# AN APPRAISAL OF QUALITY STANDARDS DIFFUSION IN THE NATIONAL ECONOMIC SYSTEM

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## Abstract

In the domain of economics and management, the meaning attributed to the concept of "quality" has experienced a significant evolution, thus expanding and enriching its connotations. In fact, in parallel with the concept of technical and economic quality, new widespread concepts of quality are progressively acknowledged, including: socio-ethical and environmental issues, working and health safety conditions, information and food security, etc. Each one of these quality subsets represents requirements that can be translated into voluntary or compulsory standards whose compliance can assume different forms of expression (product certification, systems certification, personnel certification, audit procedures etc.). The ISO 9001 and ISO 14001 series are only two amongst the multiplicity of international standards that can satisfy their correlated requests.

The worldwide exponential progression and diffusion of certification has also taken place in the Italian socio-economic context. This paper seeks to analyse the general as well as the national trend in the evolution of certifications according to the standards ISO 9001 (QMS, Quality management systems) and ISO 14001 (EMS, Environmental quality systems), via significant prevalence indexes, which allow to identify the policies required to favour the diffusion of such certifications.

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**Riassunto**

Nel campo delle discipline economico aziendali, il significato attribuito al concetto di qualità ha subito un'evoluzione significativa arricchendosi di nuove e differenti connotazioni. Accanto al concetto di qualità tecnica, economica ed ecologica si vanno affermando, sempre più, nuovi aspetti del più ampio concetto di qualità: etico-sociale, ambientale, del personale sicurezza della salute e del lavoro, sicurezza delle informazioni ed alimentare ecc. Ciascuno di questi aspetti della qualità è rappresentativa di esigenze che possono essere tradotte in norme, volontarie o cogenti, e la cui soddisfazione può assumere diverse forme (certificazione di prodotto, di sistema, di personale, attività d'ispezione ecc). Le normative della serie ISO 9001 (sistemi di gestione per la qualità) e ISO 14001 (sistemi di gestione per la qualità ambientale) rappresentano soltanto due delle molteplici norme, ancorché le più diffuse, che sono state dettate a livello internazionale e che sono tese alla soddisfazione dei bisogni correlati.

Il trend esponenziale che ha caratterizzato l'evoluzione e la diffusione del fenomeno della certificazione a livello mondiale ha anche contraddistinto il contesto socio-economico nazionale.

Il presente lavoro si pone l'obiettivo di analizzare l'evoluzione del fenomeno della certificazione secondo le norme della serie ISO 9001 e ISO 14000, a livello generale e all'interno del contesto socio-economico nazionale, attraverso indici significativi di prevalenza, al fine di cogliere le dinamiche e individuare politiche mirate per favorirne la diffusione.

**Keywords**: Quality management, Environmental management, certification indexes, regional indexes, issued certificates

## Background

The success of the standards ISO 9000 and ISO 14000 is substantiated by the constant increase of certifications worldwide and by the progressive number of economies that have adopted certifications. It is enough to consider that by the 31st December 1995 the number of ISO 9000 (Quality Management Systems, QMS) certificates issued in 96 different countries was equal to 127349; by the end of December 2000 the number had increased to 408631 in 158 Countries, which represents an increase of more than 200 % over 1995 and with the entrance of 62 new economies. By the end of December 2007, at least 951486 ISO 9001:2000 certificates had been issued in 175 countries and economies (1).

Concerning the certification of Environmental Management systems (EMS) and taking into account that the international standard ISO 14001 was launched only in 1996, by the end of the same year the number of certificates issued was equal to 1491 in 45 different economies. By the end of December 2000 that number had increased to 22897 with the entrance of 53 new economies while at the end of December 2007, at least 154572 certificates had been issued in 148 countries and economies.

The absolute values for the number of issued certificates in each country or in a determined area at a given time describe a static situation but do not allow evaluating the degree of penetration of corporate quality culture in different economies. The situation can be accurately depicted using indicators that being related to population, to the number of active organisations or to the different economic environment can be diversified according to the prevailing interest of the analysis, thus providing progressively more information about the ongoing dynamics of particular economies. This is the kind of information that potential users (policy makers, authorities, trade organisations, training institutions, service suppliers etc.) may use either to achieve specific goals in given socio-economic contexts or for detailed business management related research.

For different reasons, the current changeable reference scenario imposes to public and/or private organisations, to acquire and apply instruments for a systemic quality management, which becomes effective by means of conformity certification.

Frequency measures of an event can describe either the grouping of all existing cases in a given moment (prevalence) and in a given population or the occurrence of new cases (incidence). In general terms, prevalence measures the impacts and the degree of penetration that an event has in a given area at a particular time.

The worldwide evaluation of certification diffusion, for both standards, has been calculated by means of an index, developed for this particular purpose:

- **Certification Diffusion index (IDC)**:

**IDC** = (N° of certified sites / inhabitants*10.000)

This indicator represents the number of certificates issued for every 10000 inhabitants in a given country. Normalisation with respect to the population in a particular instant takes into account the different socio-economic circumstances where certificates are issued.

The following prevalence indexes have been defined in order to

describe in detail and explicitly, the up to date situation in a particular country, region or sector:

- **National certification index (ICN):**

$$\mathbf{ICN} = (C / A) * 100$$

where C indicates the number of certified organisations in a country (Italy in the present study) and A is the number of active enterprises (2).

**- Regional certification index (ICR):**

$$\mathbf{ICR\ r} = (Cr / A\ r) * 100$$

where Cr represents the number of certified sites or organisations in the rth region and Ar is the number of active enterprises both in this region.

**- Sectorial certification index (ICS):**

$$\mathbf{ICS\ i} = (Ci\ / A\ i) * 100$$

where Ci represents the number of certified sites or organisations in the ith sector while Ai is the number of active enterprises in this sector.

These indexes allow to express the ratio (percentage) of certified organisations, according to the standards ISO 9001 e ISO 14001, in a given instant with respect to the total number of active organisations at that same instant.

The ratios, diversified according to the prevailing interest, can refer to the National, regional or sector situation, providing each time a different significance to the analysis performed.

Before presenting the results, it is important to highlight the following issues and limits of the analysis:

There is no reliable database (European or international) containing officially acknowledged data about the number of issued certificates or of certified organisations. Nevertheless, since the ISO Committee continuously receives this type of requests, it has included amongst its activities this type of information allowing access to a database built on the basis of information from national standardisation bodies, from its members and from national accreditation and certification bodies. This database, in spite of possible omissions and/or double counts, represents a valid support for an up to date analysis of European and international certification.

Although the ISO Central Secretariat has often solicited to distinguish between certificates granted to only one site and those that refer to more than one production site, this information is not always available.

As a consequence, estimates provided by the ISO Committee, and used in this analysis for the worldwide situation, concern the number of issued certificates and not the number of certified production sites.

Furthermore, ISO estimates refer only to certificates issued by certification bodies that are accredited by the IAF (International Accreditation Forum) Certification data have been obtained from the SINCERT (National system for accreditation of certification bodies) database, which contains the number of certified organisations in Italy (as a function of accreditation sectors and of regions). SINCERT, differing from ISO provides data regarding both the number of issued certificates and of certified production sites.

The certification prevalence indexes have been calculated assuming as a reference the number of active organisations in Italy as a function of sector type and of regions. These data have been derived from the Registry of enterprises of the "Camera di Commercio Industria e Artigianato e Agricoltura" (C.C.I.A.A.) of every province, collected and published by Infocamere (2) for the period under study. For an estimate of the certification diffusion as a function of population, the data used are from the latest ISTAT updating (3).

The macroeconomic sectors have been derived from the NACE classification (nomenclature of the European economic activities).

The objective limits of this kind of analysis are the capacity and promptness for the collection and subsequent organisation of the available data, derived from different sources, as a function of users and location.

## The worldwide evolution of ISO 9001 and ISO 14001 certifications

At the end of September 2008, the ISO portfolio includes 17400 standards. Amongst these, the standards of the series ISO 9001 and ISO 14001 are by far the ones with the largest worldwide diffusion for large and small organisations in the production, transformation and supply of products and services, both in the public and in the private sector.

Table 1 shows the absolute values of Quality systems conformity certificates issued and their annual growth for the period comprised between December 2005 and December 2007.

TABLE 1

**ANNUAL GROWTH FOR QMS AND EMS CERTIFICATIONS (DEC. 2005 –DEC. 2007)**

| World Total | December 2005 | December 2006 | December 2007 |
|---|---|---|---|
| **ISO 9001** | | | |
| Certificates | 773867 | 896929 | 951486 |
| World growth | 113735 | 123062 | 54557 |
| Number of Countries/economies | 165 | 170 | 175 |
| **ISO 14001** | | | |
| Certificates | 111162 | 128211 | 154572 |
| World growth | 21225 | 17049 | 26361 |
| Number of countries/economies | 138 | 140 | 148 |

*Source*: The ISO Survey 2007

ISO data show that at the end of 2005, with 143823 certificates, China was the Country with the highest number of ISO 9001:2000 conformity certifications, followed by Italy with 98028 and Japan with 53771. In the year 2007, Italy was the leader in Europe and has also reached an outstanding worldwide position with a certification quota of 12%, over a total of 951486 certifications ISO 9001 distributed in 175 Countries/economies, and with significant rate of increase. At the end of 2008, Italy reached the value of 121550 ISO 9001 issued certificates, accredited by SINCERT.

Concerning the ISO 14001 certifications, after an initial delay Italy has rapidly gained one of the top positions, arriving at the fourth position by December 2007, with 12057 certificates over a world total of 154572.

Figures 1 and 2 illustrate data already presented as tables in a previous work (4) and show that the trend of IDC diverges with respect to that emerging from the comparison of numerical values. In fact, for what concerns the QMS certification, Italy displays, at the end of 2005, the best index of certification diffusion with 16.7 certificates ISO 9001 issued every 10000 inhabitants, followed by Spain (10.42) and Australia (8.31). Sweden is the country leading the EMS ranking (4.1 certificates ISO 14001 issued for every 10000 inhabitants), followed by Spain and Japan.

Certification represents not only a formal act that in itself improves corporate performance, but also an element for the assessment of compliance to binding standards. Once the management system is implemented,

each organisation can request to be certified, which represents the status for a challenging and complex upstream pathway that is part of a fundamental and ambitious project constantly evolving.

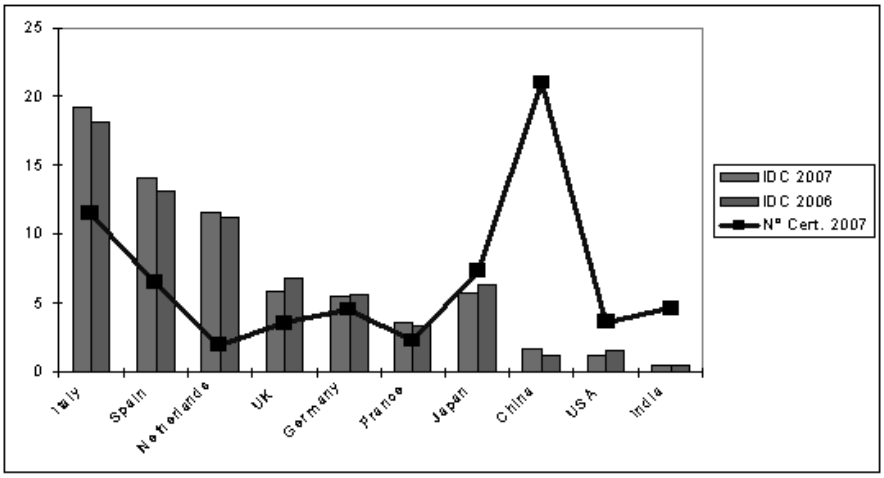


*Fig. 1*- Comparison of IDC with absolute certification values for ISO 9001
Note: N° Cert. 2007 = real number of 2007 certficates/104
*Source*: Calculated from ISO and SINCERT data

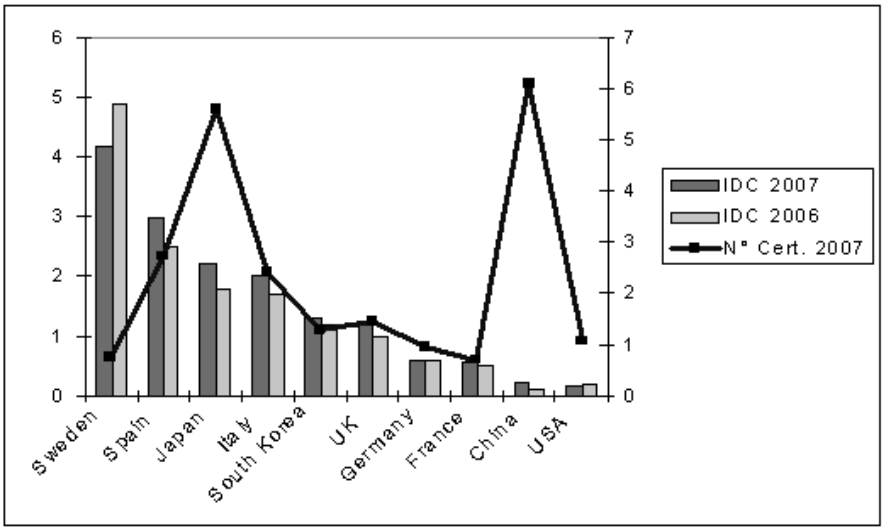


*Fig. 2* - Comparison of IDC with absolute certification values for ISO 14001
Note: N° Cert. 2007 = real number of 2007 certificates/5.103
*Source*: Calculated from ISO and SINCERT data

It should be pointed out that these diagrams represent only the countries that have the largest absolute values for issued certificates. The same type of normalisation could be done for all the other countries of the world.

As an example, according to ISO data, by the end of 2005 Canada had 1636 EMS issued certificates and an environmental IDC equal to 0.51, value that would place this country in 9th position after France.

With the same argument the Czech Republic with 2122 ISO 14001 certificates issued by the 31 December 2005 shows an environmental IDC equal to 2.07 that is higher than those of Spain, Japan, Italy, South Korea and UK, countries that occupy positions from 2nd to 6th.

In the same way, Israel with 7657 certificates ISO 9001 issued at the end of 2005, shows an IDC for QMS equal to 11.08 that would place it in second position after Italy.

The trend of this indicator in the course of time allows the evaluation of the rate for certification diffusion within a particular country or for a comparison between countries.

Besides, it can also act as a pointer, not only for the degree of interest within different countries towards quality issues (economic and environmental), but also of their economic structure.

It is reasonable to assume that countries with an economic system composed mainly of small and medium enterprises (e.g. Italy) will show a larger IDC with respect to those countries characterised by a prevalence of large firms.

The IDC values for ISO 9001 and ISO 14001 issued certificates have been calculated from the last three years of available ISO data for each European country, in the same way as it was done for the first 10 countries in absolute terms.

Their positions according to the IDC value for ISO 9001 are listed in table 2, where bold characters indicate countries with an IDC larger or equal of the European average. The same type of calculations allows building a table of IDCs for ISO 14001.

TABLE 2

**IDC FOR ISO 9001 OF EUROPEAN COUNTRIES**

*Source*: Calculated from ISO Survey 2007

| **Countries** | **N°CERTIFICA-TES 31/12/2007** | **POPULATION 31/12/2007** | **IDC 9001 31/12/2007** | **IDC 9001 31/12/2006** | **IDC 9001 31/12/2005** |
|---|---|---|---|---|---|
| 1. Liechtenstein | 99 | 32,528 | 30.4 | 23.1 | 21.5 |
| 2. Italy | 115,339 | 59,131,287 | 19.3 | 16.7 | 16.7 |
| 3.Monaco | 54 | 32,796 | 16.5 | 12.6 | 11.2 |
| 4.Switzerland | 11,077 | 7,593,494 | 14.5 | 14.6 | 16.6 |
| 5. Spain | 65,112 | 46,063,511 | 14.1 | 13.1 | 10.8 |
| 6.Rep.S.M. | 35 | 30,926 | 11.3 | 8.0 | 6.4 |
| 7.Netherlands | 18,992 | 16,318,199 | 11.6 | 11.6 | 5.6 |
| 8.Hungary | 10,473 | 10,076,581 | 10.4 | 14.9 | 15.3 |
| 9.Czech Repub. | 10,458 | 10,264,212 | 10.2 | 12.5 | 12.4 |
| 10.Andorra | 26 | 69,150 | 9.9 | 1.6 | 0.9 |
| 11.Slovenia | 1886 | 2,077,070 | 9.1 | 10.9 | 10.6 |
| 12.Malta | 349 | 410,209 | 8.5 | 8.4 | 7.5 |
| 13.Cyprus | 440 | 715,100 | 6.1 | 7.1 | 6.9 |
| 14.United Kingdom | 35,517 | 60,975,000 | 5.8 | 6.7 | 7.6 |
| 15.Bulgaria | 4633 | 7,973,673 | 5.8 | 4.0 | 2.9 |
| 16. Sweden | 5233 | 9,082,995 | 5.8 | 6.3 | 5.2 |
| 17. Germany | 45,195 | 82,438,000 | 5.5 | 5.6 | 4.8 |
| 18.Slovakia | 2840 | 5,389,180 | 5.2 | 4.1 | 3.8 |
| 19.Austria | 4203 | 8,150,835 | 5.2 | 4.6 | 4.1 |
| 20.Portugal | 5283 | 10,617,575 | 4.9 | 5.5 | 5.5 |
| 21.Croatia | 2073 | 4,494,749 | 4.6 | 3.7 | 2.9 |
| 22.Belgium | 4822 | 10,309,725 | 4.6 | 3.6 | 4.6 |
| 23.Estonia | 623 | 1,342,409 | 4.6 | 4.3 | 3.6 |
| 24.Greece | 5132 | 11,216,708 | 4.6 | 4.2 | 2.9 |
| 25.Ireland | 1999 | 4,422,100 | 4.5 | 5.2 | 4.9 |
| 26.Luxembourg | 197 | 472,649 | 4.2 | 3.0 | 3.2 |
| 27.Romania | 9633 | 21,537,563 | 4.5 | 4.4 | 2.8 |
| 28.Norway | 1703 | 4,695,134 | 3.6 | 3.1 | 3.0 |
| 29.France | 22,981 | 64,473,140 | 3.6 | 3.5 | 3.9 |
| 30.Finlandia | 1804 | 5,225,000 | 3.4 | 3.8 | 3.6 |
| 31.Denmark | 1794 | 5,475,791 | 3.2 | 3.4 | 2.2 |
| 32.Lithuania | 809 | 3,436,561 | 2.4 | 1.9 | 1.7 |
| 33.Polonia | 9184 | 38,626,349 | 2.4 | 2.1 | 2.5 |
| 34.Montenegro | 136 | 598,000 | 2.3 | 0.5 | |
| 35.Serbia | 1987 | 10,150,265 | 1.9 | 1.4 | 1.5 |
| 36.Turkey | 12,802 | 71,586,100 | 1.8 | 1.7 | 1.5 |
| 37. Latvia | 342 | 2,286,700 | 1.5 | 2.8 | 2.4 |
| 38.Bosnia-Erzegovina | 652 | 4,498,976 | 1.4 | 0.6 | 0.9 |
| 39.Macedonia | 255 | 2,022,547 | 1.3 | 1.0 | 0.8 |
| 40.Bielorussia | 1308 | 10,350,194 | 1.3 | 0.9 | 0.7 |
| 41.Russia | 11,527 | 146,400,000 | 0.8 | 0.4 | 0.3 |
| 42.Iceland | 16 | 320,169 | 0.5 | 1.2 | 1.4 |
| 43.Ukraine | 2150 | 46,263,079 | 0.4 | 0.4 | 0.3 |
| 44.Armenia | 79 | 2,982,904 | 0.3 | 0.1 | 0.2 |
| 45.Georgia | 88 | 4,989,000 | 0.2 | 0.1 | 0.1 |
| 46.Moldavia | 50 | 4,267,000 | 0.1 | 0.0 | 0.1 |
| 47Albania | 23 | 3,600,523 | 0.0 | 0.0 | 0.0 |
| **IDC QMS** | | | **5.24** | **5.07** | **4.6** |

The results show that almost 20 countries show an IDC value larger or equal than the average European value both for the standard ISO 9001 and ISO 14001. Ignoring some countries that are not very representative given their modest dimensions and small population (Liechtenstein and Monaco, San Marino), Italy is at the first place in the European classification for the diffusion of ISO 9001 certification while Sweden is the leader for the diffusion of ISO 14001 certifications, which proves its receptiveness to environmental issues. Countries such as Switzerland, the Czech Republic and Slovenia are active on both fronts (QMS and EMS) in spite of their small dimensions. It is significant to notice that most organisations tend to privilege the EMS certifications (favoured by stakeholders) with respect to QMS.

## The evolution of ISO 9001 and ISO 14001 certifications in Italy

The year 2006 marks an important milestone for Italian certification: the number of certificates issued for the standard ISO 9001 reached quota 100000, thus confirming an evolutionary trend that began in the early 90's. For the standard ISO 14001, 10000 certified sites had been recorded in the first half of 2007, which confirms the commitment and awareness of our institutions towards environmental issues.

The IDC analysis highlights the continuous diffusion of the quality culture in Italy (fig. 3) but with two different rates: faster for QMS than for EMS. Nevertheless, the analysis always show a larger degree of diffusion for the ISO 9001 certification in the Northern and Central regions of the country, where a well established quality culture has allowed its large scale adoption.

The analysis based on the absolute values obtained from SINCERT (5) shows, for both standards, the relative loss of weight for the Northern regions of the country, a slight increasing trend for the Central regions and a conspicuous increase for the Southern regions and the Islands (where their percentage over the total of certified ISO 14001 sites has doubled, during the period considered). However, the relative decline registered for Northern regions is mainly due to the total increase of certifications ISO 9001 and ISO 14001 for the whole country. It is also important to notice that EMS certifications have augmented at a faster rate than QMS certifications, which means an increase of the relative weight of EMS systems over the total of certifications.

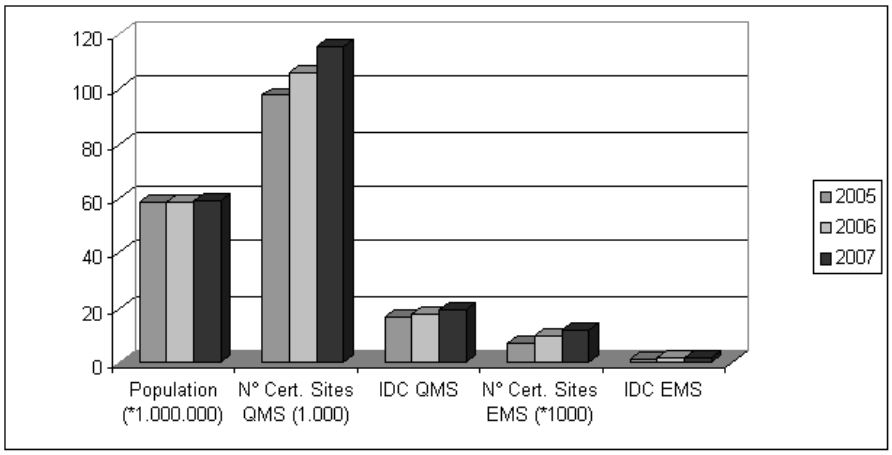


*Fig. 3* - Evolution of population, certifications and relative IDC indexes
*Source*: Calculated from Infocamere and SINCERT data

The Lazio region that represents the Central region with the highest absolute value of certifications, ranking third at the National level reaches the 13th position with the IDC analysis. Even more striking is the repositioning of Campania from the 5th to the 16th place and of Puglia from the 9th to the 20th.

At the same time, the situation of Basilicata, Molise and Valle d'Aosta appear less critical since although their small absolute values places them in the latest positions, when the calculation is done based on their population they move to more favourable rankings.

The regions that present an IDC lower than the National value are mainly in the Central, Southern and insular regions of the country (fig. 4 and 5).

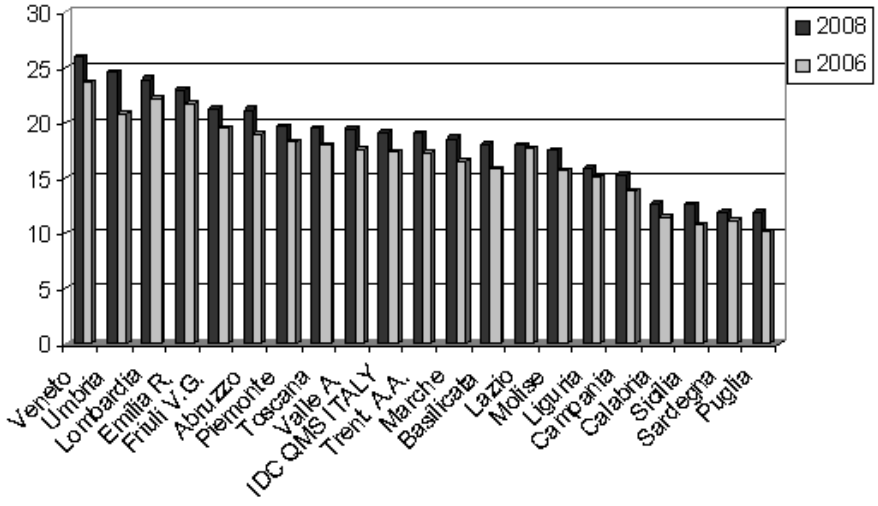


*Fig. 4* - Comparison of regional IDC values (QMS) with the National IDC
*Source*: Calculated from Infocamere and SINCERT data

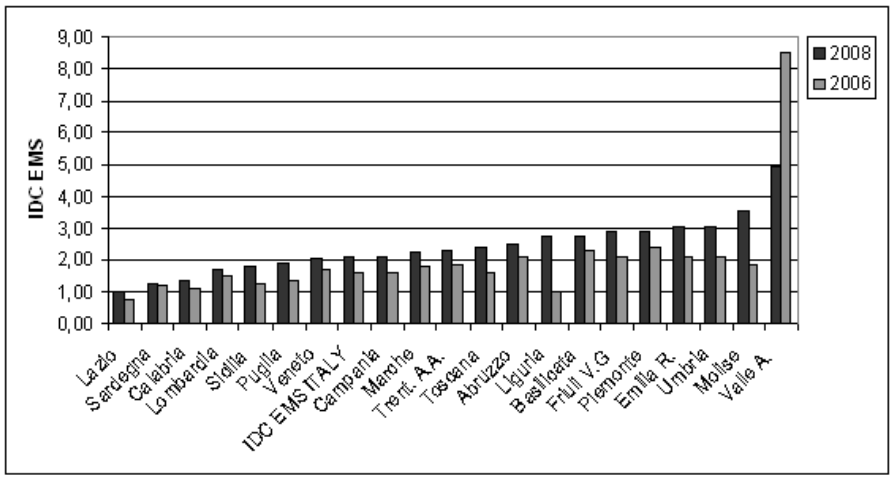


*Fig. 5* - Comparison of regional IDC values (EMS) with the National IDC
*Source*: Calculated from Infocamere and SINCERT data

The diffusion of ISO 14001 certification follows a different pattern: the Valle d'Aosta region (with 8.5 sites certified every 10000 inhabitants) occupies the first place, followed by 13 regions with an environmental IDC higher or equal than the calculated National average. Two Southern regions show particular awareness to environmental issues: Molise (environmental IDC= 3.5) and Campania (environmental IDC = 2.1).

From the results, it is possible to assert that there is a growing awareness about the strategic value that quality represents in the Italian economic system in order to increase or renew its competitiveness. The trend in time of the index conveys the tendency to overcoming the purely economic approach to quality (product certification or other forms of assurance) in the framework of a specific contract (6).

Obviously, the future of QMS and EMS certifications is strictly linked to do the dimensions of the organisations, but the tendency to have their competence and efficiency recognised, by means of the relative certifications, is an irreversible trend that draws also the SMEs.

This results corroborate the role that plays the Italian Accreditation and Certification system, constantly engaged to assure the full credibility of certifications by reinforcing environmental, health and safety, food safety and information schemes (7). This should also help to overcome the criticalities embedded in a "complex system" growing constantly and rapidly.

## The Regional Indexes

Following the IDC analysis, a listing for the period 2006 to 2008, was created containing the number of certified sites for Italian regions in conformity with ISO 9001 and ISO 14001 and the number of active enterprises/organisations.

The data is presented on the basis of "Prevalence indexes" (ICR) that represent the fraction (percentage) of certified organisations (for both standards) at a given time, with respect to the total number of active organisations at the same time. It should be pointed out that the demographic evolution of the Italian economic system in 2008 leans towards a decrease in the number of enterprises, in particular for small firms, and to the advantage of alliances.

The selection process both at the level of traditional sectors (agriculture and industry) and of organisations in general seems to be

unavoidable. Observing the territorial macro-divisions, the Centre and Northwest of the country have registered rates of growth of respectively 1.18% and 0.88% (higher than the National average of 0.59%) while the South and even more the Northeast show smaller growth rates.

Table 3 shows the number of active enterprises and the distribution of the number of certificates for each region, for the period under study. The rather modest rate of growth of Italian enterprises in 2008, is coherent with the previous year (8) and with the complex current market situation,

The progressive increase of the service sector in the economy has prompted investors to intervene in the sectors of services to organisations and clients (such as: tourist accommodation, financial services, computer and professional assistance, health service and education).

Lombardy is the region with the highest number of QMS e EMS certified sites. Lazio is the first region of Central Italy for ISO 9001 certifications while Toscana occupies the first place in Central Italy for EMS with 886 ISO 14001 certified organisations. For Southern Italy and the islands, Campania has the best performance in absolute values with respect to both standards.

The regional analysis by means of ICR allows a more realistic vision of the certification evolution and an up to date comparison with the national context (ICN). In the last three years, the ICR index has increased more significantly for the QMS certifications, but always six regions only show an ICR higher than the national average. The increase for the environmental ICR has been more uniformly distributed.

The comparison of ICR with ICN confirms the responsiveness of the Central and Northern Italian regions and the relative organisational and structural delay of the Southern regions and the islands. However, it should be pointed out that these reflections do not take into account the size of firms, which is a critical factor for the implementation of such systems and for the conservation of certification.

ICRs (for QMS and EMS) can also be organised according to frequency classes obtaining their relatives histograms.

Fig. 6 and 7 illustrate regions rankings according to the number of certified production sites in conformity with respectively ISO 9001 and ISO 14001 standards.

TABLE 3

**REGIONAL DISTRIBUTION OF ACTIVE FIRMS AND CERTIFIED SITES**

| | 2006 | Cert. Sites | Cert. Sites | 2007 | Cert. Sites | Cert. Sites | 2008 | Cert. Sites | Cert. Sites |
|---|---|---|---|---|---|---|---|---|---|
| **REGION** | **Active Firms** | **ISO9001: 2000** | **ISO14001: 2004** | **Active Firms** | **ISO9001: 2000** | **ISO14001: 2004** | **Active Firms** | **ISO9001:2000 9001:2008** | **ISO14001: 2004** |
| ABRUZZO | 131432 | 2478 | 278 | 131496 | 2766 | 327 | 132046 | 2819 | 338 |
| BASILICATA | 55585 | 949 | 141 | 55397 | 1070 | 165 | 55695 | 1073 | 164 |
| CALABRIA | 156323 | 2283 | 212 | 155075 | 2511 | 285 | 155717 | 2550 | 273 |
| CAMPANIA | 457849 | 8020 | 932 | 460245 | 8782 | 1124 | 471929 | 8930 | 1230 |
| E. ROMAGNA | 429850 | 9110 | 888 | 429617 | 9688 | 1085 | 432621 | 9913 | 1296 |
| F. V. GIULIA | 101582 | 2389 | 249 | 101097 | 2600 | 292 | 100944 | 2622 | 358 |
| LAZIO | 375748 | 9428 | 441 | 381285 | 10212 | 535 | 389794 | 10103 | 568 |
| LIGURIA | 139652 | 2434 | 367 | 140240 | 2620 | 477 | 142234 | 2591 | 446 |
| LOMBARDIA | 810444 | 21067 | 1388 | 809144 | 22677 | 1622 | 827318 | 23307 | 1637 |
| MARCHE | 160375 | 2533 | 271 | 160707 | 2855 | 321 | 161300 | 2881 | 349 |
| MOLISE | 32800 | 507 | 64 | 32708 | 572 | 104 | 32807 | 562 | 113 |
| PIEMONTE | 415017 | 7952 | 1045 | 415544 | 8488 | 1215 | 421310 | 8708 | 1288 |
| PUGLIA | 341841 | 4176 | 557 | 340694 | 4635 | 731 | 341521 | 4853 | 792 |
| SARDEGNA | 149800 | 1858 | 206 | 150145 | 2014 | 245 | 150541 | 1993 | 210 |
| SICILIA | 395092 | 5453 | 656 | 394498 | 6285 | 871 | 393884 | 6360 | 906 |
| TOSCANA | 358742 | 6537 | 581 | 359531 | 7293 | 778 | 365112 | 7203 | 886 |
| TR. ALTO ADIGE | 102080 | 1708 | 186 | 101921 | 1875 | 207 | 102579 | 1915 | 233 |
| UMBRIA | 82426 | 1815 | 186 | 82764 | 2110 | 239 | 83144 | 2151 | 264 |
| VALLE D'A | 12746 | 218 | 106 | 12795 | 233 | 110 | 12789 | 246 | 63 |
| VENETO | 459702 | 11265 | 815 | 460018 | 12119 | 984 | 463075 | 12678 | 1011 |
| TOTAL* | 5037654 | 105799 | 9825 | 5174921 | 115359 | 12057 | 5236360 | 118309 | 12922 |

Total values include also sites registered abroad

*Source*: Calculated from Infocamere and SINCERT data

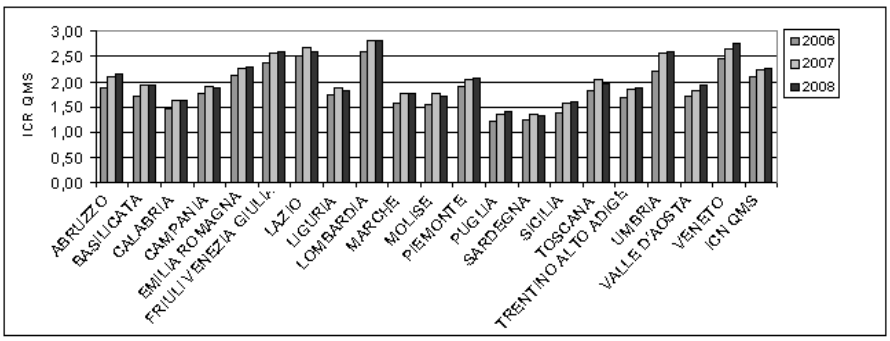


*Fig. 6* - ICR trend for QMS from 2006 to 2008
*Source:* Calculated from Infocamere and SINCERT data

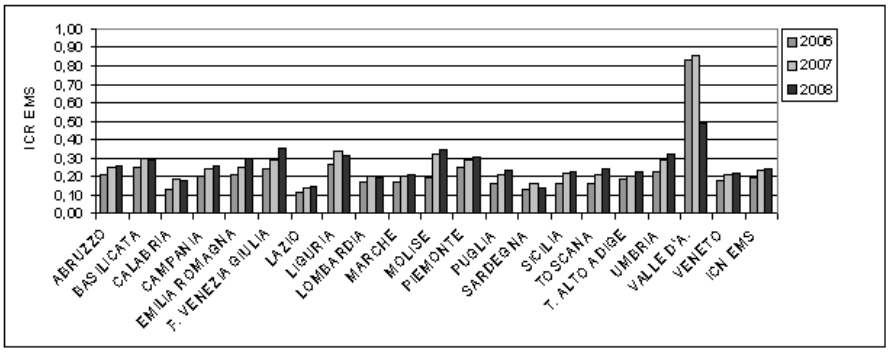


*Fig. 7* - ICR trend for EMS from 2006 to 2008
*Source*: Calculated from Infocamere and SINCERT data

## The Sectorial Indexes

Figures 8 and 9 show the trend for the absolute values of certificates issued (for ISO 9001 and ISO 14001 standards) for the different macro-economic sectors, from 2006 to 2008.

The analysis demonstrates that the first position for the number of ISO 9001:2000 certified sites belongs to the "construction" sector (EA 28), followed by "firm professional services" (EA 35). Very interesting are the positions of "education" (EA 37), "health and social work" (EA 38). The high value for the construction sector is mainly due to the existing Italian code for public bids (D. Lgs. 12 April 2006, n. 163; G.U. 2 May 2006, n. 100), which amongst other qualifying elements for tenders, considers also the specifications of the ISO 9001 standard.

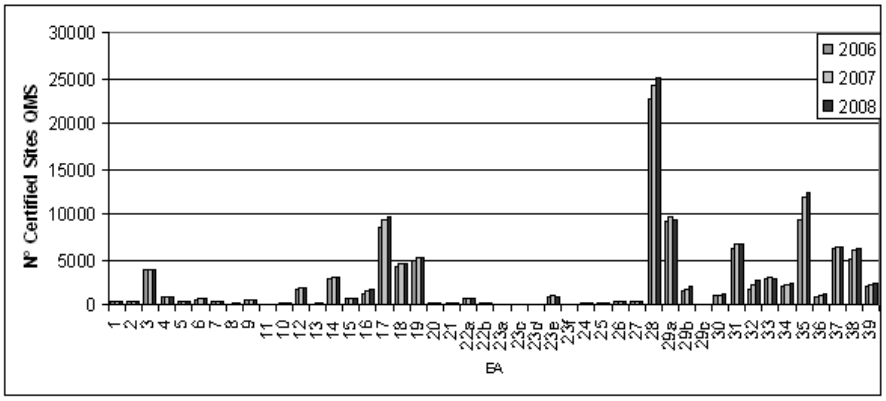


*Fig. 8* - Trend of QMS certified sites for EA sectors
*Source*: Calculated from SINCERT data

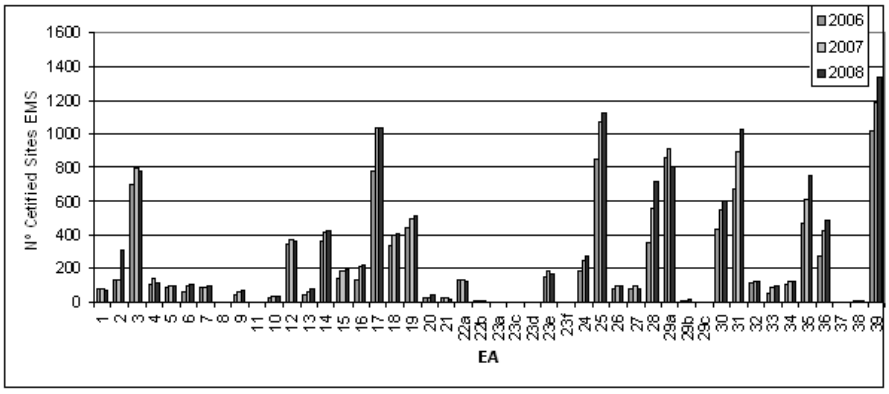


*Fig. 9* - Trend of EMS certified sites for EA sectors
*Source:* Calculated from SINCERT data

The prominent places occupied by sectors such as "firm professional services" (in particular cleaning and surveillance activities), "logistics: transport, storage and communications" (firms of public transport, international and national express courier) (EA31) can be explained by the fact that certification often acts as an assurance between client and supplier.

The most important growth is registered for the sector of "firm professional services" EA 35, followed by sectors EA28, EA 32 and EA 17 (Basic metals and fabricated metal products).

Concerning EMS, the increase of certifications is particularly significant for the sector EA 02 (Mining and Quarrying) followed in order by sectors EA 28,

EA 39 (Public services) e EA 31. The sector "Public Services" (EA 39) includes activities such as collection, transport and storage of waste (domestic and hazardous) that have a high environmental impact. Also "wholesale and retail trade" (EA 29) (in particular for oil products, chemicals, detergents and disinfectant products) and the "food products, beverage and tobacco" (EA 03) sectors occupy an important place in the classification.

By the end of 2008, there were no recorded certified sites for the sectors of: "Health and social work" (EA 38), "education" (EA 37), "public administration" (EA 36), "publishing companies" (EA 8), "manufacture of jewellery, and related articles" (EA 23a), "manufacture of sport goods" (EA 23c)," manufacture of games and toys" (EA 23d), "manufacture of prefabricated for insulation and their applications" (EA 23f) and "repair of personal goods and for house" (EA 29c).

To find out a sector analysis that gives information about the level of certification diffusion in different accreditation sectors requires a certain degree of re-organisation.

For this purpose the macro-economic sectors according to the NACE classification have been re-arranged in order to allow their normalisation. This artifice was required to be able to compare and normalise the data available from SINCERT (certified sites for economic sectors) with those provided by Infocamere (active firms in the same sectors).

The result has identified 27 sectors, listed in tab.4, where for each economic activity, the number for macro-economic sectors (according to the NACE nomenclature) is matched with the reference numbers used in this work.

The ICS index has been calculated for both standards and the results are shown in figures 10 and 11. The sector of "energy, gas and water production and supply" (Ref. N° 19) has the highest ICS for both standards: for ISO 9001 = 42.2% and for ISO 14001 = 44.6%.

The diffusion of the ISO 9001 certification in the following sectors is quite significant (>10 % of certified organisations): "machinery and electrical equipment" (Ref. N° 15) "chemicals and pharmaceuticals" (25.1%) (Ref. N° 10), "rubber and plastic products" (23.6%) (Ref. N° 11), "manufacture of coke and refined petroleum products" (Ref. N° 9) (16.8%), "mining and quarrying" (10.5) (Ref. N° 2), "manufacture of motorcycles, bicycles, vehicles, trailers and others transport facilities (Ref. N° 16) (10.1%),

Certification according to the standard ISO 14001 shows a good performance for the sectors of "electricity, gas and water supply" (40.0%), "collection and recycling" (8.5%) (Ref. N° 18), followed by "manufacture of coke and refined petroleum products" (7.9%) (Ref. N° 9), "mining and quarrying" (7.5%) (Ref. N° 2) and "chemicals and pharmaceuticals" (5.8%) (Ref. N° 10).

TABLE 4

**REORGANISATION OF NACE SECTORS**

| **Description** | **NACE code** | **Ref. N°.** |
|---|---|---|
| Agriculture, fishing | 1 | 1 |
| Mining and Quarrying | 2 | 2 |
| Food products, beverage and tobacco | 3 | 3 |
| Textiles and textile products | 4 | 4 |
| Manufacture of leather and leather products | 5 | 5 |
| Wood and wood products | 6 | 6 |
| Manufacture of pulp, paper and paper products | 7 | 7 |
| Publishing and printing Companies | 8, 9 | 8 |
| Manufacture of coke and refined petroleum products | 10 | 9 |
| Chemicals and pharmaceuticals | 12, 13 | 10 |
| Rubber and plastic products | 14 | 11 |
| Concrete, cement, lime, plaster, | 15,16 | 12 |
| Basic metals and fabricated metal products | 17 | 13 |
| Machinery and equipment | 18 | 14 |
| Machinery and electrical equipment | 19 | 15 |
| Manufacture of motorcycles, bicycles, vehicles and trailers | 20, 21, 22a, 22b | 16 |
| Manufacture of furniture and other products | 23a,c,d,e,f | 17 |
| Recovery and recycling | 24 | 18 |
| Electricity, gas and water supply | 25, 26, 27 | 19 |
| Construction | 28 | 20 |
| Wholesale and retail trade, repair of cycles, motor cycles and vehicles, repair of personal goods | 29a,b,c | 21 |
| Hotels, bars and restaurants | 30 | 22 |
| Transport and communication | 31 | 23 |
| Banks, real estate and renting | 32 | 24 |
| Information technology | 33 | 25 |
| Firm professional services, engineering Services | 34, 35 | 26 |
| Public administration | 39 | 27 |

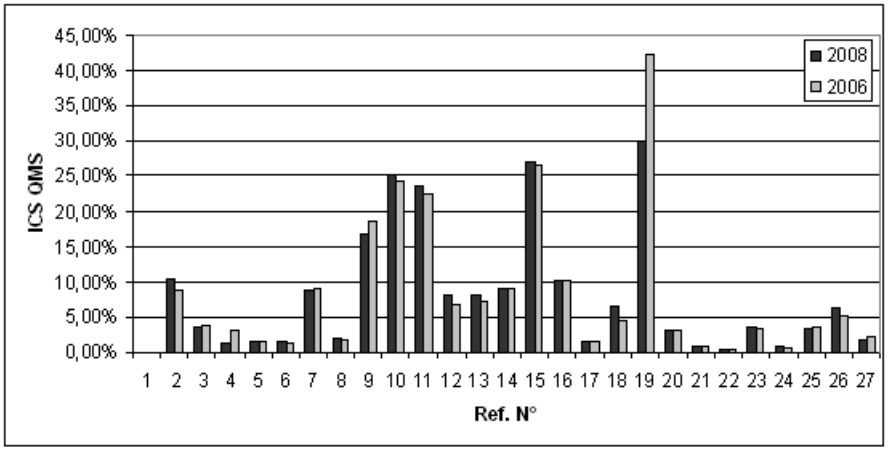


*Fig.10* - ICS trend for QMS
Source: Calculated from SINCERT data

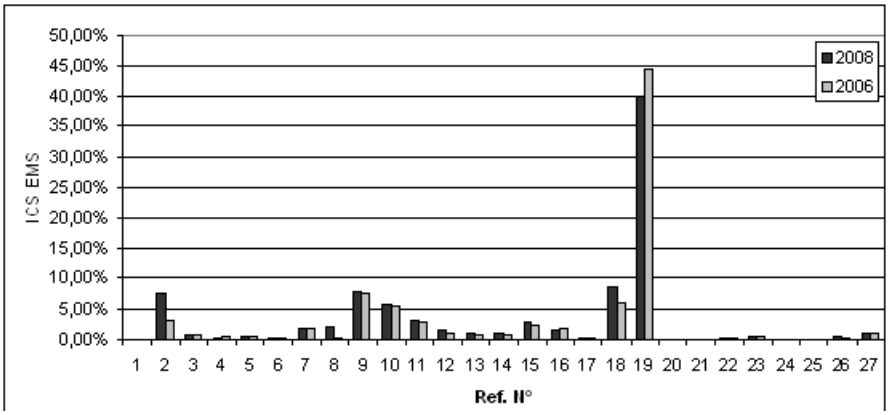


*Fig. 11* - ICS trend for EMS
*Source*: Calculated from SINCERT data

The ICS trend confirms a larger diffusion of certification in the traditional accreditation sectors related to the wholesale supply and distribution sectors (energy, gas and water production and supply, chemicals and pharmaceuticals, rubber and plastic products, manufacture of coke and refined petroleum products) with a minimal diffusion for the sectors related to services.

## Conclusions

The worldwide diffusion of quality culture in its broader meaning of social quality has been motivated by its potential to increase the competitiveness of socio-economic organisations (9). This is a crucial cultural change, well documented by the indicators used in this study, which reveals the actual trend to overcome the exclusively economic approach to quality limited to a specific contract obligation. However, in the Italian economic system the certification of Quality Management systems has developed mainly in the regions of Northern and Central Italy.

Undoubtedly, the future of certification for both systems is strictly dependent upon the organisations dimensions, but indirectly also to the evolution of accredited bodies to release conformity certificates (10). The rise in the number of SINCERT accredited bodies for the certification of Quality and Environmental Management Systems has been a stimulus for the diffusion and development of quality culture: over six years (from 2000 to 2007) the number of accredited bodies has increased from 43 to 71.

The success of an organisation will depend increasingly from its capacity to satisfy the different expectations of all stakeholders: the more an organisation will be able to operate with the favours of the whole socio-economic context, the less will be the risks of not complying with the objectives previously fixed.

The evolutionary pattern, outlined above, is in fact steering organisations that produce goods or supply services to adopt different management systems and to obtain the recognition of their competence and efficiency by means of the relative certifications. However, it is not desirable that this continues to happen by overlapping different rules and procedures for diverse systems, which produces loosely related certifications of conformity.

On the other hand, it is not possible to imagine editing, in a short time, a universal standard that would enclose all the necessary requirements to implement the "total quality" with all its diverse meanings, although the course for this has already started and it is progressing.

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