Integrated management systems in the tool and cutlery industry – beyond quality, work safety and environmental management

Introduction

Nowadays, integrated management systems are well established, not only in large enterprises but also in small and medium-sized enterprises (SME). Thereby, for SME especially the aspect of handling the different management systems with as little effort as possible is of great importance. This is due to of their limited personal and financial resources [Behrends, 2010, p. 53]. Particularly, in the German tool and cutlery industry this is an important issue. This industry branch is characterized by mostly family- or owner managed companies which mainly have less than 20 employees. Hence, within the framework of a research project funded by the German Federation of Industrial Research Associations (AiF), the research association for tools and materials (FGW) and the Federal Ministry of Economics and Technology an Excel-based tool has been developed. This tool allows the SME of the tool and cutlery industry self-assessing and improving their (integrated) management systems. Therefore, the compliance with the requirements of the standards for quality and environmental management (DIN EN ISO 9001 and 14001) and work safety (BS OHSAS 18001), was checked and need for action is revealed [Crostack et al., 2011].

Nevertheless, limiting integrated management systems to the already implemented and mentioned standards is not sufficient any more. Topics like sustainability, risk and energy management and the requirements resulting from the corresponding standards have become of increasing importance for companies to be viable in the future. This is due to the changing consumer behaviour and their need for products that are produced “fair” and resource-efficient. Further reasons for this development
are the still rising costs for resources like for instance energy. Hence, companies are forced to adapt and further develop their products and processes to reduce the consumption of resources to be competitive and also to be aware of and avoid risks going along with this development. This also includes the activities of the suppliers and is not limited to the own company and hence the whole supply chain. Consequently, advancing the integrated management system of the tool and cutlery industry by considering requirements resulting from the standards for sustainability management, risk management and energy management is necessary. Therefore, within the research project “Risk management considering the aspect of sustainability in SME of tool and cutlery industry”, the Excel-based tool has been enlarged and assessed by companies of the regarded industry with respect to its content and handling [Barthelmä et al., 2014]. Its starting point was a survey of the companies involved in the project regarding the actual state of risk and sustainability management and the revealed need for action. The results of this project are presented in this paper.

1. Status quo of integrated management systems in SME of the tool and cutlery industry and their application

1.1. Integrated contents and standards based on a quality management system

Most of the companies of tool and cutlery industry already have established an integrated management system. It comprises of a quality (DIN EN ISO 9001), an environmental (DIN EN ISO 14001) and a work safety management (BS OHSAS 18001) and is based on the quality management system and its structure. Hence, it has the following structure [Crostack et al., 2011]:

- management system,
- responsibility of management,
- resources management,
- product realization,
- measuring, analysis and improvement,

Establishing such a system additionally to the in most cases so far solely implemented quality management system was the aim of the research project “instrument for reducing the management effort in the fields of quality management, work safety management and environmental management for SME of the tool and cutlery industry” [Crostack et al., 2011].
Analysing the situation in the regarded industry by carrying out a survey with eleven companies showed a quite good documented state of health and safety management, although it was not certified. Regarding the environment it was surveyed that the large companies of the tool and cutlery industry had a certified environmental management, but those were in a minority. Companies that did not have any certified environmental and health management system achieved better results of evaluation regarding work safety than regarding environment. This was due to the fact that the amount of legal requirements on work safety management is higher than the amount of legal requirements on environmental management.

Thereby, handling the integrated management system with low effort and without external experts’ help has been an essential aspect for the companies. Because of this, a tool for self-assessing and improving the state of fulfilling the requirements of the standards for quality, environmental and work safety management was developed and tested and approved by companies of the tool and cutlery industry regarding its content and handling. In this context especially, the application of the tool without needing expert’s advice in practice was checked. For the implementation of the tool the software Excel was used as it is common and already applied in the companies. Hence, the effort for training and the costs involved for new software could be avoided. This was an important aspect for the SME and helped establishing an integrated management system for the mentioned standards by using the tool [Crostack et al., 2011]. The developed Excel-based tool is presented in the next step.

1.2. Excel-based tool for an integrated management system in the tool and cutlery industry

1.2.1. Overview of the Excel-based tool

As mentioned before, the Excel-based tool gives an overview of the requirements resulting from the standards for quality management (DIN EN ISO 9001), environmental management (DIN EN ISO 14001) and work safety management (BS OHSAS 18001). The functions of the tool are as follows [Crostack et al., 2011]:
- integrated self-assessment with low effort,
- identification of need for action,
- providing of suitable measure for improving the actual state of requirements’ fulfilment,
- development of suitable measures,
- documentation of continuous improvement.
The figure 1 gives an overview of the structure of the Excel-based tool.

**Figure 1. Structure of the Excel-based tool**

The main functions of the tool are presented in the following. The self-assessment area of the tool is structured according to DIN EN ISO 9001 as this standard has been chosen as basic system (see chapter 1.1). Thereby, within the self-assessment it is taken into account that for fulfilling the requirements of the standards an evaluation of both the processes and the guideline documents for the processes is necessary. The results of the company’s specific self-assessing are calculated automatically and show the degree of the requirements’ fulfilment. By these calculations, i.e. the calculated level of fulfilment, a need for action is made clear and recommendations for fulfilling the requirements are presented. For this purpose, suitable measures are integrated into the system.

Another part of the Excel-based tool is an integrated process model. This model includes three parts:
- management processes,
- value-creating processes and
- supporting processes.

The model shows how the processes of different management systems can be integrated and which parts of the standards are relevant for the processes, i.e. if the standards comprise requirements dealing with these processes. So, corresponding requirements and hence processes of the different standards are highlighted.
The documentation model is also embedded in the Excel-tool and implemented in form of a mind-map using the freeware X-mind. The model allows a uniform documentation structure and is based on the process model. The lowest level is set up by guideline documents, which can be assigned to the processes and whose need for integration is visually represented. Those are further linked to samples of process descriptions and guideline documents and can be appropriately adapted to the companies’ requirements. For this, it is necessary to identify specification documents for the mentioned standards. For assisting the companies, a number of example documents, for instance supplier assessing, are provided in the Excel-based tool.

2. Advancement of integrated management systems in SME

2.1. Relevant topics for SME and need for action – sustainability, risk and energy management

An adequate handling or even avoiding of risks, like for example interruption of the production due to a fire, a storm or market risks, is essential for SMEs for being viable and ensuring their market position. Sustainability trends and changes have a great influence on these risks. Disregarding them can entail existential risks for the companies. In this context, a heavy fluctuation of prices on commodity markets [Schrack, 2010], government regulations and an increasing awareness and demand of consumers for „sustainable” products can be mentioned. These aspects intensify the risk situation of the company. In particular, a credible evidence of social and environmental engagement is of increasing importance. Moreover, due to rising energy and commodity prices and globally acknowledged high environmental and social standards, resource efficiency is essential for companies and prospectively will have an even more significant influence on companies and their business and market success [Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, 2011]. Hence, companies have to take these aspects into account for their strategy and decision-making as well as their daily business. As a result the already existing integrated management systems have to be advanced with regard to the topic of sustainability and the requirements resulting from standards going along with it, as the DIN ISO 26000 and DS 49001 for sustainability management, the DIN EN ISO 50001 for energy management and the ISO 31000 for risk management.
A survey regarding the status quo of sustainability management in the tool and cutlery industry that was carried out at the beginning of the research project „sustainable risk management“ also revealed the need for action. Most of the surveyed companies assessed their actual activities regarding the topic and their knowledge of the requirements going along with it as low but also recognized the increasing importance of the topic due to rising customer demands (especially in the B2B-sector) and often required „codes of conduct“ [Klute, Refflinghaus, 2013].

Figure 2. State of knowledge of sustainability management according to ISO 26000 within the tool and cutlery industry

Source: [Klute, Refflinghaus, 2013].

In this context, a need for implementing an energy management was also expressed by the companies.

In the following sections the different relevant topics are presented in more detail.

2.1.1. Sustainability management

The standard for sustainability management [DIN ISO 26000] defines sustainability as follows: “development that satisfies the needs of the present without risking that following generations cannot satisfy their needs” [DIN ISO 26000]. Thereby, sustainability encompasses the following three dimensions [Drenk, 2009]:

– ecological sustainability,
– social sustainability and
– economical sustainability.
These three dimensions are not independent of each other. Nevertheless, it is possible focusing a certain dimension respectively a certain aspect when positioning the own company (figure 3).

**Figure 3. Triangle of sustainability**

![Triangle of sustainability diagram](image)

Source: [Kleine, 2008].

Minimizing both direct and indirect environmental impacts that result from economical activities is the aim of ecological sustainability. Exemplarily, the consumption of material and energy resources can be named [Drenk, 2009]. Having implemented an environmental management according to DIN EN ISO 14001 is an important step, although it is not sufficient. One reason therefore is the increasing and also expected increasing importance of energy efficiency in the future [Promberger et al., 2006]. The DIN EN ISO 50001 has been developed for implementing an energy management system and consequently, its requirements resulting from this standard have to be integrated into the (already existing) integrated management system for realizing ecological sustainability.

Fair treatment of the employees and also fair working conditions in the supply chain, for example no child labour, are content of social sustainability. For implementing social sustainability the international Social Accounting Standard 8000 (SA 8000) has been developed. This standard is based on the human rights convention of the United Nations and on the labour standard of the International Labour Organization (ILO).
Thereby, the aim of these standards is establishing and maintaining a minimum of social work standards [Promberger et al., 2006].

For planning and implementing sustainability in companies the DIN ISO 26000 and the DS 49001, a Danish standard for helping to implement the DIN ISO 26000, offer a compendium of topics and aspects to deal with. The main issues with which companies have to deal with according to the standard are:

- organizational management,
- human rights,
- working practices,
- environment,
- fair company and business practices,
- consumer requests,
- integration and development of community.

Thereby, for each of those key issues a variety of fields of action exists. This goes along with great effort for companies. Hence, in the standard it is recommended that SME at first should concentrate on those fields of action being most important for them and their sustainable development. The following figure shows a cut-out of the key issues and fields of action which are described in the standard (figure 4). The survey carried out in the research project showed, that due to the low knowledge and the yet merely increasing importance of sustainability respectively its importance for the surveyed companies, only some aspects, like for instance waste management, measures for (further) qualification and support of staff are mentioned as yet established [Klute, Refflinghaus, 2013a].
2.1.2. Energy management

As stated before, energy management is an important aspect for achieving and improving ecological sustainability. For companies, the topic has been brought into focus by rising costs resulting from energy...
consumption. Implementing an energy management according to DIN EN ISO 50001 respectively fulfilling the requirements of an energy audit according to DIN ISO EN 16247 has received high attention of the companies. Thereby, the aim of this standard is to enable organizations to establish systems and processes necessary for improving the energy related performance, including energy efficiency, use of energy and energy consumption [DIN EN ISO 50001]. Enlarging the existing integrated management system regarding this topic is the both logical and necessary consequence.

2.1.3. Risk management

Coping with risks is essential for companies to remain competitive. The increasing number of topics and aspects that are relevant for companies, in particular the risks going along with changing trends in consumer behaviour and regulations considering sustainable aspects, require a systematic and holistic risk management which most of the SME of the tool and cutlery industry do not have established yet. These companies rather deal with specific risks regarding their products and processes, for instance due to the often required FMEA by their customers and financial risks. This was also shown by a survey in run-up of the presented research project. Further results of the survey were that strategic and market risks and the risk of a business interruption caused by a fire, a storm etc. were mentioned as important by the companies. This showed the rising awareness for a systematic risk management and an enlargement of the integrated management system regarding this issue. The ISO 31000 offers a guideline for such a risk management. Unlike the standards mentioned before, it does not include requirements for establishing specific processes, but offers a method for identifying, assessing, handling (for this the ISO 31010 offers a lists of methods and techniques in addition to the ISO 31000) and reducing risks. Because of this, implementing a risk management in the integrated management system should also include methods and techniques for an adequate risk management in addition to the already existing functions of the currently developed Excel-tool.

2.2. Enlargement of the Excel-based tool for integrated management

The basis for enlarging the Excel-based tool was a comparative matrix of the considered standards of quality, ecological and work safety management. It was drawn up to consider the integration aspect of the assessment system. In the matrix, the sections of three subsystems are contrasted to consider corresponding requirements. This matrix was re-
plenished by requirements of the standards for energy, risk and sustainability management. Thereby, for sustainability management the DS 49001 has been applied, because of its similar structure to the basic system for quality management which facilitated integrating this topic. Taking the quality management according to DIN EN ISO 9001 as basic system for integration, it is kept up for the integration of requirements on energy, risk and sustainability management, so that the numbering of DIN ISO 9001 is still decisive for the numbering of the integrated sections. Thus, the following sections are assigned to the QM section “6.2.2 competence, training and awareness”:

- energy management – EnMa (DIN EN ISO 50001): “4.5.2 skills, training and awareness”,
- risk management – RM (ISO 31000): “4.3.5 resources”,
- sustainability management – SM (DS 49001): “7.4.1 creation of awareness and build up of competence for social responsibility”.

With it, the numbering and titles of the different standards are parts of the sections. The headlines are also classified to an integrated section so that they are applying to all integrated standards. For this, a main requirement was formed which is put on all subsystems. Additional sector specific part requirements have to be extracted from the original requirements, formulated to an EnMa / RM / SM specific part requirement as well as classified to the main requirement like it has already been done for ecological and work safety management [Klute, Refflinghaus, 2013b].

2.2.1. Enlarging of the self-assessment area

The self-assessment area is presented according to the previously chosen standards to be assessed, i.e. only the chosen standards are presented to the user. It enables the continuous determining of need for action when optimizing the management system. Consequently, the sector was enlarged by the requirements of energy, risk and sustainability management. To clarify, the following figure 5 shows a cut-out of the exemplary section “6.2.2 competence, training and awareness” for integration of energy and risk management. Thereby, the possibility for an extension of the self-assessment sector for each individual company according to its needs, just as it already exists for the already integrated part systems is slated. The valuation sectors are evaluated according to their documentation (D), their controlling respectively application (L/A) and additionally concerning their integration into the quality management system (I). Thereby, the scale for assessing ranges from 0 (not existing) to 5 (completely fulfilled).
Also for the required specification documents it is checked which of them exist.

**Figure 5. Cut-out of the self-assessment area**

![Diagram showing self-assessment area with assessment from 0-5 points for documentation, control and integration]

Source: Own elaboration.

**2.2.2. Enlarging of the process and documentation models**

The processes of quality, work safety and environmental management assigned to each other are already summarized to integrated process descriptions and now have to be expanded by appropriate processes of energy, risk and sustainability management. For implementing the model the process modelling tool ARIS Express, which is embedded in the Excel-based tool, has been used. This software, which is available as freeware, allows the adequately handling and adapting of the processes with less effort instead of the implementation with Excel, which has been used in the former project.
For a uniform documentation structure, the tool additionally contains a document model in form of a mind map, so that contexts can be represented visually. This model is based on the process model and was also expanded by requirements of risk, energy and sustainability managements. Thereby, the lowest level is set up by guideline documents, which can be assigned to the processes and whose need of integration is visually represented. Those are again linked to samples of process descriptions and guideline documents and can be appropriately adapted to the companies’ requirements.

Conclusion
Advancing integrated management systems and the further development of the Excel-based tool for implementing requirements of sustainability, energy and risk management on less expenditure, enables SME to simply establish the associated need for action by processing a self-assessment. This was tested and proved with the companies involved in the project. Their feedback during developing the Excel-tool was taken into account and implemented. For example the scale for self-assessment was changed from 1–4 points, as it was in the former development to 0–5 points. This was due to the fact, that a separate assessment of non-existing (0 points) and a low level of implementation (1 point) was required by the companies. Also, a matrix for assessing stakeholders and their requirements regarding sustainability assisted by already integrated examples for simplifying the use of it has been developed and implemented, because this topic came up by testing the Excel-tool in practice and it proved...
useful. Moreover, the tool offers recommendations and measures to improve the actual state of the integrated management. Therefore, all parts of the Excel-based tool have been advanced. In addition to it, further methods for assessing risks and sustainable requirements and their requesters have been added. Testing the developed tool by the companies of the tool and cutlery industry proved its content and applicability, whereby hints for adapting the content and handling of the tool posed by the companies, like for instance the possibility to choose the standard for which the actual state of implementation should be assessed. By this, only information needed in the regarded case is shown and an information overload can be avoided.

References
7. Drenk D. (2009), Sustainable management with small and medium-sized enterprises: A research of economical and social effects of ÖKOPROFIT-companies (in German), Dr. Kovac Verlag.

Acknowledgements
The authors wish to thank the German Federation of Industrial Research Associations (AiF), the research association for tools and materials (FGW) and the Federal Ministry of Economics and Technology for supporting this research.

Integrated management systems in the tool and cutlery industry – beyond quality, work safety and environmental management
(Summary)

Nowadays, integrated management systems are well established in most of the companies of the tool and cutlery industry, even in SME. In general, the integrated management systems comprises of an environmental and a work safety management system in addition to the quality management. They enable companies to manage the different systems with less afford than managing them independently. For implementing them easily the RIF e.V. has developed an Excel-based tool within the framework of a research project. With this tool companies can carry out a self-assessment for evaluating if and to which degree they fulfill the requirements of the established standards for quality and environmental management and also for work safety. However, due to the increasing importance of the topics of sustainability and going along with it risk and energy
management an advancing of the tool was necessary. Hence, requirements resulting from the corresponding standards should be integrated in the already implemented integrated management systems. The research project “Risk management considering the aspect of sustainability in SME of tool and cutlery industry” dealt with this topic. In this paper the Excel-based tool and topics and requirements resulting from the mentioned standards and their implementation into the Excel-tool are presented.

**Keywords**
integrated management, sustainability management, risk management, energy management