Sustainable Innovation Management

Voyage from Eco-Balances to Innovation Coaching

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In the late 80s we started corporate projects compiling eco-balances (mass and energy balances, input output balances). These projects resulted in a higher company-wide awareness of environmental matters and impacts. Environmental programs and first external reports were published, at that time attracting international attention by the media. After many years of corporate environmental management development projects and a voyage through all kinds of environmental management systems, experimenting with environmental indicators, environmental controlling procedures, guidelines, internal and external reporting systems etc., and heading for a meanwhile enlarged vision of sustainability, we came up with two conclusions.

All the endeavors of environmental management so far, and probably not only ours, showed two main deficits:

- Firstly, Environmental Management Systems (EMS's) concentrated on the organization of processes and responsibilities. We did very well in the organization of an EMS, but not very well in the reduction of environmental destruction. EMS's had difficulties getting down to the core of environmental problems, the material flow. We realized that companies had only fragmentary information on the material flow throughout the corporation, its physical quantities and monetary values, ending in the product or in unwished emissions.
- Secondly, we realized that environmental management systems, including indicators and reports, objectives and programs etc., produced many good ideas, but not many results. The Environmental Managers were busy, but the rest of the company was not much involved. Environmental affairs were considered side line business, nice to have, not core business.

In the late 90s a new generation of research and development projects, in the company as well as at the university, therefore concentrated on a higher transparency of material flow throughout the company. We wanted to know exactly what kind of material, in what quantities and what monetary values entered the company, where did it go, where was it stored, transformed, transported and where and how did it leave the company. We were not content with environmental spot information on concentrations in effluents, on end of pipe fees for waste or tons of recycled paper. We were not content with partial information on some stocks, some material movements, some material losses. We wanted to get the whole picture of material movements and stocks at every spot throughout the company. We wanted to know exactly where in the company toxic or other waste was generated, in quantities and values, what cost center or product was responsible for its generation, what were the purchasing costs of the materials involved, the handling costs of materials, including processes of cleaning, transportation, separation, storage, disposing etc.

And we found that people in charge of cost centers had detailed information on personal costs in their area of responsibility, but only fragmentary information on material costs, material stocks, movements etc. This world-wide phenomenon leads world wide to an inclination of managers when - regularly - being asked to reduce costs they struggle to reduce those costs they have information on, personnel costs. It also resulted in a lack of material efficiency, as there was no reliable information on material efficiency of a certain process, a certain facility or warehouse. Line managers were not much interested in environmental information and cost information on material flows was not available.

The projects showed that most of the information needed was somewhere included in the companies Enterprise Resource Planning (ERP) System, like SAP, but the information was not accessible, not compiled properly, and of poor quality.

These astonishing results led to projects under headings like Material Flow Cost Accounting or Material Flow Management. The projects resulted in higher material efficiency, meaning fewer resources, fewer emissions. The projects shifted from obnoxious side line and add-on efforts, involving the environmental officer and some idealistic environmentalists, to projects including the head of production, controllers, IT-managers and: top management.

The material efficiency project process in a rough outline:

1.) Drawing material flow charts
2.) Drawing information flow charts
3.) Harmonizing information flows and material flows, improving ERP-information
(Information from the ERP-System quite often does not correspond with the actual material flow or shows poor quality in plausibility checks)

4.) Generating specific material reports according to specific management needs along the flow of material throughout the company
5.) Deriving quick win and long term improvement programs for material efficiency
6.) Implementing improvement programs

Besides the tight focus on organization and documentation, the first generation of environmental projects already showed another serious deficit. The Environmental Management Systems produced Environmental Guidelines, Objectives and Programs. But the company-wide implementation of these lagged far behind. The Environmental Officers and their supporting working groups struggled and the rest of the company had "to do business". Also, in the second set phase of development, through Material Flow Management, the projects produced even more interesting results, reports, indicators, short and long term programs for measures, promising not only environmental improvements, but also economic gains. But again - and surprisingly- even measures leading obviously to economic cost reduction were not consequently pursued. People were so busy accomplishing their day-to-day tasks, handling personal conflicts with colleagues, troubleshooting in urgent assignments, that they had no energy or willingness for innovative improvements, no openness to deal with operational sequences differently than before. They saw their immediate work environment and handled their proper task properly, - without hardly any company-wide perspective, not even across departmental boarders.

According to these experiences, the new phase of in-company projects followed a new set of questions: What kept corporate people from implementing innovative measures? Where did the blockades come from? How were these to be overcome? How could differing perceptions of a company's reality, of material and information flows, be matched, considering not only a particularistic point of view, but in view of the entire whole, the whole process from the beginning to the end of pipe? How could individualistic perspectives, from an engineer's, an environmental, a monetary point of view, be merged into a holistic, integrated, sustainability-oriented perspective and a resulting common and synergetic action?

This new phase of company projects focused now on the following procedures:

1.) Joint elaboration of company wide Material and Information Flow Charts
2.) Improving material reports out of the existing ERP-System according to specific needs (e.g. of the managers in charge of Production, of a specific facility's operation, of Quality, Environment, R&D, for calculation purposes)
3.) Joint development of continuous improvement programs
4.) Explicit planning of development and implementation programs
5.) Implementation, auditing and reporting

New in this project generation was the explicit planning of the implementation and innovation phase, as well as the implementation itself and its evaluation. The former concepts assumed somehow that good ideas and programs would be implemented automatically. But this (phase 6 in the first project phase above) actually did not happen. The new explicit implementation planning made use of new concepts of innovation and change management, following some basic rules:

- People have different perceptions of "reality". For joint action these differences have to be detected and harmonized (a constructivist approach).
- People tend to perceive their immediate work environment. For joint action the whole (e.g. material flow, information flow) has to be visualized, perceived jointly. Interdependencies in the systems network, consequences of changes at one end leading to changes at the system's other ends have to be made aware, requesting communication between people from one end with those at the other, between top and bottom in both directions (a "systemic" approach).
- People do not only react to objective targets, to facts and figures. They are social subjects. They construct meaning through experience and learning. They react to (conscious or unconscious) fears, perceptions, prejudices, beliefs, emotions, vanities etc. Change and innovation processes are social processes, not only engineering or managerial business administration processes. They have to be dealt with as social processes, dealing consciously and constructively with fears, differing perceptions, prejudices, emotions etc.
- Peoples' actions are not only determined by social phenomena, but also by company structures restricting innovative flexibility, e.g. technological facilities, IT realities, architectural structures, encrusted procedures. For innovation processes the interaction between social phenomena and structural aspects has to be considered. The vicious circle is that changes in structures take place only through changes in attitudes and behaviors, changes in attitudes and behaviors only happen through changes of structures.
- Successful innovation processes not only require the individual capability of innovative action. The company as a whole needs to develop an organizational competence for innovation as part of its corporate culture. Innovation is not just a creative R&D result. It is a long term comprehensive process of taking innovative

ideas from its source of origin through all parts of the company to an economically, socially and environmentally sound market solution, to the customer.

- The company wide organizational climate and culture for innovation can be developed through internal or external coaching processes concentrating on the efficiency of material and information flows and their sustainability.

Summing up: Sustainable innovation management follows a long term perspective including economically, socially and environmentally sound procedures to ensure the company's long term existence. This might conflict with a short term ROI perspective. The core of sustainable management is the company's material flow and its efficiency in terms of material consumption, of time and costs. ERP-Systems have to generate robust and comprehensive information on all material flows, all in- and outputs. Innovation management has to consider that innovation processes are determined by social as well as by structural realities. They require social changes (of attitudes and behaviors) as well as structural changes. People construct their own realities. For joint action differing perceptions have to be harmonized. Small changes at one end of a system might have considerable consequences at other ends. Communication between these ends and along the flows of material and information has to be made possible. Innovation Management has to install an Innovation Management System, from Company Guidelines to Innovation Controlling. But first of all it inspires the Organizational Development of organizational (not only individualistic) innovation competencies, of an innovative corporate culture. Innovation Coaching takes over the responsibility to develop such a culture.

This voyage took us from the first compilations of Eco-Balances to the installation of Environmental Management Systems over the development of (Environmental or) Material Cost Accounting approaches to the redesign of ERP-Systems. We moved through the grinding implementation of innovation processes to a systemic approach of innovation coaching in order to develop a corporate innovation culture under the auspices of sustainability. This voyage is endless, sustainability a rough road mark.