___

# AidISO – THE FIRST STEP FOR SMALL AND MEDIUM-SIZED COMPANIES IN BECOMING ISO 9001:2008 CERTIFIED

Emilia SIPOS*, Luiza BUZDUGAN#, Laura IVANCIU*
*Technical University of Cluj-Napoca, Romania*
*G. Baritiu Street, 0264401471, emilia.sipos@bel.utcluj.ro*
#*Universite Libre de Bruxelles, Belgium*
*Franklin Roosevelt Av.*

**Abstract:** **The standard has become the main tool for separating the product, the reference object of contracts and transactions, the scale of price formation, quality guarantee and product promotion. The theme of this paper is to develop a stand-alone application to assist small and medium-sized organizations in implementing ISO 9001:2008.**
**The software product can be used by companies from five activity fields and it provides time planning for the implementation process, completing the documents, continuous update of the implementation states, saving the changes and the possibility to choose among several Romanian ISO certification bodies.**

*Keywords: ISO, quality management, Matlab, software tool.*

## I. INTRODUCTION

A quality management system is a management technique used to communicate to employees what is required to produce the desired quality of products and services and to influence employee actions to complete tasks according to the quality specifications [1].

Quality, quality assurance and quality management are concepts that are emerging in an increasing extent as the central task for any enterprise that wants to exist on the globalized market, regardless of the product or service they offer, location or size.

Quality management system was developed in response to an increasingly global market and was unanimously accepted.

According to ISO Survey of Certifications 2013 [2], there were 1.129.446 organizations with a quality system certified by ISO 9001, at the end of 2013. This proves the great interest of both economical agents and also other institutions (hospitals, universities, schools, public administration offices, insurance companies, banks, etc.) on the implementation and certification of a quality system.

Various studies find benefits stronger among small and medium-sized companies [3], [4] and among those with a modest level of technological diversity [5].

Romania had 14345 certified organizations at the end of 2011, 18.014 in 2012, and 18.450 in 2013 [6], which shows an increasing interest in ISO 9001 certification.

In general, organizations choose to implement their quality management system with the help of consulting companies.

For most companies, this is the most viable solution to be adopted, taking into account the fact that there is a shortage of personnel with ISO 9000 knowledge or employees don't have enough time to study.

When the size of the company increases, increasingly more people are involved into the process of implementation of the quality management system, more training is needed, more forms have to be filled out and more data records have to be completed.

The aim of this paper is to develop a stand-alone application to assist small and medium-sized organizations in implementing quality management system.

Prior to the development of the application, it was necessary to create the specific documents required for each stage of the quality management system implementation, according to ISO 9001: 2008.

The paper is structured as follows: Section II presents the necessary steps and compares the available possibilities in implementing ISO 9001:2008; Section III describes the application; Section IV concludes the paper by summarizing the advantages of the application and outlines some future development directions.

## II. MOTIVATION

To implement the quality management system, an organization must complete the following general steps:

A. Establish the documented statements of a quality policy and quality objectives;

_____

B. Determination of processes, interactions between them and the responsibilities needed to meet the quality objectives;

C. Develop Quality Management System Documentation;

The documentation of the quality management system should include:

- A quality manual – States the scope of the quality management system, including exclusions and details of their justification; and describes the processes of the quality management system and their interaction. Generally gives an organization profile; presents the organizational relationships and responsibilities of persons whose work affects quality and outlines the main procedures. It may also describe organization's quality policy and quality objectives.

- Documented procedures, work instructions, control statements - documents that provide information on how to carry out activities and processes consistently;

- Guides, specifications;

- Records - documents that provide objective evidence of activities performed or results.

D. Personnel training;

Each member of the organization must be active in the implementation of ISO quality management system for its success.

E. Finding a certification body;

F. Set date for certification audit.

Compared to large organizations, small and medium-sized companies tend to have fewer layers of management, informal rules and procedures, a fluid culture, a simple planning and control system, modest human and financial resources, and a limited customer base. Some of the representative challenges of small and medium-sized companies may include a lack of financial and human resources, inadequate technical knowledge of quality management, a lack of knowledge of formalized systems, and a lack of experience in internal auditing [7].

Currently, the Romanian market exhibits a multitude of solutions for the implementation of a quality management system in an organization, such as: hiring a specialized team, acquiring practical guides, enrolling employees into an ISO course, software assisted implementation.

The software assisted implementation of a quality management system is supported by several software tools. For example, SmartDraw helps create business charts, such as: process diagrams, flow, cause-effect, PERT, GANTT diagrams, decision trees, etc. The system requirements for a proper functioning of SmartDraw are: operating system – at Windows 7/8, Vista®, XP®, 512MB RAM and 3GB free hard disk space [8].

Selecting the implementation method for the quality management system requires a considerable budget, which may be a drawback for some companies.

For example, a collection of software products designed to assist the companies in implementing ISO 9001:2008 is available in [9]. However, these resources are not free of charge, and the potential customers are required to pay a considerable amount, should they choose to use these products.

Table 3 compares the methods for implementing a quality management system, based on the company size, highlighting the efficient resources use (Financial, Time, Human)

*Table 3. Comparison between methods for implementing a quality management system*

| Characteristics / Methods | Company size | | | Efficiency | | |
|---|---|---|---|---|---|---|
| | Large | Med. | Small | Financial | Time | Human |
| Consultancy team | X | X | | | X | X |
| Practical guides | | | X | X | | |
| Software tools | X | X | X | | X | X |
| Trained employees | | X | X | | X | |

## III. AidISO DESCRIPTION

AidISO is an application that assists small or medium-sized companies throughout the implementation of the quality management system.

The application was designed for five different areas of activity: production, sales, IT, transport and construction. The application was developed using MATLAB GUI (Graphical User Interface) and then built as a stand-alone application. It consists of several chained graphical interfaces, each of them representing a particular step in the implementation of the quality management system.

Figure 1 shows the block diagram of the application, where *QMS* means Quality Management System. The following paragraphs describe each block.
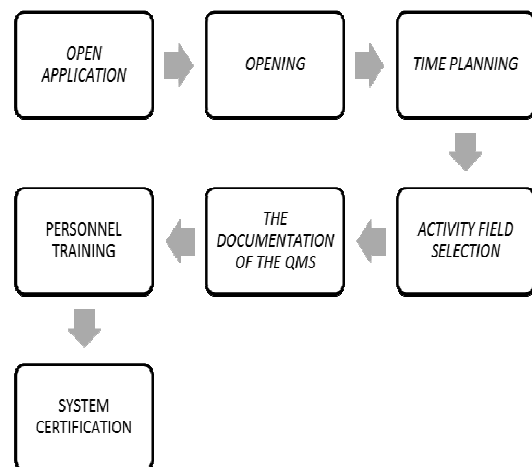


*Figure 1. The block diagram of the application*

_____

## OPEN APPLICATION

The OPEN APPLICATION block contains a graphical interface that allows the user to access the application. Navigating from one block to the following one is possible via the "NEXT" command, while going back to a previous step is possible through the "BACK" command.

## OPENING

This window displays the steps of the implementation. The user can independently access any step of the implementation, without needing to complete the previous ones first.



*Figure 2.OPENING window*

## TIME PLANNING

Here, the user will be provided with a time planning of the implementation process. With this plan the user will be able to get an idea of the time he will need to invest in the implementation of quality management system in the company.

Next, the user will receive a time planning for this process, a Gantt chart that he will be able to complete with the names of those responsible for each stage – Figure 3.

## ACTIVITY FIELD SELECTION

The ACTIVITY FIELD SELECTION window allows the user to select the company's activity field. The application includes five possible fields of activity types: production, sales, IT, transport, civil engineering – Figure 4.
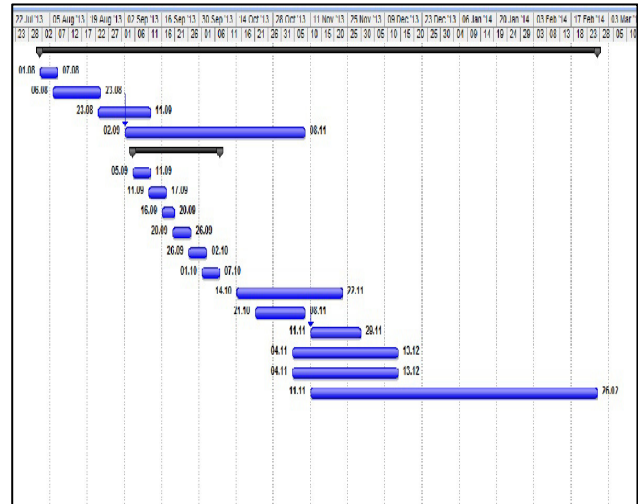


*Figure 3. TIME PLANNING window*

When an activity field is selected, the application will load the specific documents for the selected field. AidISO provides specific documents for each of the five available fields.



*Figure 4. ACTIVITY FIELD SELECTION window*

## THE DOCUMENTATION OF THE QUALITY MANAGEMENT SYSTEM

The quality system management documents, included in AidISO, are: quality policy, process map, documented procedures, quality manual.

In order to facilitate the users' access interaction with the documents of the quality system management, the application was designed to fulfill the following demands:
- user friendly interface;
- template versions for each document, for every activity field;
- ability to develop both simple and complex documents;
- step-by-step completion of documents.
- notification of the completion of documents.

When accessing each document, AidISO will open an MS Word/Power Point template, based on the company's activity field. Each document can be in one of three possible states: "Not initiated/In progress/Completed". Saving the latest updates in a document is possible, by using the "Save state" option – Figure 5.

_____



*Figure 5. Document states*

Next, the process map and the documented procedures' documents are detailed, due to the fact that they are the most complex documents.

Process map
A process map contains three types of processes: management, operational and supporting [10].

The template process map provided by AidISO is presented in Figure 6. The map is organized into four layers: management processes, operational (primary) processes, supporting and additional processes, using a different color for each layer.
The user can customize the process map, by removing/adding processes, based on size of the company and his specific needs.

Documented procedures
AidISO allows the completion of the eight compulsory procedures (System Procedures), according to ISO 9001:2008 (*Control of Documents, Control of Records, Internal Audit, Control of Nonconforming Product, Corrective Action, Preventive Action*) and also of additional procedures (Operational Procedures). AidISO contains specific operational procedures for each activity field, and the user can choose whether to implement them or not.

Some of the available operational procedures are: *Management analyses, Quality planning, Human resources management, Product development, Customer satisfaction monitoring*.

The OPERATIONAL PROCEDURES window contains the option "Standard operational procedures", which opens a Word document of a standard procedure; this document can be modified, so that the user can develop procedures that are not part of AidISO, but the user needs them.

After selecting the desired operational procedure, the states of the document will appear - "Not initiated/In progress/Completed" - Figure 7. The MS Word documents for every procedure can be saved by the user, in any location.
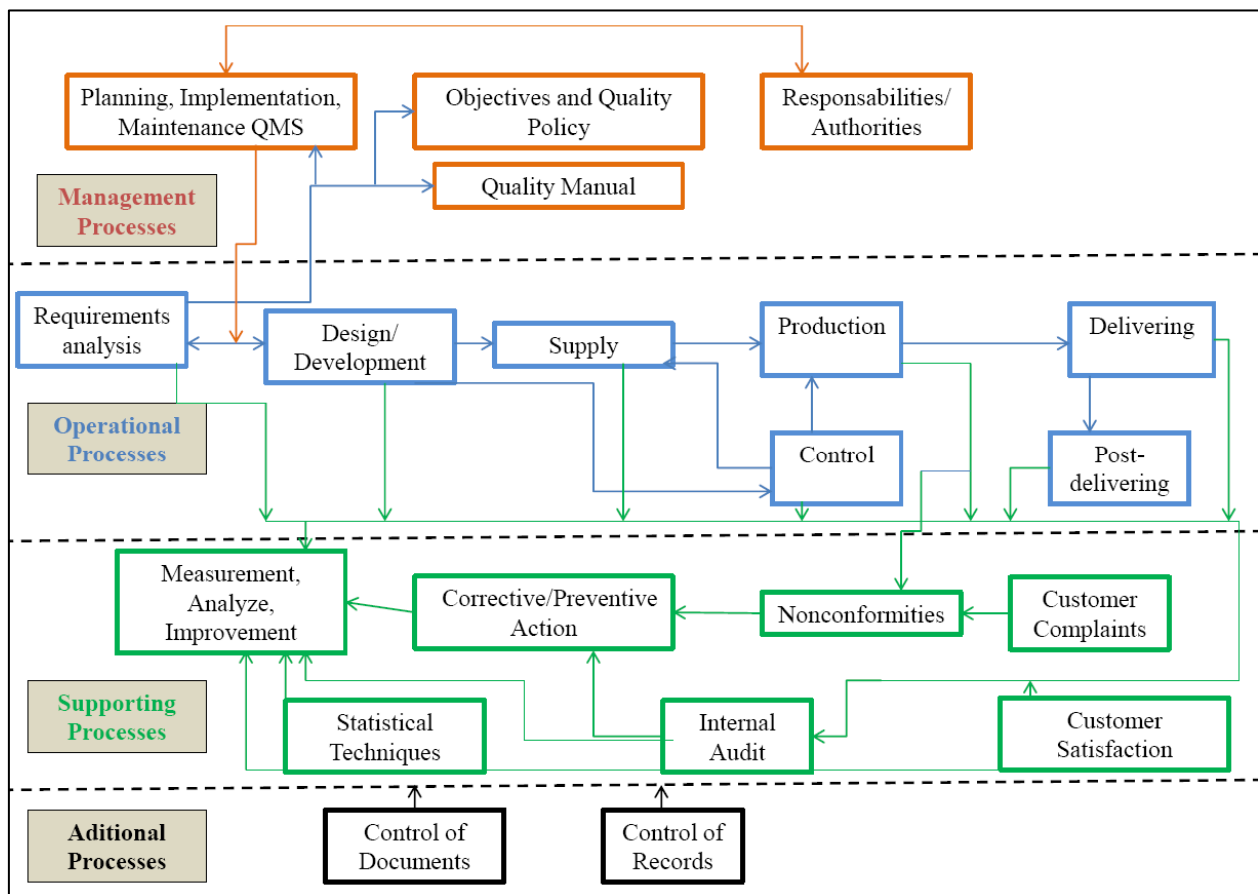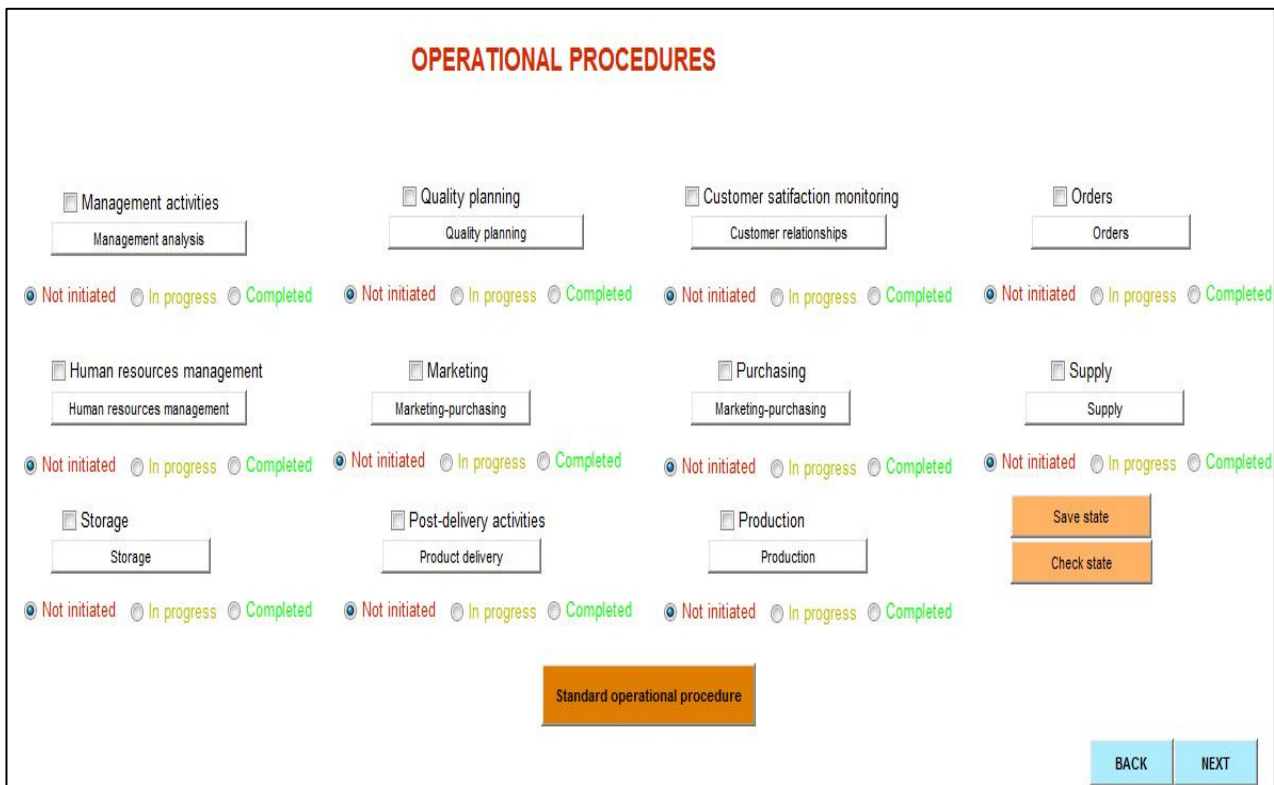


*Figure 6. Process map*

_____



*Figure 7. OPERATIONAL PROCEDURES window*

SYSTEM CERTIFICATION

Finding an ISO certification body is the next step in the implementation of the quality management system. This certification body will perform a certification audit.

AidISO provides web links for the main Romanian certification bodies - Figure 8. The user choses one, based on the company's style and budget.
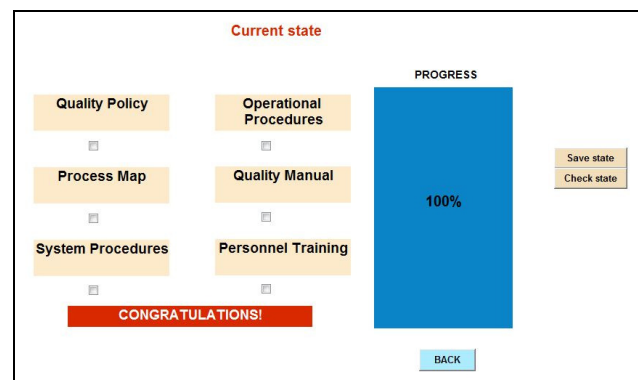


*Figure 8. Romanian certification bodies*

THE CURRENT STATE OF IMPLEMENTATION

The AidISO provides a progress monitoring windows where the user can visualize the ISO 9001:2008 implementation level. Based on the current states of all documents, a bar graph is filled, so that when all documents are completed, the bar is full. Additionally, AidISO will display a message, informing the user that the all document are ready for quality auditing - Figure 9.



*Figure 9. CURRENT STATE window*

**IV. CONCLUSIONS**

This paper describes the development and use of a stand-alone application, AidISO, designed to assist small and medium-sized organizations in implementing quality management system ISO 9001:2008.

The minimum requirements in order to use AidISO on a personal computer are: Windows operating system, Microsoft Office.

_____

This application consists of several linked windows, each one representing one step of the implementation of quality management system in a company.

AidISO is suitable for companies from five activity fields and provides time planning, template versions for each document, various operational procedures, step-by-step completion of documents. Thus, AidISO can be used for small and medium-sized companies and is efficient, with respect to financial, human and time resources.

The application can be expanded by adding modules for Gap Analysis, Improvement of quality management system and Audits.

## REFERENCES

[1] S. Stralser, *MBA In A Day: What You Would Learn At Top-Tier Business Schools*, John Wiley & Sons, 2012.
[2] The ISO website [Online]. Available: http://www.iso.org/iso/iso_survey_executive-summary.pdf?v2013 [Accessed: January 29th, 2015]
[3] D. S. Docking, R. J. Dowen, "Market interpretation of ISO 9000 registration", *Journal of Financial Research, vol.* 22(2), pp. 147-160, 1999.

[4] S. J. McGuire, D. M. Dilts, "The financial impact of standard stringency: An event study of successive generations of the ISO 9000 standard", *International Journal of Production Economics*, vol. 113, pp. 3-22, 2008.
[5] M. J. Benner, F. M. Veloso, "ISO 9000 practices and financial performance: A technology coherence perspective", *Journal of Operations Management,* vol. 26, pp. 611-629, 2008.
[6] ISO Romania section [Online]. Available: http://www.iso.org/iso/home/standards/certification/isosurvey.htm?certificate=IO9001&countrycode=RO#countrypick [Accessed: February 3th, 2015]
[7] A. Ghobadian, D. Gallear, "*TQM and organization size*", *International Journal of Operations and Production Management,* vol. 17(2), pp.121-163, 1997.
[8] SmartDraw software tool [Online]. Available: http://www.smartdraw.com/support/guidetosdforitprofessionals.pdf [Accessed: January 15th, 2015]
[9] The 9000 store [Online]. Available: http://the9000store.com/Step1-what-is-iso-9001.aspx [Accessed: February 5th, 2015]
[10] G. A. Rummler, A. P. Brache, *Improving Performance: How to manage the white space on the organizational chart*, Jossey-Bass, 1995.