MODULE F

D4S ORGANISATION & COMMUNICATION –

MANAGING THE PROCESS

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INTRODUCTION

Many of the problems and barriers that occur in a typical D4S project have a solution in management, for instance, improved communication between functions or people in the company. Your company will benefit in thinking through a couple of things regarding how you will manage your work. Organisation, information flow, and competencies, are all factors that need attention. This section is aimed at helping small and medium-sized companies to structure and manage their D4S activities as a process. This will involve a larger part of the company.

After having successfully evaluated and perhaps tested the methods and tools in this guide your company will benefit from a structured work process in the organisation as you implement the new approach. In fact, some elements of such a structured work process might already be required for initiating and testing those methods and tools. To achieve this it is necessary to set up a structure for activities on three levels, of strategic as well as operational nature:

> Activities that benchmark, redesign, or innovate D4S products. These activities involve engineering and marketing activities as well as related activities, for instance purchasing and production planning.

> Routine management measures that ensure the product portfolios conformance with the stipulated goals and make sure that this is in line with external as well as internal requirements.

> Activities on a strategic level that monitors the company's interest area for D4S and responds to changes in the requirements.

Your company may have many products and are active on different markets? Then you may have to prioritise your efforts. A systematic prioritisation of the environmental work for product portfolio and all activities you have in product development will be necessary but correctly done it can lead to the following benefits:

> **Increased know-how!** The knowledge gained in an D4S project or through eco-benchmarking can be used also in other development projects. For instance, life cycles may look similar or design solutions can be transferred to other products. Documentation and communication with people that works operationally with product development and D4S are important parts of managing the process.

> **Improving the image!** A single product with poor environmental qualities in your portfolio may jeopardise the gains in image you build with the other D4S activities. The chain is not stronger than the weakest link. It is possible to assure a certain baseline of environmental performance for all our products when managing the process.

> **Stability!** The company takes a great risk if responsibilities and know-how are isolated to a single or relatively few individuals. People leave for other jobs, gets ill or perhaps retire. It is important that several individuals of the company share knowledge, responsibilities, and accumulated experience.

Product development and innovation are complex tasks that involve many different business functions and professionals. ***Perhaps the most crucial issue to deal***

with is to carefully think through who will be involved and what information they need to have and from whom they will receive it. A company that seeks to manage product oriented environmental issues will need to integrate new competence to product development. Environmental issues will be included in marketing, design, engineering, and production. For this you will need to establish new activities in the product development process and add new competence through training or recruitment.

WHAT TO DO

This section will describe what you need to do to manage an D4S process and explain why it is important. The measures described are fully in line with parts of the *ISO 14001* standard and the technical report *ISO/TR 14062*.

Managing D4S follows the same general layout as many other management systems or structures. This means that an existing management system can be utilized to cover product oriented environmental issues. The management of an D4S process can be described as a cycle of plan – do – check – act as in the figure below.

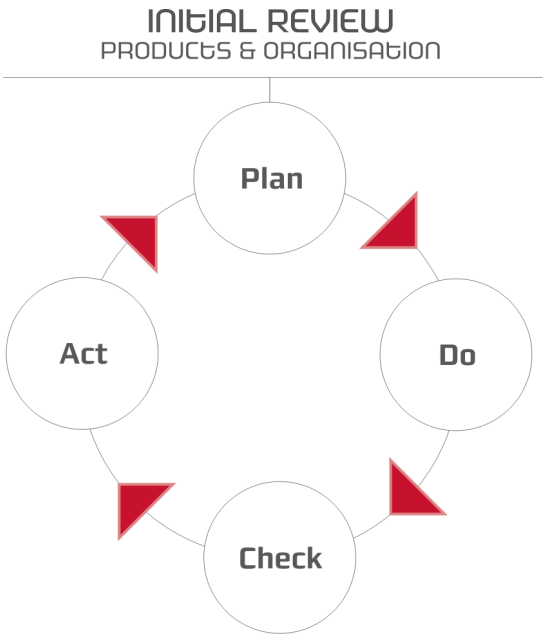

FIGURE 1 ___ TYPICAL PDCA MANAGEMENT STRUCTURE

A larger company will formalise the working structure to be able to benefit from a well-managed D4S process as previously discussed. A small company with only a few employees will probably not be as formal. But also a single individual will benefit from addressing a problem and work task in a systematic manner. The figure addresses the following phases:

> Initial Review

If the company has not worked with environmental issues from a product perspective it is advisable to investigate the products' life cycles as well as the company's capabilities to work with D4S.

> Plan The Activities and Design the Process

Most of the work on a management level (or of management character) takes place when planning the actual work. It is advisable not to save efforts during the planning. With a well thought through organisation and communication flow, time and resources will be saved.

> Do D4S Redesign, Benchmarking or radical Innovation

Your company use the tools and methods described in this guide. Of course, the activities and tools chosen will vary between different companies.

> Check the Result

To be able to know if efforts pay off if you do the right things in the right way you should check the results and verify the goals set up for D4S.

> Act on Issues that can be Done Better

One of the major reasons to follow-up on results of your activities is to learn how to make improvements in the future. Environmental issues are complex in nature, and it is often possible to improve efforts over time. Another important reason to "Act" is the possibility, especially for a larger firm, to share experiences and know-how gained by some to other staff working with product development or D4S within the organisation.

HOW TO DO IT

This section describes how the D4S process can be managed in practice. It also gives advice on how practical problems that may occur can be dealt with.

You are to implement a system that includes routines for communication, work activities, verification, and documentation in order to support the handling of product oriented environmental issues. The system should allow the organisation to identify improvement needs and to develop products that meet these needs. In addition, the system should stimulate the organisation to assess its own activities and results and to learn how to do this even better and more efficient in the future.

COMMIT AND ESTABLISH A BASELINE

Managing D4S will require active involvement or support from a number of important decision-makers in a company. Often, long-term commitments, such as D4S, are postponed to be dealt with in the future due to the prioritisation of work tasks that are deemed to need more immediate attention. Thus, D4S competes internally with other product development projects and aspirations. It is therefore important to secure resources and commitment at an early stage.

Top management must understand the environmental issues and their importance for the company, to be willing to allocate necessary resources of time, money and personnel. Recognition of the advantages and the drivers for D4S, is essential together with a realistic view of what needs to be accomplished by the organisation to reach desired benefits.

The outcome of the above should be an environmental policy that includes product development, the formation of an implementation team and a budget that includes the resources judged to be necessary.

People will be occupied with other work task of importance in your organisation. It is important to acknowledge the importance of working with D4S and the benefits it leads to. A common baseline will be the key to being able to maintain a certain effort on environmental issues in product development.

FORMATION OF IMPLEMENTATION TEAM

The first task, after a baseline has been established and necessary funding budgeted, is the formation of an implementation team. The implementation team can consist of employees or other people that are working for the company (for instance a consultant). The implementation team will not necessarily perform all tasks and construct all routines required for the system, but are needed for a complete overview of the development. The implementation team could include one ore more individuals that has some experience or education that gives them:

> Competence in D4S.

> Competence in product development.

> Have a leading position in the company. Someone with credibility and that people are willing to listen to.

> Competence in how the company function. Preferably after long experience working for the company.

> Competence in management and system building.

The members of the implementation team play an important role during the design of the D4S process and during training and implementation. However, the team members can also be assets during the continuation of the work as motivators and culture carriers. In addition, they can play a role in the work to solve problems and work with improvements of the system.

Implementation of D4S requires a number of competences in management, product development as well as environmental issues. Even if the responsibility to implement D4S is placed on one co-ordinator it is necessary to assure many competences either as advisory functions or as a team under lead of someone responsible.

PRODUCT PORTFOLIO ENVIRONMENTAL REVIEW

You will need to review the environmental impacts for all products in your portfolio by using the techniques presented earlier in this material. Quite often a company has many similar products. It is then possible to extrapolate and do assumptions based on similarities between the various products.

The result is used throughout many other activities and should provide a good map of the products life cycles and the associated environmental impacts.

The review should additionally consider existing and foreseeable future legislative and policy instruments that are relevant for the products to make certain that compliance is or will be ensured.

A review of the product portfolio will allow you to work more effective with more products and utilize their market potential. It will decrease the business risk your company faces on environmental issues.

ORGANISATIONAL REVIEW

Another review that will help to manage D4S takes its point of departure in mapping out the product development process. How are products developed today? Who will be involved in the D4S process? What information do they need at hand and with whom do they need to communicate? The following five main questions seeks an answer:

1> Identify the most important actors and functions that are relevant for the D4S process. This can be both external (e.g. suppliers, customers, and authorities) and internal business functions or support staffs.

2> What information do they need and what result do they deliver?

3> From whom do they need to receive information?

4> To whom will they have to provide information?

5> How much of their work time do you think they will be able to allocate to the D4S process?

6> What competencies do they possess today related to environmental issues and D4S?

The last two questions are "sanity checks" in order to balance the ambition level of the D4S process with the resources you have at hand. Please refer to "Complementary Comments to Organisational Review" below as well as worksheet on organisational structure and communication flows.

COMPLEMENTARY COMMENTS TO ORGANISATIONAL REVIEW

Thinking through this tactically can save a lot of work. The team can divide the portfolio into product groups that has similar environmental characteristics (same material, usage, production processes, etc.) or focus its work on the products with the largest predicted sales volume. For instance, spending time on a product that is at the very end of its commercial life cycle may be unwise.

To aid in the future system implementation work it will be beneficially to also look into capabilities (strength and weaknesses) the company has today. This will help the implementation team to work out a suitable training program and also to find the right level of ambition for the system. Too complicated work methods may not be willingly accepted from start if the organisation has little experience on the issue in the beginning.

Typical strengths to search for could be;

> Personnel is well educated and aware of environmental issues.

> A consistent and well-defined process for product development and innovations.

While typically weaknesses could be:

> Vague connections with suppliers leading to difficulties finding information of the products' life cycles.

> Large investments / long time-periods to change product design.

> Looking into the organisations capabilities from a realistic perspective and set the initial ambition on a level that is appropriate will be a good insurance not to loose pace during the implementation.

The work efforts needed for the above vary greatly. For instance, a company that has a quality system, will already have done some of the above. A smaller company will probably not have to do an extensive survey to figure out if the personnel are environmentally aware and knowledgeable. It is, however, important that the implementation team acquires this type of information to design training programs and to decide when and how environmental issues should be brought up in the product development process.

Complementary on internal communication

Knowing who has what information and who needs it is the key knowledge for successful internal communication. Information can be communicated verbally on project meetings or on request. It can also be advisable to have a master document that follows the ordinary product documentation in a project. This master document requests the project team members and the project leader to fill in specific data and results of the product.

Another common way of communicating D4S is to have a D4S guide with guidelines and checklists that helps the product developers in their work. Some companies even have a formal D4S standard that defines a minimum of environmental requirements.

Prioritise efforts

The capacity your company has to develop new products is of course always limited. Your company hopefully already has many development projects and ideas for future products. You will have to prioritise what are the most important issues and products to address for environmental improvements.

Products or projects with high priority should be exposed for one or more of the following factors:

> High environmental impacts in the life cycle according to the conducted product portfolio review.

> Environmentally aware customers.

> Existing or future legislation, for instance extended producer responsibility.

> Potential cost savings. Perhaps energy saving measures during product use is possible? This could allow for higher profit margins for the product.

> Other potential benefits. Perhaps suitability for PSS measures or other means to gain increased added value or customer loyalty.

With limited resources for product development a prioritisation among improvement measures will enable you to increase the benefits from the investment.

Implementation

The largest difference when it comes to managing D4S comprehensively carrying out an initial pilot project is that the motive now is to integrate the product oriented environmental issues with the existing processes in the company for innovation and product development. Also in other traditional development projects should environmental issues be considered and incorporated. Hence, the implementation has the goal to incorporate the tools and methods of this guide into the existing product development process where appropriate.

The process of an implementation process should include the steps described below in a chronological order:

> ***Setting of objectives_*** General objectives are set on the entire product portfolio. The objectives can be of different types. They can be restrictions on usage of certain materials or production methods. Or they can be long-term goals in correlation with the environmental policy or findings in the environmental review of the portfolio. In order to be able to measure the objectives it can be of help to develop quantitative indicators.

> ***Build Awareness*** not only on environmental issues but the reason why the company benefits from a systematic approach on how to deal with product oriented environmental issues and including this in product development. The aim of this is all personnel at the company and the main working method is information and education.

> ***Build the process*** with a point of departure in the existing process for product development in the company. This includes the allocation of responsibilities for the D4S process, a work process that leads to the definition of targets, and documentation procedures.

> ***Allocating Responsibilities_*** Responsibilities must be allocated so that it corresponds to activities on three different levels, as described in the introduction. At first, responsibility should be allocated for individual development projects. Normally, this responsibility is placed on the project leader. The project leader is then responsible for meeting targets and for documenting the process. Further, responsibility should be given to an individual who acts as a controller. This individual should have the authority to initiate development work and to

halt a market launch of products that do not face up to the company's environmental requirements. Finally, responsibility should be determined to ensure that the existing requirements are fully updated and in line with external demands on the company. The responsibility should be so defined that it is possible to anticipate and respond to changes in the stakeholders' requirements on the company. This responsibility can be placed on a staff or expert level.

> *Setting of targets_* Targets are defined as goals that should be met in development projects or in other activities within the system (such as training). They reflect the objectives. The process of setting of defined targets must be integrated with the product planning phase of product development where other criteria on the product are set. Environmental targets will have an impact not only on the products environmental characteristics but also on other product quality factors.

> *Documentation procedures_* It should be clear on what should be recorded for the future and how it is to be recorded. The documentation procedures should be a natural part of the D4S process. At least, the product's compliance with regulations and fulfilment with targets should be documented and relevant indicators calculated. It can also be relevant to record issues of interest for stakeholders such as waste managers or recyclers and matters of interest for customer requests (e.g. material content).

> *Enforce Readiness_* This implementation step includes training of all relevant personnel active with innovation, product design, marketing, etc on the actual work tasks they are to perform. Hands-on training with tools and work processes in D4S is an essential part.

Further comments on objectives and targets

Setting the objectives and targets for your effort is entirely up to what the company wants to achieve with its efforts. Objectives are goals set with an overall scope while targets are detailed requirements, for instance as a development criteria, that arise from the objective and that needs to be met to reach the goal.

Objectives and targets can be set both on activities (such as training) and on products or groups of products. The environmental review of your product portfolio together with a prioritisation among the development projects normally forms the foundation to set objectives and targets.

The objective and targets are central in the future activities and should have the following characteristics:

> Support the environmental policy and be in line with the baseline established by top management.

> Quantifiable and able to measure if possible.

> Always be verifiable.

> Reflect the findings in the environmental review and outcomes of the prioritisation.

Training

The company will have to train and inform its personnel on how they can tackle product oriented environmental issues. It can be a good starting point to assess the existing knowledge level on environmental issues. Perhaps it is necessary to give both basic education on environmental issues as well as specific training on D4S to development personnel?

Training will help to set everyone in the company on a baseline understanding on what should be achieved and why. Will save time and help to avoid misunderstandings in the long run.

Documentation

Documentation serves three major roles in this context and can be used for both internal as well as external purposes. The primary role of documentation is related to rotation of personnel. It should facilitate for personnel that has not previously been involved working with product oriented environmental issues at the company to introduce themselves to the task. That is, a manual that documents tools and procedures to perform D4S at the company.

Secondly, documentation serves the role to allow for verification and follow-up activities through the documentation of actions taken and achieved results for development projects. Generated design solutions and performed assessments and test runs can be valuable information for future development projects. The infor-

mation can also be used to improve the process of conducting D4S itself.

Finally, the documentation can be used to respond to surveys and questions from customers and other stakeholders, or in marketing and product information. Typical issues here could be a bill of materials and instructions for the end of use phase.

Stable and consistent documentation routines will help to avoid mistakes and misunderstandings and will save time in the long run.

Follow-up activities and improvements

The activities and achieved results need to be reviewed periodically by the responsible manager and by top management. If D4S is a part of ISO 14001 or ISO 9000 routines and demands stipulated by these management systems must be met. However, even if this is not the case there are rational reasons to make a serious review of the D4S processes and their results.

Studying past projects and working methods, learning from failures and successes, will help to work with improvement measures and working methods in the future that are more effective and gives better results.

Review and continuous improvement

Everything needs maintenance to work well in the long run, and this includes a management system. The systems capability to improve product's environmental characteristics through product development and design changes is of course the main issue to evaluate. It is suggested that this is done periodically (for instance annually). The company can improve its capability working with D4S as well as its products' environmental characteristics.

In order to evaluate this capability the company may ask itself a series of questions:

> Does the current environmental policy and objectives reflect the requirements from legislation and customers?

> Does the current environmental policy and objectives reflect the environmental impacts associated with the products' life cycles?

> Have objectives and targets been met? If not why?

> Is the capability of the organisation sufficient to run the D4S process? Can it be enhanced? Are the personnel working with D4S happy with the process and its tools. Are they motivated?

> How many product improvement measures have been taken? Number of ideas generated? Is it sufficient? Can the D4S process or its tools be improved to enhance creativity?

Etc.

References

ISO 14001, ISO/TR 14062, BS 8555