

## A NEW ISO 9001 DIFFUSION INDEX

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### ABSTRACT

**Purpose** – ISO 9001 certification is nowadays considered to be one of the most effective tools that can be adopted for guiding the management of Quality Systems. The stunning growth observed by these standards all over the world confirms a strong polarization of enterprises' interest in this practice. Owing to the wide incidence of this phenomenon, a deep investigation of ISO 9001 diffusion over time is of mandatory importance. In the line of our previous publications, this paper derives from a research project that we are conducting in Portugal in order to develop the “ISO 9001 European Scoreboard”, aimed at studying and ranking European Union countries based on quality management systems diffusion.

**Methodology/Approach** – In order to achieve such a goal, the authors have performed a set of statistical analyses over public data sets.

**Findings** – Based on the model developed and in the analyses performed we were able to find out clusters of countries with different ISO 9001 evolution stages, derived from the ISO 9001 per 1000 inhabitants' scores and countries growth indexes.

**Originality** – With this scoreboard we are able to categorize and rank countries based on the quality management systems evolution (growth rates) over the past few years. In the end, such an “ISO 9001 European Scoreboard” will be an instrument to provide a comparative assessment of quality management practices over the European Union

states, leading to the dynamic evaluation of their “macroquality” levels achieved, according to such a standard. We believe that such results provide an additional important contribution to the study of management systems diffusion/evolution, aimed at providing more fact-based insights and understandings.

**Keywords** – ISO 9001, scoreboard, diffusion, evolution.

## **INTRODUCTION**

International standards provide requirements or give guidance on good management practices. Of the many standards published, a few have achieved truly global status and are now integrated with the world economy and in the organizations that use them (Juran and De Feo, 2010). Thus, a management system can be defined as a set of interrelated organizational processes which use different resources to achieve the objectives specified by the organization. Management systems therefore relate to planning, carrying out, controlling and improving various activities in an organization, by itself, and with regard to its stakeholders, on how the company is performing both in the short and the long term. According to Karapetrovic *et al.* (2006), management systems are thus based on the basic principles of systematization and formalization duties.

Management systems today cover a broad spectrum of areas within an organization and are aimed at providing confidence to different internal and external stakeholders. Karapetrovic and Willborn (1998a, 1998b), Karapetrovic *et al.* (2006) and Sampaio *et al.* (2009, 2010), among other researchers, address a number of factors that influence decisions on the implementation of a specific standard, ranging from the availability of internationally accepted models to stakeholders pressures. The three most popular standards are ISO 9001 (quality management systems), ISO 14001 (environmental management systems) and OHSAS 18001 (occupational health and safety management systems). Additionally to these standards, there is an emergent set of other standards that, although having a more reduced number of certified companies, do reflect significant added value for those companies that implement them. In this group of standards one can find namely ISO 22000 (food safety management systems), ISO/TS 16949 (quality management systems – particular requirements for the automotive sector), or ISO 26000 (social responsibility).

The number of ISO 9001 certified companies is significantly high when compared with the remaining management systems, thus reflecting the huge importance that ISO 9000 certification has assumed for companies across the planet. According to the last ISO Survey (ISO, 2012), in December 2011 there were issued 1.111.698 ISO 9001 certificates in the world. China leads the ISO 9000 top 10 countries, with 328.213 certificates, followed by Italy with 171.947 certified organizations. Regardless of the number of ISO 9000 worldwide certified organizations, it is important to point out that recent analyses show an apparent stabilization over the number of certified companies, thus reflecting a possible market saturation (Sampaio *et al.*, 2011).

In the line of our previous publications, this paper derives from a research project that we are conducting in Portugal in order to develop the “ISO 9001 European Scoreboard”, aimed at studying and ranking European Union countries based on the quality management systems diffusion. With this scoreboard we will be able to categorize and rank countries based on the quality management systems evolution (growth rates) over the past few years. In the end, such an “ISO 9001 European Scoreboard” will be an instrument to provide a comparative assessment of quality management practices over the European Union states, leading to the dynamic evaluation of their “macroquality” levels achieved, according to such a standard.

We believe that such results provide an additional important contribution to the study of management systems diffusion/evolution, aimed at providing more fact-based insights and understandings.

This paper is structured as follows. In the next section we present a short literature review related to management systems worldwide diffusion, followed by a research methodology section. Then, we present the work developed and an analysis of the results obtained. Finally, we close with a conclusions section.

## **RESEARCH METHODOLOGY**

Given the goal already mentioned, the work that we conducted consisted mostly of a quantitative exploratory data analysis over data collected from reliable sources, both regarding ISO 9000 certification as well as population. By crossing both sets of data, we

were able to come up with a number of insightful observations, based upon the values collected from the sources that will be mentioned next.

### Data sources

For the purposes of this study, we have compiled and used data obtained from the following two main sources:

- ISO, regarding data related with the numbers of ISO 9001 certified entities.
- World Bank, regarding data related to the population of each country.

### ISO 9001 EUROPEAN SCOREBOARD (E9S)

According to the last available ISO Survey (ISO, 2012), the number of ISO 9001 issued certificates in Europe represents 44% of the worldwide number of issued certificates. Looking in more detail the European Union (EU) reality (Figure 1), the average number of ISO 9001 issued certificates per 1000 inhabitants – ISO 9001pc, has been higher in the EU15 than in the EU 27 for the majority of the analyzed time period. However, since 2003 the gap between the two scores is decreasing and almost inexistent in the past few years. It is important to point out that the first enlargement of the European Union took place in 2004 and this fact may have catalyzed the diffusion and increase of the number of certified quality management systems in those countries. Furthermore, the number EU 15 ISO 9001pc score is decreasing/stabilizing since 2008 and the EU 27 score presents a growth trend, thus reflecting that the increase of the number of issued certificates in Europe is mainly due to the east enlargement of the European Union.

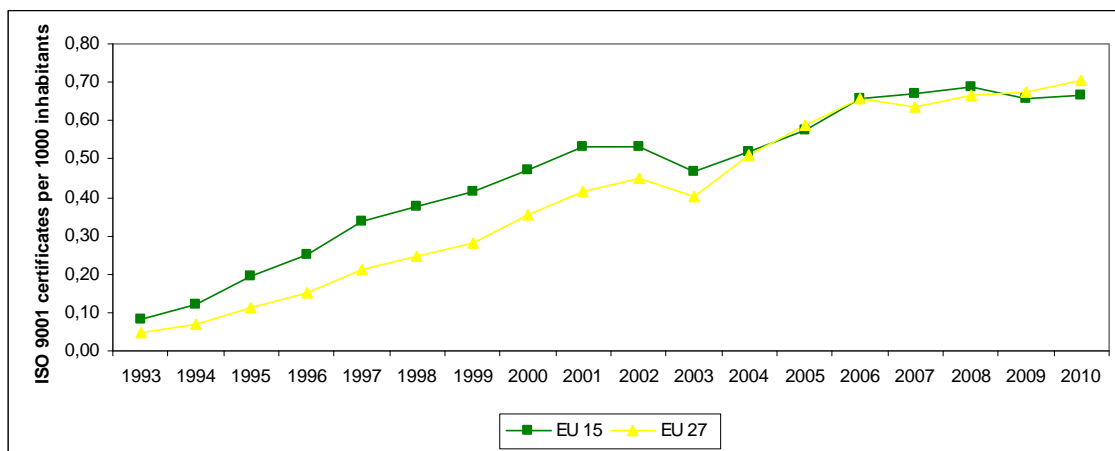


Figure 1. ISO 9001 evolution in the European Union.

The ISO 9001 European Scoreboard proposed in this paper derives from the following model:

$$E9S_{x,z} = (0.2 \times \Delta_{i-3})_{x,z} + (0.3 \times \Delta_{i-2})_{x,z} + (0.5 \times \Delta_{i-1})_{x,z}$$

where :

$$\Delta_{i-3}; \quad \Delta_{i-2}; \quad \Delta_{i-1} \quad ,$$

corresponds to the variation of the number of issued certificates in the years  $i-3$ ,  $i-2$  and  $i-1$ , to the  $x$  standard in the  $z$  country or region.

In the model developed we considered different weights for the number of ISO 9001 certificates variations, thus reflecting that each year assumes a different importance in the E9S estimation – the most recent years have more weight in the E9S score estimation.

Table 1. ISO 9001 European Scoreboard.

<b>Country</b>	<b>E9S (%)</b>
Luxembourg	-23.2
Netherlands	-12.8
Belgium	-8.4
Greece	-8.4
Slovenia	-3.0
Hungary	-2.8
Spain	-2.7
Sweden	3.6
Finland	3.8
Portugal	4.3
Germany	4.3
Denmark	4.8
Ireland	6.2
Estonia	6.3
Poland	6.6
Italy	6.9
UK	7.6
Cyprus	9.5
Slovakia	10.5
Austria	10.7
Bulgaria	11.5
Malta	12.5
France	14.2

<b>Country</b>	<b>E9S (%)</b>
Lithuania	15.4
Romania	17.7
Czech Rep.	18.9
Latvia	28.9

Table 1 shows the E9S scores computed based on the evolution of the number of ISO 9001 issued certificates in the last three years (2007-08; 2008-09; 2009-10). As one can see, we were able to identify three groups of countries:

- (1) Countries with a negative E9S score, thus reflecting that there is a decrease in the number of ISO 9001 issued certificates in those countries for the last few years.
- (2) Countries with a positive E9S score but below 10%. This group of countries is mainly composed by many of the EU15 countries. For the majority of these countries a stabilization of the number of companies with certified quality management systems or a very soft increase is taking place.
- (3) Finally, the third group of countries is composed by those countries with a very significant growth dynamic – countries with E9S scores higher than 10%, where the number of ISO 9001 issued certificates increased substantially in the last few years. In general, this group of countries is mainly composed by Eastern Europe countries.

It is also important to point out that 26% of the EU countries do have a negative E9S score, 40% do present a positive score but below 10% and 33% of the countries do present a clear growth dynamic concerning ISO 9001 registration.

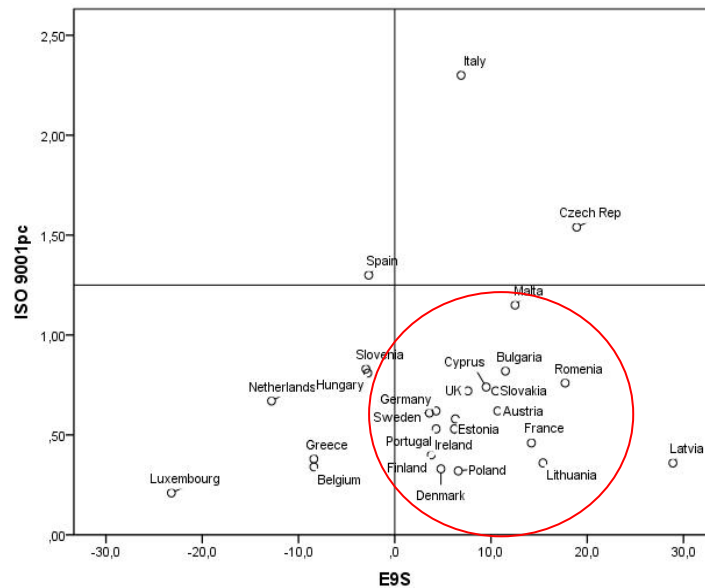


Figure 2. ISO 9001pc versus E9S.

Figure 2 reflects the relationship between the ISO 9001pc score (Saraiva and Duarte, 2003; Sampaio *et al.*, 2009b, 2009c) and the E9S score for each EU country. As one can verify, the majority of the EU countries do present ISO 9001pc scores below 1.00 and E9S scores below 20%.

Based on Figure 2, we would like to point out also the following:

- Italy does present the highest ISO 9001pc score (2.30) but a growth index (E9S) below 10%.
- Czech Republic does present a high ISO 9001pc score (1.54) together with a high E9S score of 19%. On the opposite side, Latvia does present the highest E9S score (29%) but a reduced number of issued certificates per 1000 inhabitants (0.36).
- Spain does present a high ISO 9001pc score (1.30) together with a negative growth index of 2.7%.

## CONCLUSIONS

In this paper we present the first approach to a new ISO 9001 diffusion indicator that allows one to categorize and rank countries based on the quality management systems evolution (growth rates) over the past few years. As was stated, we have identified different profiles of countries based on their E9S scores – countries where ISO 9001

certification is decreasing; countries where ISO 9001 certification is stabilizing; and countries where ISO 9001 certification is significantly increasing.

This was our first approach in order to develop an “European Quality Scoreboard”, that will be an instrument to provide a comparative assessment of quality management practices over the European Union states, leading to the dynamic evaluation of their “macroquality” levels achieved. Currently, we are working in order to improve the model presented in this paper with the introduction of new variables that reflect the quality state-of-the-art in each European Union country. However, we believe that these first results provide an additional important contribution to the study of management systems diffusion/evolution, aimed at providing more fact-based insights and understandings.

### **Acknowledgements**

The authors acknowledge the financial support provided by COMPETE Program and Fundação para a Ciência e a Tecnologia – FCOMP-01-0124-FEDER-022674.

### **REFERENCES**

ISO (2012). *The ISO Survey of Certifications 2011*, International Organization for Standardization, Geneva, Switzerland.

Juran, J. e Feo, J. (2010). *Juran's Quality Handbook*. 6<sup>th</sup> ed. (Mc Graw-Hill).

Karapetrovic, S., Casadesús, M., Heras, I. (2006), *Dynamics and integration of standardized management systems – an empirical study*, Universitat de Girona, Girona, Spain.

Karapetrovic, S., Willborn, W. (1998a). The Systems View for Clarification of Quality Vocabulary. *International Journal of Quality and Reliability Management*, 15(1), 99-120.

Karapetrovic, S., Willborn, W. (1998b). Integration of Quality and Environmental Management Systems. *TQM Magazine*, 10(3), 204-213.

Sampaio, P., Saraiva, P., Guimarães Rodrigues, A. (2009). ISO 9001 Certification Research: Questions, Answers and Approaches. *International Journal of Quality and Reliability Management*, 26(1), 38–58.



Sampaio, P., Saraiva, P., Guimarães Rodrigues, A. (2010). A Classification Model for Prediction of Certification Motivations from the Contents of ISO 9001 Audit Reports. *Total Quality Management and Business Excellence*, 21(12), 1279-1298.

Sampaio, P., Saraiva, P., Guimarães Rodrigues, A. (2011). ISO 9001 Certification Forecasting Models. *International Journal of Quality and Reliability Management*, 28(1), 5-26.