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ADOPTION OF ISO 9001 QUALITY MANAGEMENT STANDARD IN AFRICA

Abstract: *This article analyzes the dissemination of ISO 9001, the main global management standards, within Africa. The work refers to the diffusion of ISO 9001 standard in terms of its certification intensity. In this article, the dissemination of ISO 9001 in Africa has been analysed. The findings reveal that the diffusion of the standard in this continent is not very relevant, what might be seen as an indicator of the process of Africa's trade marginalization in the age of globalization. The general certification intensity of the continent is of 0.18; in other words, the proportion of the contribution of Africa to the global GDP of the world is more than five times superior to the proportion of ISO 9001 certificates located in Africa. By means of the logistic model the dissemination of ISO 9001 is forecasted, and it has been observed that the diffusion of ISO 9001 in Africa is in an 85% of its saturation point. Taking into account this model, it's expected that the dissemination of ISO 9001 will be growing until 2020.*

Keywords: *International standards, standardization, harmonization, ISO 9001, transition economies, Africa*

1. Introduction

In the last two decades we have witnessed an acceleration of the process of harmonization with regard to business management, in an economic context characterized by a marked process of globalization and economic integration of markets. In a global economy, without standardization and its results – standards, technical standards and specifications–, interchanges would become exceedingly difficult. Standardization can, then, stimulate international trade by eliminating obstacles arising from different national practices. Thus, standards are important for the promotion of economic efficiency as they provide a basis for

reducing information-related transaction costs (Nadvi and Wältring, 2004).

Standardization, or harmonization, could be defined in a general way as an activity aiming to apply an ordered system to repetitive functions that take place in the context of industry, technology, science and the economy. Standardization constitutes a mechanism of coordination and an instrument of regulation comparable to other instruments such as public regulations, markets, and hierarchies or formal organizations (Antonelli, 1994; Brunsson and Jacobsson, 2000). Standardization has been crucial for the development of the industrial society (Blind, 2004). At its origins, in the early 20th century, standardization was introduced in order to curb an uneconomical divergence of components, parts and supplies and to foster

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their interchangeability so as to facilitate mass production and the repair and maintenance of products and services. Standardization, however, has gone further than this and has come to be applied to the very management processes and systems by which products and services are produced (Heras-Saizarbitoria and Boiral, 2013). Brunsson and Jacobsson (2000) refer to these as *standards for administrative processes*, and Furusten (2000) as “*standards on how to design and manage organizations*”. We can explicitly identify these *administrative standards* with what we would define here as management system standards (MSS), also referred to as metastandards (Uzumeri, 1997), two terms that already have a tradition of academic acceptance (Corbett and Yeung, 2008; Heras-Saizarbitoria and Boiral, 2013).

These management standards are, of course, to be distinguished from the technical norms and specifications relating to those requirements with which particular products or processes need to comply. MSSs are standards which correspond to the standardization of a very wide range of aspects of business activity, such as quality management (e.g. ISO 9001), environmental management (e.g. ISO 14000), the prevention of occupational hazards and the provision of health and safety regulations in the workplace (e.g. OHSAS 18000), and corporate social responsibility (e.g. SA 8000, ISO 26000). All of these standards tend to have a very similar methodology in relation to their creation, structure, process of implementation and monitoring by a *third party*. Among them ISO 9001 is arguably the most influential single international MSSs that there has been to date (Braun, 2005).

The ISO 9000 family of standards was launched, in its initial form, in 1987, and underwent substantial revisions in 1994 and 2000, by the International Standardization Organization. This body, known by its acronym ISO and that was created in 1947, is an entity made up by more than 100 member states, and its objective is to favour

the development of standardization, thus facilitating the interchange of products and services between countries. It has to date published over 14,000 international standards (known as ISO standards), some of which are management standards.

It should also be stated that the implementation of this type of standard or norm is voluntary, although in certain sectors their application constitutes a *de facto* obligation. In this way (and as will be examined subsequently below), in those studies in which an analysis has been made of companies’ motivations for obtaining certification, considerable emphasis has been accorded to the “prescriptive” role played by large companies in the construction, automotive, energy and telecommunications sectors. The latter saw in the ISO 9001 standards a way of ensuring a certain level of quality from their suppliers and subcontractors, in the sense of obtaining a certain systematization and formalization of the key processes utilized by such companies to comply with the requirements that the larger companies had established, but without increasing their operational costs.

This article contains an analysis of the adoption of this main global management in Africa. Following this introduction, the relationship between ISO 9001 and international business is presented. The third section contains an empirical analysis of the dissemination of ISO 9001 in Africa and the fourth one a forecasting of that dissemination for the future. The paper concludes with a summary of the main discussion and the conclusions drawn and references.

2. ISO 9001 and International business

From an international business perspective, the successful diffusion of ISO 9001 would appear to be closely linked to the basic impetus of the process of globalization of the Western economies, to the extending global supply chains and the still growing

importance of multinational companies (MNCs) (Boiral, 2001; Braun, 2005). In the current economic environment, in which outsourcing and relocation of companies' activities have become key strategic elements of global supply chains, it is necessary to foster certain homogeneity of management systems in order to favour the development of such processes, and ISO 9001 may help to achieve this aim (Heras, 2006). As stressed by Clougherty and Grajek (2008) for ISO 9001 MSSs provide a common language (i.e., common routine, shared experience, similar climate, etc.) that

helps firms from different nations to consummate (i.e., successfully integrate) international acquisitions and joint-ventures.

In the specialised literature, it is pointed out that the main driving force behind firms becoming certified is mainly related to customer and market pressures (Boiral, 2001; Guler *et al.*, 2002; Braun, 2005; Shin, 2005; Duanmu and Fai, 2007; Guasch *et al.*, 2007). In accordance with these contributions, ISO 9001 certification prove very important for entry into supply chains, supplier networks, and export consortia.

Table 1. empirical works on the macro-level drivers of ISO 9001

	<i>Countries</i>	<i>Contributions/Findings</i>
Corbett and Kirsch (2001)	63	ISO 9001 level depend on export-propensity
Guler <i>et al.</i> (2002)	71	Multinationals through inward FDI and the national cohesive trade relationships
Pan (2003)	4 (Far eastern)	Strong link between ISO 9001 and ISO 14000 certification
Grajek (2004)	101	Positive effect of foreign customers' adoption on domestic adoptions
Neumayer and Perkins (2005)	142	Stock of FDI and exports to Europe and Japan
Albuquerque <i>et al.</i> (2007)	56	Bilateral trade and geographical proximity for ISO 9001,
Cao and Prakash (2007)	164	Trade and foreign investment networks support ISO 9001 diffusion
Corbett (2008)	9	Pressure exerted by downstream customers through global supply chains
Masakure <i>et al.</i> (2009)	1 (Pakistan)	Export performance is positively correlated with ISO 9001 certification
Bodas-Freitas (2009)	8 (OECD)	Trade with UK and Germany fosters ISO 9001 certification

Source: Own preparation.

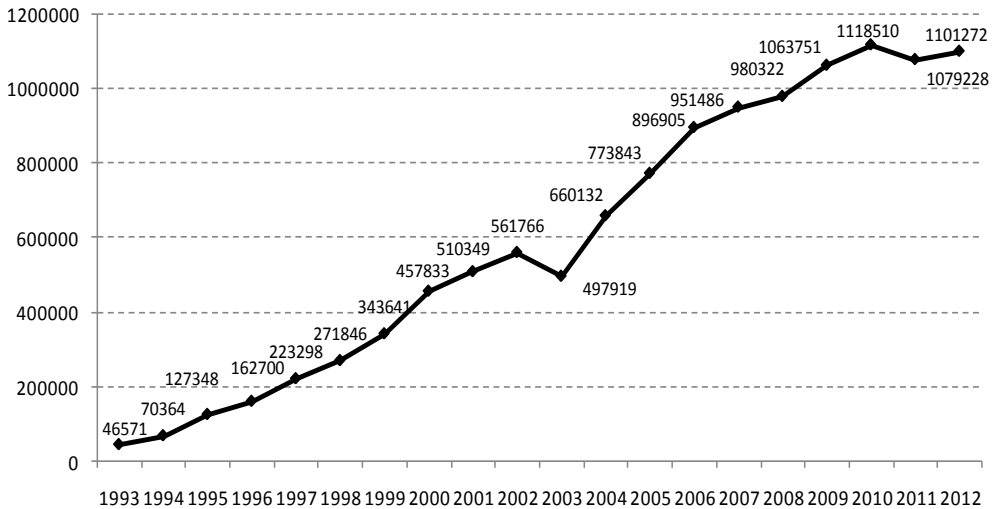
A set of studies stress that there exists a positive correlation between the number of certificates and macro-economic variables such as the volume of direct overseas investment, the tendency to export to the EU and the country's public expenditure (see table 1). Research by Cao and Prakash (2007) concluded that the adoption of ISO

9001 in a given country is likely to be encouraged if its salient export markets have high levels of ISO 9001 adoptions. Albuquerque *et al.* (2007) pointed out that the diffusion of ISO 9001 is driven primarily by geography and bilateral trade relations.

3. ISO 9001 dissemination within Africa

By late 2012, over 1,100,000 ISO 9001 certificates had been authorized in a total of 178 countries all over the world, thus more

than doubling the number of certificates compared with the figure for the end of the year 2000, a year during which a new version of the standards was launched, and by the end of which there were a total of 457,834 such certificates



Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO

Figure 1. Worldwide temporal diffusion of ISO 9001

Continent by continent, it can be seen that the EU, with 474,574 certificates issued, continues to lead in terms of total number of ISO 9001 certificates, since it absorbs more than the third of the total number of certificates awarded throughout the world (more precisely, 43.05% of the total). Nevertheless, this global leadership has diminished by more than twelve percentage points when compared with the year 2000 (55.73). China is the country with the largest number of certificates in the world (having a total of 334,032 by the end of 2012),

followed by Italy (with 137,390), and Spain (with 59,418).

In Africa, it is not very important the weight of ISO 9001. In this continent, there are 9,795 certifications, only the 0.89% of the certifications in the world. It should be remarkable, the number of certificates of South Africa 3,918 (the 40.08% of the certifications of the continent), Egypt 2,383, (the 24.32% of the certifications) and Morocco 614 (the 6.26% of the certifications).

Table 2. International adoption of ISO 9001 in the main global economic zones

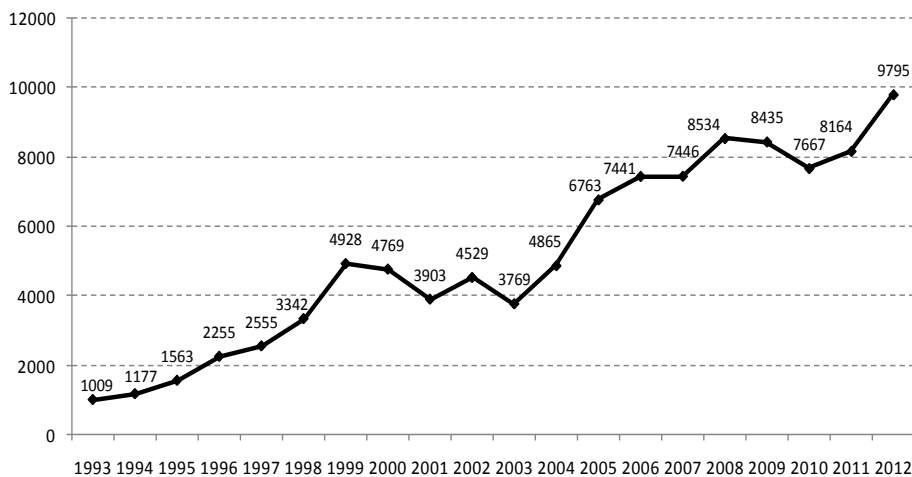
	1995	2000	2005	2012		
				N	%	CI
USA	8,762	35,018	44,270	26,177	2,38	0,21
Japan	3,762	21,329	53,771	50,339	4,57	0,98

European Union	90,023	255,191	343,382	436,402	39,63	1,63
China	507	25,657	143,823	334,032	30,33	2,16
Africa	1,563	4,774	6,771	9,795	0,89	0,18
World	127,349	457,834	773,867	1,101,272	100	1,00

Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO. Note: Up to the year 2000 the certificates analysed are ISO 9001, ISO 9002 and ISO 9003; from 2001 onwards the certificate analysed is ISO 9001:2000. CI (certification Intensity) calculated as the ratio between the percentage share of the number of certificates issued worldwide and the percentage share of total world GDP in 2011 measured in US dollars at current exchange rates of the time (World Bank).

As we can see in the figure 2, the number of certificates in Africa has gone down from 8,550 to 7,703 from 2008 to 2010. The decrease of certificates in Africa was due mainly to the decline in the number of certificates in Tunisia from 1,072 to 577, in South Africa from 3,792 to 3,326, in Mauritius from 333 to 97 and in Nigeria

from 215 to 27. However, since 2011 there has been a sharp increase of the number of certifications from 7,703 to 9,795 in 2012 due to the raise of South Africa from 3,326 to 3,918, Morocco from 414 to 614, Kenya from 264 to 460 and Egypt from 2,191 to 2,383.



Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO.

Figure 2. Evolution of ISO 9001 certification within Africa

As a report of the European Commission (2001) pointed out, ideally, the figures on ISO certifications should be weighted against the number of potential ISO certifiable enterprises in each country, and by industry structure of enterprises, in order to ascertain the degree of diffusion within the economy. As an approximation to that indicator we propose the Certification Intensity (CI). CI for the entire world, for

instance (see Table 1), is calculated as a ratio between the percentage of participation in the number of global certificates issued and the percentage participation in the world GDP.

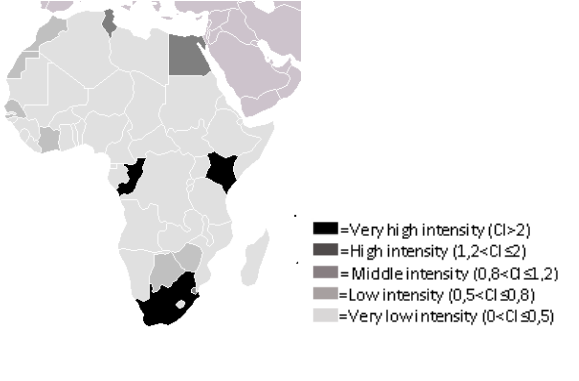
Within Africa (see Table 2), with the CI calculated as being the ratio between the percentage share of the number of certificates issued in Africa and the percentage share of total GDP of Africa, of

special note is the intensity of the Republic of Congo (4.64), Mauritius (4.19), Kenya (2.35), Southafrica (2.06), Tunisia (1.94) and Egypt (1.90). As we can see in the map of Africa the rest of the countries have a CI of

less than one, that is mean, that the proportion of its GDP respect Africa is bigger than their proportion of certificates ISO 9001.

Table 3. The certification intensity in Africa

	N-2012	CI-2012
South Africa	3,918	2.06
Egypt	2,383	1.90
Morocco	614	1.01
Tunisia	511	1.94
Kenya	460	2.35
Algeria	427	0.46
Republic of Congo	296	4.64
Mauritius	240	4.19
Sudan	84	0.23

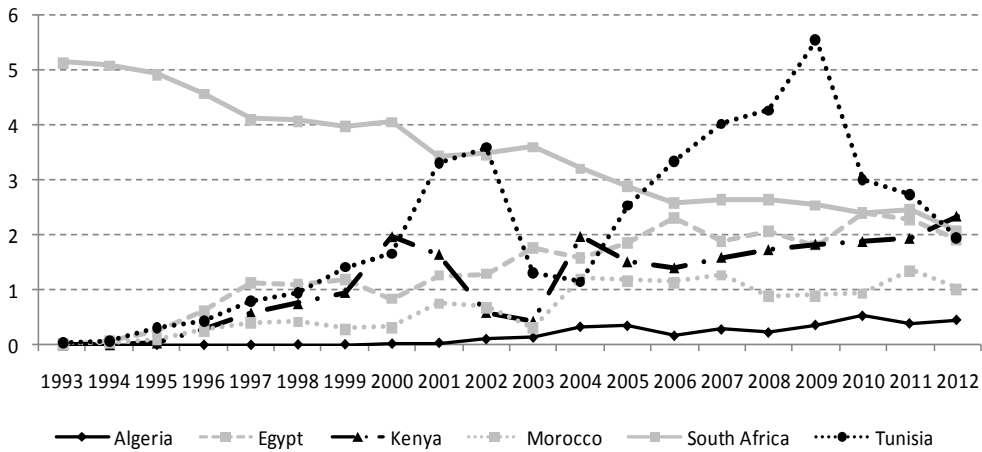


Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO and the percentage share of total world GDP in 2012 measured in US dollars at current exchange rates of the time (World Bank).

To analyse the difusion of ISO 9001 in Africa we are going to observe the difusión of the six countries with more certificates. Between Southafrica, Egypt, Tunisia, Morocco and Algeria have more than the 85% of the African certificates. In 1995, the 93 % of the african ISO 9001 certificates, namely, 1,454 were located in South Africa, in 2000 the 72%, in 2005 the 46% and in 2012 the 40%. For that reason, as we can see in the figure 3, its certification intensity has gone down from 4.79 in 1995 to 2.06 in 2012. The case of Egypt is totally diferent in 1995 there were only 45 certificated companies, the 2.8% of the african ISO 9001 certificates, and its certification intensity was 0.22 but it has grown up untill 1.90 in 2012. In this year in Egypt, there were 2,383 certificated companies that is the 24.32% of the African certificates.

As we can see in the figure 3, Morocco, Tunisia, Kenya and Algeria have increased

their CIs during this period but in a diferent way. Kenya had the highest intensity of the six countries in 2012, due to a huge increase from 2011 to 2012. A similar diffusion has been in Morocco but its CI is similar to the average of the continent, 1.01. The case of Tunisia is totally different, the number of certificates have fallen down from 1,072 in 2009 to 511 in 2012 and its CI from 4.71 to 1.94. In Algeria the number of certificates has increased gradually but its CI is low (Algeria 0.46). After this analysis, we have focused our study in the factor that could influence in the certification intensity. The first factor that we have analysed was the relation of the global competitiveness (World bank) and the Certification Intensity. To analyse this aspect we have calculate the correlation index that is 0.538 and we have proved that is significative for $\alpha=0.01$.



Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO and the percentage share of total world GDP in 2012 measured in US dollars at current exchange rates of the time (World Bank). Note: countries with more than 100 ISO 9001 certificates.

Figure 3. Comparative evolution of the Certification Intensity of ISO 9001 of the leading African countries

Another aspect that we have analysed is the relation between the GDP per capita and the CI. This relation for an $\alpha=0.01$ is significant too and its correlation index is 0.337. Another significant relation for an $\alpha=0.01$ is related with the CI and the exportation rate of the country. In this case, the correlation index is 0.356.

4. Forecasting the adoption of ISO 9001 in Africa

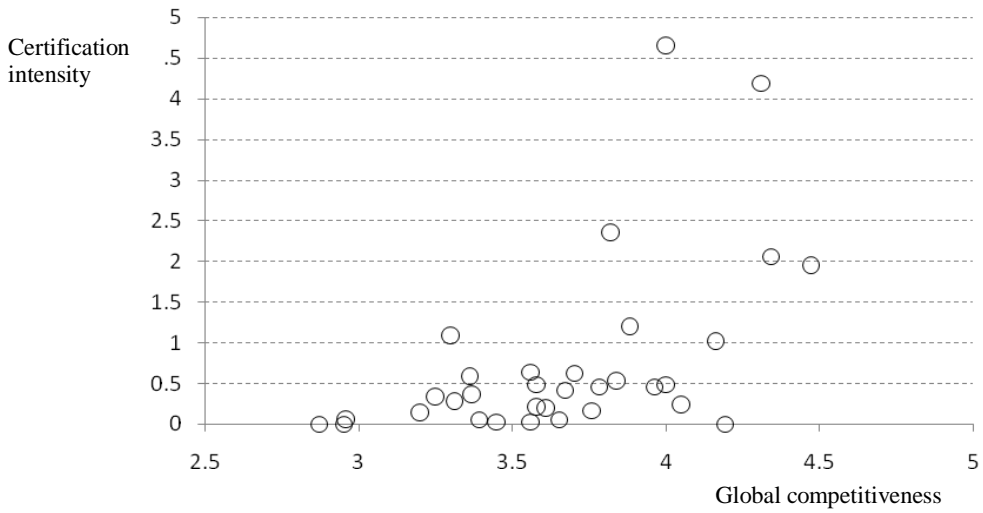
In the case of the Africa, it is observed that in ten years – from 1999 to 2012 – there was a spectacular growth in the number of certificates from 1,563 in 1995 to 9,795 certificates in 2012. However, as can be seen in Figure 2, between 1999 and 2003 there has been a sharp decrease from 4,928 to 3,729 and between 2008 and 2010 the reduction was from 8,564 to 7,667 in the number issued.

Looking to the future, it is difficult to estimate the evolution of the number of ISO certificates that are likely to be issued in

Africa. There are many economic and institutional factors which, as has been referred to in the analysis of literature available on the subject, may have a bearing on the process of development of such certificates. The major economic crisis which is currently being experienced on a global level may also have a marked influence on such evolution.

However, diverse research has attempted to propose methodologies to help make estimates as to the evolution of this type of MSS. Franceschini *et al.* (2004) and Marimon *et al.* (2006) have established that the logistic curve explains and forecasts the dissemination of ISO 9001 certification well.

For the case of Africa, in Figure 5 it may be observed how the logistic model suits the current certification data, with a fit of 92.7% for R squared. At present, we are at 85.17% of the saturation level for the ISO 9001. Considering 95% as a possible saturation point, the forecast according to this model is to arrive at a maximum of ISO 9001 certificates in 2020.

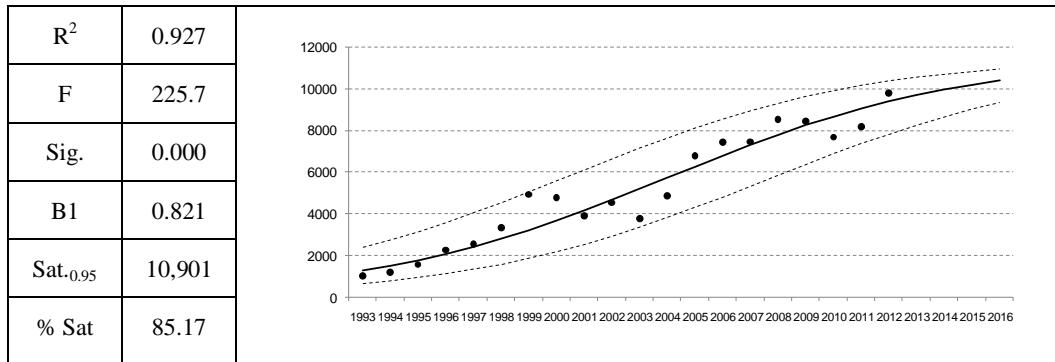


Source: Own preparation on the reports on the global statistics for ISO 9001 published by ISO and the Global Competitiveness index 2012 (World Bank).

Figure 4. Relation between the Certification Intensity of ISO 9001 and the Global Competitiveness index

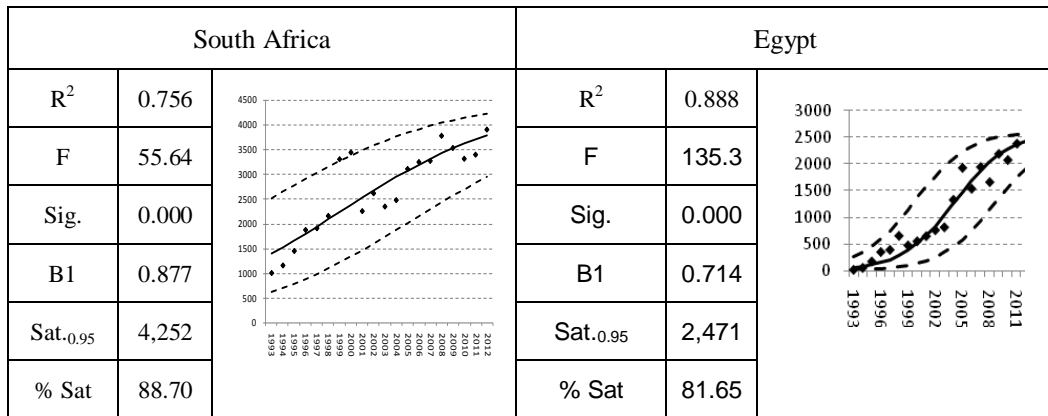
In the specific case of South Africa, as shown in Figure 8, it can be observed that the logistic model suit it well. The R Square value 0.756 it is fine, but it can be seen how in 1999 and 2000 the values are out of upper level of the model. It can be seen how the

saturation level 88.7% is higher than the saturation level of Africa because the percentage of certificates located in South Africa is decreasing from the 72.64% in 2000 to 40% in 2012.



Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO.

Figure 5. Forecast of ISO 9001 certificates in Africa



Source: Own preparation on the basis of the various executive reports on the global statistics for ISO 9001 published by ISO.

Figure 6. Forecast of ISO 9001 certificates in South Africa and Egypt

The case of Egypt is quite different. The percent of certificates located in Egypt is increasing from the 9.79% in 2000 to the 24.32% in 2012. For this reason, the saturation level 81.65 is smaller than the saturation levels of Africa. The logistic model fits well. The R Square value is 0.888 and the forecast is to arrive at a maximum of ISO 9001 certificates in 2016.

5. Discussion and conclusions

In this article, the dissemination of ISO 9001 in Africa has been analysed. According to this research, the diffusion of the standard in this continent is not very relevant, what might be seen as an indicator of the process of Africa's trade marginalization in the age of globalization. The certification intensity is of 0.18, that is, the proportion of the contribution of Africa to the global GDP of the world is more than five times superior to the proportion of ISO 9001 certificates located in Africa. By means of the logistic model the dissemination of ISO 9001 is forecasted, and it has been observed that the diffusion of ISO 9001 in Africa is in an 85% of its saturation point. Taking into account this model, it's expected that the dissemination of ISO 9001 will be growing until 2020.

With regards to the internal distribution, South Africa has been a pioneer country in this aspect because in the first stage until 1995 more than the 90% of the certifications of the continent were located in this country. From this year on, the dissemination in the other countries has been increased but in 2012 South Africa was the country with the highest number of certificates with a contribution of more than the 40% of the total, followed by Egypt that provided nearly the 25%. However, to develop a more accurate analysis, the dissemination has to be analyzed taking into account the economic dimension of each country. Then, the certification intensity of ISO 9001 related to the GDP indicator has been calculated and in eith this indicator, Mauritius, Republic of Congo and Kenya were the countries with the highest certification intensity followed by South Africa and Egypt.

Furthermore, the factors that have influenced in the dissemination of the standard has been tested. The certification intensity is positive correlated with the Global Competitiveness Index, with the GDP per capita and the exportation rate of each country. However, in our opinion, in order to make progress with this line of research, importance should be given to approaches which gather specific evidence linked to the various different

public and private programmes to promote metastandards that have been established in national contexts.

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