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AN OVERVIEW AND A COMPARISON OF ISO 9000:2000 QUALITY SYSTEM STANDARDS WITH RELATED AUTOMOTIVE ONES (QS9000, ISO/TS 16949) AND TQM MODELS (MBNQA AND EFQM)

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ABSTRACT:
The present paper examines the relationship between the generic ISO 9000:2000 quality standards, the related -automotive sector specific- QS9000 and ISO/TS 16949 and the Baldrige (MBNQA) and European Quality Award (EQA) criteria for performance excellence. A comparison is made between Baldrige and EQA criteria and the various elements of ISO 9000, QS9000 and ISO/TS 16949 and their similarities and differences are examined. ISO 9000 certification as an initial step for TQM implementation as well as the motivation for ISO 9000 and TQM application is also discussed.
Keywords:
ISO 9000:2000 quality standards, QS9000, ISO/TS 16949 standards, M. Baldrige National Quality Award, EFQM Excellence Model.

1. INTRODUCTION

One of the most effective strategies evolved over the years that have been successfully used by business organizations is total quality management (TQM). TQM is a systems approach to management that aims to enhance value to customer by designing and continually improving organizational processes and systems.

An emerging need for guidelines and standards for TQM implementation forced countries to develop models for self-appraisal and for identifying and addressing quality issues. In the United States, in 1987, the M. Baldrige National Quality Award (MBNQA) was established. The purpose was to promote quality awareness, recognize quality achievements in the US companies and to publicize successful quality strategies [1, 2].

In Europe, the EFQM Excellence Model is one of the most widely used organizational TQM frameworks and is based on nine criteria. Five of these are "Enablers" and four are "Results". The "Enablers" criteria cover what an organization does. The

"Results" criteria refer to what an organization achieves. "Results" are caused by "Enablers" and feedback from "Results" helps to improve "Enablers" [3].

On the other hand the ISO organization developed a set of quality standards (ISO 9000 series), as a model for quality assurance standards in design, development, production, installation and service. The standards are generic and therefore can be used by manufacturing and service organizations around the world. The registration implies compliance to documented practices so as to guarantee a consistent level of quality. In the automotive sector two "variations" are applied: QS9000, an extended version of ISO 9000:1994 standards developed by the big three automobiles manufacturers in the US and ISO/TS 16964:2002 which is an ISO technical specification jointly developed by the International Automotive Task Force (IATF) and the ISO organization [4, 5].

The present paper examines the relationship between ISO 9000:2000 quality standards, QS9000, ISO/TS 16949 and the MBNQA and EFQM model criteria for performance excellence. A comparison is made between Baldrige and EFQM Excellence Model criteria and the various elements of ISO 9000, QS9000 and ISO/TS 16949 and their similarities and differences are reviewed. Implementing ISO 9000 requirements as an initial step towards TQM adoption as well as the motivation for ISO 9000 and TQM application is also discussed.

2. AN OVERVIEW OF QUALITY STANDARDS

2.1. ISO 9000:2001 series

ISO is a worldwide federation of 157 national standards bodies. The ISO 9000 is a series of internationally accepted guidelines as to how companies should set-up quality assurance systems. Focusing on procedures, controls, and documentation, the standards are designed to help a company identify mistakes, streamline its operations, and be able to guarantee a consistent level of quality.

The original standards which were introduced in 1987 as well as their 1994 revision only required that an organization has a documented, verifiable quality system in place to ensure that it consistently produces what it says it will produce. In fact, compliance to the standards did not necessarily prevent an organization from producing poor-quality products. There was no emphasis on continuous improvement or defect prevention. In part, it was the deficiencies of ISO 9000 that led to the development of QS9000 by the big three automobile manufacturers in 1994 [5]. The goal was to develop fundamental quality systems that provide for continuous improvement, a proactive approach to defect reduction, as well as reduction of variation and waste. In addition, QS 9000 also required demonstration of effectiveness in meeting the intent of the standards.

ISO 9000:2000 is the latest revision of the standards. It addresses a number of issues in the old standards that created widespread dissatisfaction and criticism. The new standards have a completely new structure and are based on eight principles that emphasize the core values and concepts of TQM. The new revision also incorporates several of the principles underlying the MBNQA and/or EFQM criteria. The eight principles of ISO 9000:2000 series are summarized in Table 1.

Some of the most significant aspects of the revised standard include its emphasis on using a process related structure, using information from the system to facilitate quality improvement and including customer satisfaction in improvement activities. The new revision also attempts to address the needs and interests of organizations in specific sectors such as telecommunication and automotive. The "core" of the ISO 9000:2000 series consists of four standards:

(1) ISO 9000: Quality Management Systems – Fundamentals and Vocabulary
(2) ISO 9001: Quality Management Systems – Requirements
(3) ISO 9004: Quality Management Systems – Guidance for Performance Improvement
(4) ISO 19011: Guidelines on Quality and Environmental Auditing

Table 1: ISO 9000:2000 quality management principles.

Principle 1: Customer focus. Organizations depend on their customers and therefore, should understand current and future customer needs, should meet customer requirements and strive to exceed their expectations
Principle 2: Leadership. Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.
Principle 3: Involvement of people. People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit
Principle 4: Process approach. A desired result is achieved more efficiently when activities and related resources are managed as a process
Principle 5: System approach to management. Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.
Principle 6: Continual improvement. Continual improvement of the organization's overall performance should be a permanent objective of the organization.
Principle 7: Factual approach to decision making. Effective decisions are based on the analysis of data and information.
Principle 8: Mutually beneficial supplier relationships. An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value.

Source: http://www.iso.org/iso/en/iso9000-14000/understand/qmp.html

Note that organizations may expand their management systems by extending the ISO 9001:2000 structures to include the requirements of ISO 14001(2004): *Environmental management systems*. The structural and organizational requirements of the two management systems have been designed to be compatible.

Since the first publication of ISO 9000 series standards, in 1987, this quality management system gained worldwide attention and the number of certification to ISO 9000 standards increased rapidly, particularly in Western Europe. Statistics in *"The ISO survey of ISO 9000 and ISO 14000 Certificates"* show that up to and including 31 December 2000, the number of ISO 9000 certificates awarded in Europe increased steadily each year. For the year 2000, there were 220,127 certificates awarded in Europe, which was 29,879 more than the previous year and nearly double the number awarded in 1997 (143,000). These numbers indicate the rapid growth of certification to ISO 9000 standards in Europe, especially in the European Union (EU), and such certification in the region is likely to increase continuously; see [6}. The evolution of ISO 9000 certification in Balkan countries is summarized in Table 2.

Table 2: Growth of ISO 9000 certifications in Balkan countries.

Countries	Jan. 1993	June 1994	Dec. 1995	Dec 1996	Dec. 1997	Dec. 1998	Dec. 1999	Dec. 2000
Bosnia	-	-	-	-	2	10	34	33
Bulgaria	-	-	3	14	42	96	199	259
Croatia	-	2	22	38	96	121	336	302
Greece	18	90	248	348	682	764	1050	2173
FYROM	-	-	1	3	8	21	46	49
Romania	-	6	42	61	214	269	466	1032
Slovenia	3	43	99	152	467	502	521	843
Turkey	26	106	434	606	1284	1607	1672	2287
Yugoslavia	1	1	-	8	136	148	255	339

Source: adapted from *The ISO Survey of ISO 9000 and ISO 14000 Certificates – 10th cycle.*

2.2. QS 9000

QS 9000 is an essential quality management system for suppliers of production parts, materials and services to the automotive industry. The QS 9000 quality system was developed and published in the USA in 1994 by a team consisting of representatives of the US big three automotive manufacturers (Daimler-Chrysler, Ford and General Motors)

together with US track manufacturers. A third edition of QS 9000 was issued in 03/1998 [4, 5]. This standard is consisted of three sections.

- The first section, entitled "common requirements", include the exact text of ISO 9001:1994, with the addition of automotive and heavy trucking requirements.
- The second section (sector specific requirements) covers production part approval process, continuous improvement, and manufacturing capabilities. Note that the production part approval process (PPAP) plays such a large role in QS 9000 that the automobile manufacturers created a separate manual to document all of their PPAP requirements.

The QS 9000 standard states that production part approval must be granted for an engineering change level, a part number, manufacturing location, material subcontractor(s), and production process environment. When change occurs to any of these situations, customer notification is required, and sometimes, the PPAP documents have to be resubmitted. It was created as a means of assuring that suppliers have a clear understanding of their customers' design specifications for parts and products.

QS 9000 emphasize that a comprehensive, continuous improvement philosophy must be established and promoted throughout the supplier's organization. Suppliers should develop a specific action plan for continuous improvement in quality, service (including timing and delivery) and price for all customers.

Manufacturing capabilities specifies the following required activities to support manufacturing process improvement: facilities, equipment, and process planning; mistake proofing; tool design and fabrication and tooling management. Overalls, sections one and two in QS9000 define the quality system requirements.

The third section deals with customer-specific requirements that are unique to Chrysler, Ford and General Motors. Requirements that are unique to each company are identified here.

Although QS-9000 has proven to be an excellent quality management system, it had not been updated in line with ISO 9001:2000. ISO/TS 16949:2002; see next section, has been written in line with ISO 9001:2000 and is set to replace QS-9000 as the quality management system specification for the Automotive industry. QS-9000 has been criticized that only suited to very large organizations as they are the only ones that can justify QS 9000's enormous cost and requirements of time and resources to implement. While this standard is third party verifiable, only a very few registrars are even allowed to audit this industry specific quality management standard [7].

2.3. ISO/TS 16964

ISO/TS 16949:2002 is an ISO technical specification that represents a comprehensive quality management system for the global automotive industry to achieve world class levels of product quality, productivity, competitiveness and continual improvement. The IATF, which consists of an international group of vehicle manufacturers and national trade associations, developed these standards in conjunction with the ISO. This specification aligns existing American (QS9000), German (VDA 6.1), French (EAQF) and Italian(AVSQ) automotive quality systems standards within the global automotive industry. IATF first developed ISO/TS 16949:1999. This first edition was extensively revised in line with ISO 9001:2000 and published in March 2002 as ISO/TS 16949:2002 [5].

The goal of the new standard is the development of a global management system that provides for continual improvement, emphasizing defect prevention and the reduction of variation and waste in the supply chain. It emphasizes a process approach, commitment to quality by the top management, increased emphasis on customer focus and continual improvement. Together with ISO 9000:2000, ISO/TS 16949:2002 specifies the quality system requirements for the design/development, production, installation and servicing of automotive related products. In addition, there are customer specific requirements by individual manufactures. Along with customer specific requirements,

ISO/TS 16949:2002 standard is expected to eliminate the need for multiple certifications to QS9000, VDA 6.1, EAQF and AVSQ and is hoped to be recognized globally.

2.4. Other specific quality management system

In order to describe quality requirments in specific industry sectors a number of standards were developed based mainly on ISO 9000 series with additional features concering critical issues and key areas of the specific sectors (safety, reliability, security of information, etc). These standards include:

- *Aerospace: AS9100 (rev. B)* - a quality management system for the aero-space industry based on ISO 9001 with 80 additional requirements and 18 amplifications of the ISO 9001: 2000 (issued 11-1999, revised 01-2004).
- *Telecommunications: TL 9000* - a telecommunications quality system to ensure reliability and quality performance of products and services.
- *Information Security: ISO/IEC 27001:2005* - provides a systematic approach to manage the security of confidential and sensitive company and customer information.
- *Health and Safety: OHSAS 18001* - enables organizations to develop effective and safe working practices continuously.
- *Food Safety: ISO 22000:2005* - Food Safety Management System.
- *Medical Device Manufacturing: ISO 13485:2003* - Medical Device Quality Management System.

Due to restriction of space these standards are not further considered here.

3. COMPARISON BETWEEN QUALITY MANAGEMENT SYSTEM STANDARDS

It is generally known that the vast majority of ISO standards are highly specific to a particular product, material, or process. However, the standards that comprise the ISO 9000 (as well as ISO 14000) series are considered to be "generic management system standards". *Generic* means that the same standards can be applied:

- to any organization, 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.

Both QS9000 and ISO/TS 16949 are *sector specific* standards.

The *key differences between QS-9000 and ISO/TS 16949* are related to the aspects of customer and employee satisfaction.

Customer satisfaction:

- Both QS-9000 and ISO/TS 16949:1999 require a documented process for measuring customer satisfaction. This includes the documentation of trends and the comparison of benchmark data.
- ISO/TS 16949:2002, additionally specifies that companies should:
  - Determine a method for monitoring customer *perception* as to whether requirements have been met,
  - evaluate data *continuously,*
  - demonstrate *compliance* with customer requirements & *efficiency* of process.

Employee motivation, Empowerment & Satisfaction:

- QS-9000 makes no reference to employee motivation whilst TS 16949:1999 requires that companies develop a process for the measurement of employee satisfaction.
- ISO/TS 16949:2002 additionally specifies that organizations:
  - have a process for measuring satisfaction to achieve quality objectives & make continual improvements,
  - promote quality awareness at all levels,
  - make personnel aware of the relevance of their activities.

In general, the new ISO/TS 16949:2002 specification is more demanding than QS9000 due to the fact that it has been strengthened in several key areas which should benefit both manufacturer and customer. There is more emphasis on senior management involvement through setting and communicating quality objectives, allocating resources and integrating these into business plans. Data are used to continually improve product quality and processes. Moreover, there are additional requirements on organizational performance focusing on delivered part quality, on time delivery and customer performance. There is also added emphasis on supplier development [7].

4. TQM MODELS

TQM is both a philosophy and a systematic approach. TQM is a philosophy of quality management, the earliest conceptions of which were derived from Deming's doctrinations to the Japanese in the 1950s and 1960s. Undoubtedly, TQM was a great success in Japan. Based on TQM, the quality of Japanese products has been regarded as being superior to that of the rest of the world.

Therefore, in the early 1980s, the USA utilized TQM concepts as tools to compete with Japan. Subsequently, Europe also recognized the need for a keener focus on quality and in the 1990s, TQM concepts spread to Europe. However, making the "road" towards TQM was much more difficult than expected, since there was widespread confusion about the elements of TQM and how they could be implemented. This was because TQM was a rather abstract philosophy and did not have clear guidelines on its implementation.

The problem became easier to solve as TQM elements were more clearly understood through the development and the worldwide acceptance of quality award models; see sections 4.1 and 4.2 below, and also [6]. Actually, TQM is a systems approach to management that aims to enhance value to customer by designing and continually improving organizational processes and systems. It provides a new vision for management leadership. It places customers as principal focal point and redefines quality as customer satisfaction. The emphasis is on continuous improvement of processes through employee involvement and empowerment. TQM relies on fact-based decision-making [2].

4.1. Malcolm Baldrige National Quality Award (MBNQA)

The emerging need for guidelines and standards for TQM implementation forced countries to develop models for self-appraisal and for identifying and addressing quality issues. Perhaps, the first such attempt in the West to develop a comprehensive set of guidelines for achieving world-class quality was in the United States. In 1987 the Congress established the Malcolm Baldrige National Quality Award (MBNQA). The purpose was to promote quality awareness, recognize quality achievements in the US companies, and to publicize successful quality strategies. The criteria used for the award incorporates all major elements of TQM and is often referred to as *a de facto definition* of TQM [2, 8].

The MBNQA criteria address seven major categories and several sub-categories that primarily focus on customer-driven quality and performance excellence. The award criteria categories, sub-categories and the point values are summarized in Table 3.

Besides MBNQA there is a number of similar quality award models. Reference is made to Deming Prize (instituted by the Union of Japanese Scientists and Engineers in 1951 and actually being the inspiration of MBNQA), the Canadian Quality Award and the Australian quality Award together with a number of similar national awards [3]. Standing out at the European level are the European Quality Awards (EQA) granted by the EFQM organization for the implementation of TQM. The criteria and the key principles of this model are briefly presented in the next section.

Table 3: MBNQA items point values (2005)

Categories/Items	Point values
1. Leadership	120
1.1 Organizational leadership	80
1.2 Public responsibility and citizenship	40
2. Strategic planning	85
2.1 Strategy development	40
2.2 Strategy deployment	45
3. Customer and market focus	85
3.1 Customer and market knowledge	40
3.2 Customer relationships and satisfaction	45
4. Information and analysis	90
4.1 Measurement and analysis of organizational performance	50
4.2 Information management	40
5. Human resource focus	85
5.1 Work systems	35
5.2 Employee education, training, and development	25
5.3 Employee well-being and satisfaction	25
6. Process management	85
6.1 Product and service processes	45
6.2 Business processes	25
6.3 Support processes	15
7. Business results	450
7.1 Customer focused results	125
7.2 Financial and market results	125
7.3 Human resource results	80
7.4 Organizational effectiveness results	120
Total points	1000

Source: http://balbridge.org

4.2. EFQM Excellence model

The quality award model most widely used in Europe is that developed by the European Foundation for Quality Management (EFQM). The EFQM was formed in 1988 by 14 leading European businesses, and it encourages European businesses to improve competitiveness through the use of TQM philosophy. The EFQM has provided a holistic model (termed "business excellence" or the "excellence model") to facilitate such a purpose. The model and the associated self-assessment process have given new direction to the quality movement and have driven deep and lasting changes into participating organizations (9).

The EFQM Excellence Model was introduced at the beginning of 1992 as the framework for assessing organisations for the European Quality Award (EQA). It is now the most widely used organisational framework in Europe and it has become the basis for the majority of national and regional Quality Awards.

The EFQM Excellence Model is a practical tool that can be used in a number of different ways:

- As a tool for *Self-Assessment*
- As a way to *Benchmark* with other organisations
- As a guide to identify areas for *Improvement*
- As the basis for a common *Vocabulary* and a way of thinking
- As a *Structure* for the organisation's management system

The EFQM Excellence Model is a non-prescriptive framework based on 9 criteria. Five of these are "Enablers" and four are "Results". The "Enabler" criteria cover what an organisation does. The "Results" criteria cover what an organisation achieves. "Results" are caused by "Enablers" and "Enablers" are improved using feedback from "Results". The EFQM Model is presented in diagram form in Figure 1.

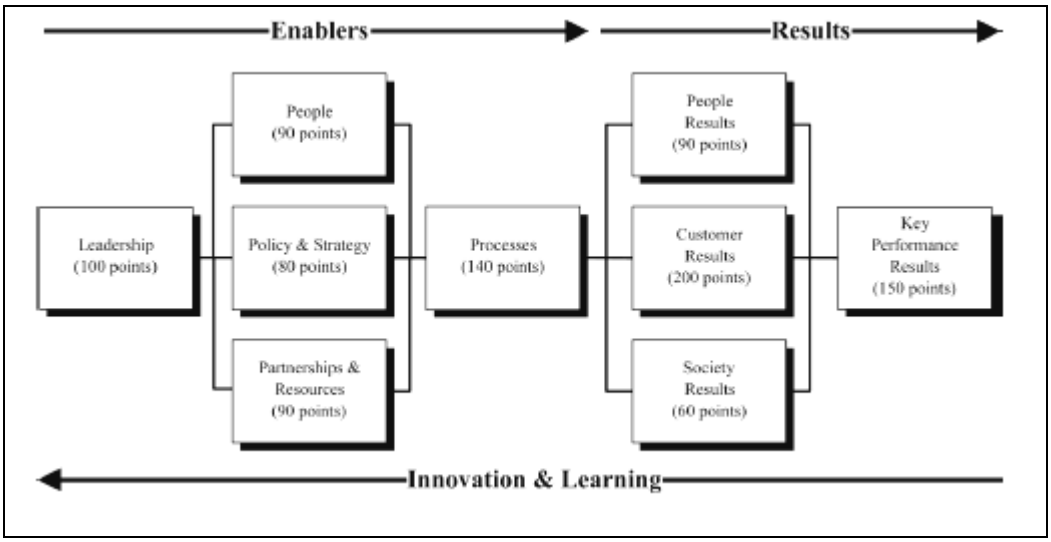

Figure 1: The structure of EFQM model

The Model's 9 boxes represent the criterion against which is assessed an organisation's progress towards Excellence. Each of the nine criteria has a definition, which explains the high level meaning of that criterion. To develop the high level meaning further, each criterion is supported by a number of sub-criteria. Each sub-criterion poses a number of questions that should be considered in the course of an assessment. Analysis on this topic is omitted since it can be easily found in EFQM Organization site.

It should be noted that in April 1999, the EFQM revised the model and there was a noticeable switch in language from "quality" to "excellence". Indeed, the word "quality" does not appear in either the sub-criteria or the areas to address in the revised model. The name of the European Quality Award (EQA) was also changed to the EFQM excellence award, with the word "quality" stripped out.

The EFQM believed that the shifts in business emphasis and new management ideas in the model would fulfill the requirements of large, small and medium-sized enterprises in the private and public sectors. Their objective, then, became to provide a model that ideally represents the business excellence (TQM) philosophy and which can be applied in practice to all organizations irrespective of country, size, sector or stage along their journey to excellence. However, the revision to the European TQM model raised much discussion, including debates over the merits and disadvantages of the shift from TQM to business excellence and the exclusion of "quality" from the EFQM Excellence Model; see for example [6, 9, 10].

EFQM defines *Excellence* as the *outstanding practice in managing the organisation and achieving results*. Truly Excellent organisations are those that strive to satisfy their stakeholders by what they achieve, how they achieve it, what they are likely to achieve and the confidence they have that the results will be sustained in the future.

Being excellent requires total leadership commitment and acceptance of the Fundamental Concepts, a set of principles on which the organisation bases its behaviours, activities and initiatives. When the organisation turns them into practice it opens the access to Sustainable Excellence. On the other hand, if these concepts are not fully understood and accepted then progress with adopting the Model will be difficult and potentially meaningless. The fundamental concepts of EFQM Excellence Model and their key explanations are summarized in Table 4.

Over the years a number of research studies have investigated the correlation between the adoption of holistic Models, such as the EFQM Excellence Model, and improved organisational results. The majority of such studies shows in general, a positive linkage; see for details [6].

Table 4: The fundamental concepts of EFQM Excellence Model (2005)

Fundamental concepts	Explanation
Results Orientation	Excellence is achieving results that delight all the organisation's stakeholders.
Customer Focus	Excellence is creating sustainable customer value.
Leadership and Constancy of Purpose	Excellence is visionary and inspirational leadership, coupled with constancy of purpose.
Management by Processes and Facts	Excellence is managing the organisation through a set of interdependent and interrelated systems, processes and facts.
People Development and Involvement	Excellence is maximising the contribution of employees through their development and involvement.
Continuous Learning, Innovation and Improvement	Excellence is challenging the status quo and effecting change by utilising learning to create innovation and improvement opportunities.
Partnership Development	Excellence is developing and maintaining value-adding partnerships.
Corporate Social Responsibility	Excellence is exceeding the minimum regulatory framework in which the organisation operates and to strive to understand and respond to the expectations of their stakeholders in society.

Source: http://www.efqm.org/Default

4.3. Motivation for ISO 9000 and TQM models

The academic literature of empirical studies or surveys, which have analyzed the motivation for the implementation of quality systems based on the ISO 9000 and TQM models' is very extensive; for an overview on the topic see [11-13].

Empirical survey concerning the Greek industry [14-16] indicated that ISO-9000 certification can offer a good first step towards TQM, since it offers significant performance improvement in all TQM areas examined. However, the standards' contribution is not the same in all TQM areas. Their most important contribution is in the areas of process management and quality data, while their contribution is much lower in the areas of leadership, human resource management (HRM) and the development of close partnerships with suppliers.

Similar surveys related to other countries and their findings; see for example [17, 18], support and enrich the findings concerning the Greek industry, indicating that the "soft" elements of TQM (leadership, employee participation and empowerment and customer relations) are the ones with the least improvement from certification. Worth mentioning that Improvements in these elements are particularly important since research has concluded [17], that performance improvement is more heavily influenced by the "soft" elements of TQM rather than the "hard" ones.

The contribution of ISO 9000 to quality improvement and particularly its position with regard to TQM models is the topic of numerous publications; see for example [19]. A number of authors saw ISO 9000 as a vehicle to help the implementation of TQM. Some others disagree proposing instead, the use of EFQM excellence model. Another finding of these researches is important: A large number of organizations still view ISO 9000:2000 as the end of their quality journey. TQM is considered to be too abstract and without "hard" requirements.

5. CONCLUSIONS: COMPARISON OF MBNQA AND EFQM MODELS WITH QUALITY STANDARDS

Based on a clause to clause comparison of the original documents concerning quality standards and MBNQA's and EFQM model's Criteria for Performance Excellence, as well as tothe published literature [2, 5, 19, 20] the following points must be outlined:

Both MBNQA and EFQM model approaches have the same objective, which is to establish a set of criteria that are used to assess organizational quality and excellence and to recognize role model performance through their award process. Both encourage the application of the criteria as a tool for self-assessment to identify strengths and areas for improvement. An overview of the objectives and the criteria applied to both MBNQA and EFQM model lis presented in Table 5.

Both models are based on a set of fundamental concepts (core values) of excellence as shown in Table 6. The premise is that organizations that embrace these fundamental concepts of excellence will achieve better performance. For both EFQM model and MBNQA, the fundamental concepts of excellence (Table 6) provide the basis for their assessment criteria as shown in Table 5. The criteria provide a way to assess the extent to which the organization has improved itself in the direction of "living" the fundamental concepts of excellence. Worth mentioning also, that both approaches are integrated with a public policy to create competitive advantage.

Table 5: Overview of MBNQA and EFQM.

Objectives	•To help improve performance practices and capabilities. • To facilitate communication and sharing of best practices among U.S. organizations. • To serve as a working tool for understanding and managing performance, planning, training and assessment	• To stimulate and assist European organizations in improving customer and employee satisfaction, impact on society and business results. • To support European managers' efforts to initiate total quality management and achieve global competitiveadvantage.
Quality principles	• Companies must have direction and customer focus. • Quality and performance are judged by customers. • Organizational and personal learning are required. • Employees and partners are vital to company success. • Success requires capacity for change and flexibility. • Market leadership requires a future orientation. • Making meaningful change requires innovation. • Management requires factual analysis. • Public responsibility is important. • Performance measurement should focus on results. • A systems perspective is required.	• Customer focus. • Supplier partnerships. • People development and involvement. • Processes and facts. • Continuous improvement and innovation. • Leadership and consistency of purpose. • Public responsibility. • Results orientation.
Criteria	1. Leadership. 2. Strategic planning. 3. Customer and market focus. 4. Information and analysis. 5. Human resource focus. 6. Process management. 7. Business results.	1. Leadership. 2. Policy and strategy. 3. People management. 4. Resources. 5. Processes. 6. Customer satisfaction. 7. People satisfaction. 8. Impact on society. 9. Business results.

- The main goal of ISO 9000 is to produce an effective quality system that will assist in eliminating errors, save money on rework and wasted work and satisfy customer requirements; therefore it aims, mainly, to maintain quality.
- TQM aims to continuously improve product quality and customer satisfaction by individual and organizational involvement. Therefore it aims to improve quality as well as aspects of performance. However, the approaches used to implement TQM vary

substantially from country to country and from culture to culture. Thus, models like the MBNQA and/or EFQM model is necessary to standardize and structure TQM.

Table 6: Core values of MBNQA and EFQM model.

EFQM model	MBNQA
Results orientation	Results focus
Customer focus	Customer driven quality
Leadership and constancy of purpose	Leadership
Management by processes and facts	Management by facts
People development and involment	Valuing employees
Continious learning, innovation and improvement	Continious improvement and learning
Parthnership development	Parthnership development
Public responsibility	Public responsibility and citizenship
	Fast response
	Long range view of the future
	Design quality and prevention

- The focus on the Baldrige Award is competitiveness through increased customer satisfaction and improved overall operational performance. The focus of ISO 9000 registration is conformance to practices specified in the registrant's quality system.
- Quality is defined as customer-driven quality in the MBNQA and EFQM model criteria whereas ISO 9000 has its operational definition of quality as conformity to documented requirements.
- The focus of ISO 9000:2000, QS9000 and ISO/TS 16949:2002 registrations, unlike the MBNQA and EFQM is compliance to specified practices so as to guarantee a consistent level of product quality. Its main purpose is to enhance and facilitate trade.
- The requirements in ISO/QS 9000 and ISO/TS 16949:2002 quality system standards serve as a subset of TQM overall requirements
- The scope of MBNQA criteria is considerably broader and the ISO 9000 requirements do not fully address any of the criteria items.
- Registration requirements of ISO 9001:2000 do not fully address customer related issues such as customer satisfaction relative to competitors, customer retention, market responsiveness and cycle time. Moreover, the ISO 9000 standards do not address certain human resource issues such as employee well being and satisfaction.
- It is reasonable to expect that more companies would be seeking ISO 9000 and ISO/TS 16949 registrations in the next several years since registration is considered to be a critical market tool. A large number of organizations still view ISO 9000:2000 as the end of their quality journey.

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