International Journal for Quality Research 7(2) 231–238
ISSN 1800-6450

Manel Alcalà [1]
Frederic Marimón
Martí Casadesús

Article info:
Received 20 November 2012
Accepted 3 April 2013

UDC – 519.248

QUALITY MANAGEMENT SYSTEMS: ONE STEP FORWARD ON THE PAPER INDUSTRY

Abstract: *The objective of this article is double: firstly is to show the standards ISO 9001 and ISO 14001 evolution and secondly evolution and situation in the pulp and paper sector during the last years. We would like to investigate why this decrease and what are the tendencies for the future. The methodology used to elaborate this publication is to study the different ISO's graphs evolution and project them to the future using mathematic logical models to see their tendencies. In other hand, we make a qualitative questionnaire to six pulp and paper companies, trying to obtain common results and to observe the tendency.*

Keywords: *quality management, ISO 9001, ISO14001, FSC, PEFC*

1. Introduction

Dominant nature paper's industry activity is one of the most impacts on the environment. It is well known to all agents involved and each one has its own role to regulate these impacts. On one hand, governments and state or local authorities and in some cases others are supranational regulations to mitigate the potential harmful effects on the environment. These regulations are mandatory in some cases and in others are only recommendatory. Companies themselves are also developing their own strategies in this field. In general, society and in particular direct customers are also sensitive to environmental performance of their suppliers.

Indeed, from different scopes is influencing paper companies. From a more general level, the Kyoto agreement marks required emission limits to be met by countries and enterprises (Lansbergen, 2004). Also at the international level, ISO (International Standards Organization) released its first version of an environmental management system (EMS) in the early 80s. This rule has been updated over time and currently valid ISO 14001:2005 version. No doubt that is one of the standards that have enjoyed growing popularity and success has spread throughout the world (Marimon *et al*., 2009).

2. Analysis and evolution of ISO 14000 and ISO 9000 at a global level

According to the latest data published by the same ISO, the number of ISO 14000 certification worldwide at the end of 2008 was 188,815 (The ISO survey of certifications, 2009). There is no doubt that the growth is spectacular, considering that just 10 years ago, the number of

[1] Corresponding author: Manel Alcalà
email: manuel.alcala@udg.edu

certifications worldwide was 7887 (ISO, 1998).

At the European level has been extended another management model, also entirely voluntary for organizations: EMAS (Eco-Management and Audit Scheme, or Community Regulation of Eco-Management and Audit-scheme).

It is a more demanding than ISO 14000 in terms of content, but also voluntary. Indeed, EMAS is a voluntary regulation of the European Union recognizes organizations that have implemented an EMS and have acquired a commitment to continuous improvement, verified by independent audits. The EMAS recognized organizations-whether industrial companies, small and medium businesses, nonprofit organizations, government and international organizations, have a defined environmental policy, make use of environmental management systems and report periodically the operation of the system through an environmental statement verified by independent bodies. At European level, the number of certified organizations in 2010 was 4460, located mostly in Germany, Italy and Spain.

The pressure created to preserve the environment has grown and has led to the SGMAS' proliferation and diffusion of these. Anyway, it begins to sense that in some sectors is slowing growth. Even in some countries there is a clear slowdown in the number of certifications (Marimon *et al*., 2006; Casadesus and Alberti, 2003; Casadesus and Karapetrovic, 2005). It is good time to analyze what happens to these EMS based on ISO 14000. What are the causes for this reduction? Why are some companies that have made the effort to get certified in the past does not renew the certification? Which is the cost of continuing certification? Obviously, the reason why organizations decide not to renew the certification is because the costs associated with keeping outweigh the benefits they find.

Organizations are seeking through policies, procedures and tools make it possible to manage effectively and efficiently to achieve quality objectives. Among other areas that have a company to achieve this commitment to quality is the quality assurance which engages the whole organization. Therefore, the organization, planning and control of all activities and functions aimed at obtaining a quality according to predetermined requirements. To keep control of quality management according to quality assurance will be necessary to introduce a Quality Management System (QMS). Among the management systems for quality assurance system with more global acceptance is one that is based on ISO 9000. The ISO 9000 standards are a set of international standards are intended for the management and quality assurance companies (Vujovic *et al*., 2010).

Since 1987 the (ISO) released the first ISO 9000 family's version and its subsequent revisions in 1994, 2000 and 2008. This standards' family started in the first version with the inclusion of the ISO 9001, 9002 and 9003 applicable to each type of organization. While in subsequent revisions terminology was intended to simplify and make it more straightforward to apply focusing its content to continuous improvement and process management. ISO standards, identifies the requirements to be followed by a company to certify their QMS, establishing a customer-oriented corporate culture and defining a management model aimed at meeting the needs and expectations of customers. A step forward was the need for companies to include providers and customers to this quality management. This commitment to excellence in aspects related to products and services important to the consumer through Total Quality Management (TQM).

Something similar has happened in the ISO 9000 evolution. It is a previously published standard ISO 14000 and has been successfully disseminated. According to ISO (2009), at the end of 2009 there were 982832 ISO 9000 certified worldwide, the order of 5 times that of ISO 14000 certifications. However, there are clear signs of decay in the rate of diffusion of this standard. In some

countries, detects a clear setback: Companies are being decertified. In any case, other countries in which the number of certificates continues to grow and make notice that the world level increase growth. The literature has studied the recession that is taking place in this standard (Albuquerque *et al.*, 2007; Casadesús and Karapetrovic, 2005; Franceschini *et al.*, 2010; The ISO survey of certifications, 2009; Karapetrovic *et al.*, 2010). Precisely this literature can show light to provide a possible similar behaviour in spreading the ISO 14000 standard. There are no studies to determine reasons for decertification, Marimon *et al.* (2009) claim that the main reasons for the decertification organizations for the standard ISO 9001 is the excessive paperwork generated and do not survive the process of re-certification. These are also possible reasons for the hypothetical recession in ISO 14000.

Figure 1 shows the comparative evolution of both standards worldwide. In the figure, both series have been scaled according to the maximum saturation level expected using the logistic curve as a yardstick to predict the future trend. The previous literature on the difusion of these standards confirms that the logistic curve well describes this phenomenon.

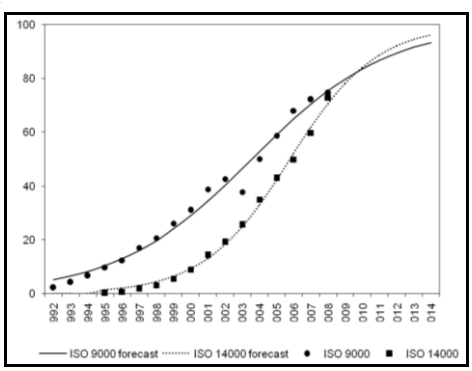

Figure 1. Evolution compared to both standards and its projected trend

The figure shows that although ISO 14000 is more recent, in 2008 both reached the same level on their respective saturations. This makes ISO 14000 is at this time a growth rates higher.

3. Analysis of the evolution of ISO 14000 certification in the paper industry

The dissemination of the EMS, as well as dissemination of management systems for quality (QMS) have been analyzed in depth, both from the point of view of the explanatory difusion's causes (Marimon *et al.*, 2009) and from the dynamic point of view (Jiang and Bansal, 2003). Anyway, all these items are analyzed aggregate data by country, but there are still few studies focusing on the analysis of a sector industry. Data are available about the certification of ISO 14000 by sector since 1998, by the reports published annually by ISO. In fact, since that year, includes a section in which the certifications are structured in both ISO 14000 and ISO 9000 in 39 sectors. One of them is the paper: "Pulp, paper and paper products."

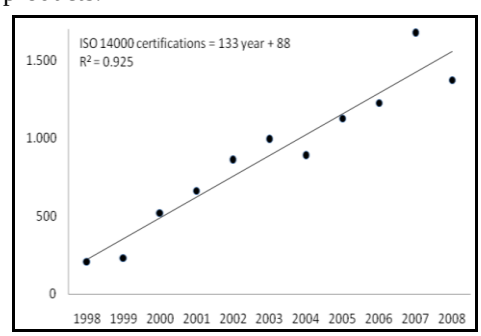

Figure 2. Linear regression ISO 14000 certification in the paper sector

Figure 2, shows the development of paper industry certifications. Adjustment explains a large percentage of the variance (R2 = 0.925) and the two coefficients are robust at the level of significance 0.05. The series shows an annual growth of 133 certificates, representing high growth rates. In fact, between 2001 and 2006 there was an average annual growth of 16.31%. The first two years and the last two are more irregular. In

any case, there is a strong growth rate. There is no doubt that the standard has a strong acceptance in the sector.

Enclosed is a similar graph (Figure 3) shows the evolution of ISO 9000 certifications in the same period. It also notes that the first two years and the last two show a somewhat different pattern to the years from 2000 or 2006. During these middle years, the linear regression fits perfectly. The number of new annual certification of 235 (one hundred more than in the standard ISO 14000), however a relative level represents an average annual growth of 4.46% between 2001 and 2006.

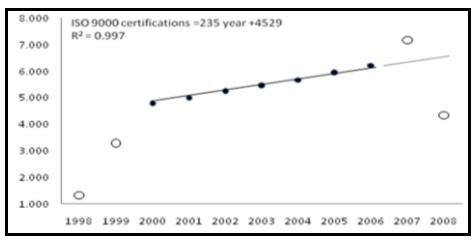

Figure 3. Linear regression of ISO 9000 in the paper sector

Another interesting aspect to analyze is the sector evolution's ranking within the list of 39 sectors in the ISO annual report. Figure 4, shows this evolution for the two standards: ISO 14000 and ISO 9000 certifications.

It is notice, that the sector has always been on the half top of ISO 14000 rankings (the contribution of this sector in the GDP (gross domestic product) of each country would provide a lower position in the ranking of ISO 14000). It is also noted that the position referred to the ISO 14000 certification has always been higher than ISO 9000. Indeed, the sensitivity for the environment sector has always been above their concern to maintain certifications in the field of quality management. Another phenomenon observed is a slight gradual decline in both rankings. This makes us wonder if there really is a widespread disinterest in the industry for this type (Barla, 2007) certification, especially the one in question in this work: the ISO 14000.

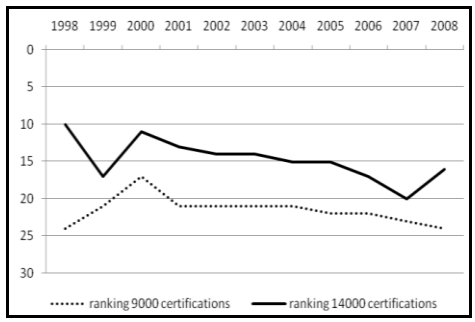

Figure 4. Evolution of the paper industry's position in the ranking of certifications by sector (in ISO 14000 and ISO 9000)

Figure 5 has a similar profile. Shows the percentage of industry certifications in total certifications. It is also noted that the share of the sector to analyze the ISO 14000 certification is always above the level which represents the sector in the field of ISO 9000.

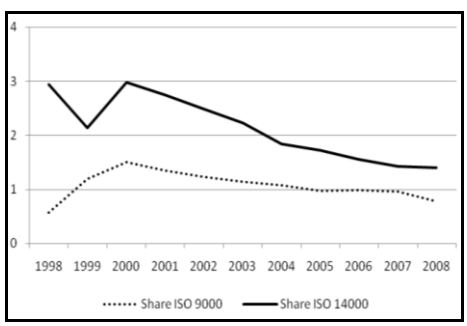

Figure 5. Evolution of the percentage of paper industry certifications (ISO 14000 and ISO 9000)

Yet, another important aspect to be analyzed in parallel with the development of ISO 14000 certifications. As defined in the various ISO 1400 2,3,4,5,6... (Karapetrovic and Casadesús, 2009) and the long journey that allows the standard itself.

4. Fsc certification

In fact, new standards are emerging to ensure a good relationship between business and environmental organizations. One of the most important in this sector that is gaining

strength over the past decade is the certifications from Forest Stewardship Council (FSC). FSC is an independent, non-Governmental, not-for-profit organization Established to Promote the responsible management of the world's forests. Established in 1993 as a response to global Concerns over deforestation, FSC is widely regarded as one of the most important of the last decade Initiatives to Promote responsible forest management worldwide.

FSC is a certification system that provides internationally recognized standard-setting, trademark assurance and accreditation services to companies, organizations, and communities interested in responsible forestry.

The FSC label provides a credible link between responsible production and consumption of forest products, enabling consumers and businesses to make purchasing decisions that benefit people and the environment as well as providing ongoing business value.

Over 16.000 certificates (March 2010), the number of companies along the forest product supply chain to FSC certification Committing Peaked at 50% in 2008 (FSC, 2010). The country that leads the ranking in this type of certification is the United States of America, 3645 certifications. Following the UK with 2030 certifications. Germany and China 1213 1142 certification. Then several countries under the 1000 certifications: Japan, Canada and Holland. In the Spanish sector, we have the breakdown by sector Table 1, where, if we include the group of pulp and paper products along with printing, we have 50% of the certificates are in the paper industry.

Table 1. Sector FSC certifications' in Spain (august 009). Source FSC spain.

PRODUCT	number	%
pulp and paper	49	26
comerce	1	1
printing	46	24
furniture, decoration, doors, windows...	43	23
boards, panels	31	16
others	18	10
total	188	

The paper sector is therefore a very important and is particularly interested in evidence to clients that they're an industry-friendly forestry. The analysis made in the previous section does see that the paper industry is still active in the demand for new ISO 14000 and other standards which demonstrate an appropriate relationship with the environment. Superior sensitivity is perceived in this respect than the other sectors. Indeed, it appears that the industry's position in the ranking of ISO 14000 certifications has always been higher than the ranking of ISO 9000. Moreover it is observed that sector participation in the global certificates is decreasing in both types of certifications. It is noted therefore that a number of companies are certified and continues to grow the number of certifications, but at a slower pace than expected. This all leads to find the reasons for this imbalance occur in the evolution of certifications in both standards.

Lot of printing customers of pulp an paper companies, consider that FSC certification is the highest available standard, if they are unable to use it in the short term they universally apply other standards to ensure that paper sourcing does not run contrary to environmental principles. The Programme for the Endorsement of Forest Certification Schemes (PEFC) provides a framework for the mutual recognition of different national

and regional certification schemes. It is their preference to use paper mills, printers and other suppliers who have gained or who have applied for EMS ISO 14001 accreditation. IS0 14001 is an internationally accepted standard that sets out effective Environmental Management Systems recognising a commitment to effective management of waste, careful use of energy and ensuring recycling processes are in line with government standards.

5. Practical cases

To investigate what will be the trend in 9000 and ISO 14000 certifications in the paper industry, a interview be conducted in depth to QMS and EMS responsible for in 5 companies.

Company A, established in 1881, is not been certified ISO 9000. According to manager "The ISO 9000 standards have been a fad and in our company do the products following procedures and ensuring product quality, without being certified". "While, certification ISO 14000 is important for us and we are currently carrying out certificates". "Our point of view in environmental issues are very important and especially in our sector"

Company B was founded in 1714. It was certified in 2001 of ISO 9001 and three years after ISO 14001. Environmental certification was the one meant for the larger company effort, erasing processes, updating ... certificates follow the two rules and according to the quality manager (QM) "Although we are not obliged, we will continue to get licenses because we will be going backward". Initially, it was a competitive advantage, but in nowadays it is no longer. The implementation has helped in areas such as establishing indicators, improving the external image of the company, improvement teams, and satisfaction surveys. As a conclusion the Q M. "disorganized business, have a poor quality and the ISO impose a certain orders, and improve the quality" ... Actually "the market demands impose us to be differentiated from the competitors in particularly by the kind of product in forest policy, environmental, allowing us to have a better profit margin." Certifications such as FSC, PEFC, Blueangel, and ECOLABEL are others that facilitate obtaining environmental certifications improving margins, improving customer image, whereas ISO not provide a better economic value. The tendency is to go to specialty products and certifications to highlight environmental characteristics.

Company C, founded in 1945. The year 1997 was certified ISO 9000, after four years of ISO 14000 and a year later OSHAS 18000 achieving an integrated system QM. "The certification was a major change within the company's own staff to change the way of work, methodologies. In recent years, we are specializing in environmental and specialty items for commercial reasons. The main certifications were FSC, PEFC and Carbon Neutral. "Today is no longer certified by the company's closure in 2009.

Company D, founded in 1884. It's currently certified ISO 14000 and ISO 9000. The q.m.: "The reasons of quality certification were primarily commercial and great benefits implantation, since the procedures were well established. It is a very bureaucratic process". They are the EMAS certificate. "The trend is specialty certified environmental standards like: Blueangel, Ecolabel, FSC, PEFC,...".

Company E, founded in 1748, was certified ISO 9000 in 1998 and ISO 14000 in 1999. Now, want to certify the EMAS. The q.m.: "The ISO 9000 certification has been requested by many countries and companies while ISO 14000 has not been as requested but has allowed some improvements in the recovery process as all waste ...".

6. Conclusion

In the global analysis phase is a downward trend of the certification of ISO 9000 and

ISO 14000. As refers to the paper industry, ISO 9000, is the most certified, while we note that in recent years a surge of decline. The ISO 14000 has followed a curve in ascending order, because the environmental sensitivity with most companies, which aim to improve its image. Currently, and as is apparent from interviews environmental certification is more important than quality. On the other hand, only these certifications do not get out on the market and many companies choose to supplement the 14001 with other qualifications. The EMAS European environmental standards and other forest FSC, PEFC, ECO-LABEL, carbon neutral ... are some of the certifications that enable companies to commercially highlight and enhance the image to their customers.

References:

Albuquerque, P., Bronnengerg, J. B., & Corbett, C. J. (2007). A spatiotemporal analysis of the global difussion of ISO 900 and ISO 14000 certifiction. *Management Science, 53*(3), 451-468.

Barla, P. (2007). ISO14001 certification and environmental performance in Quebec's pulp and paper industry. *Journal of Environmental Economics and Management, 53*(3), 291-306.

Casadesús, M., & Albertí, M. (2003). *La innovació i la gestió de la Qualitat a les empreses de Catalunya.* Barcelona: Centre d'Innovació i Desenvolupament Empresarial.

Casadesús, M., & Karapetrovic, S. (2005). Has ISO 9000 lost some of its lustre? A longitudinal impact study. *International Journal of Operations and Production Management, 25*(6), 580-596.

Casadesús, M., & Karapetrovic, S. (2005). The erosion of ISO 9000 benefits: A temporal study. *International Journal of Quality and Reliability Management, 22*(2), 120-136.

Casadesús, M., Heras, I., & Merino Díaz de Cerio, J. (2005). *Calidad pràctica*. Madrid: Prentice Hall, Financial Times.

Franceschini, F., Galeto, M., Maisano, D., & Mastrogiacomo, L. (2010). Clustering of European countries based on ISO 9000 certification diffusion. *International Joaurnal of Quality and Reliability Management, 27*(5), 558-575.

Jiang, R. J., Bansal, P. (2003). Seeing the need for ISO 14001. *Journal of Management Studies, 40*(4), 1046-1067.

Karapetrovic, S., & Casadesús, M. (2009). Implementing environmental with other standarized management Systems: Scope, sequence, time and integration. *Journal of Cleaner Production, 17*, 533-540.

Karapetrovic, S., Casadesús, M., & Saizarboitoria, I. H. (2010). What happened to the ISO 9000 lustre? An eight-year study. *Total Quality Management, 21*(3), 245-267.

Lansbergen, P. (2004, January). *The Kyoto protocol: Implications and opportunities for the pulp and paper sector.* Paper presented at the 90th. Annual meeting- pulp and paper, Technical association for Canada, Preprint, Montreal.

Marimon, F., Casadesús, M., & Heras, I. (2006). ISO 9000 and ISO 14000 standards: an international diffusion model. *International Journal of Operations & Production Management, 26*(2), 141-165.

Marimon, F., Heras, I., & Casadesús, M. (2009). ISO 9000 and ISO 14000 standards: A projection model for the decline phase. *Total Quality Management, 20*(1), 1-21.

The ISO survey of certifications (2009). *The ISO survey of certifications 2008*. Retrieved from: www.iso.org

Vujovic, A., Krivokapic, Z., & Jovanovic, J. (2010). Top priority qms principles for achieving business excellence. *International Journal for Quality Research*, *4*(2), 117-124.

Usefull links:
EMAS 2010. Web consultada 10 de mayo de 2010

- http://www.emas-register.eu/statistic.php?view=all_sites
- FSC 2010. Web consultada 11 de mayo de 2010
- http://www.fsc.org/facts-figures.htm
- http://data.worldbank.org/topic/environment
- http://www.fsc.org/facts-figures.htm
- http://www.eco-label.com/spanish/
- http://www.pefc.es/
- http://www.graciaspapel.es/
- http://www.aspapel.es/
- http://www.afco.es/

Manel Alcalà
Universitat de Girona
Escola Politècnica Superior,
Departament d'Organització,
Gestió Empresarial i Disseny
de Producte
Spain
manuel.alcala@udg.edu

Frederic Marimón
Universitat Internacional de
Catalunya
Facultat de Ciències
Econòmiques i Socials,
Departament d'Economia i
Organització d'Empreses
Spain
fmarimon@cir.uic.es

Martí Casadesús
Universitat de Girona
Escola Politècnica Superior,
Departament d'Organització,
Gestió Empresarial i Disseny
de Producte
Spain
marti.casadesus@udg.edu