# "A Case Study of Three National Surveys in Cyprus of Quality, Environmental and Food Safety Management Systems"

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**Abstract**

*There is a crucial question, which must be answered, after so many years of certification and or implementation of International Management System Standards; What are the common effects, benefits, difficulties, problems and deficiencies of companies with the implementation of **any** of the international mostly implemented standards? This question will be answered through this paper. Three independent National surveys were conducted between March and March 2009 addressing the three most popular and commonly used Standards: Quality Management Systems (QMS) ISO 9001:2000, Environmental Management Systems (EMS) ISO 14001:2004 and Food Safety Management System (FSMS) ISO 22000:2005 or Hazard Analysis and Critical Control Points (HACCP) from **three** different angles.*

*In answering the above questions and extract the right conclusions, scientific collection of information and data analysis was the author's top priority. Three National surveys were conducted by the authors team among **all** certified, with the Cyprus Certification Company (CCC) and Hellenic Organisation for Standards (ELOT), companies against the above three mentioned standards. The first two surveys for ISO 9001:2000 and 14000 were conducted eight months ago covering more than 200 certified companies followed by the survey for EMS and at the end of August. The third survey for FSMS was completed in March 2009.*

*The 3 independent surveys were investigating the standards from 3 different angles:*

*a) All Major Non Conformities (MNC), Minor Non Conformities (MiNC) and observations raised by the CCC Auditors reported for the last three years during certification and surveillance Audit reports were recorded and analysed.*

*b) Through a detailed web based questionnaire, the opinions of the CEO of each certified company were investigated and analysed. The questionnaire was covering the benefits, problems, deficiencies etc rose through certification.*

*c) In each sector (quality, environmental, HACCP) expert people involved in the processes were interviewed through a common questionnaire ( consultants, auditors, academics, government officials, consumers associations etc)*

*A fourth survey on 9001 has been conducted, but using a similar not the same questionnaire, addressing the management issues of the certified companies.*
*Important information, statistics and correlations were extracted and presented for the first time in this paper. Also, an attempt was made to compare, where possible, common characteristics and deficiencies. Through these results, companies adopting management systems will better understand their similarities, weaknesses and deficiencies compared with other companies, as well as how to address those deficiencies, in order to improve their understanding and further improve the effectiveness of the standards.*
*International Standards Organisation, Accreditation Bodies, Certification Bodies, Systems Auditors and consultants will be benefited from the comparison and results of the three surveys. WE believe that* ***this is the first publication which is covering and comparing three standards together from 3 different angles*** *(qualitative and quantitative investigation). It can be also used as a calibration tool for the interested parties.*

Keywords: Management systems, Certification, EMAS ISO14000, HACCP ISO22000, QMS ISO9001

## Introductory Information

**The three National Surveys:**

This publication includes the results of three plus one independent National Surveys, conducted by thee different MSc and one undergraduate student, under the guidance and supervision of the main author[Apostolou N. 2008, Rouvali M. 2008, Olympiou A. 2009, Loizou A. 2008].Each Survey is investigating a different standard and approached the theme in three different angles. It includes qualitative and quantitative assessment. For better understanding refer to table 1.

**Table 1: Familiarisation with the three National surveys**

| **STANDARD, STUDENT** | **PART 1: Analysis of the finding of certification audits** | **PART 2: Interviews with people involved** | **PART 3: Questionnaire to certified companies** |
|---|---|---|---|
| ISO 9001:2000 Quality Management System, ***Nasia Apostolou*** | Analysis of the auditors finding during certification, revaluation and surveillance audits for the last 3 completed years, mainly to hotels. Sample size 14% | - Lead Auditor<br>- Consultant<br>- Academic<br>- Chairman of Consumers Association<br>- Director of Cyprus Quality Organisation | Web based and or hand written Questionnaire investigating benefits, problems of deficiencies to certified companies. Sample size 16% |
| Status | Completed | Completed | Completed |
| ISO 14001:2004 Environnemental Management System, ***Maria Rouvali*** | Analysis of the auditors finding during all certification, revaluation and surveillance audits for the last 3 | - Lead Auditor<br>- Consultant<br>-Cyprus Environmental presidential Commissioner<br>- Director of the | Web based and or hand written Questionnaire investigating benefits, problems of deficiencies to |

| | | | |
|---|---|---|---|
| | completed years. Sample size 100% | Cyprus department of environment (government) -Practitioner, environmental engineer of a man. company | certified companies, sample size 27 % |
| Status | Completed | Completed | Completed |
| ISO 22000:2005 Food Safety Management System, ***Andria Olympiou*** | Analysis of the auditors finding during all certification, revaluation and surveillance audits only for the last year. Sample size 100% | - Lead Auditor<br>- Consultant<br>- Director of Cyprus Health Department (Government)<br>- Chief Inspector of Hygiene (government)<br>- Hygiene Inspector of municipality | Web based and or hand written Questionnaire investigating benefits, problems of deficiencies to certified companies, sample size? |
| Status | Completed | Completed | Incomplete |
| ISO 9001:2000 Quality Management System, **Loizou Angeliki Completed** | Not applicable | Not applicable | Hand written Questionnaire investigating effective implementation of QMS. Sample size 30% |

**Brief description of the International Standards under Investigation**

**Quality Management System Standard EN ISO 9001:2000**

The ISO 9000:2000 standard is the international standard, which specifies requirements for a QMS and aims to establish an effective system for organizing and operating a business. [ISO 9001:2008]

A QMS is a tool by which an organisation directs and controls those business activities which are associated with quality. Broadly, it includes its organisational structure together with the planning, processes, recourses and documentation that the company uses in order to achieve quality objectives, and to provide improvements of its products and services in line with customer expectations. [CCC, 2005]

The new ISO: 9001:2008 standards are now adopted and supersede the ISO 9001:2000. The changes are not many. The new standard is mainly revising requirement 8 “Measurements, analysis and improvement”.
The new standard refers to minor clarifications and changes. The heard or the requirements remain the same so the results of the current survey are valid.

**Environmental Management System EN ISO 14001:2004**

ISO 14001 is an international Standard that based on a system of procedures and structure with the aim of safeguarding that all operations of a production unit are efficient in achieving the declared environmental targets and objectives.

An EMS constitutes of a number of procedures and actions which determine how an enterprise can manage any possible impacts to the natural environment and the health and safety of its people. Thus, it creates an integrated system, which evaluates documents and measures all the environmental impacts of an enterprise, including all its operations. [CCC, 2005, ISO 14001:2004]

**Food safety Management System EN ISO 22000:2005**

The above International standard, refer to a management system for food safety which is related to the presence of food-borne hazards in food at the point of consumption (intake by the consumer). As the introduction of food safety hazards can assure at any stage of the food chain adequate control throughout the food chain is essential. Thus, food safety is ensured through the combined efforts of all the parties participating in the food chain. [ISO 22000:2005]

The standard which is the most recently implemented has the same structure and numbering of requirements as with ISO 9001 and ISO 14000. So integration of the 3 standards is now possible by organisations, leading to certification with the 3 standards.

**About Cyprus Certification Company (CCC)**

The CCC is the Government-owned Certification Organization accredited by ESYD Greece, which, through the certification of products and Management systems, aims to promote the development of competitiveness of Cypriot enterprises. CCC was founded in 2001 and it operates in a competitive environment with the Government being its only shareholder. It is managed by a 7-member Board, which comprises of representatives from ministries as well as organizations of the private sector.

CCC's independence is ensured through its legal framework, organizational structure and through the operation of an independent Certification Council and Certification Board. In addition, CCC is not involved in any way with consultancy services for design, development and implementation of management systems. The CCC is not the only certification organisation company which is working in Cyprus but possesses the largest number of certificates among its competitors (more that 70%). [CCC, 2005]

## Results Presentation

**Part 1: Analysis of the finding of certification audits** [Angeli et al. 2008]

Many surveys and reports have been written by many researches, presenting the importance, the benefits and statistics from the certification. In part 1, the deficiencies/ findings reported by the CCC auditors during certification and surveillance audits will be presented. [Angeli I, 2006]

Studying the files of CCC, the researches recorded all Major Non Conformities (MNC), Minor Non Conformities, (MiNC) and Observations (OBS) of the last three year audits that the enterprise went through by the auditors of CCC. In addition to that, the type of the audit was recorded to enable more investigations. The ISO 22000 was investigated for only one year since the standard was very recently adopted. That standard superseded the Management System for Food safety and Hygiene – Hazard Analysis and Critical Control Points (HACCP) Hellenic Standard ELOT 1416:2000 and CYS 244:2001. These audits, in their majority, were initial Certification Audits; with some Re-evaluation, audits and a smaller number Surveillance audits. There are three levels of deviations as classified by CCC:

- **Major Nonconformity:** Complete lack or inadequate documentation of a standard requirement or non compliance with such requirements. A significant number of minor nonconformities on a specific clause constitute a major nonconformity (CCC, 2008).
- **Minor Nonconformity:** Divergence of limited magnitude in the documentation or implementation of a process regarding the standard's requirements (CCC, 2008).

- **Observation:** Minor divergence in the documentation or implementation of a process of the standard which might become nonconformity in the future (CCC, 2008).

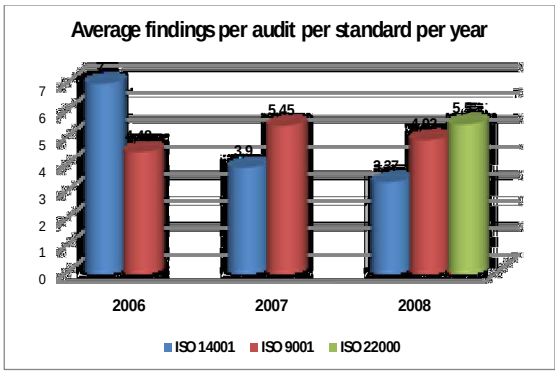


**Figure 1: Average findings per audit per standard per year.**

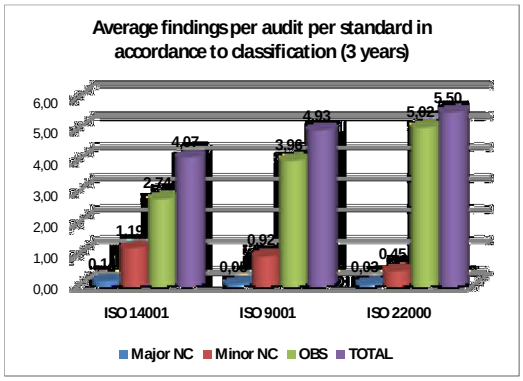


Figure 2: Average findings per audit per standard in accordance to finding classification

Looking on figure 1 all finding (MNC, MiNC, observations) from audits were added for each year. Then that number was divided by the total number of audit conducted that year. So on the same graph many things can be observed. First ISO 14001 has a decreasing trend among the three standards but it has the lowest average of findings of the three looking on figure 2, 4.07. The reason for the decreasing trend is that the first companies were certified in 2005 & 2006 because the standard was introduced in 2004. So the majority of audits were certification audits. It is evident that during certification audits the system is new, so the findings logically should be more. This is somehow proved by looking on figure 2 where the findings with respect to the types of audits are shown. The average of finding for certification audits of all standards compared with surveillance audits is higher (blue bars).

This is very clearly substantiated by looking on the ISO 22000 standard where the great majority of audits were certification audits because the standard was very recently implemented in Cyprus. It is worth to note that the great majority of those companies were certified with old but similar standard "Management System for Food safety and Hygiene – Hazard Analysis and Critical Control Points (HACCP) Hellenic Standard ELOT 1416:2000 and CYS 244:2001". *So the first conclusion is extracted that certification and reevaluation audits are more difficult since the whole system is audited.*

The second investigation revealed that the average total number of findings of the standard is the lowest. *This, very generally, leads to the conclusion that the ISO 14001 standard is easier to implement than the other two*. The main reason of that is that the great majority of certified companies with ISO 14001 are those who were already certified with ISO 9001. So they were experienced with systems maintenance. It is also well known that the ISO 14001, when it was revised the technical committees wanted to issue a standard with the same structure and requirements with the ISO 9001. *So this is another conclusion that the decision that the three standards should be harmonised and have the same structure proved to be effective.*

On the other hand ISO 22000 is the most difficult to implement (average 5.5 findings per audit). This is because as it was mentioned before, the great majority of audits were certification audits, or revaluation from the old standard to the new one. Also the difficulty is the fact that the company has to invest/ spend more money to maintain the certification due to HACCP legislative obligations.

Now, ISO 9001 which has been implemented for many years has a more steady profile on the propagation of the finding throughout the years of investigation, which are around 5 per audit. In a similar previous national survey [Angeli I, 2006] to all certified companies in 2005, the total average of findings was 6.9. That number is getting smaller year by year.

Looking on figure 2 an obvious clear conclusion can be extracted for all standards. *The number of MNC is lower than the MiNC and the observations are the highest.*

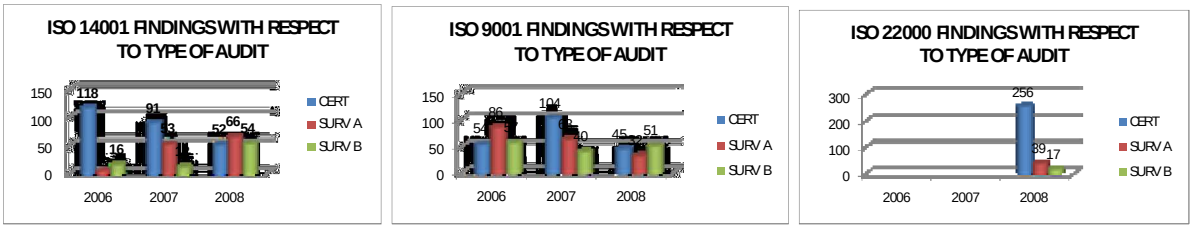


**Figure 3: Classification of audits findings with respect to type of audit**

*Another general conclusion by looking on figure 3, is that the number of findings is decreasing when an enterprise has undergone from certification to surveillance A and then to surveillance B audits. This means that the enterprises in their majority are getting better. It is obvious that the Non Conformities during the initial certification audits are more than those recorded at the surveillance audits*. During surveillance audits the companies are more experienced and have been implementing the standard for many years, so that is why there is a shift from NC to observations. Another reason for the above interesting finding is that auditors during the initial certification audit pay more attention checking that all requirements of the standard include the appropriate documentation. During the surveillance audits the auditors inspect a sample of the operations and try to look at the critical processes and activities that contribute to the efficiency and improvements of the system. The most important policy and objective of the CCC auditors is constantly trying through the audits, to improve the effectiveness of the systems and to add value to the companies.

Having discussed the concentration of observations and NC's a further analysis will be made to present in rank order the paragraphs of the standards that have the greatest deficiencies, and to try to give the reasons or main causes of that.

This is achieved through statistical analysis of all MNC, MiNC and observations recorded during the CCC audits.

## Analysis of ISO 9001:2000 Findings

It is well known that among the 8 main requirements of the ISO 9001 standard the most important paragraph and the heart of the model is requirement 8 "Measurement – Analysis – Improvement". Unfortunately the picture derived from the statistics, indicates that almost 50% of the findings/problems are recorded from this paragraph, followed by paragraph 7 with 20%, which concerns the product or service materialization. Paragraph 8, is a difficult one. It appears that it is not given the required importance from the enterprises and in some cases they misunderstand what they are required to do. In order to better understand the requirements of the standard a detailed analysis and a more in-depth concentration of findings was made.

In order not to be given wrong messages, further analysis to the third level of the paragraphs or requirements was made. Looking in the following text, three groups were identified, the 1st with the highest number of

deficiencies, the 2nd with moderate descending order and the 3rd with very few steady. So the **top most** important paragraphs and requirements with the highest number of deficiencies are written below:

8.5.2 Corrective actions (55 findings, group 1)
6.3 Infrastructure (50 findings, group 1)
7.5.1 Control of production and service provision (40 findings, group 1)
6.2.2 Competence, awareness and training (30 findings, group 2)
6.4. Work environment (30 findings, group 2)
7.2.1 Determination of requirements related to the product (28 findings, group 2)
7.6 Control of monitoring and measuring devises (27 findings, group 2)
8.2.1 Customers Satisfaction (25 findings, group 2).
8.2.4 Monitoring and measurements of the product (25 findings, group 2).
7.4.1 Purchasing process (24 findings, group 2)
5.4.1. Quality objectives. (24 findings, group 2)

## Analysis of ISO 220000 Findings

A similar analysis about the concentration of findings was carried out for ISO 22000. The only difference is that the certified companies were investigated for one year, 2007 and beginning of 2008 because the standard was very recently implemented in Cyprus. The pattern, and the concentration during that year is similar as with others standards. (Three groups but with a great difference on clause 7.2). So for similarity, only the top results will be discussed and if possible compared with ISO.

7.2 General Prerequisite programmes (PRPs) (90 Findings)
4.2.2 Control of Documents system (20 Findings)
7.6.4 System for the monitoring of critical control (18 Findings)
7.3.3 Product characteristics (13 Findings)
7.3.3.1 Raw materials, ingredients and product – contract materials (13 Findings)
6.2.2 Competence awareness and training (12 Findings)
7.10.2 Corrective actions (12 Findings)
7.8 Verification planning (11Findings)
5.7 Emergency preparedness and response (10 Findings)
7.10.4 Withdrawals

## Analysis of ISO 14000 Findings

The same procedure was followed as before by identifying the top requirements of the standard that have the largest concentration of findings. The results from audits show that nonconformities/observations are most apparent in clauses that require considerable financial investment and time. As it is appeared in Pareto Charts the clauses 4.4.6 which is referred to operational control and 4.3.3 to objectives, targets and programme (s), exhibits the highest number of minor nonconformities/observations with large difference from the rest and during the latest year the number of recordings is significantly higher. These observations imply that companies do not pay much attention to the results of audits; they do not take corrective actions to address nonconformities and are therefore subject ‘penalization’ at the next audit by receiving a minor nonconformity/observation on the clauses 4.4.6 and 4.3.3.

4.4.6 Operational Control (67 Findings)
4.3.3 Objectives, targets and programme(s): (64 Findings)
4.3.1: Environmental aspects (48 Findings)
4.5.2: Evaluation of compliance (47 Findings)

4.5.3: Nonconformity, corrective action and preventive action (37 Findings)
4.6: Management review (33 Findings)
4.4.2: Competence, training and awareness (22 Findings)
4.4.5: Control of documents (21 Findings)
4.5.1: Monitoring and measurement (21 Findings)
4.4.7: Emergency preparedness and response (21 Findings)

## Cross Reference of the Three Standards

An attempt is made in the next few lines to compare the three standards in order to identify the most common deficiencies. Looking at table 2 (at the end of the paper), the top 10 paragraphs of the ISO 9001 standard were reported. Next the top paragraphs or requirements of ISO 22000 and ISO 14001 were cross related with ISO 9001. On the same table the rank of each standard is given. The cross reference was made using the tables of last pages of the 3 standards "Correspondence between ISO 9001 and ISO 14001, and 22000". There are 73 clauses of ISO 9001 in which a company can receive a NC or observation (some how). After the new other two standards were harmonised the ISO 22000 has approximately the same amount of requirements with approximate the same numbering, and ISO 14001 has only 25 clauses. A very important conclusion extracted from the table, is that the deficiencies or top clauses of the three standards match together almost completely. Refer to shaded yellow areas and rank numbers. Of course some clauses of one standard do not correspond to any clause of the other standard. *So that leads to the main conclusion that the three standards have common deficiencies and difficulties in implementation and monitoring in more than 60% i.e. the top 10 of ISO 9001 corresponds to the top 6 of ISO 22000 and to the top 7 of ISO 14001*. The top four areas where companies should pay attention:

1 Corrective actions or Nonconformity
2 Infrastructure, prerequisite programmes, resources,
3 Control of production and service provision, or operational control
4 Competence, awareness and training

## Results Presentation

**Part 2: Interviews with people involved**

In all tree national **qualitative** surveys, the same methodology was adopted. People involved in the area were selected by the researchers and the author. An appointment was arranged and they were explained about the purpose of the interviews and the duration. In all three independent surveys, the interviewers were asked to give answers on the same questions related to the area under investigation (quality, environmental, food safety). Due to the fact that part two, was located on the same period in all surveys, the main author arranged to have approximately the same questions but related to the specific area. When performing the interviews the researchers were aiming at two directions: (a) to identify the status of quality/ environmental, food safety in Cyprus at a general level and (b) to investigate the interviewees' perceptions regarding the appropriate standard implementation in Cyprus. The questions asked, were designed in such a way to address the above issues while giving much scope for new ideas to surface. Their order was specifically chosen so to avoid repetition of certain matters, both during the interview and within the analysis. It is beyond the scope of this paper and the interest of the readers to present in detail the results of this part of the research. The main outcomes will only be presented next:

**Quality Area:**

The interviews have given considerable insights and input for thought to the researcher, since some of the points raised was not evident beforehand. It is important to note that the status of quality on Cyprus is currently relatively

low due to lack of awareness and limited know-how hence the government should show interest in and support quality initiatives. Quality within hotels is in a better state than other sectors, yet the managers should be more committed and focus on long-term strategies, which will give more serious consideration to the training of their employees and the local culture. The ISO 9000 system is in general supported by the interviewees since none of them objected to its implementation.

Some very interesting suggestions came up when, at the end of the conversations, the interviewees were asked if they would like to add or suggest anything on the subject. Further expanding on the lack of public awareness, the academic suggested the creation of an association for quality, similar to the American Society for Quality or the Institute of Quality Assurance in Britain. The responsibilities of this organisation would be to enhancement public awareness regarding quality assurance through regular publication of relevant materials and membership would be open to all citizens. This association in cooperation with the authoritative government agencies can even introduce a national quality award said the academic and the chairman who explained that citizens, organisations, academics etc. can contest for this award which would act as a motive for the promotion of quality within the Cypriot society. The consultant who seemed more concerned about the quality of human resources has suggested that Cypriots should be given incentives to be trained and work in their country's industry. This could be done by upgrading the already existing higher educational establishments.

**Environmental Area:**

All the respondents seemed to agree that there is a legal frame around the environmental issues by the establishment of 130 legislations for the protection of the environment. The Environment Service from the side of public services and the CCC from the side of private sector, are the responsible for the conduction of audits for the implementation of legislation. In each service there are few problems. The Environment Service faces a problem due to lack of employees and the complaints about the competence of its employees and the non flexible and dynamic assessments.

In spite of the fact that CCC has adequate knowledge and resources and is getting better every time, they mention that, from the side of companies, the auditors of CCC are strict and that the certification with ISO 14001 increases the bureaucracy. According to auditors' opinions they do not inspect only based on the requirements of ISO 14001 but also according to the system that company has designed and implemented. The bureaucracy of the system arises from the company's policy and from their consultants who designed it. The requirements of documentation of EMS are minimal and if the companies want to designing one super EMS is not their fault.

The implementation of ISO 14001:2004 has many benefits. The only thing that company has to do is to understand its requirements and develop it with the right way. But the point is not the certification but the development of culture inside the company. All the respondents agreed that generally the implementation of ISO 14001 in Cyprus does not face any special problems, is an investment that will give benefits to the business and it can gain conservations and as a result, profits. The point is the companies to understand the requirements of standard and to develop it with the right way for the benefit of the environment and people who work there.

The general feeling is that the companies are obliged to conform to the European Legislation but are not obliged to be certified with the National and European Standards. The public authorities contrary to the private sectors do not support these standards as the best solution for the companies, because they will not solve the company's problems, put the company in a situation to be competitive with others companies and are costly. However, the public services do not have

the proper enforcement for the compliance of legislation, cannot identify the problems and sometimes are exaggerated.

All the respondents said that there is a long way ahead about the level of knowledge in Cyprus according to environmental management by the consumers. But every day more and more people get informed through the “Green Treaties”, “Aarhus Treaty”, the “Green Dot” Company, the organised groups and the educational institutes. Also, these actions will be encouraged by the cooperation of organised public authorities and sensitive to the environment citizens.

**Food Safety Area:**

Taking into consideration the answers given by the interviews it was found out that the Cypriot companies operating in the food area conforms at a satisfactory level with the local laws and European directives.

With the ascension of Cyprus into the European Union in May 2004, the public and government services should have been develop different kind of mechanisms to harmonize with European directives in relation with food safety. The Food Safety Council and later the foundation of the Indepented Food Safety Authority will lead Cyprus in a direction were the different issues around the food area will be spherically addressed, without any deviations and in conformity with the European and International Regulations.

The interviews also revealed that small- medium size enterprises are facing important difficulties in conforming to laws and in implementing food safety and hygiene systems. This is because this kind of business does not have the adequate funds in order to invest in equipment/ machinery, buildings, infrastructure etc. and this is also due to the small number of employees employed.

The different government services have been seriously improved the last years. Of course, there is ground for further improvements more specifically in personnel training, providing the appropriate equipment, which will assist them in running better inspections in the different kind of enterprises. Of course, there are some communication problems between different government departments as well as overlapping of authority or the opposite (no responsible department). This issue was also revealed by the interviews.

## Results Presentation

**Part 3: Questionnaires to certified companies**

The main purpose of part 3 was to research the benefits, motives, expectations as well as any problems and deficiencies of certified companies with the three standards under investigation. All three independent studies used a similar questionnaire as the main mean to acquire quantitative data. The questionnaire design is an amalgamation of the questionnaire employed by Gotzamani *et al.* (2004) and that of the American Society for Quality (ASQ, 2008), adjusted to the requirements of each study and according to the relevant literature.

Using the QuestionPro online software, the questionnaire was prepared and then sent out to the email addresses that had already been collected. Web-based questionnaires were chosen against postal ones since a truly professional-looking survey would reach all respondents immediately at limited cost. Moreover, the software provides access to detailed participant statistics such as who (i.e. which email address) had viewed and answered the questionnaire thus tackling some important caveats of postal questionnaires. It is possible to view individual responses as well as aggregate ones, which provides the researcher with considerable ease when processing the data.

The questionnaire was accompanied by a covering letter (an e-mail invitation) explaining the purpose of each research and ensuring for the confidentiality of responses. In order to get more accurate responses, the invitation explicitly requested the recipient to forward the e-mail to the person dealing with quality. Environmental/ food safety matters within the company. Also, to attract the respondent's interest, the invitation gave him/her the opportunity to have a copy of the final project; he/she just had to respond to the given e-mail address.

The answers were tabulated in the Web based database and then exported to Microsoft Excel for further analysis. Each independent researcher for each standard developed many graphs and tables and many concussions were extracted. This work was very laborious and time consuming due to the massive volume of information and data.

The most difficult task was to extract from the three researches the appropriate information and data, and then to analyse and present them. The results should be of the interest of the participants of the international Conference, as well as any international readers. So it has been decited by the main author, to present only the answers of the two questions, which are directly related with the clauses of the standards and Part 1, "Findings of auditors during certification audits". The two very large questions will be addressed **"difficultness to document and to develop a conformance process for each standard" and "difficultness to implement each standard".** In each question, respondents were asked in the scale of 1 to 5 to evaluate the difficultness of each clause of each standard. So they were asked to give answers on about 60 requirements of ISO 9001 and ISO 22000, and about 20 requirements of ISO 14000. All the results and conclusion for each research are given on each independent report. Refer to references section. A fourth survey was conducted using only a different questionnaire and was investigating the effective implementation of ISO 9001. Only some data of this questionnaire will be used.

The first analysis was to present the top 10 standards requirements difficult to document/ develop and implement as well as the five easy to address. The results are shown in rank order on Table 3 below. The first conclusion that can be extracted is that *only 30-50% of the standards requirements are difficult to document and at the same time difficult to implement. The same conclusion even less applies to the easiest five.* It should be noted that there is no direct correspondence of the requirements numbers of one standard with other at this table.

**Table 3: Comparison of difficultness in documenting/ developing and implementing the three standards**

| TOP 10 | 9001 Docum. | 9001 Implem. | 22000 Docum. | 22000 Implem. | 14001 Docum. | 14001 Implem. |
|---|---|---|---|---|---|---|
| | 73 Requirements | | 73 Requirements | | 25 Requirements | |
| 1 | 5.5.2 | 7.3.5* | 6.2.2* | 6.3* | 4.3.2* | 4.3.2* |
| 2 | 4.2.4 | 7.3.3 | 5 | 7.10.4 | 4.3.3* | 4.3.3* |
| 3 | 6.1 * | 6.1* | 6.3* | 6.4 | 4.3.1* | 4.4.4 |
| 4 | 5.6.1 | 4.2.1 | 5.3 | 7.10.3 | 4.4.2 | 4.6 |
| 5 | 5.4.2 | 5.6.3 | 4 | 6.2* | 4.4.5* | 4.5.5* |
| 6 | 7.1* | 5.6.2 | 4.2 | 6.2.2* | 5.5.4 | 4.5.3 |
| 7 | 4.1 | 7.3.4 | 6.2* | 8 | 4.4.6 | 4.4.7 |
| 8 | 6.2.2 | 7.3.2 | 5.7 | 7 | 4.5.6 | 4.5.2* |
| 9 | 7.3.5* | 8.2.3 | 7.2* | 7.2* | 4.5.2* | 4.3.1* |
| 10 | 4.2.3 | 7.1* | 7.10 | 8.2 | 4.4.1 | 4.4.5 |
| ….. LAST 5 | | | | | | |
| | 5.3 | 7.2.3 | 7.10.2 | 5 | 4.5.3* | 4.4.2 |
| | 4.2.2 | 8.5.2 | 5.1 | 4.2.3 | 4.5.1 | 4.5.4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 8.3 | 7.5.2 | 5.2 | 4.2.2 | 4.4.7 | 4.4.6 |
| | 7.2.3 | 7.6 | 7.4.2.3* | 5.5* | 4.4.3 | 4.1 |
| | 5.2 | 8.2.1 | 5.5* | 7.4.2.3* | 4.2 | 4.4.3* |

The second analysis was to compare the average grates of all the standards requirements and identify which one is easier, to document or implement. Looking on the Figure 4, graph a), below, a second conclusion is extracted: *For ISO 9001 and ISO 22000 is easier to implement the requirement rather than developing / documenting. The ISO 14000 is both difficult to develop and implement.* The reason that the ISO 14000 is difficult to implement is the age of the standard in Cyprus. This standard was adopted 2-3 years ago compare with the other standards which are of 10 (HACCP) to 15 years old. In the next three graphs b, c, d, of figure 4, the degree of difficultness per standard per section is shown. Looking on graphs c and d another conclusion is evident: *section 6 'recourse management' of both standards in the most difficult to develop and implement.* Another conclusion from the overall results considering that the respondents were ask to evaluate from 1 (easy) to 5 (difficult) is that the *Cypriot managers find rather easy to develop and implement the standards, average 2.3 to 3 out of 5.*

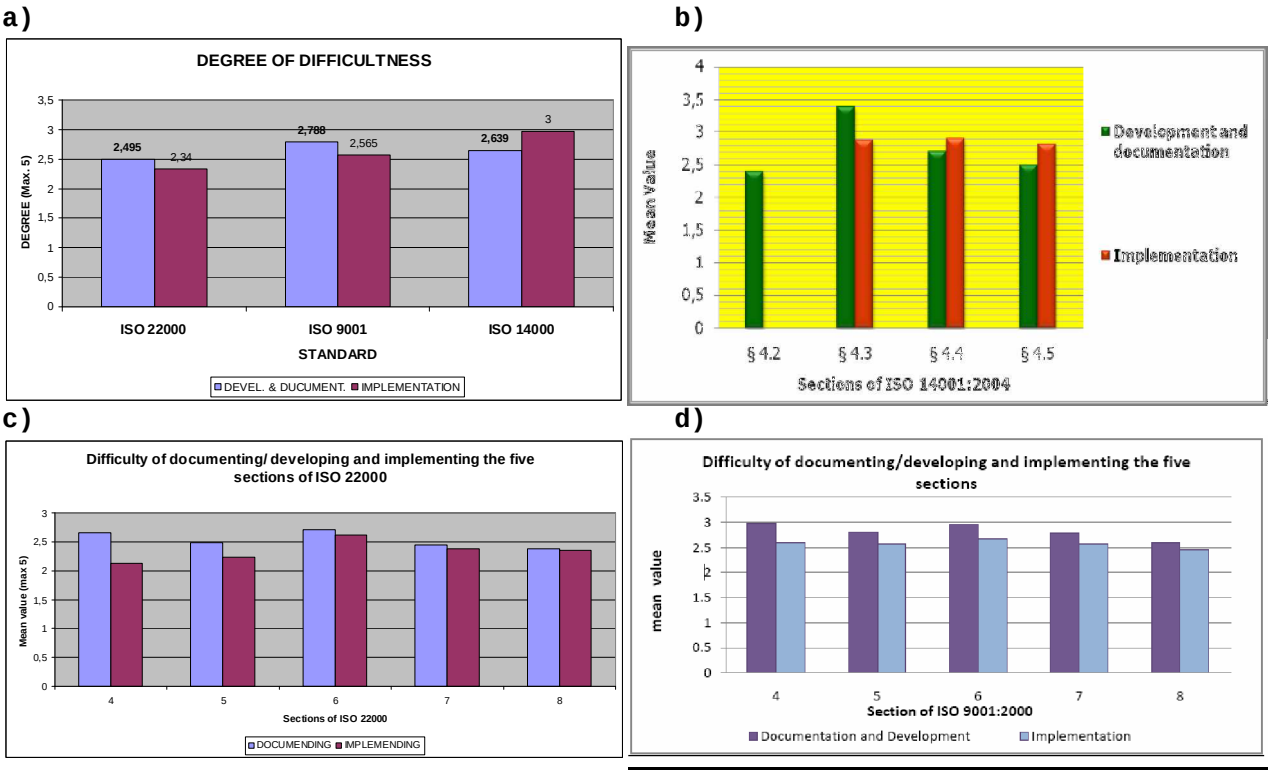


**Figure 4: Difficulty of documenting/ developing and implementing the three standards**

The third and most important analysis is presented in the left hand side of the most important table 2 (attached at the end of this paper as Table 2). The left hand side of the table was used to present the results of part 1 of the research. i.e. the ranking of the findings from certification and surveillance audits. So on the same table the ranking of **"difficultness to document and to develop a conformance process for each standard" and "difficultness to implement each standard"** is presented. The evaluations of the respondents of each clause of the standards for the most important two questions (difficulty in developing and implementing) were further analysed. Averages were calculated followed by Pareto analysis to identify the most difficult clauses of the standards. In order to have comparative data, the same methodology was followed. All clauses were compared with the ranging of the oldest and widely used standard ISO 9001.

It is clear that each clause of each standard was compared with the similar clause of the other standards. This information was extracted from the appendices "Cross reference between clauses of ISO … and clauses of ISO … (ISO 9001:2000, ISO 14000: 2004, ISO 22000:2005.

Looking on table 2 the most important general conclusion is that, *in all standards, according to certified companies managers, the clauses of the standards that receive the highest number of non conformities/ observations during external audits, have moderate of easy degree of difficultness in developing and implementing the particular clause'.* This conclusion is applied at a greatest extent with ISO 9001 were the implementation ranking numbers are on average above 35. This is because of the age and experiences of the standard. This major conclusion was expected because if managers were considering higher degrees of difficulty they would have paid more attention to those clauses so fewer observations would have been recorded during audits. The main reasons of the opposite ranking and effects are that management:

- Does not understand what is required by each clause with an effect to consider the clause easy to develop and document
- Does not pay the right attention to a particular clause during implementation because it considered easy with an impact to receive high number of non conformities or observations
- During implementation, do not take the appropriate corrective actions because the actions were related to investment, training, release of recourses, employment, time consuming, infrastructure, new equipment/ machinery etc.

Another conclusion, which extracted from the same table 2, is that *'according to managers ranking is easier to implement a clause of any standard than developing/ documenting'* this is substantiated by looking on the columns of each standard and comparing the rank number written in implementation with the rank number or documentation.

Many other conclusions and information can be revealed not only from this paper but also from the three independent reports where detail analysis of each part of the research is presented.

One question, which is very important for managers it's if the implementation of any standard increases share market and or profit. In all standards, the answers were positive and encouraging. This evident is from the answers which are shown on the following figure 5, were the share market was increased for ISO 22000 and the profit was increased with implementation of ISO 14000 (left graph).

Another critical question was if the implementation of the standards develops a competitive advantage to the certified company. Again the answers were positive in their majority. A sample chart of the 3 research projects is shown on figure 6 for ISO 9001.

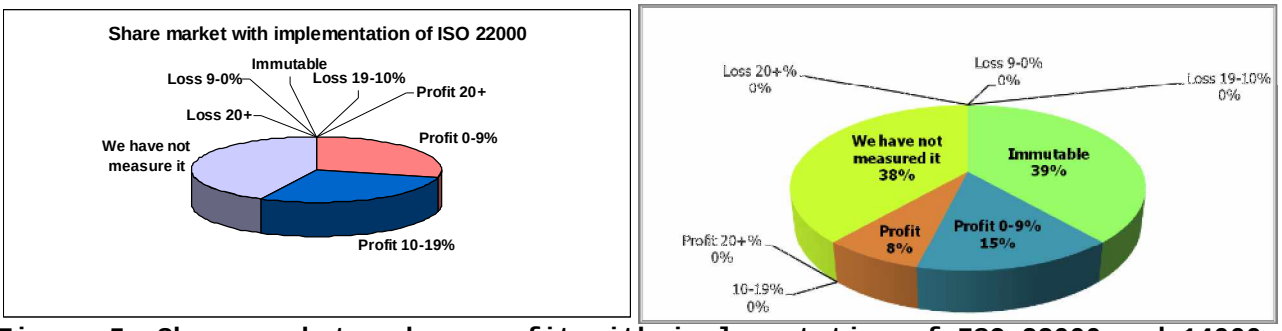


**Figure 5: Share market and or profit with implementation of ISO 22000 and 14000**

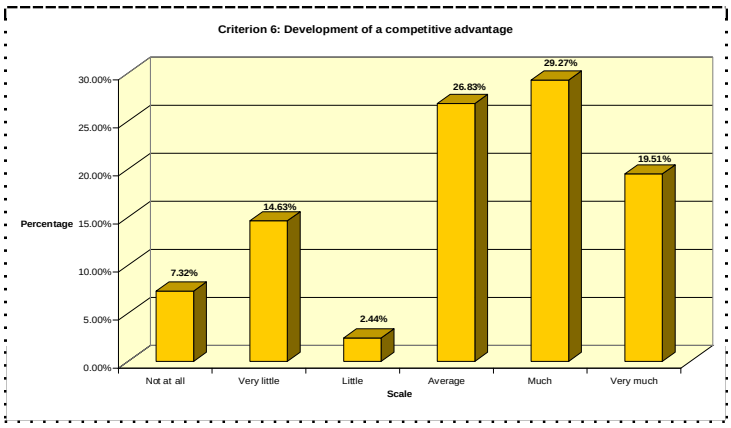


**Figure 6: Development of competitive advantage with the implementation of ISO 9001**

Other extracts from the quantitative assessments (questionnaires) are: The 70% of the sample said that the duration of certification is estimated to be one year and for audit less than three days. Also, for the maintenance of the system they need maximum 120 hours. In addition, all the respondents believe that they will have profit after the implementation of the standards. Respondents seemed very satisfied with the system's capability, which increases management commitment and improves the communication with the suppliers. The system also helps considerably with the customers' satisfaction, reduction of non conformity products and the organization's picture. In addition, it contributes to the creation of a system of health and safety and method of documentation, to the reduction of waste and less human error and repeating of mistakes. The less applied principles were the effective production and reduction of the production cost and the increase of share market.

However, if the companies participated and contributed to the designing of a simple, effective and functional system they would have achieved big reductions in the production cost. There are many benefits from this system only if the companies understand the requirements of the standard and exploit and develop them efficiently and effectively.

It is beyond the scope of this paper to present all results. The most important questions, which are of interest for the managers, were explained. The last analysis and most important with hundreds of calculations is presented on table 4 (end of this paper).The managers of the certified companies were asked to evaluate the effects of the implementation of a particular system on 20 to 30 parameters. These parameters which are important to any management include, profitability, reduction of waste communication, documentation etc. In spite of the fact, that there are three surveys + 1, by four different people and some how there were differences in evaluation scales, questions etc, the author normalize all the results, rank them in descending order and present them in table 4 in a comparable way. The table presents the evaluations of the respondents in rank order in a scale 1 to 5 (highest effect). For the ISO 9001 standard a second evaluation was conducted by another researcher, which is presented for comparison, and check the consistency of the respondents. Exploring the results many conclusions can be extracted but only some are presented next:

- The averages of all 4 surveys are above 3 so as a general comment for all standards the effects are above average and close to each other with minimum average ISO 14000 3.09, ISO 9001 3.28 & 3.59, and maximum ISO 22000 3.61.
- The averages of the two ISO 9001 surveys are very close, so there is consistency and reliability on results. Also the ranking of the two surveys has many similarities.
- Comparing the top 1st to 5th parameter and the last 5, it can be easily concluded that there are many similarities. Some of the similarities are marked with different color on table 4 for easy comparison.

- Among the top parameters with consistency in all standards are the following: Improvements of internal operations and monitoring systems, Increase in customer satisfaction, Improvements on quality of products and services, improvement on communication etc.

## Conclusions

**Part 1: Audits findings**

Data and statistical analysis was presented previously for all three standards and the top 10 problematic or findings were also given. Explanation for the reason of that was reported for some of the standards clauses. A summary of the major conclusions will be presented next, in order to be used as a tool by companies for further improvement of enterprise effectiveness, competitiveness and above all customer satisfaction.

1 The decision of the technical committees of ISO that the three standards should be harmonised and have the same structure and some how the same clauses, proved to be effective and for the benefit of certified companies.
2 The ISO 9001:2000 has 73 clauses, ISO 22000 HACCP has 73 clauses and ISO 14001 has 25 clauses. Considering the above and data presented in fig. 1 which compares the NC and Observations of the three standards, leads to the conclusion that the ISO 14001 standard is easier to implement than the other two and ISO 22000 the most difficult due to the impact to the customer and to the legislative obligations.
3 Certification and reevaluation audits are more difficult since the whole system is audited and the concentration of observations is higher. The number of MNC is reduced during surveillance audits A and B for all standards due to the maturity and experience the companies acquire; this means that the enterprises in their majority are getting better.
4 Looking on table 2, the three standards have common deficiencies and difficulties in implementation and monitoring in more than 60% i.e. the top 10 of ISO 9001 corresponds to the top 6, of ISO 22000 and to the top 7 of ISO 14001
5 The top four common clauses companies should pay attention area:
Corrective actions or Nonconformity
Infrastructure, prerequisite programmes, resources,
Control of production and service provision, or operational control
Competence, awareness and training
6 In general the deficiencies and problems recorded during CCC audits of the three systems, in spite of the fact that are three different standards, are very close to each other. So it can be concluded that Cyprus companies have the same problems in understanding and implementing the standards.

**Part 2: Interview with experts**

This qualitative assessment from three groups of people involved in each investigated area has some common characteristics:

7 The three international standards under investigation are widely accepted in Cyprus and contribute positively to the enhancement of Quality, Environmental and Food Safety culture and improvements at national and corporate level.
8 There is lack of communication and short of people involved at government departments in the area of environmental management and food safety.
9 Inadequate promotion or activities related to the three areas of studies by government, organised bodies, authorities etc
10 The implementation of European directives and national laws are followed and implemented in their great majority and at a high level.
11 Small and medium size enterprises are fasing problems in implementing environmental and food safety laws and regulations, especially when investments, infrastructure and employment are involved.

**Part 3: Questionnaires analysis.**

As it was written, previously many conclusions and information can be extracted from the certified companies' management with respect to their opinions in the benefits, problems and deficiencies with their company's certification.

12 The general picture is that internal motives are the ultimate driving forces for certification of Cypriot companies. Customer demand does not constitute an important motive for certification.
13 Certification with the standards is an investment for the company. It increases management commitment and improves the communication with suppliers, company's image and customers' satisfactions
14 Some companies do not understand the nonconformities/observations raised by the auditors so the measures taken are limited or inadequate.
15 There are problems with the inadequate infrastructure because of the lack of investments. The findings are related to the instrument, safety measures, maintenance of buildings, workplace and associated utilities and equipment of machinery.
16 Increase in bureaucracy had the largest impact on the surveyed companies. However, the inspectors of CCC claimed that companies with their consultants make the system bureaucratic.
17 Only 30-50% of the standards requirements are difficult to document and at the same time difficult to implement. The same conclusion even less applies to the most easiest.
18 Iimplementing the requirements of ISO 9001 and ISO 22000 are easier than developing / documenting. The ISO 14000 is both difficult to develop and implement
19 Section 6 'recourse management' of both standards is the most difficult to develop and implement.
20 Cypriot managers find rather easy to develop and implement the standards, average 2.3 to 3 out of 5.
21 In all standards, according to certified companies managers, the clauses of the standards that receive the highest number of non conformities/ observations during external audits, have moderate of easy degree of difficultness in developing and implementing the particular clause', ' according to managers ranking, is easier to implement a clause of any standard than developing/ documenting.
22 Looking on table 4 were the effects of the certifications are shown, the averages of all 4 surveys are above 3 so for all standards the effects are above average and close to each other so the results are consistent and reliable.
23 Comparing the top 1st to 5th parameter, it can be easily concluded that there are many similarities and consistencies in all standards with agreements on important organization effects like: Improvements of internal operations and monitoring systems, Increase in customer satisfaction, Improvements on quality of products and services, improvement on communication etc. The same applies to least effecting parameters.

The purpose of this paper was not to give statistics but discuss the benefits of the standards and brink in surface the problems before and after certification as perceived by managers. This unique paper is presenting qualitative and quantitative data, statistics, information received from the in-depth investigation of the confidential files of the certified companies; it also presents the interviews outcomes with people involved and present the results from questionnaires to managers.

The sample for the three investigations was according to international sampling techniques. The sample for certification audits findings, was 100% and for the questionnaires ranges from 17 to 30 %. So the results are considered reliable and accurate.

The results can be used for self assessment and identification of weaknesses of each certified enterprise. Knowing their weakness, managers can formulate an action plan to improve their competitiveness through an effective QMS, HACCP and

EMAS system. In spite of the fact that the surveys were conducted in Cyprus, the above information can be easily used by any certification authority for comparison and why not for calibration. Auditors working with any certification body could be also benefited as they can pay more attention to the above clauses and try to explain or help managers in better understanding the standard. It will be quite beneficial if similar National surveys could be conducted to other countries, or by certification bodies, so as the results could be compared and used for calibration of auditors.

Managers can now compare what clause of a particular standard is considered easy for them with the non-conformities reported by auditors. They now know, where efforts should concentrate, by knowing their deficiencies. Also the value and effects of each standard on companies' important parameters in now presented.

Because the dissertation reports and research work were awarded with **As**, the authors, decited to send through the CCC the three independent reports as well the publications to all participated companies and those who will express their interest. With this way the unique additional results and information will be disseminated to the Cypriot companies. This is in alignment with the main author's believe **"Knowledge and experience which is not shared with others is useless"**

We would like to thank the personnel and auditors of the CCC for providing us data and information from the certified companies' files, as well as for their constructive comments. We would like also to thank the people interviewed for their valuable information and finally, the managers of the certified companies who participated by answering the big questionnaires.

## References

Angeli, I, 2006, Deficiencies with "ISO 9001:2000 and HACCP certification. A case study of a national survey in Cyprus ", proceedings of the 3rd Balkan Quality forum, May, Sofia, Bulgaria

Angeli, I, Rouvali M, Apostolou N, Olympiou A, 2008, " Similarities and deficiencies with ISO 9001;2000, ISO 14000:2004 and ISO 22000: 2005 HACCP certification. A case study of tree national surveys in Cyprus" proceeding of the 3rd International Conference of Lead Auditors, 11-12 November, Dubai, UAE.

Apostolou N., 2008, Investigating the driving forces, impacts and problems of ISO 9001:2000 certification in the Hotel Industry: a case study on Cyprus, MSc Dissertation, University of Edinburgh, UK

ASQ: American Society for Quality (2008) The Product Support Initiative [online] available from < http://standardsgroup.asq.org/news/psi/index.html> [20 June 2008]

Cyprus Certification Company (2008). [Online]. Available from: http://www.cycert.org.cy/

Cyprus Certification Company brochures,

Environnemental Management Systems EN ISO 14001:2004

Food Safety management systems- EN ISO 22000:2005

Gotzamani, K.D., Nicolaou, M., Nicolaides, A. and Hadjiadamou, V. (2004) 'Investigation of the contribution of ISO 9000:2000 to business excellence'. Cyprus Productivity Centre publications.

Loizou A., 2008 A proposed plan for an effective implementation of ISO 9001 Quality Management System, MBA Dissertation, Cyprus International Institute of Management, Cyprus

Management System for Food safety and Hygiene – Hazard Analysis and Critical Control Points (HACCP) Hellenic Standard ELOT 1416:2000 and CYS 244:2001.

Olympiou A., 2009, The infrastructure and implementation Management Systems for Food Safety and Hygiene ISO 22000:2005 (HACCP) in Cyprus organisations, BSc Dissertation, Agricultural University of Athens, Greece, (Submission June 2009)

Quality Management System Standard EN ISO 9001:2000

Rouvali M, 2008, The infrastructure and implementation of environmental Management Systems in Cyprus organisations, MSc Dissertation, University of Glamorgan, UK.

| PART 1: CERTIFICATION AUDITS FINDINGS | | | | | | PART 3 QUESTIONNAIRES | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ISO 9001 REQUIREMENTS, 73 Requirements** | **RANK** | **ISO 22000 REQUIREMENTS 73 Requirements** | **RANK** | **ISO14001 REQUIREMENTS 25 Requirements** | **RANK** | **RANK 9001 Docum** | **RANK 9001 Implem** | **RANK 22000 Docum** | **RANK 22000 Implem** | **RANK 14001 Docum** | **RANK 14001 Implem** |
| 8.5.2 Corrective actions | **1** | 7.10.2 Corrective actions | **7** | 4.5.3: Nonconformity, corrective action and preventive action | **5** | **31** | **47** | **11**<br>**7.10.4** | **2**<br>**7.10.4** | **14** | **6** |
| 6.3 Infrastructure | **2** | 7.2 General Prerequisite programmes 6.3 Infrastructure | **1**<br>**20** | 4.4.1Resources, roles, responsibility and authority | **13** | **32** | **30** | **9**<br>**3** | **9**<br>**1** | **12** | **13** |
| 7.5.1 Control of production and service provision | **3** | 7.2 General Prerequisite programmes | **1** | 4.4.6 Operational Control | **1** | **19** | **43** | **9** | **9** | **7** | **16** |
| 6.2.2 Competence, awareness and training | **4** | 6.2.2 Competence awareness and training | **6** | 4.4.2: Competence, training and awareness | **7** | **8** | **14** | **1** | **6** | **4** | **14** |
| 6.4. Work environment | **5** | 6.4. Work environment | **0** | No equivalent | | **26** | **35** | **18** | **3** | No equiv | No equiv |
| 7.2.1Determination of requirements related to the product | **6** | 7.3.4 Intended use, &7.3.5 Flow diagrams | **16** | 4.4.6 Operational Control | **1** | **13** | **31** | **13**<br>**7.3** | **27**<br>**7.3** | **7** | **16** |
| 7.6 Control of monitoring and measuring devises | **7** | 7.3.3 Design and development outputs | **1** | 4.4.6 Operational Control<br>4.5.1: Monitoring and measurement | **1**<br>**9** | **46** | **50** | **13**<br>**7.3** | **27**<br>**7.3** | **7**<br>**15** | **16**<br>**11** |
| 8.2.1 Customers Satisfaction | **8** | No equivalent | | No equivalent | | **41** | **>50** | No equiv | No equiv | No equiv | No equiv |
| 8.2.4 Monitoring and measurements of the product | **9** | No equivalent | | 4.5.2: Evaluation of compliance4.5.1: Monitoring and measur. | **4**<br>**9** | **30** | **15** | No equiv | No equivalent | **9**<br>**15** | **8**<br>**11** |
| 7.4.1 Purchasing process | **10** | 7.3.3 Product characteristics | **4** | 4.4.6 Operational Control | **1** | **28** | **39** | **13**<br>**7.3** | **27**<br>**7.3** | **7** | **16** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.4.1. Quality objectives. | **11** | No equivalent | | 4.3.3 Objectives, targets and programme(s): | **2** | **34** | **37** | No equiv | No equiv | **7** | **2** |
| 4.2.3 Control of Documents system | **13** | 4.2.2 Control of Documents system | **2** | 4.4.2: Competence, training and awareness | **8** | **11** | **23** | **6**<br>**4.2** | **15**<br>**4.2** | **2** | **14** |
| 5.2, Customer focus, 8.5.3 Preventive actions | **16** | 5.7 Emergency preparedness and response | **9** | 4.3.1 Environmental aspects, 4.3.2 legal & other requi., 4.6 Management Review | **11** | **>50,**<br>**37** | **45,**<br>**38** | **8** | **29** | **3**<br>**1**<br>**12** | **9**<br>**1**<br>**4** |
| 8.2.3 Monitoring and measurement of processes | **17** | 7.6.4 System for the monitoring of critical control | **3** | 4.5.2: Evaluation of compliance | **4** | **23** | **9** | **20**<br>**7.6** | **19**<br>**7.6** | **9** | **8** |
| 5.6 Management Review | **20** | 5.8 Management Review | **19** | 4.6: Management review | **20** | **4** | **18** | **19** | **12** | **12** | **4** |
| 8.3 Control of non conforming product | **25** | 7.10.4 Withdrawals | **10** | 4.5.3: Nonconformity, corrective and preventive action, 4.4.7: Emergency preparedness and response | **5**<br>**10** | **49** | **36** | **11** | **2** | **14**<br>**18** | **6**<br>**7** |
| 7.4.2 Purchasing requirements | **0** | 7.3.3.1 Raw materials, ingredients,product – contract materials | **5** | 4.4.6 Operational Control | **1** | **39** | **24** | **13**<br>**7.3** | **27**<br>**7.3** | **7** | **16** |
| 7.3.5 Design & development verification | **0** | 7.8 Verification planning | **8** | 4.4.6 Operational Control | **1** | **9** | **1** | **43** | **47** | **7** | **16** |

**Table 2: Cross reference of ISO 9001 requirements (NC & observations), ISO 22000 and ISO 14001 and questionnaires results (0 = No findings)**

| | **Effects ISO 9001 1st survey** | | **Effects ISO 9001 2nd survey (4th)** | | **Effects ISO 14000** | | **Effects ISO 22000** | |
|---|---|---|---|---|---|---|---|---|
| 1 | Increase in bureaucracy | **4,51** | Improvement of internal organisation and | **4.34** | Support to the organisation's | **3.77** | Establismenent of a continues | **4,43** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | operation, | | picture | | documenting methodology | |
| 2 | Improvement of quality of service | **4,35** | Quality improvement of end products and services, | **3.99** | Con/tion in a const. syst. which obsr. the h & s | **3.77** | Establismenent of a continues monitoring hygiene & safety system | **4,43** |
| 3 | Contribution of the organisation to the protection of the environment (decrease of waste, energy saving, usage of recycled materials) | **4,22** | Decrease of defective operations, | **3.87** | Increased management commitment | **3.77** | Improve of emploees proffesionalism | **4,29** |
| 4 | Improvement of internal organisation and operation | **4,17** | Increase of customer satisfaction, | **3.85** | Reduction of waste-rubbish | **3.77** | Improve organasational image | **4** |
| 5 | Improvement of competitive position | **4,12** | Development of a quality culture within the organisation, dedication of employees in internal and external customer satisfaction, | **3.79** | Consecration in a constant method of doc/tion | **3.46** | Reduction of non conforming products | **4** |
| 6 | Reduction of faulty items / defects | **4,03** | Increase of bureaucracy, | **3.76** | Reduction of non conformity products | **3.31** | Increase management commitment | **3,86** |
| 7 | Increase in customer satisfaction | **3,94** | Improvement of communication with customers, | **3.71** | Less repeating mistakes | **3.31** | increase suppliers performance | **3,86** |
| 8 | Improvement of communication with customers | **3,89** | Improvement of employees' competences, knowledge and skills, | **3.66** | Impr/ment in the com/tion with sup/rs | **3.23** | Competitive advantgage | **3,71** |
| 9 | Decrease in absenteeism | **3,84** | Improvement of communication and relationships between management and employees, | **3.65** | Customers' satisfaction | **3.08** | Improve quality of products/ services | **3,71** |
| 10 | Increase in sales | **3,75** | Increase of team-working, | **3.54** | Increase in employees' professionalism | **3.08** | Reduse repeated mistakes | **3,71** |
| 11 | Increase of employee satisfaction | **3,73** | Improvement of competitive position in the market, | **3.54** | Less human mistakes | **3.08** | Upgrate the quality of raw material | **3,71** |
| 1 | Increase in the number of | **3,73** | Decrease of complaints, | **3.43** | Step up in the | **3.0** | Reduction of | **3,5** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | suggestions and recommendations on behalf of the employees | | returns and remunerations, | | quality of first materials | 8 | customer complains | 7 |
| 13 | Reduction of complaints, returns and compensation payments | 3,70 | Increased productivity, | 3.41 | The quality of your products/services | 3.00 | Reduse human mistakes | 3,57 |
| 14 | Improvement of communication and relations among management and employees | 3,63 | Improvement of communication and relationships among employees, | 3.31 | Improvement to the internal communication | 2.92 | Improve communication with suppliers | 3,43 |
| 15 | Improvement of communication and relations among employees | 3,63 | Improvement of the performance of the organisation's partners, | 3.20 | Reduction of the production cost | 2.92 | Less additional controls from inmterested parties | 3,43 |
| 16 | Creation of quality culture within the organisation; commitment of employees to the satisfaction of internal and external customers and other interested parties | 3,63 | Sales increase, | 3.18 | Competitive advantages | 2.85 | Customer satisfaction | 3,29 |
| 17 | Quicker penetration in new markets | 3,28 | Increase of employee proposals and suggestions, | 3.16 | Maintenance of customers | 2.69 | Improve productivity/ reduction of production costs | 3,29 |
| 18 | Increase in productivity | 3,25 | Profit increase, | 3.15 | Increase of share market | 2.54 | Reaining customers | 3,29 |
| 19 | Increase in profits | 3,23 | Increase of employee satisfaction, | 3.06 | Reduction of customers' complaints | 2.54 | Improve interanal communication | 3,14 |
| 20 | Improvement of employees' skills and knowledge | 3,20 | Faster penetration in new markets | 3.00 | Less add/nal contr. from the con/cted mem/rs | 2.46 | Increase of market share | 3 |
| 21 | Increase of teamwork | 3,17 | Contribution to environmental protection: waste reduction, energy saving, usage of recycled materials, | 2.56 | Access in specific market | 2.31 | Reduction of waste | 3 |
| 22 | Improvement in the performance of associates | 2,86 | Increase of social responsibility, | 2.44 | | | Penetration to a specific market | 2,71 |
| 2 | Contribution of the | 2,81 | Decrease of flexibility, | 2.20 | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3 | organisation to society's welfare through charities and other activities | | | | | | | |
| 24 | Decrease of flexibility | **2,55** | Decrease of employees' absence, | **2.16** | | | | |
| 25 | Limitation of creativity and innovation | **2,45** | Constraint of creativity and innovation, | **1.94** | | | | |
| | **AVERAGE** | **3.59** | | **3.28** | | **3.09** | | **3.61** |

**Table 4: Cross reference of ISO 9001, ISO 22000 and ISO 14001 effects on certified companies as perceived by top management (questionnaires)**