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INTEGRATED MANAGEMENT SYSTEMS IMPROVEMENT FOR PRODUCTION ENTERPRISES SUSTAINABLE DEVELOPMENT AND ACHIEVING A SUSTAINABLE SUCCESS

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Abstract: *Situation analysis is made before the current study. Staging is described and target of the research problem is determined. Common structure and principles for designing and implementing integrated management systems (IMS) are given. Information base of integrated systems for sustainable development (SD) and environmental protection (EP) in manufacturing plants is briefly described. Two main groups of IMS elements are differentiated - basic and upgrading. Models of IMS are graphically represented. Modeling of production systems for achieving sustainable success (SS) by applying the principles of sustainable development (SD) is presented. Information flows for appro-placement and logistics processes are formed. Indexes and indicators for evaluation of activities for achieving sustainable success are defined. Scientific applied results are synthesized. Findings and conclusions are made.*

Keywords: *integrated management system (IMS), sustainable development (SD), environmental protection (EP), basic and upgrading elements, sustainable success (SS)*

1. Introduction

Integrated systems (IS) are an excellent management tool for any organization. Customer and assistants satisfaction increases with them as define clear organization objectives. This leads to increased opportunities for access to national and international markets. Therefore, they are widely disseminated. Perhaps this trend will continue and integrated management systems (IMS) will replace all single systems where is possible. [1, 2]

Establishment of an IMS from existing systems is more difficult than planning it from scratch. The general development rule is: as bigger organization is, the less organizational processes have to be included to reduce its complexity. It is important to integrate these processes which have the greatest strategic importance to the organization. In order to be effective an IMS should be carefully

planned and requires a lot of time and effort. Well planned IMS can increase efficiency and employee motivation. [1]

For the paper purposes industrial enterprises are considered as organizational systems which are capable of achieving sustainable success (SS) at the expense of satisfying the needs and expectations of all stakeholders by applying the sustainable development (SD) objectives and principles of long-term basis. Organizational systems - small, medium and large, production and non-production work in constantly changing conditions. This suggests continuous implementation of monitoring and analyzing the organizational environment to detect, assess and manage risk situations related with stakeholders and their needs and expectations. [3, 4]

The procedure for analyzing and assessing contain approaches and models, which are used in world analysis practice - self-assessment / evaluation - synthesis of improvements, basics of self-assessment organizing, tools that applying to the processing and analysis of self-assessment results and on the basis of them defining the need to plan and implement improvements to develop the organization management system.

2. Situation analysis before the current study

The following findings and conclusions can be made from the analysis of research on the problem:

1) Very small percentage of the surveyed enterprises (about 15-20%) has implemented integrated management systems for environmental quality under ISO 14000.

2) The predominant components of integrated systems for SD are to manage production and economic processes and activities (about 90%), next social problems (40%), and the environmental problems (20%).

3) A large proportion of production enterprises do not have, in general, component of environmental management (about 80%).

4) The degree of integration is low, because each component has its primary database. The greatest benefit of integration occurs, when different components use a single database and uniform indicators for components.

5) More complex and large manufacturing plants have structures built on 2, 3 and even 4 levels, located at different sites and areas, which (from the known cases) are not reported in the integration of components.

6) The influence of neighboring establishments in terms of industrial zones indicate very inaccurately or not recorded at all.

3. Staging and target-setting of research problem

Research problem, subject and object of study are formulated from preliminary studies on the issue as follows:

1) Object and subject of study: Study object is the integration and interaction between management bodies of SD of manufacturing enterprises in terms of

industrial zones and supervisory authorities for EP and working environment protection for achieving their SS. Study subject is condition improvement of the information base for sustainable growth and success of manufacturing enterprises through integrated management of environment and working environment.

2) Research problem: Methodology, which is good enough to optimize structure and management of integrated systems for EP and SD by modeling techniques and structural synthesis in terms of industrial enterprises and industrial zones absent in our famous theory and practice. Aims and targets of the study are defined as follows:

3) Aim: Informational, legal - economic and methodological basis for synthesis of structural schemes of integrated systems for EP and SD in terms of production enterprises be developed and experimented.

4) Targets: A literature review and analysis of the current situation at European, national and regional level to be made and problems and unfinished targets to be identify; A methodology for integrated systems modeling for SD and EP in production enterprises to be developed; A database and an algorithm and a program for synthesis of structural schemes of integrated systems for SD and EP to be developed; Experimental verification of the database and algorithm for synthesis of structural schemes.

5) The survey methodology is based on the use of methods for modeling complex systems, IMS models optimization by parametric and structural optimization, statistical methods of data processing and analysis, synthesis and optimal compromise solutions and others.

4. Common structure and principles for IMS designing and implementing

Common structure of MS: If an organization has certified Quality management system (QMS) and / or Environmental management system (EMS) and / or Occupational health and safety management system (OHSAS), it can be developed by adding necessary processes to meet the requirements of standards for EMS and / or QMS and / or OHSAS [1, 5, 6, 7, 8]. Which MS will be a leading (at the base of the IMS) depends on the activities of the company (organization), but the common structure will remain the same (Fig. № 1- schemes 1.2, 1.3, 2.1, 2.3, 3.1, 3.2). Those IMS are considered "double types classical schemes" for the purpose of this development.

All MS should cover the following processes to be integrated in a common system:

1) Development of documents and control;
2) Training employees;
3) Risk Assessment;
4) Internal audit of elements in the IMS,;
5) Management review of the entire IMS;

6) Corrective actions.

5. Information base of integrated systems for SD and EP in manufacturing plants

5.1. Basic elements: The most massive developed and deployed MS among IMS according to International standards are: (Fig. № 1 – basic elements):

- ISO 9001 – Quality management systems (QMS);
- 2 - ISO 14001 – Environmental management systems (EMS);
- 3 - BS OHSAS 18001 – Occupational health and safety management systems (OHSAS).

For the purpose of the development these systems will be called "basic elements" of IMS.

5.2. Upgrading elements: Other frequently developed and deployed MS with the basic elements are (Fig. № 1 – upgrading elements):

- 4 - ISO 45001 – Health and safety at work management systems [9];
- 5 - SA 8000 – Requirements for Corporate Social Responsibility [10];
- 6 - ISO 26000 – Guidance on Social Responsibility [11];
- 7 - ISO 31000 – Risk management systems [12];
- 8 - GMP – Good manufacturing practice [14];
- 9 - ISO 5001 – Energy management systems [13];
- 10 - ISO 22000 – Food safety management systems [14];
- 11 - HACCP – Hazard analysis and critical control points [14];
- 12 - IFS Food – Standard for auditing the quality and safety of food products [15];
- 13 – BRC - Standards for food safety, consumer goods, packaging and materials for packaging, storage and distribution [16];
- 14 - GLOBALG.A.P – GLOBAL Good Agricultural Practices [14];
- 15 - PASS 220 - Food safety. Prerequisite programmes on food safety for food manufacturing [14];
- 16 - ISO 27001 – Information security management systems [17];
- 17 - ISO 28000 – Supply chain security management systems [18];
- 18 - ISO 20000-1 – Services management systems [2];
- 19 - ISO 9004 – Managing for the sustained success of an organization – A quality management approach [4].

6. Methodology for modeling of integrated systems for SD and EP in industrial enterprises

6.1.Modeling methodology

Modeling methodology represents a comprehensive and systematic analysis and synthesis of activities and processes in the production system in accordance with predefined objectives and indicators. The modeling and resulting model

should give a general presentation on the effectiveness of production system and the level of sustainable success (SS) achievement as a result of management processes. Production system should use modeling as opportunities for improvement, establish priorities and develop action plans to reach a SS by the principles of SD and innovative approach. SS models contain valuable information for analysis and synthesis of management decisions. Moreover SS model can become a tool for training and proper presentation of the production system and stimulate interest and motivation of all stakeholders. [19, 20]

6.2.General rules for successful functioning of production systems

Successful production system assumes the following:

- Understanding and satisfying the needs and expectations of stakeholders;
- Conducting monitoring of the production environment;
- Detection of possible areas / processes, which require improvement and innovation;
- Defined and deployed the strategy and the policy;

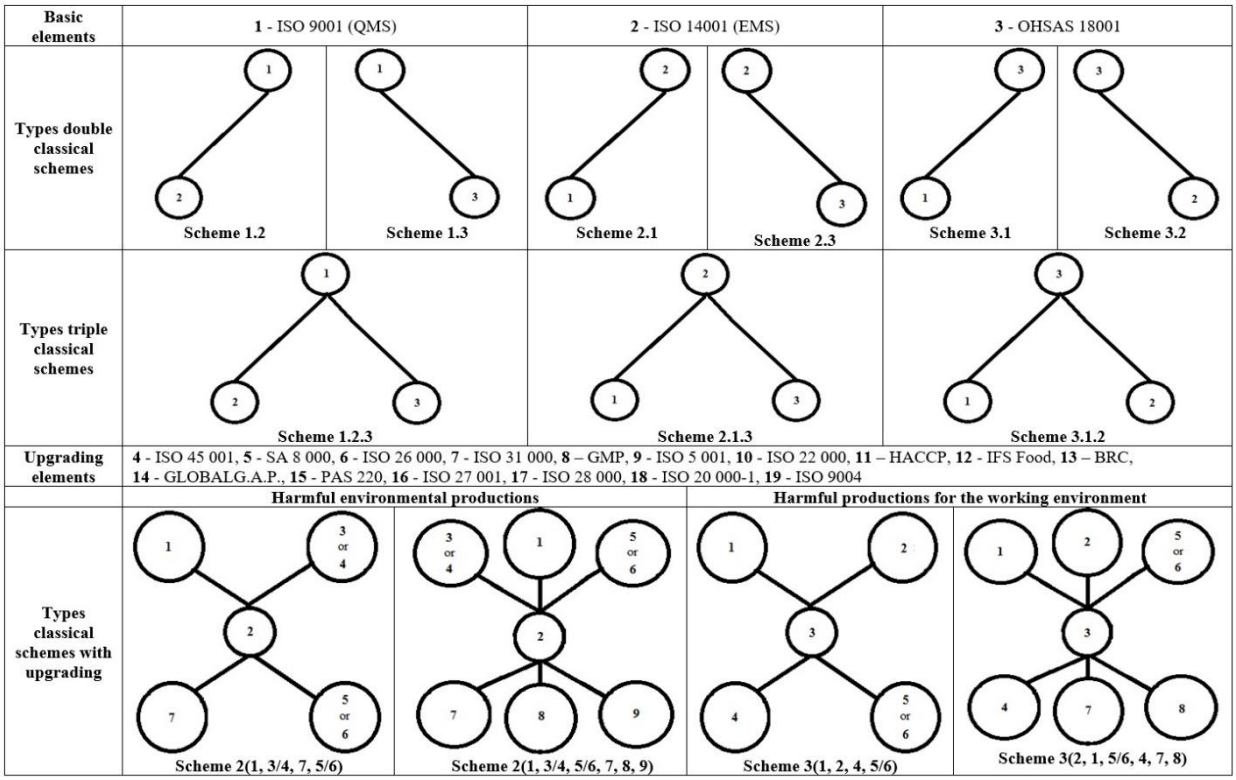

Fig. № 1: Basic elements and types structural schemes of IMS for SD and environmental protection

- Defined and structured the objectives;
- Implemented process and resources management;
- Ensured trust and mutually beneficial relationships with stakeholders.

Figure 2 shows an exemplary production system model to achieve SS and essential information flows to setting targets and processes and resources management. [4, 20, 21, 22, 23]

7. Scientific-applied results

1) A database and legal - economic framework for the optimal functioning of integrated systems for SD and EP in production enterprises are created;

2) A methodology for modeling of integrated systems for SD and EP in industrial enterprises is developed;

3) An algorithm and a program for synthesis and optimization of structural schemes of integrated systems for SD and environmental quality management are developed in terms of industrial enterprises;

4) Types structural schemes of two or more levels of integrated systems for environmental quality management and SD are developed;

5) A SWOT analysis of the types structural schemes of integrated systems for environmental quality management and SD is prepared.

6) This paper builds upon IMS models of manufacturing plants with the application possibilities of ISO 9004:2009 in their management for achieving SS by applying SD principles;

7) The modeling methodology can evolve and adapt to the characteristics and strategies for development, for all industry sectors and sub of modern industrial production. The model of Fig. № 2 can be specified for each production company / organization for the purpose of managing its SS by SD principles.

8. Users of results

- Production enterprises (small, medium and large) in drafting their strategies and action plans on EP, protection of work environment and sustainable economic development and competitiveness;
- Small, medium and large municipalities and mayoralties with industrial areas in drafting their strategies and action plans for sustainable regional development and EP;
- Different social communities and NGOs with activity subject similar to the studied problems;
- In all educational forms of employees of production enterprises, civil society, NGOs, municipalities, middle and high schools and universities.

9. Findings and conclusions

1) A variety of international standards for MS is created. They aim continuous improvement. By them can be achieved certification;
2) The standards have a similar pattern of performance and they can be integrated into a common management system;
3) The integration of MS is a very good mechanism to prevent adverse effects on all aspects of SD;
4) The implementation of IMS, instead of two or three or more separate systems running on same model and with largely overlapping input is much more cost-effective for any organization;

6) In terms of SD and environmental protection most effectively is not just the introduction of IMS in an enterprise, but its coordinated management between any one entity and its environment, in which there may be another organization, again having an impact and accordingly implemented IMS for SD and environmental protection;
7) Created database base and legal framework are harmonized with Bulgarian and international law in building IMS of production plants;
8) They are suitable for setting up a computer managing system for SD and environmental protection in terms of manufacturing enterprises IMS;
9) International standards groups, which are used, cover all components of SD of production systems and environmental protection and working environment protection and provide a good prerequisite for synthesis of appropriate IMS structural schemes.

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