18001 certifications; 2 – ISO9001 and ISO14001 certifications; 1 – ISO9001 certification; 0-None of the three certifications.	
<i>D2 – Dummy</i> : 1, if <i>j</i> =2014; 0 if <i>j</i> =2013,2015;	
<i>D3 – Dummy</i> : 1, if <i>j</i> =2015; 0 if <i>j</i> =2014,2015;	
<i>Variables D2 and D3 introduced for controlling time effects.</i>	
<i>Tests for detecting autocorrelation in residuals performed. Durbin Watson values within normal parameters.</i>	
<i>Multicollinearity tests performed: maximum VIF (Variance Inflation Factors) value: 1.3 – within normal parameters.</i>	
<i>Results after outliers' removal.</i>	

As seen in Table no. 4, the variables that capture the features of the management systems certified remain significantly correlated with the performance of the companies in the period under review, even when controlling for scale effects. Therefore, the two hypotheses are confirmed, corporate financial performance is linked to management systems certification and this relationship is not explained by company size.

## Conclusions

The purpose of this paper was to explore a possible association between ISO 9001, ISO 14001 and OHSAS 18001 certifications and audited financial performance of Romanian companies listed at BSE. In the international literature, although there is not yet a consensus reached, most studies indicate a positive impact of the implementation and certification of various models of management systems on financial performance. Our study confirms international trends showing that ISO 9001, ISO 14001 and OHSAS 18001 certifications increase financial performance. In particular, the study revealed that listed Romanian companies that have implemented multiple management systems (quality – environmental and/or health and safety) perform better in terms of return on assets (ROA) and that their performance is directly proportional to the complexity of the management systems certified. The positive effect of certifications was proven even when controlling for a potential significant source of interference, namely the size of the companies, which is likely to influence both the degree of certification and the financial performance.

The results should be, however, interpreted with caution, as corporate financial performance may be affected by a variety of complex factors and their influence has not been taken into account. In addition, the results are representative only for profitable companies listed on the BSE, and not for the whole capital market. Nonetheless, our findings provide, for the first time in the literature, objective evidence of a potential positive impact of management systems certifications on the financial performance of listed Romanian companies. Consequently, this paper represents an exploratory study providing a basis for developing future research in the

Romanian setting, one possible research direction being the effect of integration of management systems on the performance of Romanian companies.

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