Environmental Management System and Performance in SMEs. Evidence from the Abruzzo Region

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Abstract

The paper aims at investigating the potential effect on economic and financial performance caused by the adoption of an environmental management system ISO14001certification, by SMEs in Abruzzo region, which represent a significative case study due to the environmental capital that characterizes the whole region. From the Signaling Theory perspective, the adoption of such international environmental management system certification "signals" to the firm's stakeholders, the engagement in adopting a sustainable management system, contributing to reduce information asymmetry and consequently, positively influence economic and financial performance.

Considering a panel dataset of a total sample of 490 SMEs located in Abruzzo (observed from 2011 and 2019), constituted by 212 ISO14001 certified firms and a control group of 278 firms, selected comparing size, age and geographical location of the main group of analysis, the results show how economic and financial performance are positively related to the adoption of an environmental management system certification.

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1. Introduction

The debate emerging from the literature regarding the nature and purpose of the entrepreneurial initiative, qualifies company as an economic-social institution and a socio-technical system (D'Amico, 2017). Companies' activities play a crucial role for corporate stakeholders and for the society in general (Corsi and Migliori, 2017), in different ways and intensities, in an ethical dimension that incorporates the economic and social dimensions, defining its role and mission (Ruisi, 2010; Di Carlo, 2017; Cortese and Cantino, 2020).

Regarding this issue, it is noted that the company unitary conception, in the classical meaning, starting from the business and economic studies conducted by Zappa, adequately defines the company as a system related to the ethical business dimension. As pointed out by Rusconi (2018) this ethical perspective has always permeated economic thoughts. From the Aristotelian Nicomachean Ethics to Friedman, who, although supporting the concept, according with the shareholder primacy and the profit maximisation, affirms that this duty it is subordinated to "compliance with the law and current customs" (Friedman, 1970).

Contrary to this vision, the introduction of issues related to business ethics in the corporate economic literature (Lewis, 1985), allowed to develop a research field that relegated business ethics with a limited role relating to the development of the capital system (Stark, 1993). Furthermore, the growing attention towards business activity has led to the development of Corporate Social Responsibility (CSR) concept, as a "social bond" deriving from the ethical dimension, which accompanies the complex corporate system activities.

In this perspective, the concept defined by "corporate social responsibility" has been implemented through different strategies, underlying the decision to adopt socially responsible behaviours, characterized as purely philanthropic choices, as compensation for socially irresponsible behaviour, or for the need to comply with rules and laws, perhaps not internally shared (Rusconi, 2018). The deepening reasons that underlie the CSR strategies in companies has been and is still being the subject of an important research stream (e.g., Graafland and Van de Ven, 2006; Graafland and Mazereeuw-Van der Duijn Schouten, 2012; Wang, Lam and Varshney, 2016; Mancini *et al.*, 2016).

Developing issues related to the social responsibility, sustainable development and the growing request for the contribution to this shared mission in the public and private organizations, seems to led that the adoption of an ethical vision in the whole company system that is not compatible with the limitation of social responsibility to sporadic initiatives with a social impact, but it is the same systemic company vision (Paolone and D'Amico, 2017) that reasonably brings us closer to the concept of "shared value" creations, which anticipates international models (Freeman, 1984; Porter and Kramer, 2012), involving the essence and organisation purpose as a whole.

According with this perspective, corporate social responsibility leaves the role of an external limit towards company's economic and financial objective (Rusconi,

2018), becoming a key factor for corporate success (Coda, 1989; 2010).

In addition, the management's motivations - including specifically opportunistic reasons - for the adoption of implicit and explicit strategies, of social responsibility in business management, promote competitive growth, facilitate the understanding and analysis of the competitive context in which they operate, as the relationship with the groups of corporate stakeholders, more interested in the sustainability organisations activities, especially for profit-making companies (Rusconi, 2018).

This debate emerging raises the fundamental question regarding how companies actually approach towards sustainable management in the complex set of activities and how this activity affects the economic and financial performance in the medium and long term. Particularly, despite the growing expectations of stakeholders, the literature highlights the specific medium-sized and micro enterprises behaviours in adopting sustainable and social responsibility approaches. Whilst the literature highlights some difficulties in adopting sustainability strategies related to the lack of managerial and financial resources (Shields and Shelleman, 2015, 2017; Kautonen *et al.*, 2020; Wiesner, Chadee and Best, 2018), some SMEs characteristics seem to favour the implementation of social responsibility strategies, opposite to large companies, regarding the less formalization of decision-making, management and control processes and the flexibility and speed in adaptation to the reference context; to the greater ethical orientation and to the entrepreneur's value heritage; to the deepest link with the territorial environment in which SMEs operate (Del Baldo, 2009; Jamali, Zanhour and Keshishian, 2009; Mio, 2014; Tarquinio and Posadas, 2020).

Therefore, the analysis of the dynamics through small and medium-sized enterprises adopts sustainability strategies and how these strategies affect their economic and financial performance is the main aim of this research, to encourage, albeit only partially, the implementation and communication of sustainability initiatives and strategies in the small and medium-sized enterprises and micro-enterprises.

In particular, the research focuses on the emerging dynamics arising from the Region Abruzzo, strongly characterized by an economic environment characterized by micro and small and medium-sized enterprises (D'Amico, 1994). In addition, the choice to investigate this context is supported by some characteristics of this region, in particular:

- In the nineties, Abruzzo was characterized by an economic development that led it to the levels of the Central Italy regions, allowing to compete with European macro-regions. (European Commission, 1995). In 2019, Abruzzo was the southern region with the highest GDP per capita (equal to 85% of the European average value, on a par with Greece, Spain and Portugal) (Istat, 2020);
- The specific attention towards to environmental dimension. Abruzzo is characterized by a territory that has led it to be defined as the Green Europe Region, thanks to the extension of the National Parks and Protected Areas (3 national parks, 1 regional natural park, 52 protected reserves and natural reserves) which cover the 36.6% of the regional territory (Istat, Report BES

2020). The environmental heritage safeguard and promotion represent a concrete regional's development objective.
- The lack of large industrial and urban districts and the almost exclusive presence of micro-enterprises and SMEs.

Therefore, the aim of this research is to investigate how the adoption of strategic and management approaches, oriented towards sustainability and corporate responsibility, affects the micro and SMEs economic and financial performance in Abruzzo. The relationship that we intend to investigate is intrinsic in the purpose of encouraging organizations to approach towards sustainable management in their business, analysing whether and to what extent this aspect can contribute to improve the economic performance.

In this research the relationship takes shape analysing how the integration of an ISO14001 certified environmental management system affects the company economic-financial performance, under the theoretical perspective of the signalling theory, which reflects the purpose of the environmental management system certification as a "signal" of the signaller's commitment towards sustainability and corporate social responsibility - the company - and the receivers - the stakeholders (Connelly, 2011; Taj, 2016; Todaro *et al.*, 2020).

This paper is divided as follows. Section 2 presents and discusses the theoretical framework underlying the study and the advanced research hypotheses. Section 3 presents the sample, the variables used for the empirical analysis, the technique and the estimation models adopted. Section 4 highlights the descriptive and the results from the estimated models. Finally, section 5 discusses the analysis results, the main theoretical and practical managerial implications, with the limitations and the future research.

2. Theoretical Framework and literature review

The relationship between sustainability and the company's economic and financial performance is a widely topic analysed in the literature, underlying conflicting results regarding the sustainability dimensions (Epstein and Roy, 2003; Molteni, 2004; Ameer and Othman, 2012; Aggarwal, 2013; Weber, 2017; Cantele and Zardini, 2018; Alshehhi, Nobanee and Khare, 2018; Danso *et al.*, 2019).

In particular, the debate relating the influence regarding the initiatives undertaken by companies to mediate the socio-environmental impact of their business activity appears controversial. Many studies found that these activities have a positive impact on economic and financial performance (Wheelen and Hunger, 2012; Ahamed, Almsafir and Al-Smadi, 2014; Kim and Kim, 2014; Maqbool and Zameer 2018; Platonova *et al.*, 2018). Instead, other studies conducted, found a negative relationship between sustainability initiatives and the company's economic performance (Cordeiro and Sarkis, 1997; Wright and Ferris, 1997), while some research define this relationship undetectable due to the multiple variables involved (Griffin and Mahon, 1997; Kraft and Hage, 1990; McWilliams e Siegel, 2000).

Studies that support the positive relationship between the adoption of strategic

approaches, aimed at sustainable development and economic and financial business performance, mainly refers to the promotion and the implementation of a management systems that consider the socio-economic impacts generated by the business activity.

In this perspective, the research gives great consideration especially to one aspect, i.e. the issue is to point out the adoption of sustainability practices to the business stakeholders with the aim of evaluating the business activity in its entirety and reducing informative asymmetries. (Connelly *et al.*, 2011, Spence, 2002; Stiglitz, 2002). In that sense, it is alarming the growing concern of companies in adopting means of communication, information and reporting for sustainability that allow to communicate their commitment to the adoption of sustainable business management systems and models, including, the management system certifications. (Godemann and Michelsen, 2011; Newig *et al.*, 2013; Reilly and Larya, 2018).

The company "need" to inform regarding the adoption of sustainable approaches can be framed under the perspective of the *Signalling Theory* (Boulding and Kirmani, 1993; Connelly *et al.*, 2011). This theory is based on four key elements: *signaller, signal, receiver, feedback*. Under this perspective, in this research, the "Signalling Theory" helps us to understand the reasons behind the adoption of the ISO14001 environmental management system certification, typically used to point out the adoption of a standardized business management model.

ISO 14001 is a technical standard of the International Organization for Standardization on Environmental Management Systems (EMS) which determines the requirements that an organization, of any size, must comply in its environmental management system. ISO 14001 - revised in 2015 - presents a general discipline with the aim of certifying how the company management system is suitable for assessing and reducing the environmental impacts, and that it is oriented towards continuous improvement. Therefore, ISO 14001 can be defined as a process certification, and the requirements to obtain the certification are based on the 'Deming cycle': *Plan-Do-Check-Act (PDCA)* (Johnson, 2002).

Furthermore, the evaluation criteria of the company environmental management system are not determined according to a systematic and unambiguous framework, but they are defined on the basis of the industrial activity breakthrough. Therefore, the environmental management system adequacy assessment will be preceded from a context analysis, highlighting the needs and expectations of stakeholders and the main impacts generated.

This procedure is based on one of the fundamental requisites for obtaining the ISO14001 certification: green procurement. Organizations must define and apply environmental criteria to products and services purchases that support production or trade. The adaptation to this type of international standards, highlights common benefits for all company typological classes, including: the internal performance improvement and efficiency (cost reduction, productivity growth, profit growth, internal process improvement, workers motivation improvement), the company public image and the quality brand perception for the customer, the relationship improvement regarding socio-economic context and with the institutions (Tarí,

Molina-Azorín and Heras, 2012).

In particular, the ratio underlying the decision to adopt the standard that certifies the company management system environmental protection ISO14001 is linked to the national and international context in which the company operates. Although, the annual certification and management fee is particularly high, it should be noted that the first reason that pushes companies to certify is the economic performance increase, since it becomes the means - signal - through to signal the adequacy of their environmental management system to certain standards, thus reducing information asymmetries, and the cost of alternatively externally reporting (Morrow and Rondinelli, 2002; Babakri, Bennett and Franchetti, 2003; Heras-Saizarbitoria, Molina-Azorín and Dick, 2011).

This is particularly relevant regarding the small and medium-sized enterprises (Johnstone, 2020). The scarcity of economic, financial and human resources involves the lack of means and skills to adequately inform stakeholders regarding the initiatives aimed at mitigating the environmental impact through the information disclosure and specific reports and documents (including, for example: Sustainability Report, Social Report, Integrated Report) (Shields and Shelleman, 2017).

According to the *Signalling Theory* framework, this research aims to investigate the following research hypothesis:

H1: The adoption of an ISO14001 certified environmental management system positively influences the SMEs economic performance in Abruzzo.

3. Methodology

3.1   Analysis sample and data source

In order to empirically verify the research hypothesis, a panel data of 212 ISO14001 certified micro, small and medium-sized enterprises from Abruzzo (identified on the basis of the database of companies available by Accredia - the Italian accreditation body[2]), was analysed, extracted from AIDA BvD database, an Italian subset of ORBIS database, that include historical data relating to economic, financial, biographical and commodity elements of approximately 700,000 active Italian companies. In particular, the financial information is provided by Honyvem, which acquires and re-elaborates the financial statements filed in the Italian Chambers of Commerce. The data refer from 2011 to 2019. In addition, a control group of 278 non-ISO14001 certified companies was extracted from the Aida database to rationally determine the impact of this certification on the company's economic and financial performance. The control group was selected relating to the geographical location, size and the company age. Based on the list of ISO 14001

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[2] Accredia is the Single Accreditation authority designated by the Italian government for the competence verification and attestation, independence and impartiality of the bodies and laboratories that verify the compliance of goods and services with the standards. It carries out its function according to the EC Regulation 765/2008 and the ISO / IEC 17011 international standard.

certified companies, a matrix was generated to outline the company geographic, dimensional, and age-related determinants. Subsequently, the data of non-certified companies were randomly collected from AIDA based on the defined criteria. Due to these considerations, the final sample is composed by 490 companies. Tables 1 and 2 show the matrices of the certified companies and the total sample of the companies considered, and it is possible to compare the percentages relating to the characteristics of the sample considered.

Table 1: ISO14001 certified enterprises Sample matrices

CHIETI				
	SIZE			
AGE	0-9 Employees	10-49 Employees	50 + Employees	Total
0-19 years	9 (4,24%)	17 (8%)	5 (2,35%)	31 (14,6%)
20-29 years	2 (0,94%)	15 (7,07%)	10 (4,71%)	27 (12,73%)
30+ years	1 (0,47%)	17 (8%)	13 (6,13%)	31 (14,62%)
Total	12 (5,66%)	49 (23,11%)	28 (13,20%)	89 (41,98%)
L'AQUILA				
	SIZE			
AGE	0-9 Employees	10-49 Employees	50 + Employees	Total
0-19 years	3 (1,4%)	7 (3,3%)	3 (1,4%)	13 (6,13%)
20-29 years	0	4 (1,8%)	3 (1,4%)	7 (3,3%)
30+ years	1 (0,47%)	7 (3,3%)	4 (1,8%)	12 (5,66%)
Total	4 (1,8%)	18 (8,49%)	10 (4,71%)	32 (15,09%)
PESCARA				
	SIZE			
AGE	0-9 Employees	10-49 Employees	50 + Employees	Total
0-19 years	3 (1,4%)	6 (2,83%)	4 (1,8%)	13 (6,13%)
20-29 years	0	11 (5,18%)	4 (1,8%)	15 (7,07%)
30+ years	2 (0,47%)	5 (2,35%)	6 (2,83%)	13 (6,13%)
Total	5 (2,35%)	22 (10,37%)	10 (4,71%)	41 (19,33%)
TERAMO				
	SIZE			
AGE	0-9 Employees	10-49 Employees	50 + Employees	Total
0-19 years	2 (0,47%)	14 (6,60%)	5 (2,35%)	21 (9.90%)
20-29 years	3 (1,4%)	9 (4,24%)	5 (2,35%)	17 (8%)
30+ years	2 (0,47%)	4 (1,8%)	6 (2,83%)	12 (5,66%)
Total	7 (3,3%)	27 (12,73%)	16 (7,54%)	50 (23,58%)

Source: Author's elaboration.

Table 2: Total sample analysis matrices

CHIETI				
	SIZE			
AGE	**0-9 Employees**	**10-49 Employees**	**50 + Employees**	**Total**
0-19 years	21 (4,28%)	39 (7,95%)	11 (2,24%)	71 (14,48%)
20-29 years	5 (1,02%)	35 (7,14%)	23 (4,69%)	63 (12,85%)
30+ years	4 (0,81%)	39 (7,95%)	29 (5,91%)	72 (14,69%)
Total	30 (6,12%)	113 (23,06%)	63 (12,85%)	206 (42,04%)
L'AQUILA				
	SIZE			
AGE	**0-9 Employees**	**10-49 Employees**	**50 + Employees**	**Total**
0-19 years	7 (1,42%)	16 (3,26%)	7 (1,42%)	30 (6,12%)
20-29 years	0	9 (1,83%)	7 (1,42%)	16 (3,26%)
30+ years	3 (0,61%)	16 (17,7%)	9 (1,83%)	28 (5,71%)
Total	10 (2,04%)	41 (8,36%)	23 (4,69%)	74 (15,10%)
PESCARA				
	SIZE			
AGE	**0-9 Employees**	**10-49 Employees**	**50 + Employees**	**Total**
0-19 years	7 (1,4%)	14 (2,85%)	9 (1,83%)	30 (6,12%)
20-29 years	0	25 (5,10%)	9 (1,83%)	34 (6,93%)
30+ years	5 (2,35%)	12 (2,44%)	14 (2,85%)	31 (6,32%)
Total	12 (2,44%)	51 (10,37%)	32 (6,53%)	95 (19,38%)
TERAMO				
	SIZE			
AGE	**0-9 Employees**	**10-49 Employees**	**50 + Employees**	**Total**
0-19 years	5 (2,35%)	32 (6,53%)	11 (2,24%)	48 (9.79%)
20-29 years	7 (1,4%)	21 (4,28%)	11 (2,24%)	39 (7,95%)
30+ years	5 (2,35%)	12 (2,44%)	14 (2,85%)	28 (5,71%)
Total	7 (3,3%)	62 (12,65%)	36 (7,34%)	115 (23,46%)

Source: Author's elaboration.

3.2   Variables Description
3.2.1 Dependent variable
In order to highlight the emerging relationship between the company economic results analysed and the adoption of a certified environmental management system, the ROA (Return on Assets) profitability index was used as a proxy of the company

economic performance. Regarding the economic and financial results, the literature identifies a set of variables that can be described in 2 macro-groups: *market-based* variables and *accounting based* variables (Garcia-Castro, Ariño and Canela, 2010; Lassala, Apetrei and Sapena, 2017; Alshehhi, Nobanee and Khare, 2018). The accounting variables includes the ROA index, used in this research.

Although some limitations have been highlighted for both methodologies, it emerges that the accounting indicators are in any case considered more suitable than the market-based ones to assess company performance. (Wu, 2006). Furthermore, although the company behaviour can be explained using market-based indexes, accounting data shows what really happens in the company (López, Garcia and Rodriguez, 2007), while the market-based variables reflect the profitability expectations, including additional macroeconomic factors that affect these measures.

The Return on Assets (ROA) represents the profitability of assets utilisation and measures managerial efficiency. According to this perspective, it emerges that ROA ratio is, a necessary condition for achieving the profitability outcome. Furthermore, ROA is one of the most financial-used measure (Alshehhi et al,2018) to understand the relationship between corporate sustainability practices and financial performance.

Therefore, the use of the ROA profitability index - defined by the ratio of operating profit to total assets - appears consistent with the purposes of this research.

3.2.2   Independent Variable

Referring the independent variable used to estimate the model, we consider the adoption of the ISO14001 environmental management system certification, which, as anticipated in the theoretical framework in section 2, determines the adoption of a company management and operations system oriented towards sustainable development. Hence, a dummy variable has been constructed and assumes a value 1 if the company is ISO14001 certified and 0 otherwise.

3.2.3   Control Variables

In order to verify the presence of functional effects on the dependent variable, a set of control variables was introduced in the model. Specifically, we used first the company size, as the natural logarithm of the number of employees in 2019 (Size). Secondly, we introduce a variable that express the company age (Age) calculated as the natural logarithm of age up to 31/12/2019.

Thirdly, an indicator was included to describe the corporate financial structure, through the variable Debt/Equity, measured as the ratio between total corporate debt and equity (D/E). As a further control variable of the hypothesized relationship, the geographical variable - considering the Abruzzo provinces in which the company is located (Teramo, L'Aquila, Chieti, Pescara) - and the temporal variable (Years) - were considered - to verify the effects of the variables in the period considered (2011-2019).

3.3 Analytical investigation approach

The analysis of the potential effects exerted by the adoption of a certified environmental management system on the company's economic and financial performance was conducted according to an empirical approach divided into two stages. In the first, descriptive analysis of the selected sample was performed and, a specific analysis was conducted to exclude the presence of multicollinearity among the independent variables. Specifically, a *VIF - Variance Inflation Factor* analysis and a Pearson's bivariate correlation analysis were conducted to verify the absence of high and significant correlation coefficient between the independent variables. Furthermore, with the aim of empirically validating the research hypothesis, a *GLS - Generalized Least Square Regression* model was developed, particularly suitable to estimate the linear relationships between variables in a panel dataset.

Regarding the models used for the study, the function that expresses the relationship between the company economic and financial performance and the adoption of a certified environmental management system can be described as follows:

$$ROA_{it} = \beta_1 ISO14001_{it} + \beta_2 CONTROL_{it} + \varepsilon_{it} \tag{1}$$

where CONTROL represents the vector of control variables and ε_{it} the company's error term i at the time t.

4. Results

4.1 Descriptive statistics

Table 3 shows the descriptive statistics, separately computed for ISO14001 and non-ISO14001 certified companies. It should be noted that the companies that adopt an ISO14001 certified environmental management system show, on average, a higher profitability with a similar variability than non-certified companies. Furthermore, certified companies are, on average, larger than non-certified companies, with a lower ratio between corporate liabilities and equity capital.

Table 3: Descriptive statistics separately calculated for ISO14001 certified and non-certified companies

ISO14001 = 0					
Variables	**Obs**	**Mean**	**SD**	**Min**	**Max**
Age	2,502	24.46043	10.92886	9	58
Employees	2,502	24.46043	47.87702	2	225
Assets	2,417	7954.703	17171.54	0.816	276223.3
ROA	2,417	4.727571	13.139	-329.17	65.67
Debt/Equity	1,912	2.153651	7.775759	-82.86	161.79
ISO14001 = 1					
Variables	**Obs**	**Mean**	**SD**	**Min**	**Max**
Age	1,908	24.71226	10.26331	9	59
Employees	1,908	50.15094	53.36991	2	244
Assets	1,907	14756.98	27235.3	14.872	308646.2
ROA	1,907	6.067672	9.124103	-55.88	67.28
Debt/Equity	1,723	1.751741	6.618009	-11.69	156.05

Source: Author's elaboration

Table 4 shows the values from the VIF analysis computed for the independent variable and the control variables analysed. The results show that the VIF coefficients, for each variable and the mean value, are lower than the cut off value of 4 (VIF <4), as well as the values of 1 / VIF are higher than 0.2, traditionally considered as limit values to verify the presence of multicollinearity (Hair et al., 2010).

Table 4: VIF analysis results – Variable Inflation Factor

Variables	**VIF**	**1/VIF**
Chieti	2.26	0.4430
Teramo	2.00	0.4999
Pescara	1.91	0.5228
AGE	1.07	0.9303
Employees	1.06	0.9435
D/E	1.01	0.9923
Mean VIF	1.55	

Source: Author's elaboration

Table 5 shows the Pearson's bivariate correlation matrix: the absence of high and significant correlation between the predictors and the control variables suggests that multicollinearity doesn't represent a critical issue. Therefore, it is possible to conduct the empirical analysis according to the models and the estimation method defined in the previous section.

Table 5: Pearson's bivariate correlation matrix

	Variables	1	2	3	4	5	6	7	8	9
1	ROA	1.0000								
2	ISO14001	.0576*	1.0000							
3	Age	-.0820*	.0263	1.0000						
4	Employees	.0190	.1034*	.2519*	1.0000					
5	Teramo	.0282	.0024	-.0516*	.0173	1.0000				
6	Chieti	-.0181	-.0011	.0471*	-.0373*	-.4716*	1.0000			
7	L'Aquila	-.0103	-.0002	-.0357*	.0150	-.2336*	-.3592*	1.0000		
8	Pescara	.0015	-.0011	.0288	.0144	-.2716*	-.4177*	-.2068*	1.0000	
9	D/E	-.0400*	-.0277	-.0667*	-.0539*	-.0147	.0100	.0352*	-.0275	1.0000

4.2   Estimation of regression models

Table 6 shows the results of the regression model. The model was completed following the stepwise method: the control variables estimation is shown in column (I), while the estimation of the main effects is included in column (II).

These results show a positive and significant relationship between the adoption of an environmental management system certification (ISO14001) and the company's economic and financial results, measured with the ROA value (Column II, 1.3646, p> 0.05) which allows us to support the research hypothesis H1. Furthermore, it is possible to verify that, for the control variables, there are no significant variations in the values and in the coefficients' significance, demonstrating how the choice of these variables are functional to correctly define the estimated model.

Table 6: Results of the estimated GLS regression models

	(I)	**(II)**
ISO14001		1.3646** (0.6835)
Control Variables		
Age	-2.2214** (0.7803)	-2.2159** (0.7781)
Employees	0.5311* (0.3162)	-0.4740 (0.3166)
Teramo	-0.6280 (1.0367)	-0.7340 (1.0337)
Chieti	-0.5640 (0.9297)	-0.6006 (0.9272)
L'Aquila	-1.1131 (1.1682)	-1.1180 (1.1648)
Pescara	*(omitted)*	*(omitted)*
D/E	-0.3416 (0.0167)	-0.3362 (0.2829)
Year		
2012	0.8724 (0.6908)	0.8721 (0.6908)
2013	1.2748* (0.6909)	1.2719* (0.6915)
2014	0.6702 (0.7048)	0.6679 (0.7048)
2015	1.1568* (0.7015)	1.1552* (0.7015)
2016	0.5519 (0.7036)	0.5496 (0.7036)
2017	1.0055 (07024)	1.0090 (0.7023)
2018	0.7649 (0.6969)	0.7675 (0.6969)
2019	0.07352 (0.6968)	0.7957 (0.6967)
N. of observations	3635	3635
N. of groups	484	484
Wald chi2 (25)	18.23	22.29
Overall R2	0.1963	0.1005

Note: Robust standard errors are shown in parentheses.
* $p < 0,10$.   ** $p < 0,05$. *** $p < 0,001$.
Source: author's elaboration

5. Conclusion

The results from the empirical analysis allow us to state that the implementation of an environmental management system, to obtain ISO14001 certification, with the aim to assess and reduce environmental impacts and to plan sustainability and corporate social responsibility strategies, positively influence the economic and financial performance of Abruzzo SMEs and allow us to affirmatively answer the research question and to confirm the relationship hypothesized in paragraph 2. These results are part of the research line that supports the adoption of management approaches and models towards sustainable development and, therefore, allow to mitigate social and environmental impacts of the business activity contributing to the economic performance improvement. (Wheelen e Hunger, 2012; Ahamed, Almsafir e Al-Smadi, 2014; Kim e Kim, 2014; Maqbool e Zameer, 2018; Platonova *et al.*, 2018).

Under the Signalling Theory perspective, the research contributes to the theoretical development, showing how the management system environmental ISO14001 certification is suitable as a signalling tool for the orientation towards the sustainable development of small and medium-sized enterprises in Abruzzo, noting a positive influence relating to corporate stakeholders, signal receivers, reducing information asymmetries and the related costs. Hence, it contributes to the company results improvement. The Signalling Theory, used as a theoretical framework for this research, highlights that the company's reporting orientation towards sustainable development, through useful tools to communicates the specific characteristics of the environmental management system - such as ISO14001 certification - both functional and not only for the specific purpose - or to demonstrate compliance with an international standard for the promotion of sustainable models -, but to contribute to the improvement of economic results and company profitability.

From a practical point of view, this research offers some managerial implications. It helps to show that the adoption of an environmental management system, with its reporting process and the alignment with an international standard, contributes to the reduction of the social and environmental impact and to improve the economic performance, with particular reference to SMEs, that need to implement proper communication tools for their commitment in sustainability initiatives, facing the lack of economic resources and specific skills, widely discussed in the literature.

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