

Influence of Firms' Environmental Management and Community Involvement Programs in their Employees and in the Community

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To assure enduring success, firms need to generate economic value with respect for the environment and social value. They also need to be aware of the needs and expectations of relevant stakeholders and incorporate them in their business strategies and programs. These challenges imply that engineers should take into consideration societal, health and safety, environmental and commercial issues in their professional activity. This investigation accesses the influence of firms' environmental management programs and community involvement programs on their own employees and in the community, with a focus on small and medium companies. Based on a quantitative research, the findings suggest that firms that invest both in environmental management programs and in community involvement programs have a higher involvement of their own employees with the community, while at the same time receiving more feedback (positive, but also negative) from the community, stressing the need to pay special attention to their communication policies.

Keywords: Environmental management systems, ISO 14001, Environmental involvement programs, community involvement programs, employee involvement, community feedback, small and medium companies.

1. INTRODUCTION

The United Nations [1] has emphasized the importance of achieving a sustainable progress that must cover all three dimensions that affect people's life chances (social, economic and environmental) and UNESCO [2] highlighted the role of engineers to help achieve those goals. The sustainability "umbrella construct" could include concepts like corporate citizenship from Carrol [3], stakeholder orientation framed by Freeman [4], triple bottom line presented by Elkington [5], and creating shared value from Porter and Kramer [6]. Another relevant concept is "social responsibility" that can be defined as the contributions of organizations to sustainability [7].

The need for engineers to properly address environmental and societal concerns has been recognized by the engineering community. The EUR-ACE [8] program outcomes of accredited engineering degree specifically emphasize the need for engineers to recognize and work on a wider context of engineering and take into consideration societal, health and safety, environmental and commercial issues.

The purpose of this investigation is to access the influence of firms' environmental management programs and community involvement programs on their own employees and in the community. Both the employees and the community are relevant stakeholders

and, in line with stakeholder theory [4], firms must focus on their relationships with critical stakeholders. While there is a considerable line of research on the motivations, benefits and cost of sustainability programs [9] there is limited knowledge concerning the influence of environmental management and community involvement programs in the firm's own employees and in the feedback received from the community, particularly in small and medium companies and in European countries.

This research starts with a literature review of environmental management and community involvement programs, followed by a quantitative survey and statistical analysis of the results.

The results contribute to knowledge on the influence of environmental management and community involvement programs in the involvement of companies own employees with the community and on the feedback received from that community, highlighting contributions both to academics and managerial practice.

2. ENVIRONMENTAL AND COMMUNITY INVOLVEMENT PROGRAMS

Firms are pressured to act in a more responsible and friendly environmental way by many stakeholder groups, from the public authorities, the society and public opinion, associations and non-governmental organizations, the financial and insurance institutions, consumers and their own employees. As a result, managers (and shareholders) have to address these concerns aiming for pollution prevention and less

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consumption of resources and energy, gasses emissions, effluents, and residues generation.

Environmental management is a key area for companies wanting to be competitive in a global scale and the International Standard ISO 14001 is recognized as the most widely used Environmental Management System (EMS), in many organizations from all sectors and countries [10]. Authors such as Tari, Molina-Azorin and Heras [11], based on a literature review, suggest that ISO 14001 has clear benefits on organizational, operational, people and customer results. In general, studies have found the internal motivations to implement ISO 14001 led to better results than external motivations [11].

ISO 14001 International Standard is based on Plan-Do-Check-Act (PDCA) approach and the relationships with the framework of the 2015 edition of the ISO 14001 (released 15th September 2015) is presented in figure 1[12]:

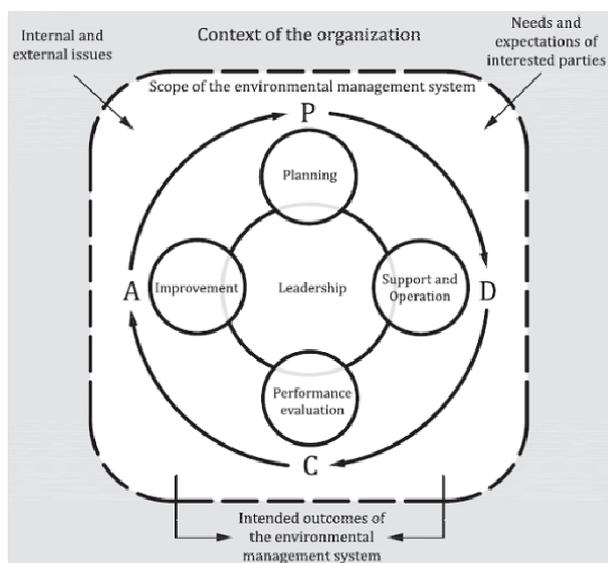


Figure 1. Relationship between PDCA and ISO 14001:2015 International Standard framework (source: ISO 14001:2015)

ISO 14001:2015 International Standard [12] requires that organizations “determine the external and internal issues that are relevant to its purpose and affect its ability to archive the desired outcomes of its environmental management system” (clause 4.1) and that “the organization shall understand the needs and expectation of interested parties ... and which of those needs and expectations become compliance obligations” (clause 4.2). These issues include any environmental condition that may affect or be affected by the organization and the organization must also establish the relevant needs and expectations of their relevant interested parties (e.g., individuals and organizations that can affect, be affected by, or perceive to be affected by, the organization’s decisions or activities).

ISO 14001:2015 also has requirement’s concerning internal and external communication that “the organization shall establish, implement and maintain the processes needed for internal and external communication relevant to the environmental management system” (clause 7.4.1). Communication with interested parties is considered relevant for an

effective EMS and the information provided needs to be consistent with the information generated within the EMS (“walk the talk”).

According to ISO Survey 2014 [13] until the end of December 2014, at least 324.148 ISO 14001 certificates had been issued representing a growth of 7% in certificates number (+22.526) from the previous year. Although certification is not compulsory in many situations, the number of ISO 14001 certified environmental management systems (EMS) can be a good proxy to evaluate the dissemination of this International Standard [10]. Figure 2 summarizes the evolution of ISO 14001 certifications worldwide:

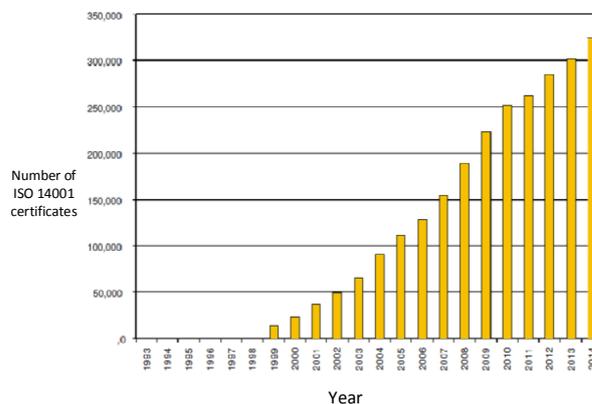


Figure 2. ISO 14001 certifications worldwide (source: ISO Survey 2014)

As presented in figure 3, the top five countries in numbers of certificates were China (117.758), Italy (27.123), Japan (23.597), United Kingdom (16.438) and Spain (13.869). In major growth in numbers of certificates, China was also number one (+13.023), followed by Italy (2.461), Australia (2.358), Czech Republic (1.039) and Colombia (667). At regional level there were 170 countries/regions with ISO 14001 certificates and East Asia and Pacific account for 166.441 certificates (51,3% of total number of world certificates) with a major contribution from China (117.758 certificates), while the second world region was Europe with 123.849 certificates (38,2%), as presented in figure 4.

The consistent growth of EMS worldwide is explained by its relevance for companies’ success. EMS support companies in the evaluation of barriers and key drivers for environmental compliance and improvement as firms have to deal with the stakeholder pressures to protect the environment while remaining competitive. Based on a literature review, the following benefits from the implementation of EMS were identified:

- Improvement in competitive position [14], stakeholder relations [14, 15] and market share [14]
- Use of clean technologies and improvement in operational processes [14]
- Higher managers and employees motivation and performance [14, 16]
- Better environmental performance: reduction in gasses emissions, energy and water consumptions, waste generation, and materials use [17]

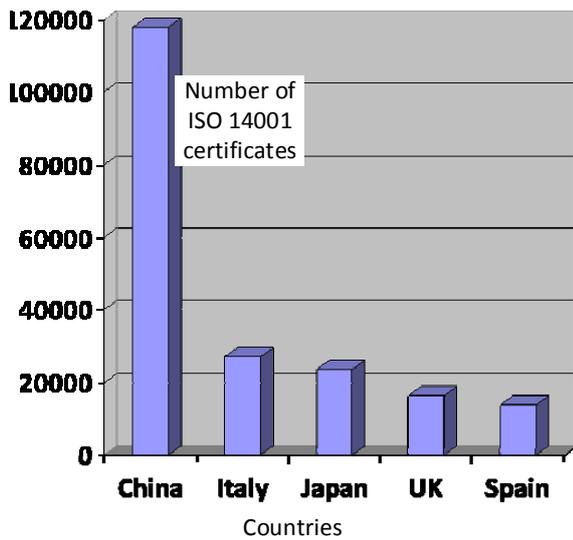


Figure 3. Top 5 countries in number of ISO 14001 certifications (source: ISO Survey 2014)

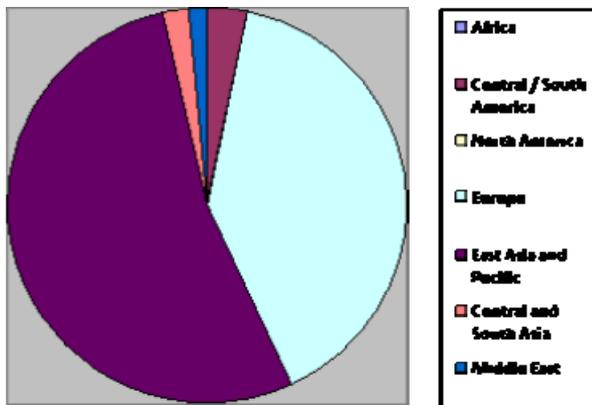


Figure 4. Share of ISO 14001 certifications per world region (source: ISO Survey 2014)

- Increased product and service quality [14]
- Cost reductions and increased productivity [14]
- Improvement in the company image [14,15,16]
- Increased customer acceptance [16]
- Compliance with legal and statutory requirements and fewer fines and sanctions due to non-conformances [18]
- Better access to sources of finance and smaller insurance costs [14, 15].

Scholars have also recognized that the adoption of EMS can help companies to improve their communication with the communities and increase their employees' skills, knowledge, motivations and satisfaction [19]. However, research providing evidence about the advantages and disadvantages of EMS is still needed since academics have not yet reached consensus [19]. Stakeholder involvement is becoming increasingly important for ensuring that a company stays in tune with changing stakeholder expectations and communication and involvement with the community are relevant for companies enduring success. Research has pointed to the potential business benefits of the internal and external communication with the community [20] and also suggests employees' commitment to the organization is related to the perceptions of their firm's social responsibility [21]. But the investigations have

been more focused on the motivations to do it and the benefits and costs of several available strategies and not so much on the community feedback and the result on changing employee behaviors [22]. Specifically concerning Portugal, national research on the subject is scarce [23].

3. HYPOTHESES AND METHOD

The purpose of this investigation is to contribute to the body of knowledge concerning the social impacts of environmental and community involvement plans with a particular emphasis on small and medium companies in European countries. Following the conclusions of the literature review, this research aims to study if firms' environmental management programs and community involvement programs influence the involvement of their employees with the community and the feedback (positive and negative) firms receive from the same community. Considering the research objectives, the investigation was based on a hypothetical - deductive approach assuming a deductive logic starting from a previous theoretical body of knowledge to formulate hypotheses that can be tested and accepted or rejected. A quantitative approach was used to test the following hypotheses presented in the table below:

Table 1. Research Hypotheses

H1: There is a positive relationship between the firms environmental management programs and the community positive feedback
H2: There is a negative relationship between the firms environmental management programs and the community negative feedback
H3: There is a positive relationship between the firms community involvement programs and the community positive feedback
H4: There is a negative relationship between the firms community involvement plans and the community negative feedback
H5: There is a positive relationship between the firms environmental management programs and the employee community involvement
H6: There is a positive relationship between the firms community involvement programs and the employee community involvement
H7: There is a positive relationship between the firms environmental management programs and the firms community involvement plans

Taking into account the research objectives, a survey of Portuguese Small and Medium Enterprises participants of the Social Responsibility Benchmarking and Good Practices database from the Portuguese IAPMEI – Public Agency for Competitiveness was carried on in 2013 [24]. The research is cross-sectional with the data collected in a single moment in time and belonging to a sample of the population. The sample yielded a total of 69 companies that fulfilled the protocol for this research. On average, companies had 33,72 employees (Standard Deviation=36,48) with a maximum value of 206 employees and a minimum of just 3. Micro (less than 10 employees) companies accounted for 26% of the respondents (n=18), while small (between 10 and 50 employees) represented 52%

(n=36) and medium (between 50 and 250 employees) 22% (n=15). The variables for this research were operationalized as presented in tables 2, 3 and 4.

Table 2. Variable EMP-Environmental management program operationalization

Question	Scale
EMP: Did the company establish an action plan with targets concerning its environmental impacts	Likert scale 1 to 4 - The company has no idea of its environment impacts: score 1 - The company measures its energy and water consumptions, gas emissions and effluents and foster recycling, but improvement actions are not systematic: score 2 c) The company measures the items mentioned in b) and implements systematic improvement programs: score 3 d) The environmental management program is systematically and periodically reviewed and improved: score 4

Table 3. Variable CIP-Community involvement program operationalization

Question	Scale
CIP: Mean of question 1 and question 2: Question 1: Did the company establish an action plan with targets concerning its involvement with the community? Question 2: Did the company implement a communication policy towards the community?	Likert scale 1 to 4 a) There is no formal plan: score 1 b) There is a regular process of interaction with the community and the contributions are quantified: score 2 c) There is an action plan and targets are aligned with the company strategy and taking in consideration community inputs: score 3 d) Same as c, but, in addition, the plans, objectives, and targets are regularly reviewed and improved: score 4

Table 4. Variables ECI-Employee community involvement, CPF-Community Positive feedback, and CNF-Community negative feedback operationalization

Question	Scale
ECI: Number of company employee's involved in community programs	Integral number
CPF: Number of positive feedbacks received from the community	Integral number
CNF: Number of negative feedbacks received from the community	Integral number

SPSS software – Statistical Package for Social Sciences (v.21) was used for data treatment. Several descriptive statistics were calculated (mean, standard deviation, maximum, minimum, mean rank, asymmetries, and kurtosis) and construct reliability was tested for community involvement plans construct (2 items) using Cronbach alpha which assess reliability

through the internal consistency of each construct, yielding a satisfactory Cronbach alpha of 0,72 [25].

4. RESULTS AND CONCLUSIONS

The literature review highlighted possible social impacts of companies environmental and community involvement plans, both internal (e.g., on employees) and external (e.g., on the community). The survey variables descriptive statistical measures were calculated and the corresponding results are presented in tables 5, 6 and 7:

Table 5. Variables descriptive statistics - firms

Variable	Mean	Standard deviation	Comment
EMP	1,97	0,75	Moderate/low level of environmental management programs
CIP1 and CIP2	1,3	0,1	Low level of firms involvement with the community

Table 6. Variables descriptive statistics – firms' employees

Variable	Mean	Standard deviation	Comment
ECI	1,0	0,3	Although the mean number of employees involved with the community is low, 76% of the firms had at least 1 involved employee

Table 7. Variables descriptive statistics – community feedback

Variable	Mean	Standard deviation	Comment
CPF	2,1	1,1	The number of community positive feedbacks is 7 times the number of negative ones
CNF	0,3	0,1	See above

The absence of inter-items correlations higher than 0,30 and the existence of high values of kurtosis and skewness didn't allow the use of principal component analysis for a score of CIP.

Due to the non-normality of all the variables, Spearman rho correlations were used to test the research hypothesis. Spearman rho correlation coefficient measures the intensity of the relationship between two variables and varies between -1 e 1. As near the values are from these extremes the stronger is the linear association between the variables. The sign indicates the direction of the association between X (the independent variable) and Y (the dependent variable). If Y tends to increase when X increases, the correlation coefficient is positive. If Y tends to decrease when X increases, the correlation coefficient is negative. If the value is zero this means there is no linear relationship between the variables.

When Spearman rho is between 0,2 and 0,6 we can state that the linear association between the two variables is positively moderate, while if it is between 0,70 and 0,89 we can state it is high [25].

The correlation coefficients are presented in table 8 and were calculated with SPSS software – Statistical Package for Social Sciences (v.21):

Table 8. Correlation coefficients

	EMP	CIP	ECI	CPF	CNF
EMP	1				
CIP	0,37**	1			
ECI	0,41**	0,57***	1		
CPF	0,22	0,34**	0,48***	1	
CNF	0,26*	0,40**	0,54***	0,54***	1

*p<0,05; ** p < 0,01; ***p < 0,001

Concerning the statistical validation of the hypotheses based on the above results, the following conclusions, presented in tables 9, 10 and 11, were reached:

Table 9. Hypotheses testing results – Community feedback

Hypothesis	Conclusion
H1: not validated H2: not validated	When firms invest on environment management programs there is a positive weak to moderate relationship with the negative feedback they receive from the community. The positive relationship with community positive feedback was not statically validated at the confidence level
H3: validated H4: not validated	There is a positive moderate relationship between the firms community involvement programs and the community positive and negative feedback (both more positive and negative feedback is received)

Table 10. Hypotheses testing results – Employee community involvement

H5: validated H6: validated	There is a positive moderate relationship between both the firms environmental management and community involvement programs and the actual employee community involvement
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Table 11. Hypothesis testing results – Firms Environmental management program and EMS and Community involvement program

H7: validated	There is a positive moderate relationship between the firms environmental management programs and the firms community involvement programs
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These findings are relevant both for academics and managerial practice as they suggest that firms that invest both in environmental management programs and in community involvement programs will have a higher

involvement of their own employees with the community, which is in line with the works of Fonseca [9, 10], Tari, Molina-Azorin and Heras [11], Hillary [14] and Russo and Fouts [16]. Firms that engage on environmental management programs also address the issues of communicating with the community, and receive more feedback (positive, but also negative) from the community stressing the need to pay special attention to their communication policies and confirming the research of Hillary [14], Porter and Van der Linde [15], Russo and Fouts [16] and Morsing and Shultz [22]. These results suggest that the community is more demanding when a company implements an EMS and opens to the community.

These findings emphasize the relevance of stakeholder theory and of the economic, environment and social dimensions and are consistent with previous works from Fonseca [9, 10], Tari, Molina-Azorin and Heras [11], Martín-Peña, Díaz-Garrido and Sánchez-López [19], Duarte, Mouro and Neves [22] and Ferro [24].

In addition, they bring new knowledge concerning small and medium companies and highlight that firms when engaging with the community will receive both more positive and negative feedback, with the number of community positive feedbacks being considerably higher than the negative ones. This is in line with the conclusions of early research that companies that pursue higher ethical and social admissions and engage in more open communication likely will attract more critical stakeholder attention [26]. Managers and employees (including engineers) must be prepared with the soft skills needed to deal with those situations. But, as Porter and Kramer [27] have highlighted, companies should create both economic and societal value (shared value). And shared value creation requires new and more intense forms of collaboration with the society and communities by fostering interaction to identify the societal needs, benefits, and also possible problems, which can be tackled by the company's products and services. Giving the dynamic and turbulent environment that many firms operate, the opportunities must be addressed in an ongoing way and both community and employees' interactions and contributions are critical for success. These processes can allow companies to differentiate and achieve a better market positioning, contributing to its enduring success. Environmental management and community involvement programs are effective approaches to make this happen by increasing the level of employee and community involvement with the firm. And this is of particular relevance for SMEs that need to rely more on differentiation by agility and flexibility than on economic of scales more easily achieved by bigger companies.

Concerning the limitations of this work the nature of the available data and the small sample size (69 companies) didn't allow the use of more powerful statistical methods such as Partial Least Squares (PLS) or Structural Equation Modelling (SEM).

In light of these limitations, it is suggested to perform additional research with bigger sample sizes and use qualitative research to triangulate the results and check for possible bias in the survey responses. It might

also be useful to replicate the study with managers from other countries (e.g., cultural dimensions) and to consider other dimensions, such as company age and organizational culture. According to Fonseca [28], based on literature review, organizational culture has a significant impact on many actions and subsequent outcomes of organizations and recent research supports that there is indeed an association between certain features of organizational culture and organizational performance outcomes.

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REFERENCES

- [1] United Nation, *WECED Report (Brundtland), Our Common Future*, United Nations, 1997. Accessible at <http://www.un-documents.net/our-common-future.pdf>.
- [2] UNESCO, *Engineering: Issues Challenges and Opportunities for Development*, 2010. Accessible at <http://unesdoc.unesco.org/images/0018/001897/189753e.pdf>.
- [3] Carroll, A.B.: The four faces of corporate citizenship. *Business and Society Review*, Vol. 100, N° 3, pp. 1–7, 1988.
- [4] Freeman, R.E.: *Strategic Management: A Stakeholder Approach*, Pitmam, Boston, 1984.
- [5] Elkington, J.: *Cannibals with Forks. The Triple Bottom Line of 21st Century Business*, New Society Publishers, London, 1997.
- [6] Porter, M.E. and Kramer, M.R.: Creating shared value, *Harvard Business Review*, Vol. 89, No. 1/2, pp. 62–77, 2011.
- [7] ISO, International Organization for Standardization, *ISO 26000:2010 International Standard, Guidance on social responsibility*, Geneva: 2010.
- [8] EUR-ACE, European Network for Accreditation of Engineering Education, *Framework Standards and Guidelines*: 2015. Accessible at <http://www.enaee.eu/eur-ace-system/eur-ace-framework-standards>.
- [9] Fonseca, L.M.: Strategic Drivers for Implementing Sustainability Programs in Portuguese Organizations – Let’s Listen to Aristotle: From Triple to Quadruple Bottom Line, *Sustainability: The Journal of Record*, Vol. 8, No. 3, pp. 136-142, 2015.
- [10] Fonseca, L.M.: ISO 14001:2015. An improved tool for sustainability, *Journal of Industrial Engineering and Management*, Vol. 8, No. 1, pp. 37-50, 2015.
- [11] Tari, J.J., Molina-Azorín, J.F. and Heras, I.: Benefits of the ISO 9001 and ISO 14001 standards: A literature review, *Journal of Industrial Engineering and Management*, Vol. 5, No. 2, pp. 297-322, 2012.
- [12] ISO, International Organization for Standardization, *ISO 14001:2015 International Standard, Environmental management systems – Requirements with guidance for use*, Geneva: 2015.
- [13] ISO, International Organization for Standardization, *The ISO Survey 2014*, Geneva: ISO Central Secretariat, 2015. Accessible at <http://www.iso.org/iso/iso-survey>.
- [14] Hillary, R.: Environmental management systems and the smaller enterprise, *Journal Cleaner Production*, Vol. 12, pp. 561-569, 2004.
- [15] Porter, M.E. and Van der Linde, C.: Green and competitive: ending the stalemate, *Harvard Business Review*, Vol. 73, pp. 120-137, 1995.
- [16] Russo, M.V., Fouts, P.A.: A resource-based perspective on corporate environmental performance and profitability, *Academy Management Journal*, Vol. 40, pp. 534-559: 1997.
- [17] Russo, M.: Explaining the impact of ISO 14001 on emission performance: a dynamic capabilities perspective on process and learning, *Business Strategy and the Environment*, Vol. 18, No.5, pp. 307-319: 2009.
- [18] Bansal, P., Roth, K.: Why companies go green: a model of ecological responsiveness, *Academy Management Journal*, Vol. 43, pp. 717-736: 2000.
- [19] Martín-Peña, M.P., Díaz-Garrido E. and Sánchez-López, J.M.: Analysis of benefits and difficulties associated with firms’ Environmental Management Systems: the case of the Spanish automotive industry, *Journal of Cleaner Production*, Vol. 70, pp. 220-230, 2014.
- [20] Maignan, I. and Ferrell, O.C.: Nature of corporate responsibilities: perspectives from American, French, and German consumers, *Journal of Business Research*, Vol. 56, No.1, pp. 55–67, 2003.
- [21] Brammer, S., Millington, A. and Rayton, B.: The contribution of corporate social responsibility to organisational commitment, *International Journal of Human Resource Management*, Vol. 18 No. 10, pp. 1701-1719, 2007.
- [22] Morsing, M. and Schultz, M.: Corporate social responsibility communication: stakeholder information, response and involvement strategies, *Business Ethics: A European Review*, Vol. 15, No. 4, pp. 323-338, 2006.
- [23] Duarte, A.P., Mouro, C. and Neves, J.G: Corporate social responsibility: mapping its social meaning, *Management Research: The Journal of the Iberoamerican Academy of Management*, Vol 8, No. 2, pp. 101-122, 2010.
- [24] Ferro, R.L.: Management systems from 9K, 14K, 18K to SR (26K): its influence on risk management and organizational competitive factors, Ph.D. thesis, UAL-Lisbon Autonomous University, Lisbon, 2014.
- [25] Pestana, A.H. and Gajero, J.N.: *Data analysis for Social Sciences with SPSS (Análise de Dados para*

as Ciências Sociais – A Complementaridade do SPSS), Edições Silabo, Lisbon, 2008.

- [26] Ashforth, B.E. and Gibbs, B.W.: The double edge of organizational legitimation, *Organization Science*, Vol. 1, No. 2, pp. 177–194, 1990.
- [27] Porter, M.E. and Kramer, M.R.: Creating Shared value, *Harvard Business Review*, Vol. 89, No. 1/2, pp. 62-67, 2011.
- [28] Fonseca L.M.: ISO 9001 Quality Management Systems through the Lens of Organizational Culture, *Quality, Access to Success*, Vol. 16, No. 148, pp. 54-59, 2015.

**УТИЦАЈ ФИРМИНИХ ПРОГРАМА
УПРАВЉАЊА ОКОЛИНОМ И
УКЉУЧЕНОСТИ ЗАЈЕДНИЦЕ НА
ЗАПОСЛЕНЕ И ЛОКАЛНУ ЗАЈЕДНИЦУ**

Л. Фонсека, Р. Ферро

Остваривање континуираног успеха фирме подразумева стварање економске вредности уз уважавање околине и друштвених вредности. Фирме такође морају да знају какве су потребе и очекивања релевантних фактора и да их укључе у своје стратегије пословања и програме. Ови изазови подразумевају да инжењери у својим професионалним активностима треба да узимају у обзир друштвена, здравствена и безбедносна, комерцијална и питања околине. Ово истраживање бави се утицајем који имају фирмини програми управљања околином и укључености заједнице на њихове запослене и на локалну заједницу, при чему је посебна пажња посвећена малим и средњим компанијама. Резултати квантитативних истраживања показују да запослени у фирмама, које више улажу у програме управљања околином и програме укључености локалне заједнице, показују веће учешће у локалној заједници и да има више позитивне него негативне повратног утицаја од заједнице, при чему се истиче да је потребно да фирме посвећују више пажње својој политици комуникације.