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## **Imprint**

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# Quality Management

c a l l i d u s .

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# Contents

<b>Foreword</b>	<b>8</b>
<b>Chapter 1. Quality. Definitions and Basic Concepts</b>	<b>11</b>
1.1 The Organization. The Internal and External Environment of the Organization	12
1.2 The Importance of Quality within the Current Economic Context	19
1.3 Quality. Short History and Definition	23
1.3.1 Systems for Inspection or Assessing Conformity	26
1.3.2 Quality Control Systems	26
1.3.3 Systems of Quality Assurance	26
1.3.4 Quality Management Systems	29
1.4 Concerns Regarding the People in Charge of Quality for the Development of the Quality Systems and Techniques	31
1.4.1 An Approach to Quality by W. Edwards Deming	32
1.4.2 An Approach to Quality by Joseph M. Juran	33
1.4.3 An Approach to Quality by Armand V. Feigenbaum	34
1.4.4 An Approach to Quality by Philip Crosby	35
1.4.5 An Approach to Quality by Kaouru Ishikawa	36
1.4.6 An Approach to Quality by Genichi Taguchi	38
1.4.7 Quality Improvement in Sigheo Shingo's Opinion	40
1.4.8 An Approach to Quality by Claus Møller	40
1.5 Internal and External Organizational Factors that Influence Quality	41
1.5.1 The Influence of Environmental Factors and their Partnership of the Organization	41
1.5.1.1 The Market Factors and the Clients	41
1.5.1.2 Technical and Technological Factors	43
1.5.1.3 The Factors of the Suppliers' Environment	43
1.5.1.4 Competition Factors	44
1.5.1.5 Legal Factors	44
1.5.1.6 Economic Factors	46
1.5.1.7 Educational Factors for Human Resources	46
1.5.1.8 The Socio-political and Cultural Factors	47
1.5.2 The Internal Factors of the Organization which Influence the Quality of the Accomplished Products	47
1.5.2.1 The Structure of the Organization	48
1.5.2.2 Organizational Processes	48
1.5.2.3 The Staff, their Values and Creed	49
1.6 Modern Concepts in Approaches to Quality. Competitive Global Quality	50
1.6.1 The Dimensions of Quality	50
1.6.2 The Competitive Global Quality	56
1.7 Chronological Landmarks in the Evolution of Quality	57
1.8 Romanian Legislation and Institutions in the Field of Quality	65

<b>Chapter 2. Quality Management. Fundamental Principles and Elements</b>	<b>69</b>
2.1 Vision, Mission, Policy and Commitment	70
2.1.1 The Concept of Quality Policy and Its Relationship with Organizational Policy	72
2.2 Organizational Culture and Quality	74
2.3 Principles of Quality Management	78
2.3.1 Client-oriented Approach	79
2.3.2 Leadership	81
2.3.3 Employee Involvement	82
2.3.4 Process-based Approach	83
2.3.5 Systemic Approach	84
2.3.6 Continuous Improvement	85
2.3.7 Information and Data-based Decision Making	86
2.3.8 “Win-win” Relationship with Suppliers	87
<b>Chapter 3. Quality and Environment Patterns</b>	<b>89</b>
3.1 Introduction	90
3.2 The ISO 9000:2000 Quality Management Standards	90
3.2.1 The ISO 9000:2000 Standard	92
3.2.1.1 The Structure of the ISO 9000:2000 Standard	92
3.2.1.2 Conceptual Relationships and Graphic Representation of ISO 9000:2000 Terminology	92
3.2.2 The ISO 9001:2000 Standard	99
3.2.3 The ISO 9004:2000 Standard. Requirements, Comments, Case Studies	102
3.2.3.1 The ISO 9004:2000 – An Overview	102
3.2.3.2 The Quality Management System	103
3.2.3.2.1 Quality Management System Documentation	104
3.2.3.2.2 Document Control	104
3.2.3.2.3 Records Control	105
3.2.3.3 Management Responsibility	106
3.2.3.3.1 Management Commitment	107
3.2.3.3.2 Focusing on the Customer	107
3.2.3.3.3 Quality Policy	109
3.2.3.3.4 Quality Objectives	109
3.2.3.3.5 Planning the Quality Management System	110
3.2.3.3.6 Responsibility and Authority	113
3.2.3.3.7 Management’s Representative	114
3.2.3.3.8 Internal Communication	115
3.2.3.3.9 Management’s Analysis	116
3.2.3.4 Resource Management	121
3.2.3.4.1 Human Resources	121
3.2.3.4.2 Infrastructure and Work Environment	123
3.2.3.5 Product Accomplishment	124

3.2.3.5.1	Product Realization Planning	125
3.2.3.5.2	Processes Related to Customer Relationship	126
3.2.3.5.3	Design and Development	127
3.2.3.5.4	Supply	132
3.2.3.5.5	Service Production and Supply	137
3.2.3.5.6	The Control of Monitoring and Measuring Devices	141
3.2.3.6	Measurement, Analysis and Improvement	142
3.2.3.6.1	Monitoring and Measurements	143
3.2.3.6.2	Controlling Nonconformance	146
3.2.3.6.3	Data Analysis	147
3.2.3.6.4	Improvement	148
3.3	The ISO 14000 Standard Series for Environmental Management	150
3.3.1	Environmental Management and the ISO 14000 Standard Series	150
3.3.2	Integrated Systems – Quality and Environment	152
3.3.3	Implementing the Community System of Environmental Management and Audit	156
3.4	The QS-9000 Standard	160
3.5	The VDA Standard	162
3.6	The ISO 16949 Standard	163
3.7	The HACCP Model	164
3.7.1	Description of Terms and Concepts Occurring in the HACCP System	164
3.7.2	Reference Documents	167
3.7.3	Principles of the HACCP Structure	168
3.7.4	The HACCP Process	168
3.8	The BS 8800:1996 Standard for Occupational Health and Safety Management Systems	168
3.9	Patterns of Business Excellence	170
3.9.1	European Quality Prize	172
3.9.1.1	Fundamental Excellence Concepts (According to the EFQM Model)	172
3.9.1.2	Evaluation and Qualification Procedure	173
3.9.1.3	Basic Criteria for the European Quality Prize – Large Enterprise	173
3.9.1.4	Basic Criteria for the European Quality Prize – Small and Medium Enterprises (SME)	176
3.9.2	The Malcolm Baldrige American Quality Award	178
3.9.3	The Edwards Deming Quality Award	180
3.9.4	The Canadian Award for Business Excellence	181
3.9.5	The Australian Quality Award	181
3.9.6	The “J. M. Juran” Romanian Quality Award	182
3.9.6.1	The Foundation for the “J. M. Juran” Romanian Quality Award	183
3.9.6.2	The Mission, Vision and Values of the “J. M. Juran” Romanian Quality Award Foundation	184
3.9.6.3	The Evaluation Pattern for the “J. M. Juran Romanian Quality Award”	184

3.9.6.3.1 Criteria Regarding the “Determination Factors”	185
3.9.6.3.2 Criteria Referring to “Results”	186
<b>Chapter 4. Implementing the Quality Management System</b>	<b>191</b>
4.1 The Management of Organizational Change	192
4.2 Implementing Quality Management	196
4.2.1 Quality Management and Change	196
4.2.2 Implementing Quality Management	197
4.3 Organization for Quality	206
4.3.1 The Quality Manager	207
4.3.2 Executive Committees and Teams	207
4.3.3 Quality and Process Improvement Teams	209
4.3.3.1 Team Selection and Management	209
4.3.3.2 Team Objectives	209
4.3.3.3 Team Meetings	210
4.3.3.4 Team Tasks	210
4.3.3.5 Team Dynamics	210
4.3.3.6 Team Results and Analyses	210
4.3.4 Quality Circles or Kaizen Teams	210
4.3.4.1 The Structure of Quality Circles	211
4.3.4.2 Training Quality Circle Leaders and Members	212
4.3.3.3 Quality Circle/Kaizen Team Activity	212
4.3.5 Departmental Purpose Analysis	212
<b>Chapter 5. Quality Systems Audit and Certification</b>	<b>215</b>
5.1 Quality Evaluation	216
5.2 Quality Audit	216
5.3 Quality Certification	220
5.3.1 TÜV Rheinland Berlin Brandenburg Certification	222
5.3.1.1 TÜV Rheinland Berlin Brandenburg – Brief Description	222
5.3.1.2 TÜV Rheinland Berlin Brandenburg – Certification Process	222
5.3.2 SIMTEX-OC Certification	224
5.3.3 Romanian Auto Registry (RAR) Certification	226
5.3.3.1 RAR – Outline	226
5.3.3.2 The Evaluation and Recording Process	228
5.3.3.3 Final Evaluation, Quality System Certification and Registration	229
5.3.3.4 Using the RAR-OCS Logo	230
<b>Appendix. List of Renar Authorised Organizations</b>	<b>233</b>
<b>Bibliography / List of Abbreviations</b>	<b>236</b>
<b>Biography</b>	<b>240</b>

## Foreword

Quality – an essential principle and concept in the evolution of things and phenomena – has been long dealt with and thoroughly studied by specialists in various areas. However, research on quality has never been comprehensive or completed, precisely because of its complexity and the multiplicity of approaches in order to unveil its essence. Therefore, any theoretical approach to the concept of quality evinces contradictory opinions as well, and this is not surprising for any thorough and objective research.

Any attempt to define quality levels entails even more controversial issues, as these notions cannot be generally and unanimously accepted by everyone. The main reason of differentiated or even differing perceptions of these aspects stems from the tremendous variety of its beneficiary, i.e. client.

Experience has shown that an organization is the result of maintaining balance in the context of major turbulences triggered by internal and external constraints in pursuit of profit - the output of organizational process that justifies survival.

In this context, organizations are able to improve their managerial strategies so that all efforts are focused on meeting client needs and requirements, provided that trust in product accomplishment is testified by quality assurance.

Experience has testified that open borders allow free circulation of products, services, capital and people all over the world, facilitated by the European Union area. Consequently, one can notice a growing personalization of products that are going to become better known than the name of most countries worldwide. Such personalization can only be achieved in the world by means of a quality standard placing them at the top of a great number of similar products.

Organizations need to invest much effort in order to attain this level of competitiveness in a highly competitive economy, where supply greatly exceeds demand. Given this situation, it is imperative to develop and implement a system of quality management at the organizational level in order to achieve objectives included in the strategic plans of the organizations.

The present study aims to clarify important quality-related concepts, as well as approaches to quality by some well-known specialists in the field. Quality management is presented in a modern perspective, accompanied by related issues in the field of environment management and occupational health and safety management. The book also provides an original scientific approach to other important aspects of auditing and certifying quality systems.



All the issues dealt with in the present study represent a fundamental basis for further understanding and knowledge for specialists in all areas that evince any interest in accomplishing quality.

The study is also addressed to undergraduates and postgraduates who study Quality Management as a discipline included in their curriculum. The book, however, is an important reference for anyone interested in further aspects about quality and its effects.

The authors would like to express their heartfelt thanks to all colleagues, members of the Quality Research Center, whose activity and unfailing contribution have helped increase the competence and prestige in the field of quality for all academics at the “Lucian Blaga” University of Sibiu.

Authors

where a company meets with many suppliers, regulations, consumer groups and a tough competition.

**A maximum level of uncertainty**, given by a very dynamic and complex environment, is to be found on the computer market, marked by a rapid rate of technological innovation and significant changes as regards consumers, suppliers and competitors.

Thompson set forth a new way to assess the environment where the organization works. The organizations consider the environments where they act according to five competitive factors:

- Danger of new entries on a certain market or market segment. This is considered to be business that needs small capital (cleaning services, pastry) but also new entries requiring large capital (Mercedes, Toyota in the U.S.A, Daewoo in Romania)
- Competition among the dominant organizations on the market (jockeying among contestants - deceit among the competitors). For example, "Coca-Cola" and "Pepsi", which so often undertake a war of prices, as well as the advertising companies and the presentation of new products. The large car companies often find themselves in such a situation.
- Danger of substitution products represents the degree to which alternative products or services lower the demand for products or existing services. Therefore, micro-computers have cut down the demand for huge computers and typewriters; saccharine reduces the demand for sugar.
- Purchasing power represents the extent to which merchandisers have the possibility to influence the supplying organizations. For example, only certain organizations can buy Boeing 747 planes. Or let us consider the general decrease of the purchasing power in Romania nowadays, which has an influence on the output of many organizations providing goods and services.
- The power of suppliers represents the extent to which suppliers have the ability to influence the buyers' potential. Therefore, one should mention the case of the monopoly market when the suppliers can enforce whatever they wish (e.g. electricity). In such cases the state intervention to cut down the effect of the monopoly is imperative. Another example is the manufacture of large planes with more than 300 passenger seats – extremely advantageous to purchase.

Environment disturbance is linked to the devastating results of some accidents such as earthquakes, nuclear accidents at Chyrnobel and Three Mile Island, leaks of toxic gas in Bhopal India, the explosion of the spaceship Challenger.

Understanding the way in which the organizations act when changes occur in the environment is a necessary step in order to realize the consequences of the environmental impact on the organizational culture. There are five different ways in which the organizations react to the influence of the environment on them, namely:

- **Information.** Information management is important for the understanding of the environment and in order to take steps to employ the favorable elements of the environment or counteracting the unfavorable elements.

- **Strategic response.** After the managers have accomplished the required level of understanding they must create a strategic answer.
- **Mergers, takeovers and acquisitions.** The merger takes place when two or more companies combine themselves in order to create a new one, and the takeover arises when a company buys another company (in spite of its will)
- **The design of the organizational structure.** This is being accomplished according to the environment. Organizations that operate within an environment with a low degree of uncertainty can project a bureaucratic- like organizational structure, and those operating within an environment with rapid changes will project a more flexible, organic-like organizational structure.
- **The direct influence on the environment.** Organizations are not always powerless facing the environment. They can and must influence the environment in different ways. Organizations use some techniques to influence suppliers (more suppliers, long term contracts with pegged prices), competitors (prices, quality), clients (advertisement, new use for products, new requirements), trade unions.

Organizations must take into account the environmental conditions of where they carry out their activity. And to function best, they must continuously tally their organizational culture with the changes that may occur. This adjustment is a matter of decision-making, organizing and planning and requires adequate attention.

## 1.2 The Importance of Quality within the Current Economic Context

The realities of the contemporary world highlight a very dynamic evolution both from a political and economic point of view. This occurs after a relatively long period of more than 50 years. The '90s have also meant the decline from a political point of view and practically the failure of the communist system, due mostly to the huge discrepancy between the communist and the capitalist systems. The excessive centralization of decision elements in all fields of social life, mostly in the economic area, proved to be unprofitable, cumbersome and unproductive. The consequence was that a great number of communist countries, which have experimented or rather were compelled to adopt the economic communist model, were forced to admit its failure and turn it into a new system. Our country belongs to this category and the end of the century found the Romanian society under the aegis of a tough fight to overcome the discrepancy created within this historical period as compared to other European countries and from other parts of the world. The transition towards such an organization has implied and entails many problems to be solved, and different solutions are being looked for. The difficulties of the transition are emphasized by the characteristics of this period in which the economic outlook highlights a diversity and rapid renewal of merchandise supply under the impact of revolutionary progress in science and technology and a serious growth of home and foreign competition. This happens since more and more organizations take over and practice free trade and new industrial policies. We can outline the following as in figure 1.5 [46] by analyzing the evolution of the main factors of competitiveness:

- Until 1950 the most important factor was to manufacture products with lower prices by using cheap labor force, achieved by a specialization of the working place so as to allow the employment of a weakly trained staff, therefore having poor claims in being paid.
- Until 1980 the price of products continued to be a competitive factor, accomplished by taking into account the automation of production. This cut down manual labor expenses and increased work productivity.
- After 1980 two new important competition factors arose, such as the quality of products and adjustment to the market requirements. Under the conditions of a powerful intensification of competition, the high demands of clients increased and, consequently, only those organizations won the competition that were able to ensure the required flexibility to satisfy the demands of the consumers regarding the range and accrued specifications asked for the products.

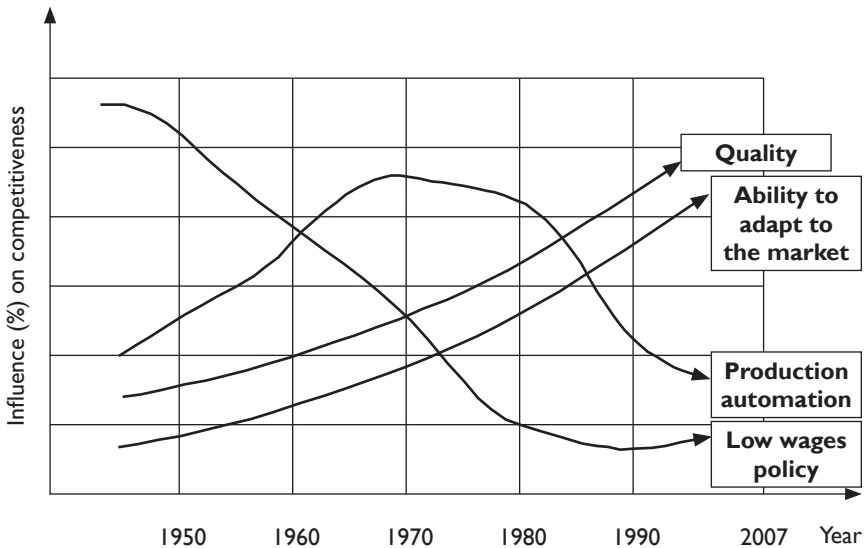


Fig. 1.5 The influence of major factors on organization competitiveness

Under the conditions of the free market, of free competition, the fundamental requirement for the success of an organization is competitiveness. Its objectives are to win and maintain the market segment to which it appeals with the products (goods or services) offered under conditions of profitability. Organizations delivering the same kind of products are found in continuous competition and therefore, there is a continuous preoccupation for the growth in competition. It is a process which starts with the

setup of the organization and never comes to an end because the loss of competition may lead to bankruptcy.

The characteristics for the competitiveness of any organization are rendered in figure 1.6 [37]. These are product quality, industrial activity, staff, commercial and financial activity [52].

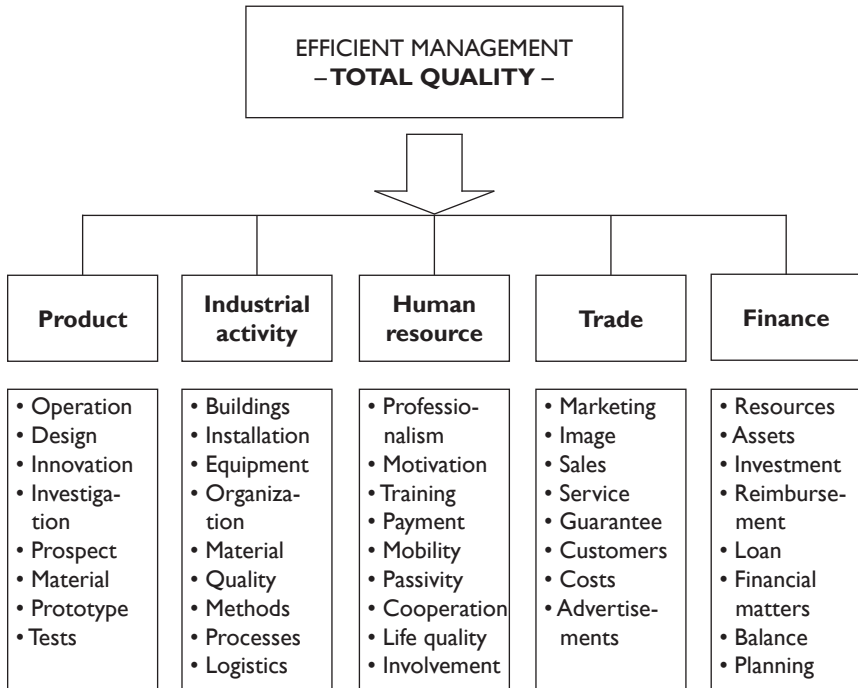


Fig. 1.6 The characteristics of organization competitiveness

An organization is the more competitive as the quality of its product improves, its industrial activity becomes more efficient, the staff becomes better trained and more involved in the working process, the commercial and financial activities are carried out in time, while assuring and continuing competitiveness. This represents the basic target for any management pattern.

Any organization, whether small or large, state run or private, providing goods or services (even commerce only) can be competitive only if it produces, sells and earns from sales. Many factors might occur throughout this process some may disturb and even hinder the activity and some may determine the success of the sales. They include the market conditions, the nature of the product, the image created by the advertise-

implementation of ISO 14001. The ISO 9001:2000 standard even presents a correspondence between requirements of the ISO 9001 and the ISO 14001. The realization of such a quality-environment integrated system will have as a result the same area of documentation, but also specific documents, requested by the two standards.

One can identify two large categories of similarities between the two systems: at the core structure of reference standards and at the concrete aspects of the two main domains: quality and environment.

In the first case we are talking about the main ideas of the management systems, which are to be found in both the ISO 900 and ISO 14000 standards, as seen in table 3.7

<b>General principles of management systems</b>	Design and implementation of an internal system – guidelines	Operation – specifications	Assessment instruments • Internal (assessment) • External (certification)
ISO 14000 standard - environment -	ISO 14004 Guidelines for EMS	ISO 14001 Specifications and guidance	ISO 14010, 14011, 14012 EMS audit
ISO 9000 standard - quality -	ISO 9004 Guidelines for QMS	ISO 9001 Quality management pattern	ISO 19011 QMS audit

Table 3.7 Similarities between ISO 9000 and ISO 14000 standards principles

These resemblances may be detailed at paragraph level, which are almost identical for the reference standards of the two systems, ISO 9001 and ISO 14001 (table 3.8)

ISO 14001 - 1996		ISO 9001 - 1994	
Requirement	Paragraph	Paragraph	Requirement
Environment policy	4.2	5.3	Quality policy
Training, awareness, competence	4.4.1	6.2	Human resource
Document control	4.4.5	4.2.3	Document control
Records	4.5.3	4.2.4	Records control
EMS audit	4.5.4	8.2.2	Internal audit
Analysis performed by management	4.6	5.6	Analysis performed by management

Table 3.8 Similarities between ISO 9001 and ISO 14001 standards requirements

**a. Similarities between particular approaches regarding the two areas: quality and environment**

There are numerous similarities and that is why organizations that choose distinct quality and management systems are becoming fewer and fewer. The most important aspects regarding the common denominator of the concrete level of designing, implementing and operating environment and quality management are listed below:

- both standards take into account the concept of “continuous upgrading”
- both standards take into account the “prevention concept”
- both standards have placed the human factor at the core of creating, implementing and operating the management system.

#### **b. Differences between the quality management system and the environment management system**

The most often quoted difference is that each system has its own reference document, its own standard with special requirements.

Except the differences strictly connected to the contents of the two standards, there are numerous differences to be seen regarding the specific nature of the domains that we compare: quality and environment.

#### **c. Types of integration of the quality – environment management system**

Resemblances and differences between the two management systems may be used as arguments for implementing them completely or partially for each separate organization. The fact that there are both fully integrated systems and partially or non-integrated systems reveals the fact that the particular conditions of each organization are very important in making the right decision. The relationship between the QMS and EMS may be revealed in three situations: fully integrated systems, partially integrated systems, separate systems.

Complete integration requires:

- Drafting the quality and environment policies in a single document
- Elaborating a unique manual of quality – environment, based on common procedures and special procedures
- Elaborating a documentation containing as many common documents as possible, with the participation of staff which has responsibilities in both quality and environmental areas
- Process integration
- Human resources integration.

Partial integration may be summed up in several ways, by combining the following situations:

- separated or unique quality-environment policies
- separated or unique quality – environment manual
- partially integrated system procedures
- specific environment instructions and procedures
- specific quality instructions and procedures
- partial process integration
- partial human resources integration.

Separate systems include the drafting of:

- distinct policies
- distinct manuals for quality and environment
- environmental procedures, instructions and recordings
- quality procedures, instructions and recordings.

The elements stated above are to be found in table 3.9

Complete integration	Partial integration		Separate systems	
Environment and quality manual. Methods and guidance for environment and quality	Environment and quality manual.		Environment manual	Quality manual
	Methods and guidance for environment	Methods and guidance for quality	Methods and guidance for environment	Methods and guidance for quality
	Database input		Environment input	Quality input

Table 3.9 Quality-environment systems: types of integration

An organization undergoing a certification process, or which does already hold a certificate for a quality management system and aims to implement an environment management system, is advised to develop an environment management system, but with a unitary conception and to obtain the ISO 9000 and ISO 14000 certificates.

For an organization that has neither a quality management system nor an environment management system, a simultaneous manner of obtaining them is advised, in a unique organizational concept and with a concentrated effort to implement and certify the two systems.

### 3.3.3 Implementing the Community System of Environmental Management and Audit

The preoccupation for promoting sustainable development has become more and more obvious within the European Union for the past few years. We may single out the following landmarks, in this respect:

- The Maastricht treaty of 07.02.1992, which sets forth, among others, promotion of sustainable development in the E.U.
- CEE resolution of 01.02.1993 regarding the action program “Towards a sustainable development”, a special program for the implementation of EU policy regarding environment protection and ensuring such a development
- CEE regulation no.1836/29.06.1993 regarding voluntary participation by organizations from the industrial sector to a community environment and audit management system (European Environmental Management and Auditing Scheme – EMAS), which became valid on the 13.04.1995.

With the community system for audit and environmental management the European Union hopes to achieve the continuous upgrading of its results regarding the environment of industrial activities, taking the following elements into account:

- Elaborating and implementing environmental management systems, policies and programs by the organizations
- Systematic and objective assessment of the efficiency of applied environmental management systems, policies and programs
- Keeping the public informed about organization results in this respect.



In order to implement the community system for environment and audit management, the EEC regulation sets forth the following prerequisite stages (chart 3.28) [37,38]:

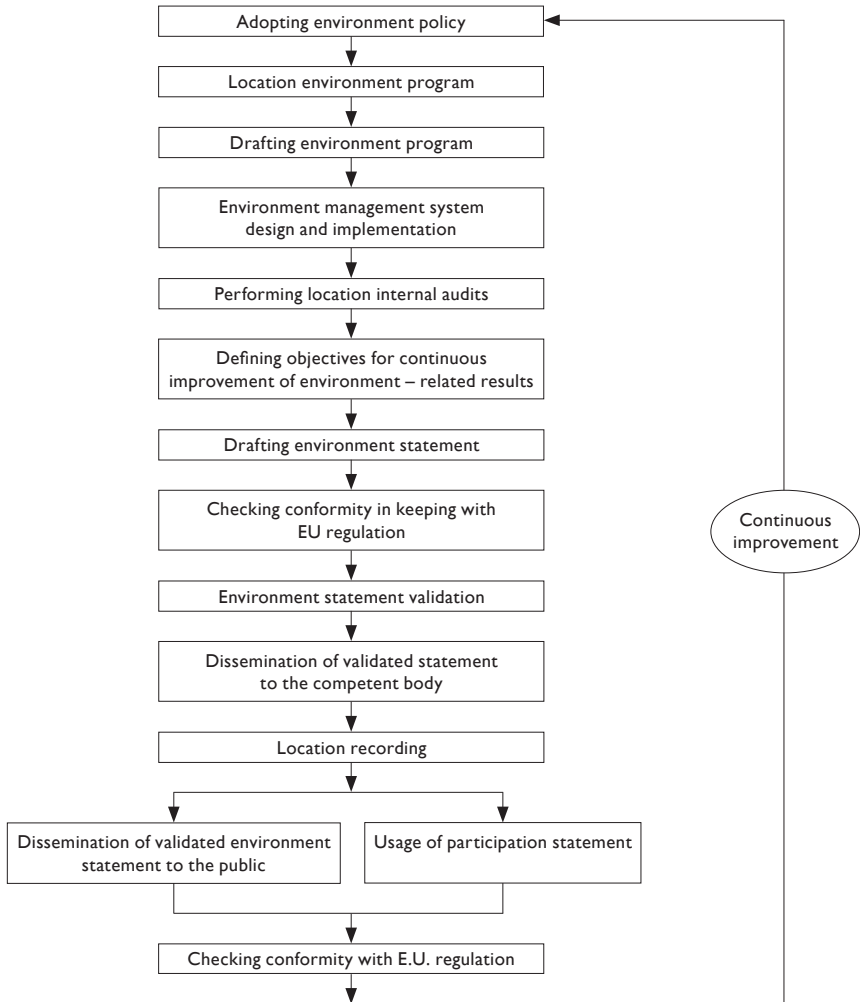


Fig. 3.28 The stages of applying the community system for audit and environmental management

- **Adopting an environment policy**, in keeping with the requests stated in the regulation, namely: defining the policy in writing, its connection with the environmen-

## Biography

**Professor Constantin Oprean**, Rector of the „Lucian Blaga” University of Sibiu, was born in Spring, Alba county, in 1948. He graduated from the Polytechnical University of Bucharest, Faculty of Machine Building Technology (1971), was awarded a Ph.D. in engineering (1985) and has been a doctoral advisor (since 1992). Professor Constantin Oprean has over 30 years of experience in higher education.

His academic tours abroad include USA, France, Great Britain, Italy, Germany, Sweden, Denmark, Belgium, Holland, Finland, Australia and Greece. He is specialized in the fields of: quality management, academic management, strategic management, occupational safety and health management, and technological transfer.

Professor Constantin Oprean has authored and co-authored over 35 books/manuals, 310 scientific lectures and papers, 26 patents and over 50 national and international scientific research grants.

He is also a member of numerous national and international professional organizations, member of the scientific committees of international reviews: „Global Journal of Engineering Education”, and „World Transactions on Engineering and Technology Education”, edited by UNESCO International Center for Engineering Education, member of the advisory boards of national reviews: „Management and Economic Engineering”, Cluj-Napoca, „Management and Marketing”, Bucharest.

He was also awarded the title of Doctor Honoris Causa of the University of Oradea (2005) and the Diploma and Gold Medal of the UNESCO International Center for Engineering Education, Melbourne, Australia. Professor Constantin Oprean is Knight of the Order of Merit for Education awarded by Romanian Presidency (2004).

**Professor Claudiu Vasile Kifor** was born on April 15, 1970 in Sibiu, Romania. He is married and is the father of one child. He graduated from the „Lucian Blaga” University of Sibiu, Faculty of Engineering (1994) and a year later he completed the postgraduate study program Technological Engineering and Machine Integrated Systems. In 2000 he defended his doctoral dissertation entitled Contributions to the implementation of quality systems in integrated manufacturing (CIM). Claudiu Vasile Kifor started his academic career in 1996 at the „Lucian Blaga” University of Sibiu where he is currently a professor and doctoral advisor in the field of Industrial Engineering. His main fields of competence include Quality Management and Engineering and Process Modelling and Management, and he has evinced a deep interest ever since he was an undergraduate and continued his specialization in these fields by his cooperation with industrial organizations in the context of national and international research projects.

Professor Claudiu Kifor has coordinated 7 research projects and is a member of other 15 research teams. He has authored 9 books, 65 scientific papers, 26 of which were published in Thomson Scientific (ISI) publications. He has participated in a number of international congresses as guest, keynote speaker, peer reviewer, member of the scientific committee, and has contributed to the organization of international scientific events.

For his scientific research results and contributions to engineering education, Professor Claudiu Kifor was awarded various distinctions, such as: The Silver Medal for the activity in the field of Engineering Education, conferred by the UNESCO International Center for Engineering Education, Melbourne, Australia; The Diploma of Merit for Scientific Research, awarded by the „Lucian Blaga” University of Sibiu; The British Council Award at the Youth Management Symposium, organized by the Management International Foundation.

Professor Claudiu Kifor has coordinated the department for scientific research of the „Lucian Blaga” University of Sibiu since 2004, and has functioned as scientific secretary of the Research Center in the field of Quality and the Balkan Center for Engineering Education (under the aegis of the UNESCO Center for Engineering Education).

