Chapter 3
CHAPTER – 3
ISO 9000 STANDARDS

You don’t have to do this.
Survival is not compulsory.
Dr. W. Edwards Deming, on the importance of ISO 9000.95

International Organization for Standardization defines a standard as a documented agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes and services are fit for their purpose.

3.1 Introduction to ISO96:

International standardisation began in the electro technical field. The International Electro technical Commission (IEC) was created in 1906. The International Federation of the National Standardizing Associations (ISA), which was set up in 1926, carried out pioneering work in other fields. The emphasis within ISA was laid heavily on mechanical engineering. ISA's activities ceased in 1942, owing to the Second World War. In 1946, delegates from 25 countries met in London and decided to create a new international organisation, of which the object would be "to facilitate the international coordination, and unification of industrial standards". The new International Organization for Standardization (ISO) officially began operations on 23 February 1947. The first ISO

96 Details given under this heading are taken from the website of ISO. (http://www.iso.ch/iso/en/ISOOnline.openerpage)
standard was published in 1951 with the title, "Standard reference temperature for industrial length measurement".

The International Organization for Standardization, now, is a worldwide federation of national standards institutes of 147 countries, on the basis of one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. ISO is a non-governmental organisation. ISO standards are voluntary. As a non-governmental organisation, ISO has no legal authority to enforce their implementation. The mission of ISO is to promote the development of standardisation and related activities in the world with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activities. ISO's work results in international agreements, which are published as International Standards.

To date, ISO's work has resulted in some 12,000 International Standards, representing more than 3,00,000 pages in English and French (terminology is often provided in other languages as well).

ISO is not an acronym of International Organization for Standardization. In fact, "ISO" is a word, derived from the Greek isos, meaning "equal", which is the root of the prefix "iso-" that occurs in a host of terms, such as "isometric" (of equal measure or dimensions) and "isonomy" (equality of laws, or of people before the law). From "equal" to "standard", the line of thinking that led to the choice of "ISO" as the name of the organisation is easy to follow. In addition, the name ISO is used around the world to denote the organisation, thus avoiding the plethora of acronyms resulting from the translation of "International
Organization for Standardization" into the different national languages of members, e.g. IOS in English, OIN in French (from Organisation internationale de normalisation). Whatever the country, the short form of the Organization's name is always ISO.

The existence of non-harmonised standards for similar technologies in different countries or regions can contribute to so-called "technical barriers to trade". Export-minded industries have long sensed the need to agree on world standards to help rationalise the international trading process. This was the origin of the establishment of ISO.

International standardisation is well-established for many technologies in such diverse fields as information processing and communications, textiles, packaging, distribution of goods, energy production and utilisation, shipbuilding, banking and financial services. It will continue to grow in importance for all sectors of industrial activity in the foreseeable future.

The main reasons, for such importance, are:

(1) Worldwide progress in trade liberalisation:
Today's free-market economies increasingly encourage diverse sources of supply and provide opportunities for expanding markets. On the technology side, fair competition needs to be based on identifiable, clearly defined common references that are recognised from one country to another, and from one region to another. An industry-wide standard, internationally recognised, and developed by consensus among trading partners, serves as the language of trade.
(2) Interpenetration of sectors:
No industry in today's world can truly claim to be completely independent of components, products, rules of application, etc., that have been developed in other sectors. Bolts are used in aviation and for agricultural machinery; welding plays a role in mechanical and nuclear engineering, and electronic data processing has penetrated all industries. Environmentally friendly products and processes, and recyclable or biodegradable packaging are pervasive concerns.

(3) Worldwide communications systems:
The computer industry offers a good example of technology that needs to be standardised quickly and progressively at a global level. Full compatibility among open systems fosters healthy competition among producers, and offers real options to users since it is a powerful catalyst for innovation, improved productivity and cost cutting.

(4) Global standards for emerging technologies:
Standardisation programmes in completely new fields are now being developed. Such fields include advanced materials, the environment, life sciences, urbanisation and construction. In the very early stages of new technology development, applications can be imagined but functional prototypes do not exist. Here, the need for standardisation is in defining terminology and accumulating databases of quantitative information.

(5) Developing countries:
Development agencies are increasingly recognising that a standardisation infrastructure is a basic condition for the success of economic policies aimed at achieving sustainable development. Creating
such an infrastructure in developing countries is essential for improving productivity, market competitiveness, and export capability.

Industry-wide standardisation is a condition existing within a particular industrial sector when the large majority of products or services conform to the same standards. It results from consensus agreements reached between all economic players in that industrial sector - suppliers, users, and often governments. They agree on specifications and criteria to be applied consistently in the choice and classification of materials, the manufacture of products, and the provision of services.

The aim of international standardisation is to facilitate trade, exchange, and technology transfer through:

- Enhanced product quality and reliability at a reasonable price;
- Improved health, safety and environmental protection, and reduction of waste;
- Greater compatibility and inter-operability of goods and services;
- Simplification for improved usability;
- Reduction in the number of models, and thus reduction in costs;
- Increased distribution efficiency, and ease of maintenance.

Users have more confidence in products and services that conform to International Standards. Assurance of conformity can be provided by manufacturers' declarations, or by audits carried out by independent bodies.
3.2 Technical work of ISO:

The technical work of ISO is highly decentralised, carried out in a hierarchy of some 2,850 technical committees, subcommittees and working groups. In these committees, qualified representatives of industry, research institutes, government authorities, consumer bodies, and international organisations from all over the world come together as equal partners in the resolution of global standardisation problems. Some 30,000 experts participate in meetings each year.

The major responsibility for administrating a standards committee is accepted by one of the national standards bodies that make up the ISO membership - AFNOR, ANSI, BSI, CSBTS, DIN, SIS, etc. The member body holding the secretariat of a standards committee normally appoints one or two persons to do the technical and administrative work. A committee chairman assists committee members in reaching consensus. Generally, a consensus will mean that a particular solution to the problem at hand is the best possible one for international application at that time.

The Central Secretariat in Geneva acts to ensure the flow of documentation in all directions, to clarify technical points with secretariats and chairmen, and to ensure that the agreements approved by the technical committees are edited, printed, submitted as draft International Standards to ISO member bodies for voting, and published. Meetings of technical committees and subcommittees are convened by the Central Secretariat, which coordinates all such meetings with the committee secretariats before setting the date and place. Although the greater part of the ISO technical work is done by correspondence, there
are, on average, a dozen ISO meetings taking place somewhere in the world every working day of the year.

Each member body interested in a subject has the right to be represented on a committee. International organisations - governmental and non-governmental – in liaison with ISO, also take part in the work.

3.2.1 Fields covered:

The scope of ISO is not limited to any particular branch; it covers all technical fields except electrical and electronic engineering, which is the responsibility of IEC. A joint ISO/IEC technical committee (JTC 1) carries out the work in the field of information technology.

3.2.2 Principles of ISO standards:

ISO standards are developed according to the following principles:

(1) Equal footing:

Every participating ISO member institution has the right to take part in the development of any standard which it judges to be important to its country’s economy. No matter what the size or strength of that economy, each participating member in ISO has one vote. ISO’s activities are thus carried out in a democratic framework where each country is on an equal footing to influence the direction of ISO’s work at the strategic level, as well as the technical content of its individual standards.

97 www.iso.ch/iso/en/aboutiso/introduction/index.html#twenty
(2) Voluntary:

ISO standards are voluntary. As a non-governmental organisation, ISO has no legal authority to enforce their implementation. A certain percentage of ISO standards – mainly those concerned with health, safety or the environment – has been adopted in some countries as part of their regulatory framework, or is referred to in legislation for which it serves as the technical basis. Such adoptions are sovereign decisions by the regulatory authorities or governments of the countries concerned; ISO itself does not regulate or legislate. However, although ISO standards are voluntary, they may become a market requirement, as has happened in the case of ISO 9000 quality management systems, or of dimensions of freight containers and bankcards.

(3) Market-driven:

ISO develops only those standards for which there is a market requirement. Experts on loan from the industrial, technical and business sectors, which have asked for the standards, carry out the work and subsequently put them to use. Others with relevant knowledge, such as representatives of government agencies, consumer organisations, academia, and testing laboratories may join these experts.

(4) Consensus:

Although ISO standards are voluntary – the fact that they are developed in response to market demands, and are based on consensus among the interested parties – ensures widespread applicability of the standards. Consensus, like technology, evolves, and ISO takes account of both evolving technology, and evolving interests by requiring a review of its standards at least every five years to decide whether they should be
maintained, updated or withdrawn. In this way, ISO standards retain their position as the state of the art, as agreed by an international cross-section of experts in the field.

(5) Worldwide:

ISO standards are technical agreements, which provide the framework for compatible technology worldwide. Developing technical consensus on this international scale is a major operation. In all, there are more than 2,850 ISO technical groups (technical committees, subcommittees, working groups etc.) in which some 30,000 experts participate annually to develop ISO standards.

3.2.3 ISO Standards Development and Revision Process:

(1) Development Process:
There are three main phases in the ISO standards development process. The need for a standard is usually expressed by an industry sector, which communicates this need to a national member body. The latter proposes the new work item to ISO as a whole. Once the need for an International Standard has been recognised and formally agreed, the first phase involves definition of the technical scope of the future standard. This phase is usually carried out in working groups, which comprise technical experts from countries interested in the subject matter.

Once agreement has been reached on which technical aspects are to be covered in the standard, a second phase is entered during which countries negotiate the detailed specifications within the standard. This is the consensus-building phase.
The final phase comprises the formal approval of the resulting draft International Standard (the acceptance criteria stipulate approval by two-thirds of the ISO members that have participated actively in the standards development process, and approval by 75% of all members that vote), following which the agreed text is published as an ISO International Standard.

(2) Revision Process:
Most standards require periodic revision. Several factors combine to render a standard out of date:

- Technological evolution,
- New methods and materials,
- New quality and safety requirements.

To take account of these factors, ISO has established the general rule that all ISO standards should be reviewed at intervals of not more than five years. On occasion, it is necessary to revise a standard earlier.

3.2.4 How ISO standards benefit society:

ISO standards have played an important role in providing benefits to the various strata of the society. The benefits, which can accrue to the different strata, are given in the following paragraphs:

For businesses, the widespread adoption of International Standards means that suppliers can base the development of their products and services on specifications that have wide acceptance in their sectors. This, in turn, means that businesses using International Standards are increasingly free to compete on many more markets around the world.

For customers, the worldwide compatibility of technology, which is achieved when products and services are based on International Standards, brings them an increasingly wide choice of offers, and they also benefit from the effects of competition among suppliers.

For governments, International Standards provide the technological and scientific bases underpinning health, safety and environmental legislation.

For trade officials negotiating the emergence of regional and global markets, International Standards create "a level playing field" for all competitors on those markets. The existence of divergent national or regional standards can create technical barriers to trade, even when there is political agreement to do away with restrictive import quotas and the like. International Standards are the technical means by which political trade agreements can be put into practice.

For developing countries, International Standards that represent an international consensus on the state of the art constitute an important source of technological know-how. By defining the characteristics that products and services will be expected to meet on export markets, International Standards give developing countries a basis for making the right decisions when investing their scarce resources and thus avoid squandering them.

For consumers, conformity of products and services to International Standards provides assurance about their quality, safety and reliability.

For everyone, International Standards can contribute to the quality of life in general by ensuring that the transport, machinery and tools we use are safe.
For the planet we inhabit, International Standards on air, water and soil quality, and on emissions of gases and radiation, can contribute to efforts to preserve the environment.

3.3 ISO 9000:

The ISO 9000 and ISO 14000 families are among ISO's most widely known and successful standards ever. ISO 9000 has become an international reference for quality requirements in business-to-business dealings.

The vast majority of ISO standards are highly specific to a particular product, material, or process. However, the standards that have earned the ISO 9000 and ISO 14000 families a worldwide reputation are known as "generic management system standards". "Generic" means that the same standards can be applied to any organisation, large or small, whatever its product – including whether its "product" is actually a service – in any sector of activity, and whether it is a business enterprise, a public administration, or a government department. "Management system" refers to what the organisation does to manage its processes, or activities. "Generic" also signifies that no matter what the organisation is or does, if it wants to establish a quality management system or an environmental management system, then such a system has a number of essential features, which are spelled out in the relevant standards of the ISO 9000 or ISO 14000 families.

The ISO 9000 family is primarily concerned with "quality management". This means what the organisation does:

100 www.iso.ch/iso/en/iso9000-14000/index.html
To fulfil the customer's quality requirements,
To fulfil applicable regulatory requirements,
To enhance customer satisfaction, and
To achieve continual improvement of its performance in pursuit of these objectives.

More than half a million organisations in more than 150 countries are implementing ISO 9000 which provides a framework for quality management throughout the processes of producing and delivering products and services for the customer.

3.3.1 ISO 9000 in plain language:

ISO 9000 is actually family of standards, which are referred to under these generic titles for convenience. The family consists of standards and guidelines relating to management systems, and related supporting standards on terminology and specific tools, such as auditing (the process of checking that the management system conforms to the standard).

ISO 9000 is primarily concerned with "quality management". In the everyday context, like "beauty", everyone may have his or her idea of what "quality" is. But, in the ISO 9000 context, the standardised definition of quality refers to all those features of a product (or service), which are required by the customer.

"Quality management" means what the organisation does to ensure that its products or services satisfy the customer's quality requirements and comply with any regulations applicable to those products or services.


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In addition, ISO 9000 requires organisations that implement them to **improve their performance continually** in quality management.

ISO 9000 concerns **the way an organisation goes about its work**, and not directly the result of this work. In other words, it concerns **processes**, and not products, at least, not directly. Nevertheless, the way in which the organisation manages its processes is obviously going to affect its final product.

In the case of ISO 9000, the efficient and effective management of processes is going to affect, whether or not everything has been done to ensure that the product satisfies the customer's quality requirements.

### 3.3.2 Background of ISO 9000:

By 1977, a number of countries had started realising a need for a comprehensive standard for quality. Many of them were working on developing national standards for the manufacturing operations and quality systems. Various national standards were developed in the quality systems arena and for the operations in the manufacturing. Some of these standards were guidance documents. These standards were quite useful to the respective nations for production of better quality products for internal consumption. However, these standards were not sufficiently consistent for widespread use in international trade. Terminology used in these standards was also inconsistent and confusing. A need, therefore, was felt to bring out a standard that can provide harmonisation on international scale. In 1979, the British Standard Institution (UK) published BS Standard 5750 on quality management and quality assurance. These were intended for general use by any manufacturer. They enabled organisations to become certified; allowing them to
display a mark of registration issued by the body that carried out the assessment.

Anticipating the impact of a shrinking global market, a new ISO technical committee “ISO/TC 176, Quality management and quality assurance” (more details of ISO/TC 176 are given in Annexure – II) was approved and formed in 1979 – by International Organization for Standardization – to harmonise the increasing international activity in quality management and quality assurance standards. Initially, 20 member countries decided to become active participants (P – members) in the work of this new committee and another 14 countries opted to follow the work as observers (O – members). Today, the number of countries participating in ISO/TC 176 is 69, with another 18 as observers. The new committee set to work and, completed its first standards in 1986. Subcommittee 1 was established to determine common terminology. It developed ISO 8402: Quality-Vocabulary, which was published in 1986. Subcommittee 2 was established to develop quality systems standards. Published in the early part of 1987, these standards were known as the ISO 9000 series. Many nations and regional bodies quickly adopted this series of standards. The details of the series of these standards are given in Annexure – III.

There were three main models in ISO 9000 series:

ISO 9001 was meant to demonstrate the supplier’s capability to control the processes for design as well as production. The requirements specified were primarily at achieving customer satisfaction by providing conformity at all stages from design through servicing. This standard

covered the full range. ISO 9002 was to be selected when the need was to demonstrate the supplier's capability, to control the processes for production and installation. Here, the design and development component was not considered. ISO 9003 was to be selected for conformance to specified requirements by the supplier solely at final inspection and test. The level for stringency was less for ISO 9002 than 9001, while for the 9003 had the lowest level of stringency.

ISO had shown the happiness over the market success of the ISO 9000 series in the Vision 2000\textsuperscript{103} by stating:

“This initial market-place success of the ISO 9000 is testimony to two important achievements of the ISO/TC 176 committee. (1) The ISO 9000 series embodies comprehensive quality management concepts and guidance, together with several models for external quality assurance requirements. Using an integrated systems architecture, the standards are packaged under a harmonised, and easily memorised, numbering system. These features have high value for the commercial and industrial needs of current international trade, and (2) the ISO 9000 series was published in time to meet growing needs for international standardisation in the quality arena, and the wide adoption of third-party quality certification schemes”.

In March 1993, the first recommended revisions to these standards were presented to the member countries for perusal and suggesting possible ratification. The member countries evaluated the standards and in September 1993 voted to accept the content of modifications to the ISO

9000 standards\textsuperscript{104}. The standards were updated in 1994, but this was a minor update. These revised standards set out the requirements for an organisation whose business processes included some element of design, development, production, installation and servicing. The details of the series of these standards are given in Annexure – IV.

In 1997, a global user/customer survey\textsuperscript{105} was undertaken involving 1,120 users and customers worldwide. This covered attitudes toward the existing standards, requirements for the revised standards and relationship to environmental management. Customers' needs identified by this process included:

- Revised standards should have increased compatibility with ISO 14000 series of Environmental Management System Standards;
- The revised standards should have a common structure based on a process model;
- Provision should be made for the tailoring of ISO 9001 requirements to omit requirements that do not apply to an organisation;
- ISO 9001 requirements should include demonstration of continuous improvement and prevention of non-conformity;
- ISO 9001 should address effectiveness while ISO 9004 should address both efficiency and effectiveness;
- ISO 9004 should help achieve benefits for all interested parties, i.e. customers, owners, employees, suppliers and society;

• The revised standards would be simple to use, easy to understand, and use clear language and terminology;
• The revised standards should facilitate self-evaluation;
• The revised standards should be suitable for all sizes of organisations, operating in any economic or industrial sector and the "manufacturing orientation" of the current standards should be removed.

ISO 9000 standards of the 1994 were updated again in the year 2000. The revisions of several of the core series standards in the ISO 9000 family were carried out and the same were published on 15 December 2000 by International Organization for Standardization. These revised standards are identified by the number "2000" in their designation and are now known as ISO 9000:2000. These new version of the standards demonstrates how, collectively, such standards form a basis for continual improvement and business excellence.

The details of ISO 9000:2000 are given in Annexure – V.

In the revision made in the year 2000, the familiar three standards ISO 9001, ISO 9002 and ISO 9003 have been integrated into the new ISO 9001:2000. ISO 9001:2000 is now the only standard in the ISO 9000 family against whose requirements quality system can be certified by an external agency. The standard recognises that the word "product" applies to services, processed material, hardware and software intended for, or required by, the customer. This new ISO 9001:2000 specifies requirements for a quality management system for any organisation that needs to demonstrate its ability to consistently provide product or service which meets with customer requirements and his enhanced
satisfaction. ISO 9001:2000 has been organised in a user-friendly format with terms that are easily recognised by all business sectors.

The quality management system standards of the revised ISO 9000:2000 series are based on the eight quality management principles. These eight principles are given in Annexure – VI.

The greatest value can be obtained by an organisation when it uses the entire family of standards in an integrated manner. However, International Organization for Standardization suggests\(^\text{106}\) that, beginning with ISO 9000:2000, a company can adopt ISO 9001:2000 to achieve a first level of performance. The practices described in ISO 9004:2000 may then be implemented to make the quality management system increasingly effective in achieving the own business goals. ISO 9001:2000 and ISO 9004:2000 have been formatted as a consistent pair of standards to facilitate their use.

Some organisations may expand their management systems by extending the ISO 9001:2000 structures to include the requirements of ISO 14001:1996: Environmental management systems. The structural and organisational requirements of the two management systems have been designed to be compatible\(^\text{107}\).

ISO and the International Accreditation Forum (IAF) jointly\(^\text{108}\) agreed on a policy to ensure a smooth transition to the ISO 9000:2000 series. Under this policy, organisations certified to 1994 versions of ISO 9001, ISO 9002 or ISO 9003 were given a three-year transition deadline from the publication of the revised standards to migrate to ISO 9001:2000.

Therefore, from 15 December 2003, certificates to the 1994 versions are supposed to have lost their accredited status by the IAF and its national accreditation body members.

3.3.3 Procedure for obtaining ISO 9000 certification:

No fixed or exact procedure has been suggested by ISO for obtaining ISO 9000 certification. However, ISO has suggested certain steps, which are presented in Annexure – VII. On the basis of the requirements of the standards, steps suggested by the ISO, and discussions with the executives of the various organisations, a general procedure shown below is suggested:

(1) Awareness Stage:

In this stage, the organisation becomes aware of the standards and gets more information of the standards. More information might be obtained from ISO, outside agencies rendering help, third party auditors, some other organisations who have obtained such certification, or some other agency. Many agencies are arranging seminars also for such requirements.

(2) Decision by Top Management:

Once an organisation becomes aware about the requirements, the management has to decide whether it wants to go for the ISO 9000 certification or not. This decision has to come from the top management because the whole process requires commitment in terms of finance, deadlines, goals, policies etc.
(3) Initial Preparation:

Initial preparation needs lot of arrangements to be made. This will include but not restrict to:

(a) Development of plan to proceed with ISO registration.
(b) Establishment of task team.
(c) Establishment of Quality Council.
(d) Establishment of sub teams if necessary.
(e) Informing the whole organisation and preparing all the members of the company mentally for the certification through functional level and corporate level trainings.
(f) Deciding about the third party.

(4) Deciding an Outside Agency (if necessary):

Many organisations, generally small and medium scale, may not have sufficient knowledge to prepare the documentations or other procedural requirements of the certification. Such organisations may go for hiring the services of an outside agency that has know-how and is ready to provide consultancy on chargeable basis. It is not necessary or mandatory to take such help.

(5) Detailed Preparation:

In this stage, detailed quality manual to match the requirements of the ISO certification is prepared. In addition, following tasks may be performed:

(a) Establishment of Audit Procedures.
(b) Setting up of the policies in the quality manual.
(c) Setting up of plant and office procedures.

(d) Providing basic training to all the members at functional level and corporate level to achieve major cultural changes in terms of attitudes, skills, knowledge, and abilities.

(e) Up-gradation of existing procedures if necessary.

Developing a corporate culture having total commitment to ISO.

(6) Internal Audit:

Generally, such audits are known as process audits and are conducted by members of quality assurance group. These auditors need to be trained for carrying out such audits. This audit looks for compliance with the process described in the procedural manual developed for each area. If any discrepancies are found, they are to be removed through corrective actions. This helps in uncovering potential problems and removing them.

(7) Pre-audit Assessment:

This is an extension of internal audit. This stage gives an overall assessment of the existence and changes in the overall culture of the organisation before the arrival of third party for initial audit. It checks for adequacy and compliance of the requirements. It also helps in developing corrective actions.

(8) Initial Audit by Third Party:

This is also known as pre-audit. This helps the company to experience a trial run of the proper audit. A formal audit is carried out in various stages. At the end of the initial audit, the third party
auditor submits a formal audit report, which contains audit findings.

(9) Formal Audit Findings:

The organisation can go through these formal audit findings given by the third party. The management, the task team, the quality council etc. study these findings in total perspective and come out with corrective action plans.

(10) Corrective Action Plans:

The corrective action plans suggest as to how the organisation will comply with the audit findings.

(11) Follow up Audit and Final Assessment:

After the receipt of corrective action plans, the third party may accept them or may suggest further changes. Once, this is complied with, the follow up audit and final assessment is carried out.

(12) Registration:

After the final assessment, the organisation is granted the certification.

3.3.4 Glossary of ISO 9000:

Glossary of ISO 9000 is given in Annexure – VIII.
3.4 State of ISO 9000 Certification in the World and India:

Table 3.1 below gives three types of data for each year from 1993 to 2002:

(1) Number of countries having ISO 9000 certified companies,
(2) Total number of ISO 9000 certified companies in the world, and
(3) Total number of ISO 9000 certified companies in India.

The data for the year 1993 is for the month January, while the data for the year 1994 is for the month of June. For all the remaining years the data is as on 31st December.

Table: 3.1 Year-wise Number of Countries, Number of ISO 9000 certified companies in the World, and in India.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Countries having ISO 9000 certified companies</th>
<th>Total number of ISO 9000 certified companies in the World</th>
<th>Total number of ISO 9000 certified companies in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993 Jan</td>
<td>48</td>
<td>27,816</td>
<td>8</td>
</tr>
<tr>
<td>1994 June</td>
<td>75</td>
<td>70,364</td>
<td>328</td>
</tr>
<tr>
<td>1995</td>
<td>96</td>
<td>1,27,349</td>
<td>1,023</td>
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<tr>
<td>1996</td>
<td>113</td>
<td>1,62,701</td>
<td>1,665</td>
</tr>
<tr>
<td>1997</td>
<td>126</td>
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<td>1999</td>
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<td>2000</td>
<td>157</td>
<td>4,08,631</td>
<td>5,682</td>
</tr>
<tr>
<td>2001</td>
<td>161</td>
<td>5,10,616</td>
<td>5,554</td>
</tr>
<tr>
<td>2002</td>
<td>159</td>
<td>5,61,747</td>
<td>8,110</td>
</tr>
</tbody>
</table>


The year-wise data of number of countries having ISO 9000 certified companies are represented in Chart 3.1 below:
Chart 3.1 Year-wise Number of Countries having ISO 9000 certified companies.

It can be seen from the bar chart that the number of countries has increased at a rapid rate up to the year 2000. The increase in the year 2001 was not so rapid. During the year 2002, the number of countries has reduced by two. Overall, on an average, the number of countries has increased by 14.23 percent every year between 1993 and 2002. This shows the high acceptance level of the standards all over the world.

The year-wise data of total number of ISO 9000 certified companies in the world is given in Chart 3.2 below:

The chart shows a tremendous increase in the world from 27,816 in January 1993 to 5,61,747 in December 2002. This is more than 20-fold increase in just nine years, or an average increase of 39.64 percent every year. These figures again reflect the high level of acceptance all over the world.
Chart 3.2 Year-wise total of ISO 9000 certified companies in the World.

The year-wise data of total number of ISO 9000 certified companies in India is given in Chart 3.3 below:

There were only eight ISO 9000 certified companies in India in January 1993. This number has increased to 8,110 at the end of the year 2002. There has been a continuous increase in the number during all these years except 2001 when there was a marginal decrease from the previous year. The overall increase is around 1014 times in nine years. It may be safely concluded from a number of eight certified companies in 1993 that this was the beginning year of ISO 9000 certification for the Indian industry. The probable reason can be that the opening of Indian Economy had started in 1991, and the industry might have felt the need of accepting an international standard to meet the global competition. This argument is further strengthened by the fact that the number has suddenly sprung from 8 in January 1993 to 328 in June 1994.
Chart 3.3 Year-wise total of ISO 9000 certified companies in India.

Even if the figure of 8 in the year 1993 is not considered (as being an extreme value in the beginning of the certification), and a figure of 328 in June 1994 is considered, there has been about 25-fold increase in eight years. This increase is equivalent to an average of 49.33 percent every year from 1994 to 2002, much more than a world figure of 39.64 percent. The Indian industry, therefore, has responded to the ISO 9000 standards much more seriously than the world, even though the process of certification under these standards had started in India after six years of their publication in 1987.

Table 3.2 below gives number of ISO 9000 certified companies in various countries. It can be seen from this table that even though, there are 159 countries in which ISO 9000 certified companies are existing, there are only 16 countries which account for 4,58,556 out of 5,61,747
ISO 9000 certified companies i.e. 81.63 percent of the total companies. Remaining 143 countries account for only 18.37 percent.

Table: 3.2 Number of ISO 9000 certified companies in different Countries as on 31-12-2002.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of ISO 9000 certified companies as on 31-12-2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>8,110</td>
</tr>
<tr>
<td>Czech</td>
<td>8,489</td>
</tr>
<tr>
<td>Hungary</td>
<td>9,254</td>
</tr>
<tr>
<td>Switzerland</td>
<td>10,299</td>
</tr>
<tr>
<td>Canada</td>
<td>12,371</td>
</tr>
<tr>
<td>Netherlands</td>
<td>13,198</td>
</tr>
<tr>
<td>Korea Rep.</td>
<td>14,520</td>
</tr>
<tr>
<td>France</td>
<td>19,870</td>
</tr>
<tr>
<td>Australia</td>
<td>27,135</td>
</tr>
<tr>
<td>Spain</td>
<td>28,690</td>
</tr>
<tr>
<td>Japan</td>
<td>33,964</td>
</tr>
<tr>
<td>Germany</td>
<td>35,802</td>
</tr>
<tr>
<td>USA</td>
<td>38,927</td>
</tr>
<tr>
<td>UK</td>
<td>60,960</td>
</tr>
<tr>
<td>Italy</td>
<td>61,212</td>
</tr>
<tr>
<td>China</td>
<td>75,755</td>
</tr>
<tr>
<td>Others</td>
<td>103,191</td>
</tr>
</tbody>
</table>


China has the highest number of certified companies followed by Italy and UK. These three countries account for 35.23 percent of the total world certified companies, much more than the remaining 143 countries. India stands at 16th rank in this tally, having 8,110 certified companies i.e. only 1.44 percent of the world certified companies. It can be seen that even though registration of ISO 9000 standards in India is at a higher pace than the world, it has very less number of ISO certified companies compared to developed countries. The reason for this may be the late acceptance of the standards by India because India has only nine
years of registration period since 1993 as compared to 16 years since 1987 by many countries.

The data of the Table 3.2 is represented in a Bar Chart shown below as Chart 3.4. This chart reflects the Indian scenario vis-à-vis other 15 countries individually and 143 countries combined (as others).

Chart 3.4 Country-wise ISO 9000 certified companies as on 31-12-2002.

Table: 3.3 below shows 'Number of ISO 9000 certified companies in different Regions as on 31-12-2002.' The International Organization for Standardization (ISO) does not tabulate the data on the basis of the continent. But, it has a system of showing the ISO 9000 certified companies region-wise. India is considered under the region ‘Africa and West Asia.’ The whole region has only 23,534 certified companies i.e. only 4.19 percent of the whole world.
Table: 3.3, Number of ISO 9000 certified companies in different Regions as on 31-12-2002

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa and West Asia</td>
<td>23,534</td>
</tr>
<tr>
<td>Central and South America</td>
<td>13,660</td>
</tr>
<tr>
<td>North America</td>
<td>53,806</td>
</tr>
<tr>
<td>Europe</td>
<td>292,970</td>
</tr>
<tr>
<td>Far East</td>
<td>148,573</td>
</tr>
<tr>
<td>Australia and New Zealand</td>
<td>29,204</td>
</tr>
<tr>
<td>Total</td>
<td>561,747</td>
</tr>
</tbody>
</table>


The same data is represented in Chart 3.5 as Pie Chart. This chart clearly indicates that Europe has the highest number of certified companies followed by Far East countries. These two regions account for 78.60 percent of the ISO certified companies.

Chart 3.5 Region-wise ISO 9000 certified companies as on 31-12-2002.
India accounts for the highest number of ISO 9000 certified companies in the ‘Africa and West Asia’ Region. Percentage wise India’s share is 34.46. After India, only Israel, South Africa, and U.A.E. have substantial share. The remaining 47 countries have only 5,335 certified companies i.e. 22.67 percent share.

3.5 Literature Survey of ISO 9000 Standards:

3.5.1 Importance of ISO 9000:

Samuel K. M. Ho\textsuperscript{109} in his paper says, “All around the world, in many developed and developing countries, TQM and ISO 9000 are promoted by government bodies and many firms. The UK’s Department of Trade and Industry has published a full range of booklets and videos on TQM. The Single European Marketing Directive on Standards and Certification stipulates that ISO 9000 should be encouraged among its 12 member countries. In South-East Asian countries like Hong Kong, Malaysia and Singapore, the governments have set up special divisions to help industries to go for ISO 9000 accreditation. Many Japanese companies in these regions like Sony, Panasonic, etc., have followed suit. In mid-1992, the Chinese Government required that all foreign manufacturers investing in China and exporting their goods should seek ISO 9000 registration. All this evidence has supported one theme: ISO 9000 and TQM are the passports to success.

This article has given a diagnosis of TQM and ISO 9000, their relationships, and how successful companies are practising them. Counter examples have been given to explain some of the

misinterpretation and mismanagement of the systems. It has been proved by many that these systems are the golden routes to satisfying the demanding needs of consumers in the 1990s.”

Jaideep Motwani, Ashok Kumar, and Chun Hung Cheng\textsuperscript{110} carried out a case study of a large US manufacturing organisation to illustrate how it achieved the ISO 9000 certification. They state, “ISO 9000, an international standard for quality systems, has gained worldwide acceptance since its introduction in 1987. The standard requires a company seeking ISO certification to pass a stringent, independent, third party audit. Although the certification process is lengthy and the documentation extensive, ISO 9000 provides substantial benefits in terms of, for example, higher customer satisfaction, smoother operations and lower costs, higher quality and productivity. The company is very proud to have obtained ISO registration. The company feels that there are major benefits that follow from registration. First and foremost are the customer benefits. According to the CEO of the company, ‘ISO registration assures consistent quality of products, processes and services’. Other benefits include the organisation’s positioning in the European and domestic markets, together with the standardisation of procedures and rules of operation, and the high level of discipline throughout the company.”

Tat Y. Lee\textsuperscript{111} of the University Industrial Centre of the University of Hong Kong conducted a questionnaire survey in August 1996 with a


view to providing answers to the following questions in relation to the Hong Kong environment:

- What companies, in terms of trade and size, are involved in ISO 9000 certification?
- What are the reasons for certification?
- What are the benefits and limitations of ISO 9000?
- Is ISO 9000 certification the end of the quality journey?
- What are the key-factors in quality improvement?

His summary and conclusions on the basis of the survey are as under:

1. While the number of firms seeking ISO 9000 certification was increasing, the proportion of certified small and medium firms remained relatively stable in Hong Kong.

2. Since 1994, a larger proportion of manufacturing firms employing over 1,000 people had implemented ISO 9000. Most of these firms used the quality assurance management system to control their production and the associated operations in China.

3. The main reason for small and medium firms in the service sector to become ISO 9000 certified was to satisfy the customers’ requirements.

4. The majority of construction firms were under customer pressure when seeking ISO 9000 certification.

5. The benefits derived by the certified firms included achieving better team spirit, having fewer staff conflicts, reducing wastage, increasing efficiency, improving sales through attracting new customers, and getting less customer complaints.

6. One of the biggest limitations of ISO 9000 was that it focused on systematic process management with little emphasis on the use of technology. As a result, it was reported that the certification exercise brought limited improvement on the lead-time.
(7) The relationship between the certified firms and subcontractors appeared to be an area where improvement was required. It seemed necessary for the certified firms to provide more training and assistance for the subcontractors in order to upgrade their quality consciousness.

(8) A large proportion of the firms reported having continued their pursuit of quality and management after being certified to ISO 9000. TQM appeared to be the most popular management approach. Some certified firms were planning for ISO 14000 certification.

(9) Customer relationship building and management, leadership, and safety management were ranked as the most important quality concepts.

Matts Carlsson, and Dan Carlsson\textsuperscript{112} in their study of Swedish industry state, "One thing is certain; the ISO system is here to stay. It is an important catalyst for change, which, correctly used, gives it great potential for bringing about positive change. Thus, assuming that the system will be around for a long period of time, several scientific issues will need to be highlighted and studied. We need more knowledge about the system on all levels, from an overall perspective down to more detailed issues.

From an organisational perspective, the implementation of an ISO system is a change process. The results of the study presented here, for example, have established that those responsible for quality regarded the

influence of certification on all functions to have been greater than did the representatives of these functions themselves. Further, those not responsible perceived that implementation of the system was the result of a management directive to a greater extent than those responsible for quality. Also, when it comes to the effects of the implemented system, those responsible for quality reported greater effects than other personnel. The attitudes of the latter may reflect a weaker interest in the ISO system than may be required for the ISO system to exert a strong influence on the development of the quality work in companies.

Uncertainty regarding the underlying reasons and the expected effects of change prevents efficient change. We have in our study found indications that this is a factor at least partly in play when it comes to implementing the ISO system in industry. Earlier studies have shown an extremely large discrepancy between the way in which company management and employees perceive and interpret quality strategies. To remedy this situation, a possible way forward might be greater member participation through delegation of the operative quality work. This solution should then be complemented with information and education."

Katerina D. Gotzamani, and George D. Tsiotras113 in a paper present the results of an empirical study on the contribution of ISO 9000 standards towards total quality management (TQM). The paper is a continuation of the authors' research on the ISO 9000 standards effectiveness and capability as an entry key to TQM. For the purposes of this study, a TQM measurement instrument was developed and tested for its reliability and validity to measure TQM performance improvement in

certified companies in Greek industry. This performance improvement was then used to test the basic research hypothesis: "Can ISO 9000 standards provide a good first step towards TQM?" The results of the study are presented in eight basic TQM categories, showing the certified companies' performance improvement in the basic elements of each category, and revealing their strengths and weaknesses on their way to TQM.

A comprehensive survey was conducted by Tat Y Lee, Hareton K.N. Leung, and Keith C.C. Chan\textsuperscript{114} with a view to identifying the benefits derived by ISO 9000 certified companies in Hong Kong. They state, "It is generally agreed that the certification helps the companies to improve quality in terms of work procedures, product and service quality, team spirit, subcontractor control, efficiency and complaints. While a large proportion of the certified companies would like to continuously improve their quality on the basis of the certified management system, many of them do not know how to make a start. Some recommendations are made for the certified companies which are planning to develop their quality journey based on ISO 9000."

Juan José Tari, and José Francisco Molina\textsuperscript{115} state, "Many firms have started to realise the benefits of total quality management. In this respect, quality management improves internal and external quality management performance. This philosophy enhances customer satisfaction, employee satisfaction and increases business results. Therefore, the results of most quality management practices show that


firms implementing quality systems achieve significant improvement in customer satisfaction, employee satisfaction, social impact and business results." The focus of their study was to analyse and evaluate quality management results in ISO 9000 certified firms, in order to identify the key results of TQM and to classify firms. For this purpose, they used a factor analysis and a cluster analysis. In this respect, they distinguished three clusters, which indicate the results on which firms focus. Thus, they identified:

(1) A cluster where a high concern for the customer exists, as demonstrated by the customer satisfaction level, which involves better business results compared to the other groups;
(2) Another group with low concern for the customer and the environment; and
(3) A cluster formed by those obtaining less positive effects on business results due to the quality system.

A paper by Francis Buttle\textsuperscript{116} reports findings from the largest-ever national, omni-sectoral survey into the impacts of ISO 9000 on UK business. In this paper, Francis Buttle concludes, "Companies pursue ISO 9000 certification in order to enjoy both operational and marketing benefits which impact on costs, revenues, and, by inference, profit. The most important benefit sought from certification is profit improvement. Ranked second and third most important are process improvements and marketing benefits. Marketing benefits include gaining new customers, keeping existing customers, using the standard as a promotional tool, increasing market share, increasing growth in sales and improving customer satisfaction. By and large companies are satisfied with the

impact of the standard on their organizations. The large sample size and broad scope of this survey add considerable weight to the conclusions. In order of relative importance corporate satisfaction is related to process improvement benefits, profitability benefits and marketing benefits. The achievement of marketing benefits does not account for much variance in overall satisfaction.”

Bozena Poksinska, Jens Jörm Dahlgard, and Marc Antoni\textsuperscript{117} state, “It seems today to be an indisputable fact that ISO 9000 is a powerful instrument, which cannot be disregarded. It is, far and away, the most influential initiative that grew from the quality movement of the late 1980s.” Their paper contains an evaluation of results from a survey on ISO 9000 certified companies and aims to present some aspects of the current state of the standard in Swedish industry. The study is focused on motives for implementation, perceived benefits and key implementation factors. The predominant reasons identified for seeking certification were the desire to improve corporate image and quality. Like many previous studies this study underlines the need for management commitment and participation. The very important conclusion drawn from this survey is that the motivation for certification may influence the performance of ISO 9000.

In their paper, Hesham Magd, and Adrienne Curry\textsuperscript{118} put forward a point. They say, “The ISO 9000 series of standards has formalised systems for evaluating the ability of organisations to consistently design,


\textsuperscript{118} Hesham Magd, and Adrienne Curry, “ISO 9000 and TQM: are they complementary or contradictory to each other?” \textit{The TQM Magazine}, XV, 4, (2003), pp. 244.
produce and deliver quality products and services. Total quality management (TQM) is seen as a relatively new concept and a way for organisations to improve the quality of their products and services, but it may well be the key to survival and achieving competitive advantage in today's turbulent business environment. However, there are mixed views in the literature concerning whether ISO 9000 and TQM complement or contradict each other. The primary objective of this paper is to address the competing views on both concepts in an attempt to show that both concepts complement each other and ISO 9000 should be used in association with TQM to secure organisational success.”

A paper by Alex Douglas, Shirley Coleman, and Richard Oddy119 summarises the arguments for and against the ISO 9000 standard and examines the perceived advantages and disadvantages of implementing it. It reports the results of a survey of over 100 quality managers/representatives of ISO 9000-certified organisations in the service and manufacturing sectors of UK industry. Survey results indicate quite conclusively that most quality professionals are content with ISO 9000's contribution to quality improvement, dismissing many of the past criticisms of the standard as inappropriate. These results can form the basis of a case for the implementation of the standard for those organisations currently trying to decide whether to implement it or not.

Carmen Escanciano, Esteban Fernández, and Camilo Vázquez120 state, "The increasing demand of mechanisms making easier the choice of a

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provider, both in the domestic and global markets, has contributed to ISO 9000 certification possession becoming a requisite for the development of commercial relations. The present article is based upon the results of an empirical research in which the effectiveness and reach of ISO 9000 certification is studied at a multi-sector level in Spain. Mail surveys were carried out on ISO certificated organisations. Results indicated that certification helps in terms of being a management tool, a source of competitive advantages, and its potential to stimulate the company transition towards total quality management.”

Ahmet Beskese, and Ufuk Cebeci\textsuperscript{121} carried out a survey in Turkey on ISO 9000 certified companies. They state, “The literature includes many success and failure stories of the firms adopting total quality management (TQM). As many firms in Turkey try to adopt this philosophy, there is a need to clarify quality concepts and comment on applications. This paper attempts a broad review of the current status of TQM and ISO 9000 in Turkey. It considers the extent to which ISO 9000 and TQM are being successfully implemented. It also presents the reasons for obtaining an ISO 9000 certificate, difficulties faced during the registration process, improvements achieved and disappointments experienced after being certified. The findings of this study are compared with those from other countries.”

George Tsiotras and Katerina Gotzamani\textsuperscript{122} carried out a survey of ISO 9000 certified companies in Greek. They say, “ISO 9000 standards


harmonised the large number of national quality system standards and satisfied the urgent need for a universal evaluation method of suppliers’ quality assurance systems. Although they are not mandatory, their popularity has made them a necessity for companies who want to create a high quality profile and satisfy intense market demand. This is also the case with Greek industry, whose products must be competitive not only in the internal but also in the external market as well. ISO 9000 standards offer a great opportunity to Greek companies wanting to improve their internal organisation system and increase their products’ competitiveness. However, they must be careful in order to avoid the ISO 9000 pitfalls. Certification alone must not be the aim. The ultimate target must be the development of a solid quality assurance system, which will lead to the future development of a total quality system.”

W. Andrew Taylor, and Sarah T. Meegan\textsuperscript{123} carried out a survey in manufacturing and service organisations in the Northern Ireland region with a particular interest in the process of organizational transition from ISO 9000 to TQM and the role of senior executives in this process. They formulated four interim hypotheses, namely:

\textit{HI.} Understanding of the purpose of ISO 9000 should show some consistency with the reasons why it was being sought. For example, if it were being pursued as a response to customer pressure, then its purpose would typically be viewed as “a paper work exercise to keep customers happy”.

H2. Organisations practicing both TQM and ISO 9000 would be more likely to display “enlightened” motivations for pursuing and obtaining ISO 9000 than the rest, which had obtained ISO 9000 only. For example, if both ISO 9000 and TQM were in operation, then ISO 9000 should be seen as one of a series of steps along the “quality” path to greater business benefits. If, on the other hand, ISO 9000 only was in operation, then it may be seen as an end in itself, to achieve efficiency gains or cost reduction rather than the journey being considered to be as important as the destination.

H3. Organisations with correct understanding of TQM and ISO 9000 would be more likely to move beyond initial ISO 9000 registration and embark on TQM. This implies the need to see how the two entities fit together and complement each other.

H4. Organisations with incorrect understanding allied to reactive motivations (such as, for example, responding to customer pressure), are less likely to sustain any quality development beyond ISO 9000 than those with correct understanding allied to enlightened, proactive motivations.

In terms of the original hypotheses posed in their two papers, the data seem to support H1, and more significantly, H4, i.e. that organisations where the senior executives have a narrow or erroneous understanding of ISO 9000 and TQM, together with reactive motivations for their pursuance, are less likely to sustain any quality development beyond ISO 9000, than those organisations where the senior executives display correct understanding allied to proactive, “enlightened” motivations. It would appear that a lack of drive, commitment and leadership from
senior management could have the kinds of effects in practice which theory tends to suggest.

As regards \( H2 \), the data raise questions about why many of these companies had embarked on TQM and ISO 9000 at all. This was underscored by the subsequent findings in relation to \( H3 \), where again, many TQM organisations displayed confusion about the purposes of ISO 9000 and TQM.

A paper by Johan F. Devos, José L. Guerrero-Cusumano, and Willem J. Selen\(^{124}\) compares ISO certification in Belgium and The Netherlands from a comprehensive viewpoint of organisational structure of quality assessment and certification, the certifying bodies involved and, a survey analysis according to industry sector. It discusses perceptions of the implementation and future trends of ISO 9000 certification in Belgium in the automotive industry, telecommunications, management consultancy, and ISO certification agencies. It also highlights the growing importance of ISO certification in Europe and the world, and does away with the misconception of seeing ISO as a non-tariff trade barrier. The paper claims that ISO will be complemented by specialised certifications, which may eventually lead to a single certificate in which quality, safety and environment are combined. It puts ISO certification in perspective as merely one step in the progression towards achieving business excellence.

Erdal Erel, and Jay B. Ghosh\textsuperscript{125} note, "It has become a competitive necessity for firms doing business globally to acquire the ISO 9000 certification. Despite the misgivings, many have faith with regard to its true effectiveness. Turkey, an emerging industrial economy, has a significant stake in the EU markets. The paper provides a background on the Turkish quality movement, and reports the results of a survey conducted among large Turkish companies that attempts to provide answers to the issues raised above. The findings are revealing and should help an international manager doing or planning to do business in Turkey, or his Turkish counterpart thinking about getting certification. What we see from the survey tells us that Turkish large companies are in many ways similar to their international counterparts, at least with respect to ISO 9000 certification."

A paper by Winco K.C. Yung\textsuperscript{126} assesses the latest revisions to the ISO 9000 quality system, which seek to embrace the principles of total quality management (TQM) more closely. It highlights some of the TQM elements introduced into the system, such as: quality improvement; management commitment with a greater emphasis on executive roles; operational processes showing linkages to the overall system; and customer satisfaction. It also compares the advantages and disadvantages of the two systems and discusses the practicality of the revised ISO 9000 system as a highway to TQM.


Tony Bendell\textsuperscript{127} discusses the important implications of the changes in the ISO 9000 and says, “The international quality systems standard ISO 9000 is changing. Whilst much maligned, the standard has still done much to ensure basic quality requirements in world industry, commerce and the public sector. In November, ISO 9001 is changing dramatically, and ISO 9002 will no longer exist. This is probably the most substantial change in its history. In one major leap the international standard will come up to date with modern development in quality thinking. Quality assurance will never be quite the same again! The new version of ISO 9001 places emphasis on process management and resource management and has commonality of architecture with ISO 9004, so that quality assurance requirements and quality management aspirations can be aligned holistically. The standard will be reduced from a 20-clause standard to a four-clause standard. Further, it will be more holistic; more customers orientated and have more in common with other quality and excellence models. It is a good development, but it will mean changes, and the sooner organisations start to understand the new requirements, the more ready they will be for avoiding the pitfalls! What, though, are the implications for organisational excellence?”

George P. Laszlo\textsuperscript{128} discusses the advantages of ISO 9000:2000 and says, “The 2000 version of ISO 9000 is very exciting for quality practitioners because it embraces the principles of quality management that have received wide acceptance because of the publicity of the various National Quality Awards that are models based on these tenets. However, there are potential difficulties that lie ahead for those


organizations that aspire to fulfill the requirements of this new version of ISO 9000 unless they recognize that there is a cultural gap between the new approach required as compared to the previous 1994 version. Similarly, auditors working with the new version must have a different background and approach as the emphasis is being changed from one that has been totally compliance-based to a new approach that also includes evaluation of management techniques that requires hands-on experience and judgment. Unless these two types of issues are properly addressed, the 2000 version of ISO 9000 will frustrate applicants and may tarnish the quality movement.”

In an article, Jeroen Singels, Gwenny Ruël, and Henny van de Water have studied the relationship between certification on the ISO 9000 series and the performance of organisations. They say, “This research aims to find out if ISO certification indeed results in better performance outcomes for organisations. This is of importance, for example, for those organisations that seek ISO certification in order to improve their performances. To test the hypothesis, an instrument is developed to measure the performance. The performance of organisations is operationalised through five performance indicators, which were derived from the literature: production process, company result, customer satisfaction, personnel motivation, and investment on means. Besides this main research interest, the question is posed if other factors can explain for the performance. The concept of motivation is introduced which is the focus of the second part of the study.”

3.5.2 Criticism of ISO 9000:

Morris Abraham\textsuperscript{130} mentions about the criticism of ISO 9000, "There is also considerable debate over the value of the ISO 9000 certification process and a number of criticisms of ISO 9000 have appeared (Wenmoth, 1996; Zukerman, 1994). These are that:

- It does not ensure product quality;
- Is seen as an end in itself rather than the beginning of the quality journey;
- Is driven by documentation not organizational behaviour;
- Is bureaucratic, stifles change, and quickly becomes out of date;
- Is limited to those parts of the organization that directly affect the quality of the product or service and not the whole of the operation;
- Focuses on technologies, methods and systems, not on the competencies and skills of people and their creativity;
- Is often an imposed system that diminishes ownership and hence motivation; involves following procedures rather than taking responsibility;
- Under-emphasizes improvement; and
- Does not add value."

Gavin P.M. Dick\textsuperscript{131} in his article argues, "Given the rapid recent growth in ISO 9000 applications and the business performance benefits being claimed for it by National Accreditation Registrars, it is timely to review the research in this area to see if any substantial proof exists for these

\textsuperscript{131} Gavin P.M. Dick, "ISO 9000 certification benefits, reality or myth?,” \textit{The TQM Magazine}, XII, 6, (2000), pp. 365.
claims. The paper explores the literature and finds that there is no proven link between quality certification (ISO 9000) and improved business performance. However, it is clear from the research reviewed on business performance factors, that better quality does have a consistent, positive relationship with business performance. Combining these findings leads to the inference that quality certification to ISO 9000 standards is not consistently associated with having a quality assurance system that delivers improved process control, or better quality. We conclude that the National Accreditation Registrars need to reflect on the standards of proof that they currently use to support claims for business performance improvement from the application of the ISO 9000 standards.”

Frank Martin Aarts, and Ed Vos\textsuperscript{132} have raised a financial issue related with ISO 9000 certification. In their article, they say, “The question that this study addresses is whether the shareholders of New Zealand firms benefit from the process of gaining ISO registration. Three major questions with regard to ISO registration within the New Zealand business context are raised. First, how do New Zealand public firms' stock prices react to the announcement of ISO registration? Secondly, do ISO registered firms perform any differently to the New Zealand market on average? And finally, does the choice of certifying authority (organisation that awards ISO registration) have an influence on the subsequent performance of the ISO registered firms' performance? This study is conducted from a financial perspective. The New Zealand market is found to have no reaction to ISO registration announcements, supporting the existence of semi-strong market efficiency. ISO

registered firms are found to perform below average when compared to the New Zealand capital market, and the choice of certifying authority does hold influence on subsequent firm performance.”

A paper by Robert Jones, Guenter Arndt, and Richard Kustin\textsuperscript{133} utilises a survey of 272 Australian ISO 9002 quality certified companies to examine two issues: first, the relationship between a company’s initial motivation for seeking certification (QCert) and its perception of the benefits it has received; and, second, the impact of time on perceptions of benefits received. Their paper has advanced and tested the following two hypotheses:

\textit{H1.} That companies which seek QCert for the primary purpose of “obtaining a certificate” perceive fewer beneficial outcomes than companies, which seek QCert for the primary purpose of developing the internal performance of their organisation.

\textit{H2.} That longer-established certified companies perceive greater benefits from QCert than more recently certified companies.

Analysis of the responses shows that \textit{H1} is supported, whereas \textit{H2} cannot be supported.

Manoochehr Najmi, and Dennis F. Kehoe\textsuperscript{134} discuss post ISO 9000 scenario in their paper, “ISO 9000 certification has been accepted worldwide as a useful first step towards quality development and a number of organisational benefits have been identified which result from the implementation of a quality systems standards approach. However, many companies who have obtained certification to ISO 9000 eventually observe a diminishing business benefit and require further stimulus to their quality management efforts. This further progression beyond the requirements of ISO 9000 requires a rigorous measurement of performance to ensure that the selected direction is appropriate. The research described in this paper indicates that the lack of an appropriate performance measurement system is a barrier to post-ISO 9000 quality development.”

3.5.3: ISO certified v/s non-ISO organisations:

Atul Gupta\textsuperscript{135} in an empirical study has made an attempt to find whether any differences exist between ISO and non-ISO organisations in India. In this study, four areas of study viz. technology management, causes of poor quality, participation in the quality improvement programs, and quality control techniques are used. The results of this study indicate that statistically significant differences do exist between ISO and non-ISO organisations under all the four categories specifically in training, using quality in the strategic planning, product design, and team building.


3.5.4 Expectations from ISO 9000 certified companies:

In the article, Ingo Janas, and Holger Luczak\textsuperscript{136} state that the revised ISO 9001 requires companies fundamentally to restructure their existing quality management system and to adapt it to the processes taking place in the individual company. They, therefore, say that in this context, it is of utmost importance not only to identify current weak points but also to retain the positive effects of the present quality management system. Based on the results of an empirical survey, their article outlines the main weak points, the companies had named, which are therefore points of departure in eliminating them. The article demonstrates that the new requirements of ISO 9001 do not present many companies with a difficult challenge, because they are already able to fulfil them.

3.5.5 Japanese Principles and ISO 9000:

Low Sui Pheng\textsuperscript{137} states in his article, “5-S is the acronym for five Japanese words: seiri, seiton, seiso, seiketsu and shitsuke which, when translated, mean organisation, neatness, cleanliness, standardization, and discipline respectively. They have been referred to as the five keys to a total quality environment. There are many similarities between the ISO 9001:2000 requirements for quality management and 5-S principles, which should be integrated. This paper shows that this integration can be achieved by extending the ISO 9001:2000 templates to incorporate relevant 5-S principles. By piggy-backing on ISO 9001:2000 quality management systems, 5-S principles can be introduced more readily into


organisations without the need for additional resources. This paper presents the ISO 9001:2000 requirements as well as 5-S principles and discusses how these two sets of requirements/principles could be integrated to move towards total quality management."

3.5.6 Small Scale Organisations and ISO 9000:

Roberth Gustafsson, Bengt Klefsjö, Eric Berggren, Ulrika Granfors-Wellemets\textsuperscript{138} in their article discuss the experiences of implementing a third-party certified quality system in small (maximum 50 employees) Swedish organisations. The results of the project show that more the CEO and employees have been involved in the implementation process, the more the system is used, that the CEO is more satisfied with the results; and quality improvements have continued after certification. Furthermore, the higher the level of education within the company, the less help has been required from external consultants. The project also indicates that important factors for a successful implementation are the attitude of the organisation when the implementation starts, that fairly detailed plans for the implementation are performed and that the documentation is adapted to the business and not necessarily to the ISO standard.

Alan Brown, Ton van der Wiele, and Kate Loughton\textsuperscript{139} carried out a study of small to medium enterprises (SMEs) in Australia. They examined the following questions:


• Why have organisations sought ISO 9000 series certification?
• How did they achieve certification?
• What benefits have they achieved?
• What difficulties have SMEs encountered and how have they been dealing with these difficulties?
• Are there differences (related to the first four research questions) between those enterprises, which have found certification beneficial versus those, which have not?

The major findings of their research can be summarised in the following way:

• The approach taken to ISO 9000 may impact on results. If it is seen as a means of improving internal efficiencies and involves employees in documenting systems and so on, the outcome is more likely to be a workable system. If ISO 9000 series quality system certification is only a reaction to external pressure from customers or governmental bodies, it will be more difficult to perceive improvements coming from the quality system.

• There are potentially substantial internal benefits from adopting a quality assurance system. While it does not have to be an ISO 9000 series system, it must be workable. The most important benefits mentioned by the respondents cover not only improvements in the quality of the products and services, but also improvements in quality awareness and improved management control.

• Involvement of employees in the process of gaining certification enhances the outcomes and commitment. Although in many SMEs, an external consultant was involved in developing the
quality system, own staff and employees were also participating in the development of the system.

- While ISO 9000 series certification may be important in gaining access to markets, by itself, it will not guarantee success. Industrial customers and governmental bodies are demanding ISO 9000 series certification as a general rule in relation to their vendor list; however, those general rules are not strictly practised.

- ISO 9000 series certification is generally an expensive process for SMEs as they are more reliant on outside assistance. Sharing expert time with other SMEs and/or involving students who are following quality programs are good solutions to those problems.

- Many SMEs experience disappointment with ISO 9000 series certification, with the increase in paperwork, and the costs involved. The biggest disappointment is that industrial customers and government bodies, who forced the SME to go for ISO 9000 series certification, still are using non-certified suppliers.

- ISO 9000 series certification has provided mixed experiences for SMEs. For many, it is a “necessary evil”, forced upon them largely by purchasers, particularly large organisations and government departments.

- Any competitive advantages to a single enterprise may be short lived, as it is usually only a matter of time before many companies in the same industry achieve certification.

- It is then seen by many as just another cost of doing business without any corresponding improvements in market share.
A paper by M. Sadiq Sohail, and Teo Boon Hoong \(^{140}\) examines and compares the total quality management (TQM) practices and organisational performances of small to medium enterprises (SMEs) with and without ISO 9000 certification in Malaysia. A quality measurement framework is developed for this paper based on the critical success factors of the TQM program. Empirical research was carried out to determine the difference, if any, in the TQM implementation and organisational performances of SMEs with and without ISO 9000 certification. The quality measurement framework developed for this paper provides a benchmark of TQM practices for SMEs, which are in the early implementation stage of the quality program and this is proposed as a quality checklist for SMEs to improve and focus on specific areas of their respective quality program. Results based on testing the mean differences between firms with and without ISO 9000 certification indicate that there are significant differences in performances between certified and non-certified firms, supporting the hypothesis that ISO 9000 certification contributes to a higher organisational performance.

Marti Casadesu’s, Gerusa Giménez, and Ifnaki Heras\(^{141}\) say, “The ISO 9000 standard for quality management systems was accepted by the International Organization for Standardization in 1987. Since then, large companies and SMEs have been obliged to open their doors to something new, ‘the culture of quality’, a message that is very often associated with the initials of this well-known standard. Currently, there


are more than 6,000 companies with this certificate in Spain, but they have not always obtained the same results. This paper gives the results of empirical research into 502 Spanish companies to determine the benefits of the implementation of this standard. By means of cluster analysis it was found that different typologies of companies exist. Also, nearly 65 per cent of the companies certified in Spain have obtained substantial internal and external benefits.”

3.5.7 Documentation and ISO 9000:

Barbara E. Withers, and Maling Ebrahimpour\textsuperscript{142} carried out a research, which was based on a case study of five firms operating in the USA that had or were seeking ISO 9000 registration. Three of the companies were American-owned (A-1 through A-3), one was German-owned (G-1), and one was Japanese-owned (J-1). The authors state, “Our conclusions are based on personal observations, interviews with management and employees, reviews of firms’ documents and internal publications, and responses to the questionnaire. Some distinct differences among the plants were noticed as well as some important similarities. One dramatic difference relates to the variation in the number of employees involved in the registration process, ranging from a handful at A-3 to over 400 at A-1. Another noteworthy difference relates to the quality system documentation philosophies at the five plants. Quality system procedures and documentation at A-2 represent one extreme. At A-2, the quality systems manuals are written as high level, general descriptions of the systems’ procedures and practices. Consequently, the manual is

small and easy to read. Many changes to procedures and practices can be accommodated without requiring changes to the manuals. Additionally, the use of these more general procedural descriptions minimises the opportunities for ISO 9000 auditors to identify procedural violations. At the other extreme are the considerably more detailed quality system manuals maintained by the other four firms. These manuals specify every aspect of all procedures. At firm J-1, these procedures fill many three-ring binders. Detailed manuals may prove difficult and time consuming to maintain and may increase the likelihood that a procedural violation will be uncovered by ISO 9000 auditors. As a result, firms with highly detailed quality system manuals may incur higher annual registration maintenance costs.

Several similarities exist among the five firms' ISO 9000 registration experiences. All plants experienced improvements in their record-keeping processes to meet ISO 9000 standards. With respect to their ISO 9000 registered suppliers, none of the firms felt these suppliers had passed on any of the savings that had accrued due to registration. Registration was motivated by corporate goals, customer demands, quality improvement, and competition. In summary, however, no single registration strategy emerged. Each plant achieved registration utilising its own approach.