European Quality Scoreboard: Preliminary Results

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Abstract

**Purpose:** Nowadays, quality is usually measured based on the ISO 9000 registration numbers. However this gives us a narrow perspective of quality. To overcome this issue it is proposed a new model to measure macroquality in the Europe Union - the European Quality Scoreboard (EQS). This scoreboard is not just based on the number of ISO 9000 issued certificates per country, but also based in other indicators that are related to the country quality state-of-the-art. Each one of the indicators, previous validated with an expert panel, has a different weigh of importance in the computation of the score. Through the EQS it will be possible to make a comparative assessment and characterization of the quality performance of each European Union Country and understand their behaviors concerning quality. It is expected that the scoreboard will be able to aggregate countries in a more accurate way according to their quality performance.

**Methodology/Approach:** To achieve the goal of this project, it was performed a set of statistical analyses over public data sets and in the final stage the scoreboard indicators had been validated with a specialists panel, composed by people from the industry sector and from academia.

**Findings:** The scoreboard allows one to aggregate countries in a more accurate way according to their quality performance.

**Originality:** The EQS is an instrument that provides a comparative assessment of the macro-quality in the European Union countries, allowing one to characterize the quality state-of-the-art in each one of those countries. The results provide an additional important contribution to the worldwide study of quality approaches diffusion and evolution.

**Keywords:** Quality, scoreboard, macroquality
Introduction
The main goal of the European Quality Scoreboard (EQS) is to give a broader view of the state of Quality in European Union. This scoreboard is not just based on the number of ISO 9000 issued certificates per country because according to Karapetrovic et al. (2006), management systems are thus based on the basic principles of systematization and formalization duties and this cannot give us the real perception of quality. It is also important to have other indicators that are related to the country quality state-of-the-art, namely, the training of human resources percentage in quality field, also the number of other kinds of certifications and accreditations, and understand how many people are directly involved in quality field.

Each one of the indicators, previously validated with an expert panel, has a different weight of importance in the computation of the score. Through the EQS it will be possible to make a comparative assessment and characterization of the quality performance of each European Union Country and understand their behaviors concerning quality. It is expected that the scoreboard will be able to aggregate countries in a more accurate way according to their quality performance. To achieve the goal of this project, it was performed a set of statistical analyses over public data sets and in the final stage the scoreboard indicators had been validated with a specialists panel, composed by people from the industry sector and from academia.

According to Sampaio et al. (2013) 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, nowadays, the most popular standards for certification are ISO 9001 (quality management systems), ISO 14001 (environmental management systems) and OHSAS 18001 (occupational health and safety management systems) also ISO 22000 (food safety management systems), ISO/TS 16949 (quality management systems – particular requirements for the automotive sector), or ISO 26000 (social responsibility) are standards that belong to a more restrict group having a more reduced number of certified companies, do reflect significant added value for those companies that implement them.

This article is more focused in the ISO 9001 European Scoreboard indicator,. we believe that such results provide an additional important contribution to the study of the real quality.

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.

Literature Review
According to Sampaio et al. (2013) 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, 2011), in December 2010 there were issued 1.109.905 ISO 9001 certificates in the world. China leads the ISO 9000 top 10 countries, with 297.037 certificates, followed by Italy with 138.892 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).

At present, there is a large number of international and national standards whose aim is to order
and systematize, among other things, the implementation of business management systems in relation to a wide variety of functions and operations. All the ISO management standards have a very similar methodology, which includes the creation, structure and implementation process, possibly followed by a verification conducted by a third independent part.

Chang and Lo (2007) and Huarng et al. (1999) claimed that in Taiwan, certification brought significant benefits in terms of quality improvement, international competitiveness, cost reduction and increased sales. Also operating a quality system allows a reduction in costs, increasing the company’s economical stability, competitiveness and prestige, and helping the company extending the number of customers, meeting better the external regulations, etc. (Ruzevicius et al., 2004). Nevertheless some authors consider that the number of ISO 9001 certificates per country does not express directly the companies’ efficiency. It is not possible to classify a country as more efficient than other, just because it has a higher number of issued certificates. However, usually, certified companies are more organized and more client-focused due to the implementation of the standard. The ISO 9001 standard is a tool that helps companies to achieve business excellence, promoting quality excellence with a strong customer focus (Klefsjö et al., 2008).

Studies carried out by Franceschini et al. (2004, 2006), analyzes in detail some areas looked at by Saraiva and Duarte (2003). The authors have studied the ISO 9000 standard quality certification growth in some European countries and have suggested the use of a logistic model, from a close analogy between certification diffusion and bio-population growth, in order to describe the certification diffusion process related to each specific economic-entrepreneurial macro-structure. The model suggested provides a forecast of new certifications growth, together with the time required to reach a certain saturation level. If we look at the evolution curve for the number of certificates over time, in each country, we can indeed observe a kind of “saturation effect” (Franceschini et al., 2006). According to the authors, after a certain period of fast growth, a physiologic break takes place, suggesting that when the number of certified organizations reaches a certain limit, certification loses its connotation and becomes less attractive for the remaining non-certified companies. At this stage, there is a reduction of the competitive gap between certified and non-certified companies, and the number of new enterprises potentially interested in achieving certification decreases significantly (Franceschini et al., 2004).

Sampaio et al. (2009b, 2009c) have concluded that there is a linear relationship between the number of ISO 9001 issued certificates per 1000 inhabitants and the percentage of ISO 9001 certified companies for each European Union (EU) country.

More recently, Marimon et al. (2004) and Casadesús et al. (2005) have tried to see if the model proposed by Franceschini et al. (2004) is only adaptable to a country’s ISO 9000 certification, or whether similar models can also be used for their levels of ISO 14000 certifications. Casadesús et al. (2005) have investigated whether these models can be used solely in terms of data gathered at worldwide level or could be also adaptable to each individual country involved. The authors have also tried to find out if the diffusion process has gone on in a relatively homogeneous way, between the different activity sectors involved, or if certification has clearly taken place more quickly in certain sectors. The authors have concluded that, according to the model proposed, ISO 9000 and ISO 14000 standards have reached an important moment in their maturity. From the economic sectors perspective, both standards are developing towards smaller indices of concentration and there are fewer fluctuations in the sector’s positions in the rankings of certifications. The authors have stated that those sectors that were leaders or pioneers in the introduction of the ISO 9000 standards have played similar galvanizing roles in the case of
the ISO 14000 standards. Corbett and Kirsch (2001) have stated that the unprecedented surge in the progress of the ISO 9000 standards has been an important factor in explaining the surge observed for the ISO 14001 standard.

According to van der Wiele et al. (2009) the differences among the different ISO 9000 countries lead to the conclusions that the diffusion of the ISO 9000 standard follows its own routes in different countries influenced by those countries specificities. For example, in a research study carried out in Egyptian companies the perceived relative advantage of ISO standards, the perceived complexity of ISO standards, the perceived compatibility of ISO standards with the existing quality system and procedures, the competitive environment where the company operates, the external pressure to implement a quality management system, the company organizational structure and an organizational structure highly formalized influence positively the adoption of ISO standards (Hashem and Tann, 2007). From a global perspective, the success do disseminating the management standards would seem to be closely linked to dynamics themselves of the globalization process of Western economies and the main players in them – multinationals (Marimon et al., 2009).

Given the above previous works, in the next section is proposed the European Quality Scoreboard that will allow to categorize and rank countries based on their macroquality. In the end, the EQS will be an instrument to provide a comparative assessment of macroquality practices over the European Union states.

Research Methodology
To achieve the project goal, it was conducted a study to identify the indicators present in the literature more suitable to evaluate the quality state-of-the-art of a region or a country. These indicators interact with ISO 9000 but have a broader view, including other kinds of certifications and accreditations that can be related to quality improvement. An expert panel validated and reviewed the proposed indicators, scoring them by its importance and suggesting adjustments to be incorporated in the EQS. After the collection of the experts’ feedback the EQS was revised and a new version of it was resubmitted again to the panel for a final validation.

Through the application of EQS it will be possible to make a comparative assessment and characterization of the quality performance in the different European Union countries and understand their behaviors concerning quality. As a first application of EQS it was performed a set of statistical analyses over public data sets.

Results discussion and future work
The presented results are based on only one of the EQS indicators – ISO 9001 European Scoreboard (I9S). According to Sampaio et al. (2013), the ISO 9001 European Scoreboard is an instrument to provide a comparative assessment of quality management systems implementation and diffusion over the European Union states.
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:

\[ \Delta_{i-3}, \quad \Delta_{i-2}, \quad \Delta_{i-1}, \]

corresponding 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. According to Sampaio et al (2013), the model developed above 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.
Figure 1 reflects the comparison between the E9S (2010) and the E9S (2011) score for each EU country. Additionally, it is possible to observe that the majority of the EU countries has an E9S score below 20%, and that the 2011 score reflects a significant reduction/stabilization of the
number of ISO 9001 registered companies in EU, with the exception of Romania, Italy, Finland, Estonia and Cyprus that present higher values for the E9S 2011. In other countries the score had decreased and in some of them becomes negative in 2011, namely, in Austria, Belgium, Bulgaria, Denmark, Greece, Hungary, Ireland, Netherlands, Poland, Spain, Sweden, Slovenia and Portugal. These situation could be the reflex of the European economic crisis.

The results presented in this paper are preliminary results. In future work a more detailed and complete description of the EQS will be presented, including its application to the Portuguese context.

References


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