A Management Information System (MIS) for 'Sustainability Networks'

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Environmental management is no longer a minor, voluntary matter in industry but is rather becoming a critical executive function. Many organizations have already implemented an environmental management system (EMS) to comply with international standards such as ISO 14000 and EMAS regulations. In addition to these intraorganizational activities the concept of 'industrial symbiosis', defined as a "collective approach to competitive advantage involving physical exchange of materials, energy, water and/or by-products" (Chertow, 2000) has emerged. The best documented example here is Kalundborg in Denmark, but the industrial recycling network in Styria, Austria has also become a very famous case in the field of industrial symbiosis.

The aim of this contribution is to show how these interorganizational recycling activities between various industries can be used as starting point for 'sustainability networks'. These are defined as a 'system of voluntary but organized cooperation between different interest groups with the common target of sustainable development of society within a certain region'. As a consequence, in sustainability networks all relevant stakeholders need to be involved, whether they are private persons or groups, companies or even public or governmental organizations. Although, in practice, the exchange of by-products for recycling purposes may still count as the most important activity within these sustainability networks, the field of potential cooperation is in fact much larger. For example, common R&D-activities leading to environmentally oriented innovation, continuous improvement, and common knowledge management could be established. Moreover, infrastructure might be shared, such as in the case of common sewage plants or car-sharing-activities.

For sustainability networks to emerge at all they need to be organized to some minimum extent. This is necessary to initiate cooperation between stakeholders and to promote cooperative activity over time. Hence, an appropriate management information system has to be developed that simultaneously considers the specific objectives of the individual stakeholders involved, as well as the overall vision of the network. While correspondence between individual and network objectives is essential, it merely provides a basic prerequisite for cooperation. In addition, sustainable development also requires a balance between economic, environmental and social (cultural) objectives (triple bottom line). After this complex system of objectives is generated, it has to be transformed into a comprehensive set of performance measures that provides the framework for continual environmental evaluation of the activities within the network. The choice of indicators for the environmental performance evaluation strongly depends on the nature and scale of

the sustainability network and the stakeholders involved. Nevertheless, it is crucial that the set of indicators is not a mere collection of piecemeal measures but should rather be a linked series of critical indicators that are internally consistent and related to the overall vision of sustainable development. In terms of the management approach of Kaplan/Norton, this could be seen as a form of 'Sustainability Balanced Scorecard'. Benchmarking can also help to incorporate existing best practice and to verify that the proposed targets do indeed assess network sustainability.

The model of sustainability networks described here derives from two empirical studies, both of which were carried out at the Institute for Innovation and Environmental Management at the University of Graz. The first was based on the industrial recycling network in Styria. As mentioned above, this is a well known case of successful industrial symbiosis. The second empirical study was based on the smaller region of Eisenerz, an abandoned iron ore mining area, which presently finds itself in a phase of fundamental re-orientation owing to chronic economic crisis. For this region, a comprehensive system of objectives was defined in an inter- and trans-disciplinary project. Moreover, in cooperation with the University for Applied Sciences Technikum Joanneum in Kapfenberg a web based information tool was developed, that enables organizations and networks to achieve a holistic knowledge-based environmental management approach. When completed, the sustainability network in Eisenerz with its management information system is likely to be exemplary, and to provide a model of best practice not only for Austria, but also for its neighbours.

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