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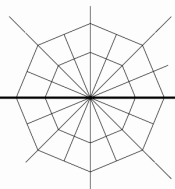
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**Organisational learning and
environmental communication
- the momentum of environmental
management**

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Technology, Environment and Society

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Abstract

Environmental management is a social and distributed process, where environmental communication is “the glue” that keeps the process together. However, environmental communication in and between companies is seldom addressed systematically in coherence with a policy, strategy and action plan for environmental communication activity. The philosophy of environmental management, and the so-called Deming Cycle: Plan, Do, Check, Act, is to provide a systematic approach for continuous improvements. In this paper, the Deming cycle is complemented by an organisational learning cycle of four related phases: Generate, Integrate, Interpret and Act to emphasise environmental communication activities, which serve to anchor, develop and diffuse environmental practises within the organisation and within the product chain as well. A case study at the Danish company Grundfos A/S serves to illustrate the impact of environmental communication activities related to the different phases of an organisational learning process. As result, the organisational learning cycle is concretised to the field of environmental communication and an overall model presents one way of addressing environmental communication in a systematic way.

Keywords: Organisational learning, environmental communication, employee participation.

Organisational learning and environmental communication—the momentum of environmental management

Jette Egelund Holgaard, Arne Remmen & Tine Herreborg Jørgensen

Introduction

As pollution prevention in companies has changed from a rather narrow and technical focus on optimisation of existing production processes to a more organisational focus on environmental management, the importance of considering communication and learning processes within the company has increased. Communication can be considered as the “glue” that hold together the various EMS elements and it is therefore crucial to give a significant amount of attention to ensure the success of the entire EMS [1].

For integrated management systems (IMS) and Life Cycle Management (LCM), the organisational learning processes and inter-organisational relations become even more profound. In IMS the system is more complex, combining quality, environment, health and safety as well as social aspects. This creates new challenges to e.g. management commitment, employee motivation and participation, and to change routines and traditions in order to have IMS institutionalized throughout the organisation and within stakeholder relations. Besides, preconditions for IMS is an extensive, internal communication in order to coordinate and facilitate the initiatives of different departments and to secure considerations of all relevant aspects of quality, environment and H&S in decisions [4]. In an LCM perspective, globalization of product chains and the focus on environmental impacts from products are increasing the need for environmental communication inside and especially between companies.

In 2006, the increased focus on environmental communication was underlined by the international standard ISO 14063: Environmental management – environmental communication – Guidelines and examples. In this standard, environmental communication is defined as the process of sharing information to build trust, credibility and partnership, to raise awareness and to use in decision making [2:v]. Furthermore, environmental communication is one of the crucial issues to be dealt with by any organization, with or without an environmental management system in place [2:vii].

ISO 14063 illustrates the complexity of environmental communication and the need for a comprehensive effort, including an environmental communication policy and strategy as a framework for

environmental communication activities [2]. Thereby, ISO 14063 provides an overall framework together with guidelines and examples. This is an important contribution, as companies' efforts to facilitate and carry out environmental communication in and between companies are seldom a systematic activity, although environmental communication in most cases is an integrated part of environmental policies [3].

In this paper, a systematic approach to environmental communication is specified further, taking our point of departure in the philosophy of the Deming Cycle: Plan, Do, Check, Act [4]. The PDCA-cycle includes a continuous process of policy-making, planning implementation, checking and acting in order to secure improvements of the environmental performance of the company [5]. The idea unfolded in this paper is to make a comparable framework, which emphasises how the company can manage and develop their environmental communication in a similar process and systematic way.

For that purpose, the organisational learning cycle developed by Nancy Dixon can serve as a suitable point of departure. As the Deming cycle, the organisational learning cycle emphasise continuous improvements by letting the experiences gained in one phase form the basic conditions for the next phase. However, where the Deming cycle is focused on stepwise and continuous identification and solution of problems, the Dixon cycle is concerned with the generation, integration and collective interpretation of knowledge within an organisational context.

To illustrate how different environmental management practises relate to different phases in the organisational learning cycle, we draw on a case study at Grundfos A/S. Qualitative interviews have been made with environmental managers [6-8], the head of the communication division [9], the environment coordinator at the electronic production unit [10], purchase to the electronic unit [11] and product development [12]. Furthermore, follow-up information has been provided by telephone or mail during the period.

Briefly introduced, the Grundfos Group is a producer of electro-mechanic pumps. In 2006, the turnover was 15,376 DKK million, annually they produce more than 10 million pumps and employ more than 14,000 people [13]. Grundfos has a quality certification, ISO 9001:2000, environmental certifications, ISO 14001 and EMAS (Environmental Management and Audit Scheme) and they are certified according to OHSAS 18001 for occupational health and safety. In 2006 they introduced their first sustainability report. Grundfos has a long tradition for environmental improvements with high ambitions, and the EMAS-registration implies a special attention to environmental communication.

To sum up, the purpose is to develop a framework for addressing environmental communication in a systematic way which is in alignment with the PDCA philosophy. To address this aim, this paper will provide:

- A short introduction to the organisational learning cycle presented by Dixon [14], which, supplemented by the theory of communities of practice presented by Wenger [15], creates a framework for organisational as well as inter-organisational communication and learning.

- A clarification of which concrete environmental management activities can be related to the different phases in the organisational learning cycle, drawing on a case-study at Grundfos A/S.
- A synthesis of how the organisational learning cycle can systemise a range of different communication activities in order to keep up the momentum of environmental management.

Finally, the concluding remarks will serve as a reflection on the challenges embedded within the organisational learning perspective on environmental management presented in this paper.

The organisational learning cycle

According to Dixon [6] organisation learning can be defined by the intentional use of learning processes at the individual, group and system level continuously to transform the organisation in a direction that is increasingly satisfying for its stakeholders. The organisational learning process is described by the following four steps [6], see figure 1:

1. **Generate:** Widespread generation of information, which encompasses both the collection of external data and the internal development of new ideas.
2. **Integrate:** Integration of new/local information into the organisational context. The key processes are diffusion of information and the questioning of established collective meaning structures.
3. **Interpret:** Collective interpretation of information, whereas new collective meaning structures are created by a collective participation and negotiation, but not necessarily consensus.
4. **Act:** Having authority and the necessary information to take responsible action based on the interpreted meaning.

The experiences from the actions taken by the organisational members will be compared to information from the outside and the process of organisational learning begins all over again.

Dixon [6] stresses that the steps of generating, integrating, interpreting and acting on information is not new to organisations, but often different parts of the organisation conduct each step. Ideally, each member of the organisation must engage in all steps of the organisational learning cycle.

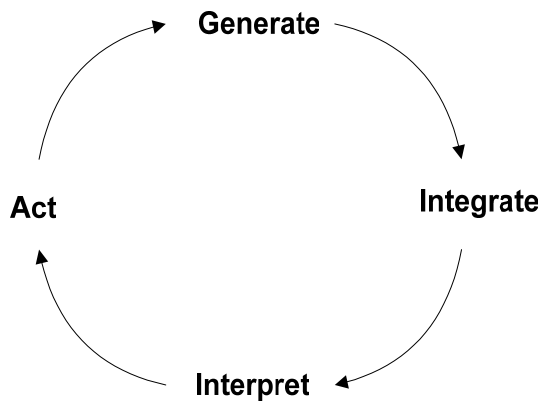


Figure 1: The organisational learning cycle [14]

By introducing the concept of communities of practice, communication and collaboration become a matter of both intra- and inter-organisational relations, and external partners might be players in all the phases of the organisational learning process. Furthermore, Wenger's theory of communities of practice underline the need for and complexity of the collective interpretation of information, as different meaning structures are embedded in different communities of practices within the organisation.

In the following, the different phases in the organisational learning cycle will be discussed and the implication of each phase in an environmental management perspective will be outlined.

Generate

Generation of environmental information includes participation in knowledge networks or cross organisational projects, collaboration with actors from the product chain and the authorities, and literature studies or interviews, seminars, conferences or workshops. Widespread generation of environmental information encompasses both the collection of external data and the internal development of new ideas.

The external sources of environmental information are many. Søndergaard et al [16] presents the key sources categorised within three different network relations: the knowledge, business and regulatory network, see figure 2.

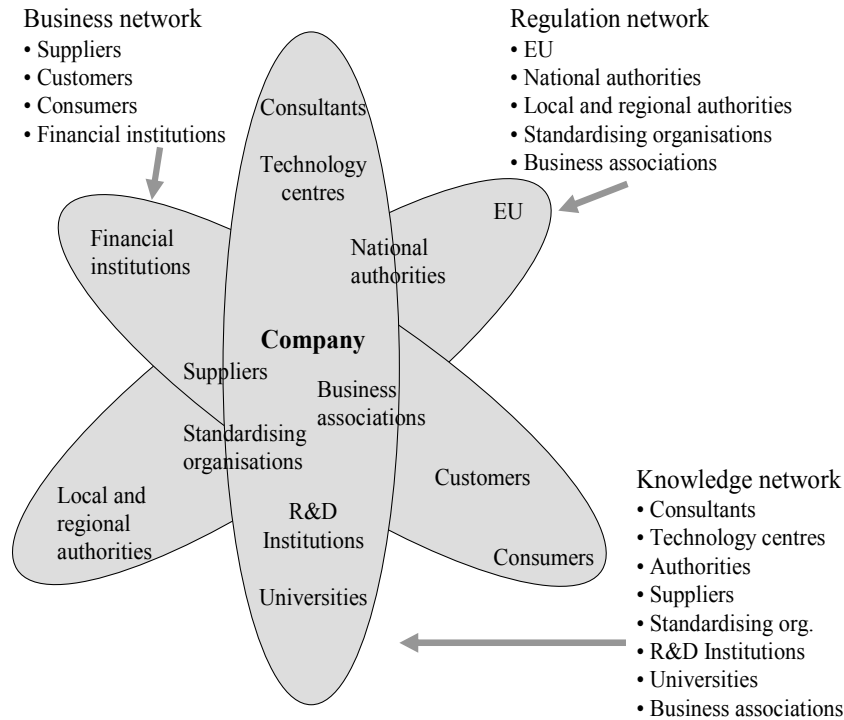


Figure 2: Different networks related to environmental management [16]

In the case of Product-Oriented Environmental Management Systems (POEMS), generation of environmental information in the business network becomes even more important. EMS is closely related to the environmental and/or the production department, while the aim of POEMS is to embrace a wide number of activities, involving several departments such as product development, purchasing and marketing to promote the development of cleaner products [17, 18]. With POEMS, the responsibility towards the environment is now reaching far outside the company fence. POEMS call for a certain degree of supply chain management, i.e. a network, where organisations mutually and co-operatively work together to control, manage and improve the flow of materials and information [19]. In this phase of the organisational learning cycle, where the scope is to generate information, this might involve data collection for lifecycle assessment and/or eco-design of products as well as the establishment of systems to evaluate the environmental performance of suppliers or gather experiences with best available technologies.

The internal sources to generate environmental information are the employees and central issues are their awareness of and interest in environmental impacts and improvements and their possibilities to express or develop their opinions and ideas. A risk in traditional EMS is to focus so much on ideas from production, that other sources within the company might be neglected. In POEMS, the environmental management system reaches much further with involvement of other departments such as R&D, sales, purchase and logistics.

Grundfos has a long tradition for environmental communication within the company and with external stakeholders as well, as they interact with several inter-organisational knowledge networks to exchange experience and collaborate in the product chain to reduce the environmental impacts from their products. This includes attending courses, seminars and conferences occasionally and on a more regular basis participating in cross-organisational knowledge networks to exchange experiences with environmental management practises, e.g. within the framework of the trade union ITEK [8]. Furthermore, environmental issues are integrated in the supplier evaluation scheme and information on the environmental performance of the suppliers is gathered through self assessment systems, relevant written information and audits [11].

Additionally, a lot of work has been invested in providing easy access to feedback from employees through information technology. A database with the employees' ideas of environmental improvements has been established, and as a consequence, the motivation for contributing to pollution prevention activities has increased considerably [6]. The number of suggestions for environmental and health and safety improvements at Grundfos A/S was 2,606 in 2001 and 12,236 in 2006 [20].

Integrate

After gathering information in the previous phase, this local information has to be integrated into the organisational context or, with reference to Wenger [15], cross-organisational communities of practices. The key process is diffusion of information e.g. by using the intranet, preparing information material, arranging meetings, making experiments, educating people and securing an ongoing informal dialogue. Integration also means that the participants go into dialogue in order to question the established collective meaning structures.

Without having personally and collectively integrated the related values, norms and understandings of a desired behaviour, there is a risk that environmental considerations will not be manifested within the company culture [21] – and then the momentum of environmental management will likely fade. Culture is seen as an enabler for performance improvements, although culture and learning is a blind spot for ISO standards. Therefore, the challenge for organisations is to embed the different responsibilities as an organisational culture [22].

In order to create a culture that supports continuous improvements, the environmental awareness among all employees is crucial, and the improvements must be deeply rooted in everyday practices. In POEMS, the coordination of the environmental effort becomes even more distributed, and this raises considerable challenges to diffuse environmental information throughout the company, and as several communities of practices come into play, the brokers are of highly importance. If a company is moving towards IMS trying to integrate for example ISO 9000, ISO 14001 and OHSAS 18001, potential benefits are related to internal coordination [21], e.g. by optimising the already established lines of communication to serve multiple purposes.

At Grundfos, they distinguish between the different purposes of environmental information, e.g. to promote sales by branding and marketing, to attract and maintain competent employees by internal information or to inform the public at large through stakeholder information [9]. A broad variation of media is used, e.g. leaflets, internet, newsletters, environmental reports, eco-labels, meetings, lectures and company visits. Furthermore, Grundfos has experimented with providing environment information to educate suppliers. For instance, environmental coordinators at Grundfos have served as consultants in order to implement environmental management in supplier companies in Estonia [10].

Written information only plays a minor role to create an environmental management culture within the company. Instead, the attitude of the environmental coordinators is emphasised as essential for integrating environment information and pollution prevention in daily practices. The employees are not only suggesting possibilities for change, they are also questioning the daily routines [10]. The environmental managing unit at Grundfos stressed that environmental coordinators' ability to create a good atmosphere and exude openness towards the employees was reflected in the high environmental activity of the production units [6, 10].

Grundfos has experienced other challenges such as adjustment of the communication system to integrate product oriented environmental information, as well as the need for information exchange among employees. Whereas environmental management of production is coordinated through a formalized internal network of representatives from the different production units, the coordination of the product oriented environmental management is more ad hoc. Recently, Grundfos has made some adjustments to meet this challenge, for example one environmental specialist is seated partly in the environmental department (Central services) and partly in the product development department. In this way, environmental information can be integrated within the daily product developing practices, and at the same time the link to the environmental department is maintained.

Interpret

The gathering and diffusion of environmental information serve as a platform for a collective interpretation of information. This includes translating and discussing information and experiences in relation to the company context, and getting values about the issues out in the open. Thereby new collective meaning structures are created through participation and negotiation.

In an intra-organisational setting the challenge is to create an environmental identity. An important tool to help facilitate the social construction of such an identity is environmental teams. Research by Lorentzen & Remmen [23] has pointed out that setting-up environmental teams is a way to increase employee participation. First of all, it is possible to involve the most environmentally conscious and motivated employees in environmental activities. Secondly, employees from all relevant departments can be involved in the environmental team, for instance employees with specific knowledge useful for the tasks of the team. From the research, based on five case companies, it was stressed that the environmental teams have secured that knowledge and experience of the

employees, as well as consultation and negotiations, have been the pivotal point of the environmental effort. Participation had given the employees a relatively high degree of influence on the activities, as there has been a forum to discuss the potentials and problems that arose during the process.

In inter-organisational partnerships, the interpretation process involves the interplay of different organisational settings and a need for intercultural communication. The interpretation seeks to reach a level, where the partners have a collective understanding of the differences in the contextual conditions and reflect on how these differences influence their shared engagement. Mutual commitment and equal participation can be seen as a driver for maintaining inter-organisational collaborations [24].

At Grundfos, several environmental teams are formed in order to facilitate exchange of ideas related to specific issues, e.g. noise, working environment and hazardous substances [6]. These groups motivate new environmental initiatives and give a new angle on the existing environmental practice. However, to some degree the teams seem to be constructed with a specific focus, e.g. on noise, but this approach does not necessarily secure a broad representation of employees, and interactions between employees and management. In this way, there is a risk of creating a situation, which fosters corroboration instead of negotiation.

Some production units at Grundfos have established local environmental teams, which collectively take responsibility for the environmental activities at the specific unit. The environmental coordinators at Central services do not make any requirements to how the production units organise their environmental work. However, the overall impression is that the environmental initiatives work better, when there is a collective responsibility and systematic meetings among the employees [6].

The case study at Grundfos also showed how clashes between different communities of practice can occur and can be handled through dialogue in order to create a collective interpretation and understand the potential needs for trade-offs. That is, a material might increase the durability of a product considerably, but on the other hand it might have a considerable impact on the working environment. At Grundfos A/S, there is close collaboration between environmental managers and the communication division in preparing environmental reports. Whereas the environmental managers emphasise the content of the reports, the division of communication emphasises the form and distribution of the publication - and sometimes this may lead to a trade-off, established through dialogue.

Grundfos has also experienced the challenge of inter-cultural communication. For example, when the environmental coordinator from the electronic production site served as a consultant in order to help suppliers from Estonia implement environmental management, he found that it was hard to adjust the principles from Grundfos to companies with different resources, incentives and working climate. At some companies, employee participation was a major challenge, as the employees were not used to that kind of involvement [10].

Act

Dixon defines action as having authority and the necessary information to take responsible action based on the interpreted meaning. In an environmental management perspective the actions to be taken could include environmental protection activities, but also new strategies or policies, trying out new systems, methods and techniques, document experience or assessing the potential for improvements.

Lorentzen and Remmen [23] include different types of activities and levels of influence: information, collecting knowledge and experience, consultation, negotiation and co-determination. By assigning employees' authority to take action, the level of co-determination is reached, and in this way the employees gain ownership of the environmental management activities. Employees will not change their environmental practices if they do not have a saying in the planning, implementation and evaluation for change [25]. Furthermore, when entering an inter-organisational collaboration, it is crucial that the representatives have the authority to take action on behalf of the company [3]. In order to take responsible action, based on the interpreted meaning, it is important that the actions taken are in alignment with the stakeholders' expectations from the integration and interpretation of information. The keywords are ownership, management commitment and credibility.

It is stressed that the ongoing and visible commitment from top-management striving to make Grundfos a frontrunner within environmental management has motivated the employees to continuous environmental improvements [7-12]. One indicator is that among 44 questions in an opinion poll among employees at Grundfos, the statement with the highest rating was "I appreciate that Grundfos contributes to a better environment" [26].

The organisational culture at Grundfos is characterised by a high degree of decentralisation of the decisive power. As an example, the different production units have a considerable freedom in deciding how to organise their environmental management and which environmental goals they want to pursue [6]. Furthermore, attention is given to give feedback and recognition to employees, who provide an interesting idea to the database [8]. The environmental coordinator at the electronic production site explains this decentralised culture in the following way [10]:

"I think Grundfos has organised the work in a great way with production teams and so on, and the principle that those who work with the things on a daily basis are also involved when more exiting things happen and get the opportunity to feel your own influence. This also means that the mill is running by it self – because you get the chance to do what you are dying to do."

The project in Estonia was educating suppliers within the field of environmental management, and the support from employees in those occasions is stressed as a considerable strength. However, there is a risk that this organisational culture will slow down the decision making within inter-organisational relations, as the representatives continuously have to go back and secure backing from within their organisation.

At Grundfos, the alignment of information and practice is underlined in their company values addressing open and credible conducts [27]:

"We must have an active information policy and systematically tell the relevant interest groups what we do, and what we are thinking of doing - and why".

This statement stresses the importance of strong relations between information, dialogue and practice to create the trust, on which the community is built. This is especially important in cross-organisational relations, where an environmental statement without a subsequent action can be damaging for the company image – and, in the case of Grundfos, strictly against company values. On the other hand, if there is a statement and an action, but no dialogue in between, there is a risk of making environmental improvements at one phase in the product chain, which actually increases the environmental impact in another phase of the product life cycle.

Organisational learning in environmental management

In this paper, different activities of environmental management have been addressed to the four phases in the organisational learning cycle, whereas:

- *Generation and distribution of information* includes participation in knowledge networks or cross organisational projects, collaboration with actors from the product chain and the authorities, preparation of stakeholder information, and eventually literature studies or interviews, seminars, conferences or workshops.
- *Integration of knowledge* within the company includes using the intranet, preparing information material, arranging meetings, making experiments, educating people and securing an ongoing informal dialogue.
- *Collective interpretation* of information includes translating and discussing information and experiences in relation to the company context. This involves explication of values, room for an ongoing dialogue and easy access to feedback.
- *Action* includes authority and the necessary information to take responsible action based on the interpreted meaning. Actions of environmental protection could relate to strategies or policies, trying out new systems, methods and techniques, document experience or assessing the potential for improvements.

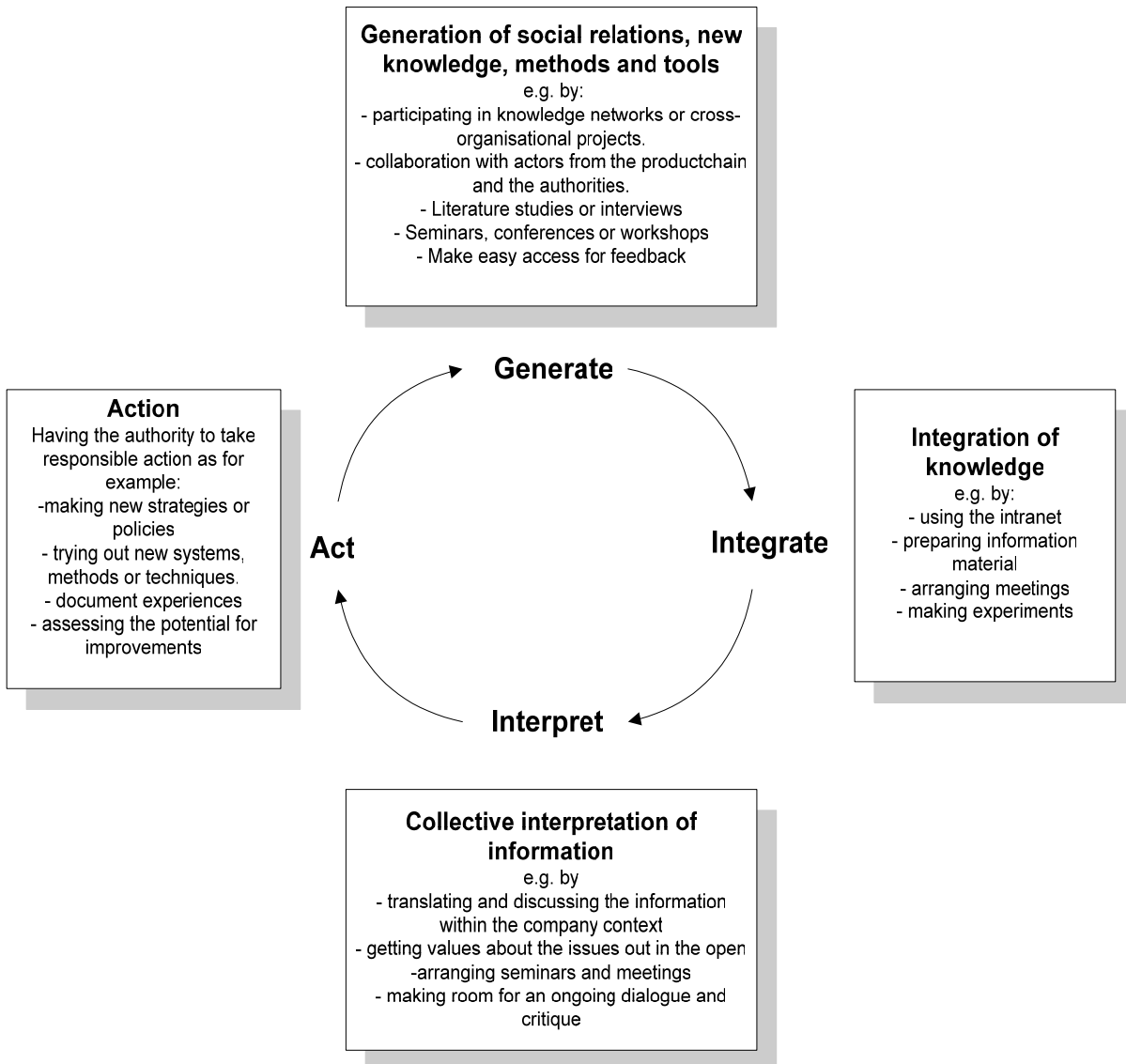


Figure 3: Systematic environmental communication within an organisational learning perspective

Figure 3 provides an overall illustration of the organisational learning cycle related to environmental management. It should be noted, that the action phase of the organisational learning cycle shown in figure 3 is deeply intertwined with the activities within the PDCA-cycle communication. Whereas the organisational framework stresses the authority to take action, the PDCA cycle provides a framework for systematic planning and implementation of the activities.

Final remarks

In this paper, a possible framework for working systematically with environmental communication is applied complementary to Deming's PDCA-cycle. By developing a framework, which emphasises environmental communication, this paper can be viewed as a modest contribution to concretise the guidelines provided within ISO 14063 by applying organisational learning theory and practical experiences from a case study at the Danish company Grundfos A/S. More research regarding the actual challenges of systematising and embedding environmental communication in companies is necessary in order to validate the actual usability of the theoretical framework. However, at this stage the framework illustrates the need for a complementary framework to the Deming cycle in order to raise questions related to the communicative and social aspects of environmental management.

In environmental management, the Deming PDCA cycle stresses the key questions: Which environmental impacts does the company have? How can the company continuously prevent or reduce these impacts? From an organisational learning perspective, emphasis is instead on environmental communication and social relations, stressing key questions such as: Which knowledge networks have to be established? Which meaning structures have to be negotiated in order to anchor and maintain the momentum of environmental management within the organisation? How can a company develop an identity embracing an environmental consciousness? Which social relations have to be established to continuously improve the environmental management practises? These questions are important to address in order to anchor, develop and diffuse environmental practises within companies.

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