

SUSTAINABLE PRINCIPLES APPLIED TO NOISE CONTROL MANAGEMENT: A METHODOLOGICAL APPROACH

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ABSTRACT

This work has its focus on a methodological approach for noise control management. Among the strategies of preventing future noise impacts, one important investigation is the user-producer relation. Innovation must be connected to communities needs as well as user-values priorities, commitment with lower impact technologies may only be possible with an extra support from local governments in order to improve local ecological culture. We have correlated noise control with the sustainable performance principles in a management checklist in order to improve compatible technological options. Concepts will be discussed by highlighting the possibilities of managing noise impacts with a pro-active attitude.

1. HISTORICAL AND CONCEPTUAL CONSIDERATIONS

Technological innovation is related either to a process, product or to a new management approach. How can innovations contribute to noise control policies? Along the last decades, technologies have improved information requirements for inputs and outputs of environmental impacts, that includes noise, since is considered as waste in the production chain. From the nineties on, globalization brought the word integration into systems. Today, the question of how conjectures will survive concomitant attending environmental laws is a subject of speculation. On the past years of ISO 14.000, according to Kinlaw [1], there was an upgrade from total quality management to total environmental quality management with Certifications and Eco-labels.

2. FROM THE NINETIES ON: SUSTAINABILITY AND CHARACTERISTICS RELATED TO THEM.

The concept of sustainable performance [SP] has originated from a work in cooperation with the Management Institute for Environment and Business MEB, Washington, it was developed within a purpose: attending the need of remodeling companies based on the premises which are listed below.



Figure 1: Premises of the concept of sustainable performance.

In 1997, there were identified two kinds of postures towards environmental causes: the reactive and proactive ones. The level of environmental seriousness is defined by those concepts. Activities such as planning, managing and innovating started to be evaluated within its impact on the long run. The reactive posture has a limited short-run approach with short-planning actions, it avoids the implementation of environmental legal demands. Some of those strategies are in the area of public relations, trying to keep for media the image of green marketing although its production and operational matrix becomes untouchable. The highlights towards pro-active organizations, however, have a successful response in achieving not only what has been demanded by law but also by creating a new environmental culture, persistent research on processes with an increased SP. When directed to noise impacts, such groups would be searching key-elements capable of reducing noise levels emitted from the sources, process change or some mechanical characteristics that can alter the noise sources characteristics. The environmental consciousness over the noise impacts, however, remains less evident in terms of audits, that makes it somewhat harder to monitor.

3. TECHNOLOGICAL INNOVATION, CHANGE OF PARADIGM AND SUSTAINABILITY IN NOISE ENVIRONMENTAL IMPACTS.

Technological innovations play the role as legitimating political responses of groups. Rudelius [2] have studied the process of innovation as one resulted from economic development and technological change. Hagedoorn and Lundval [3] have understood the same concept related to the interactive aspects. He has focused that the starting point of innovation is related to industrial economy's occasion: the vertical development of one enterprise and labor division. The aspects of innovative process can be studied in different levels of aggregation, such as in microeconomics, the other in terms of a national system. Lundval's focuses was based on the capability of one economy to produce and spread values and uses with new characteristics, successful innovations should be based on the knowledge of what are the potential user needs, such understanding is as relevant as the new technical opportunities, once one innovation is introduced, it will only be spread if the information about use and value are transmitted to potential users.

When looking at noise impacts, Lundval's approach has a precious highlight: the aspects of innovation demands related to group values and governmental support. In Brazil's scenario, for instance, the relation user-producer in terms of noise impacts on environment, is still worthless in terms of audits as well as to find enough support from agencies and green marketing. In most of the cases, the user-producer relation in terms of noise emissions is precarious, within a lack of technical information, and no Eco-labeling in equipment. Noise labels have started recently, limited to a modality of products because of bottlenecks found in calibration, certification laboratories enough in numbers, and also due to reactive behavior from some industries.

Such situation would need local intensification of an environmental culture creating an identity of user needs through educational campaigns related to noise. Other important feature of noise

control is the mandatory aspect in conjectures where user-need and culture are not of an environmental conscious nature, the contribution to noise reduction will still remain to be provided by a national or local subsidized laws. The link between innovation and sustainability will only be established within a corresponding use and value culture.

An R&D (Research and Development) program for a decreased noise impact could be exemplified [4] in the acoustic area by producing noise maps emitted by equipment, industrial machines and process. Such approach is a quite effective one in order to discover the sound energy propagation: decompose it into small parts, looking at it as a structure of noise propagation and irradiation in order to act locally, separately in each part. In this nature of investigation there are some benefits, non rarely the method is followed by an increase on the environmental performance for future generations of the product, process or system, which starts to operate in a different technological basis originated by those small but significant changes on focused component parts.

When technology changes fast and radically, a change of paradigm is characterized. The concept of technological trajectories offers strong prescriptions about the technical directions needed in order to attend the market demanded specifications or the ones originated by scientific policies. The research areas are displaced in order to serve either market or R&D oriented demands. In this process, whenever changes occur that aggregates with increased effectiveness, turning the old ones obsolete, it is typified as a change of paradigm, whenever there is no reason – including cost-benefit one - to continue with current techniques, instead, the new ones represent the best form of practice. The scope of all these scientific discoveries, evolutionary of technological [5] implementations and innovations can be called technological trajectory.

4. TECHNOLOGICAL TRAJECTORIES ORIENTED FOR SUSTAINABILITY.

In the nineties, there was a significant pressure for process, product and services to be compatible with the principles of sustainability. Late development countries remained with some difficulties of economical nature to become compatible with those principles. What would be the principles of sustainability? According to Kinlaw [1], the ones that summarizes values of technological trajectories regulated by proactive actions. In the late 1999, the International Standards Organizations, ISO, adopted the topic “EcoDesign/DFE” (DFE- Design for Environment), as a standardization task, and its work on this commenced in 2000. Various companies, however, have deliberately developed their own standards independently of International Standards Associations. Siemens has, for example, developed a standard (SN 36350-1), with the title “Guidelines for Product Design and Development, Principles and overview”. The next figure shows what are the ecodesign purposes [6].



Figure 2: Ecodesign purposes edited by Siemens Standard (SN 36350-1)

In recent years, national environmental policies have increasingly focused on subjects related to product design and its ecological properties. Environmental culture has oriented innovations. A recent publication in the Harvard Business, showed the current transformations on industries strategies related to “customers as innovators: a way to create values” [7]. In the course of their study of innovation they have found companies adopting a completely new counterintuitive

approach to produce R&D: observing how customers-users have created new values, what are them and, finally, redefine tendencies in a straightforward process. In noise impact the possibility of control happens with environmentally conscious customers. That behavior of focusing on products within an increased SP will provide companies a new task: create and capture new environmental-friendly tendencies. When customers preferences do not share the values of SP, extra effort is demanded, such as mandatory, compulsory actions. In German, they have developed the potential of interventions by instruments and corresponding participation, as shown in next figure.

CATEGORY	EXPLANATION
Specific consumer related tools	1 The instruments included here encompass the work of consumer advisory centers, consumer sanctions, education, competence building and representation.
Voluntary information instruments	2 They encompass a environment-related product information underlying certain rules and standards criteria. Their application is of a voluntary nature.
Voluntary agreements	3 They are established between different interest groups, usually the government, trade and /or industry. They aim at the accomplishment of certain environmental standards.
Compulsory information instruments	4 They oblige the producer to inform the consumer about certain environmental characteristics of the product.
Economic instruments	5 They intervene in the market by setting (financial) incentives to encourage environmentally friend products and services as well as to discourage environmentally problematic products and services
Direct regulatory instruments	6 They intervene in the market by, for example, prescribing the material composition of product or prohibiting the use of certain products.

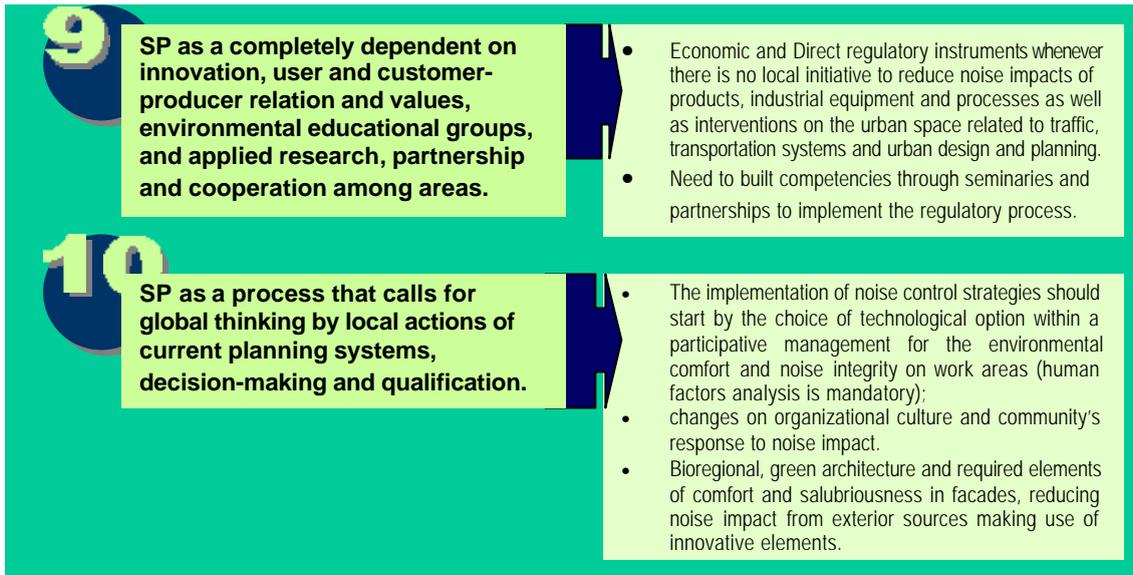
Figure 3: Overview for categories for integrated product policy.(Data collected from German Fed. Environ. Ministry [6]).

5. THE SUSTAINABLE PERFORMANCE (SP) GUIDANCE TO MONITOR NOISE IMPACTS.

To open up possibilities for interesting solutions besides enhancing motivation of those involved with noise impacts, the process of Sustainable Performance (SP) gradually introduced as pilot project and complete revision of attitudes will provide and increase the chances of a relevant ecodesign in terms of noise impact. The SP supports environment as well as the production upholds the enterprises. As business move in such direction, they become progressively involved with new technologies such as *DFE- Design for Environment and CLP- closed loop-processing*. In architecture, those new concepts are known as *"Green Architecture"*, which has in the last decades, spreaded a new project philosophy method joining the *Environmental Design or Ecodesign* area.

In the area of noise control, plenty of solutions ought to be worked on and implemented such as facades elements for tropical areas like the city of Rio. One of the most frequent bottlenecks related to traffic noise in Rio de Janeiro's central area, for instance, is the degraded indoor environment from main streets. One improvised, individual strategy is the act of closing windows and introducing artificial ventilation, that is an example of reactive posture. The systematically act of masking noise with those attitudes have a direct impact on the energy costs, exemplifying a short-term reactive proposal. A pro-active behavior would direct efforts to introduce transportation solutions, reduction of noise emitted by the traffic and its moving sources, besides natural ventilation proposal to concomitantly work with decreased energy costs within an innovative technology in terms of noise reduction, already available in specific kind of windows (product design strategy for sustainability in urban areas).





6. FINAL COMMENTS

The proposed noise impact management model based on the SP principles suggests a significant level of information in order to succeed, among them, the response level of community according to law observance, motivational reasons as well as building competencies to validate noise control policies and strategies formed by individual attitudes, corporations and political guidelines to local interventions. An environmental restoration of quietness in city, and its extension to work areas with decreased noise impacts, should get started by changing old cultural patterns and its established settlements, by the replacement of reactive postures from enterprises to a pro-active one. A new paradigm in the area of noise control will make all stages of production as environmentally benign as possible besides upgrading technologies and product improvements.

7. REFERENCES

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