

Life Cycle Assessment Supporting Processes Innovation

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Abstract:

The role and significance of environmental management, as a part of management and processes innovation, becoming ever more important in the competitive market. The increasingly limited environment resources demand managers of organisational systems to perform alternative measures in managing organisational systems. One of the techniques being developed for this purpose is Life Cycle Assessment (LCA). The article focuses on LCA as a tool for environment protection and processes innovation.

Key words: business , innovation, life cycle assessment, environment, management, production processes,

1 Introduction

Innovation is of vital importance not only for those who want to increase or sustain economic growth in a given area (region, state and the like) but also for those who benefit(in)directly. According to this, producing as much as possible is no more a central issue that should affect or change the economic course of development or improve quality of life [10].

The role and significance of environmental management, as a part of management and processes innovation, becoming ever more important in the competitive market. The activities are orientated to the whole proceeding. In a world where markets, products, technologies, competitors, regulations and even societies change rapidly, continuous innovation and have become important sources of sustainable competitive advantage [4]. It is about a new approach in managing the organisation and environment resource planning in society.

Integrated production processes innovation model which promotes production processes innovation was derived from the model of managing company policy following the interest theory and business excellence. It was conceived in the frame and interdependence of both objective and subjective starting points of initial change agents as well as from process knowledge of process managers. The successful development and implementation of processes innovation in an organizational system can produce a significant saving in the amount of business and environment resources and therefore a smaller environmental impact. The heightened awareness of the importance of environmental protection, and the possible impacts associated with products manufactured and consumed, has increased the interest in the development of methods to better comprehend and reduce these impacts. One of the techniques being developed for this purpose is Life Cycle Assessment (LCA) [11].

2 Environmental performance evaluation

Everybody speaks of technological development only, although it is causing increasing unemployment around the world and other problems such as motivation and environmental degradation, including a dangerous climate change. There is also an unchallenged supposition that in transitional economies owners and managers are equally fond of continuous innovation as are the ones in the most advanced corporations of the world [3]. In efforts for the improvement of position on the purchaser's market the companies must also consider accordance of operation with valid environment protected prescriptions in field of process consumer. The inclusion of enterprises in the international market, the care for reputation, that the enterprise profit with the environment protection and permanent development, places the politics of environment protection to the base of the professional politics [7]. The environment protection and permanent development is so a basic component of the basic politics. Many organizations have undertaken environmental "reviews" or "audits" to assess their environmental performance [9]. Figure 1 presents interrelationship of an organization's management and operations with the condition of the environment.

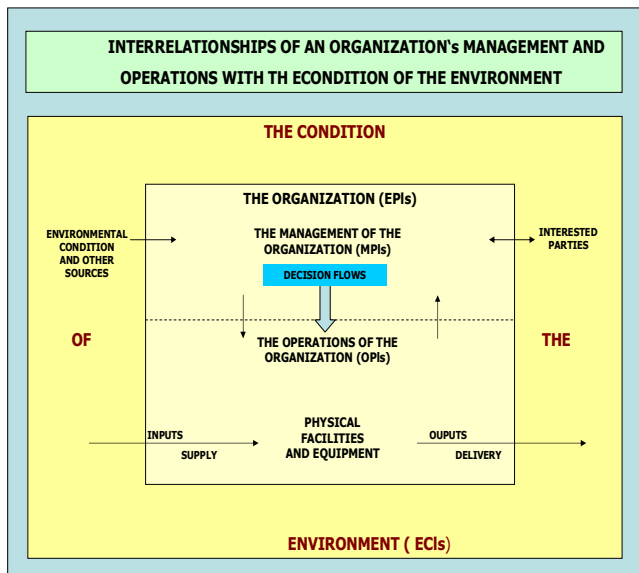


Figure 1: Interrelationships of an organization's management and operations with the condition of the environment [12].

It is about the important decisions about the basic goals of operating and development. It is about the acceptance of basic principles values and rules. The current position of an organization with regard to the environment can be established by means of an initial processes, environmental performance evaluation and innovative operations. Environmental performance evaluation (EPE) is an internal management process that uses indicators to provide information comparing an organization's past and present environmental performance with its environmental performance criteria. EPE, as detailed in ISO 14031:1999(E)-Environmental management – Environmental performance evaluation – Guidelines,, follows a “Plan-Do- Check-Act” management model. The steps of this ongoing process are following:

a) Plan

- 1) planning EPE;
- 2) selecting indicators for EPE (the process of selecting indicators may include both choosing from existing indicators and developing new indicators).

b) Do

Using data and information which includes:

- 1) collecting data relevant to the selected indicators;
- 2) analysing and converting data into information describing the organization's environmental performance;
- 3) assessing information describing the organization's environmental performance in comparison with the organization's environmental performance criteria;
- 4) reporting and communicating information describing the organization's environmental performance.

c) Check and Act

Reviewing and improving EPE [12].

The renovation of production processes results from lean organization, which is based on up-to-date technological and organizational starting points. Market need new consumers. Consumers need new products and services. Only innovative lean flexible organization could be the answer. Lean organization is market-driven; a buyer's market and innovation society prevail and acts as change generators in a company or other organization [10]. Figure 2 presents environmental performance evaluation.

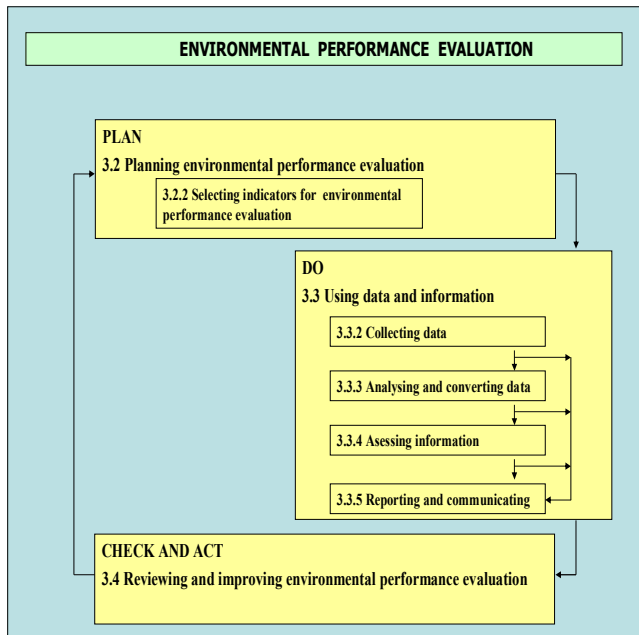


Figure 2: Environmental performance evaluation [12].

3 Life cycle assessment - the stimulation of innovation of processes

LCA is a technique for assessing the environmental aspects and potential impacts associated with product, by

- compiling an inventory of relevant inputs and outputs of a product system;
- evaluating the potential environmental impacts associated with those inputs and outputs;
- interpreting the results of the inventory analysis and impact assessment phases in relation to the objectives of the study [12].

From this point of view LCA has an important and significance role. This is why the integration of LCA, environmental goals into the management system is so vital. In theory, we can distinguish the ones, which pertain to the inflow (rational use of raw materials, materials, energy, etc.), and those, that relate to the outflow (absolute limitation of waste and emissions), with the simultaneous maximisation of waste re-use [8]. LCA studies the environmental aspects and potential impacts throughout a product's life from raw material acquisition through production, use and disposal. The general categories of environmental

impacts needing consideration include resource use, human health, and ecological consequences. LCA can assist in:

- identifying opportunities to improve the environmental aspects of products at various points in their life cycle;
- decision-making in industry, governmental or non-governmental organizations (e.g. strategic planning, priority setting, product or process design or redesign);
- selection of relevant indicators of environmental performance, including measurement techniques;
- marketing (e.g. an environmental claim, ecolabelling scheme or environmental product declaration)[12].

The continual adaptation for enforcement of competitive ability of professional system dictates the stimulation of creativeness, intensity and novelty [6]. Innovative society tries today to achieve purposely also with measurements for "the society of perfect quality" [1]. Figure 3 presents phases of an LCA.

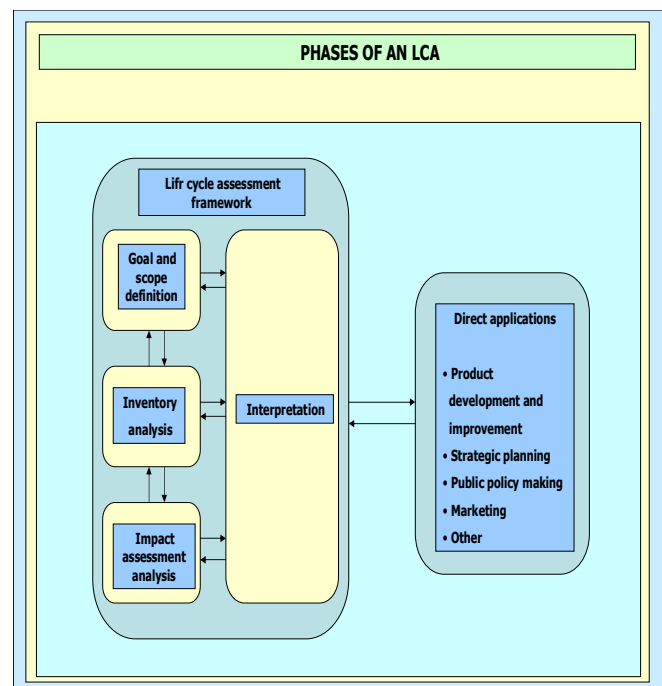


Figure 3: Phases of an LCA [14]

4 Environmental management need LCA in integrated production processes innovation model

New economic issues dictate the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor and not, as had previously been considered, only the supplier of raw materials [6]. These have previously been free goods without an assigned market value, while the environment has been an agent for the neutralisation of wastes and emissions of production and consumption [2]. Life cycle assessment and permanent development with processes innovation is a complex process, where the earlier events have more influence than the later one. From here it originates the sense of activity planning of these, who administrate, who define the aims, who organize and so on. Experience show that the environment protection and permanent development as a part of entrepreneur's philosophy is not carried into effect enough. The systemic reflex ion with the administration is necessary [1]. Figure 4 presents LCA as a part of environmental management – waste management.

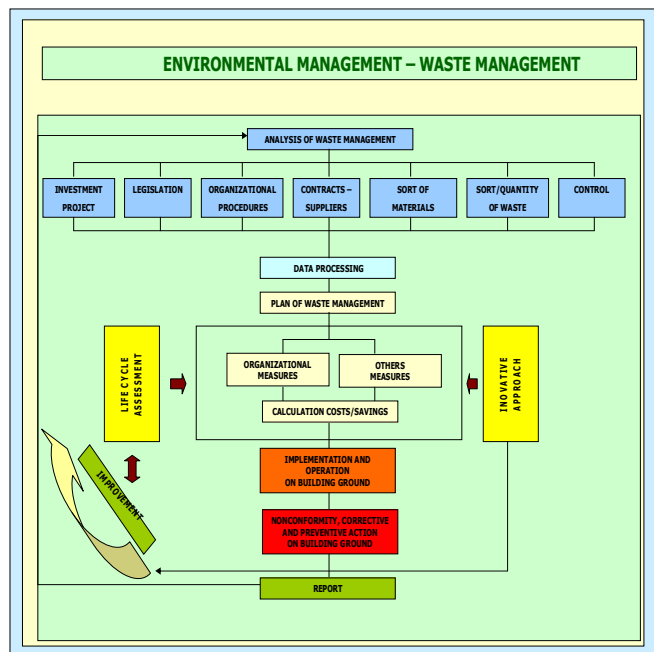


Figure 4: LCA in Waste management

Innovation is necessary on all domains and everybody is included in innovation. The role of management is shown in creativeness for the support of collaborators' creativeness. The processes innovation is so a segment

in the innovative business system. In the example of environment protection it is necessary that we are as much collaborative, creative and target directed as possible [5]. To the purpose of environment preserving development, the aims of environment protection are also:

- Changes in production and samples of use, that contribute to the minimisation of natural sources use and creativeness of waste,
- Development and use of such technologies, that decrease and suppress environment charges,
- Use of harmless and decomposed chemicals and substances that have not been accumulated in alive organisms [1].

The dynamic creativeness of administration is important with the realization:

- Dynamic creativity management has its field of application as an approach for handling complex problems, i.e. as a supporting tool in the process of attain sustainability.
- The whole process of creative problem solving - logical-analytical procedures based on convergent thinking as well as creative intuitive procedures based on divergent thinking.
- The whole process of creative problem solving is a complex system in itself, dynamically changing over time, with permanently interacting system elements, it requires a systems thinking perspective in order to be understood and applied [1].

LCA can help all the these activities as tool to improve Innovation management system.

5 Conclusion

New economic issues dictate the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor. We need innovation, because without innovation, there is no future. Also without environment protection. LCA is one of the techniques, which supporting processes innovation. The whole treat of environment in the administration and leading of professional processes is inevitable condition for the preservation of natural balance in the environment.

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