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THE MANAGEMENT OF BLENDED LEARNING IN SMEs WITH THE CYBERNETIC E-LEARNING MANAGEMENT MODEL - A CASE STUDY AT KRONES AG -

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***Abstract*:** Blended learning is gaining momentum in further education in particular for internationally operating organisations. The blend of classical face-to-face trainings with media-based trainings frequently is still not a standard to internationally operating small and medium-sized enterprises (SME). The Cybernetic e-Learning Management Model - CeLMM - [5], developed for the management of media-based trainings, is founded on the generally valid ISO reference model for Learning, Education and Training [1], and has been developed and used in particular for the application of e-learning in internationally operating organisations. This holistic phase- and process-oriented model comprises aspects that are generally treated in the conception of e-learning trainings in order to develop a training for internationally operating enterprises. This framework for the development and the introduction of a Blended Learning training of Krones AG has been adapted within the scope of a case study, and it has been used with the target of a holistic management of the training for the introduction of an IT system at the Krones AG. This paper focuses on the analysis and discussion of the general applicability of the CeLMM framework in the context of Blended Learning training approaches, and the observation of the efficiency of the application in small and medium-size enterprises with multi-nationally operating organisations. The analysis of the Krones AG case study shows immediately, as well as three years after its implementation, that the model has already been realised in internationally operating enterprises such as the adidas Group or the BMW Group [5] that it can be used with a positive effect on the management of blended learning situations as well.. In the process, the development and introduction of Blended Learning methods has been supported successfully. Besides the description of the examination method, the case study at Krones, a final critical discussion will be held on whether the application of the CeLMM for Blended Learning scenarios can be generalised, and an outlook on the further research activities will be presented.

***Keywords*:** Blended Learning; Case Study; Cybernetic e-Learning Management Model; KRONES AG; Action Design Research

I. Introduction

Today, the internationalisation of small and medium-size enterprises (SME) is an essential success factor, in particular for the export country Germany. What has been a privilege of big enterprises up to 20 years ago is now a matter of course also for SMEs.

For small and medium-size enterprises, whose value creation is made up from production, worldwide sales of machinery and the complementary services, the introduction and the training of new business processes or IT procedures represent the challenge of balancing costs, benefits as well as the principal understanding of a professionally operating organisation. Thus this kind of organisations does have trouble to manage the process from initialization & preparation till the close-down of Blended Learning trainings. Recently, this phenomenon has presented itself during the introduction of the IT system for Customer Relationship Management (CRM) business processes at Krones AG. The company that produces machines and systems for the process, filling, and packaging technology with a total of approx. 13'800 employees [13] is operating in six regions of the world. The introduction of a new CRM business process and the related IT system involves approximately 1'000 employees of the international Krones sales organisation. A project team has performed the analysis, conception and implementation of a further education measure for the stepwise introduction of business processes and the IT system for the sales organisation. At the start of the casework for the training, various problems concerning the pedagogic-didactic (for example self-paced e-Learning content, classroom, face-to-face training, synchronous vs. asynchronous trainer-trainee-relation etc.), technological (for example the

use of an e-Learning platform vs. the creation of singular e-Learning modules, the use of chat functions etc.), organisational (for example the role of process experts and key users of the CRM system as supporting trainers, the role local trainings teams etc.) and socio-ethical design (for example content differentiation after learner-individual cultural background and learning style) have been examined. The central results of this evaluation were a), that there is a gap in the existence of an overall and comprehensive management framework in this typically SME organisation and b) training for CRM project has to be done as a combination of class-room and e-Learning training; therefore as Blended Learning concept. In the end this lead to the decision in favour for the application of a structured framework.

Within the framework of a dissertation, and based on a balanced literature review as well as an environment analysis, the Cybernetic e-Learning Management Model [5] has been selected and applied in the context of a Blended Learning concept at Krones AG.

The central question of this case study from the scientific point of view refers to the applicability of the Cybernetic e-Learning Management Model (CeLMM) in the environment of a Blended Learning concept in a multi-nationally operating SME. The application of the model in the context of blended learning situations was not tested before.

Summarized the motives for the scientific supervision of the project at Krones AG were therefore: a) the finding concerning the general applicability of the e-learning management model that has been designed and tested in big industrial enterprises also for small and medium-size enterprises, and b) the adaptation for an effective and efficient management of Blended Learning scenarios.

The article is structured as follows: Chapter 2 describes the applied research methods and case design. Chapter 3 consists of the results from the research. Chapter 4 close the paper with research insights, its interpretation and limitations. This research has been subject to the following theses:

- *Thesis 1 (H1)*: Blended Learning supports the in-plant educational areas of internationally operating SME organisations.
- *Thesis 2 (H2)*: The application of Blended Learning training programs requires a holistic and comprehensive management, based on the individual situation of an organisation.
- *Thesis 3 (H3)*: The adaptation and application of the Cybernetic e-Learning Management Model provides the potential for the management of Blended Learning training strategies, adapted to the respective situation, in SME enterprises.

II. Research Process and Case Study Design

A. Research Process

In principle, the study conducted in this paper is based on the Action Design Research approach [9]. The use of this research approach allows the examination of the actual situation, the reflexion of an existing or the creation of a new theory referring to a generalised problem/phenomenon and subsequent testing. Blended Learning as a concept, is, besides the technological challenges, mostly an institutional and socio-ethical issue in internationally or multi-nationally operating organisations. Action Design Research provides the frame for the analysis meets the requirements of this Social Life Context investigations [3] and is thus considered to be a suitable method for examination in the present case. The examination has been conducted under application of the case study method [8]. An authentic elaboration of the examination results is possible thanks to an embedded role (embedded observer) of one of the authors. Beside this central method of embedded observing, the research was accompanied by doing a literature review as well as interviews and workshops within the case study.

B. Case Study Design

Besides many other internal projects in the Krones AG, the implementation of a CRM system has been an important milestone for the business year 2013. The system rollout and the implementation involve approximately 1'000 sales staff worldwide. To guarantee a successful implementation of the project, several persons in charge of different focal points are involved worldwide. The number of staff cooperating around the world in the CRM project was approximately 50 people. They are subdivided into different roles with different tasks. An organisational chart that represents the project structure, the distribution of the tasks and the communication relations among the individual project roles may help to provide a quick overview of the task distribution. This helps to obtain a clear representation of the leading relations between the individual project roles. The structure of the organisational chart in the following is divided into the levels decision, training coordination, teaching and learning target group. This procedure allows a clear and brief overview of the interrelations and dependencies of the individual roles.

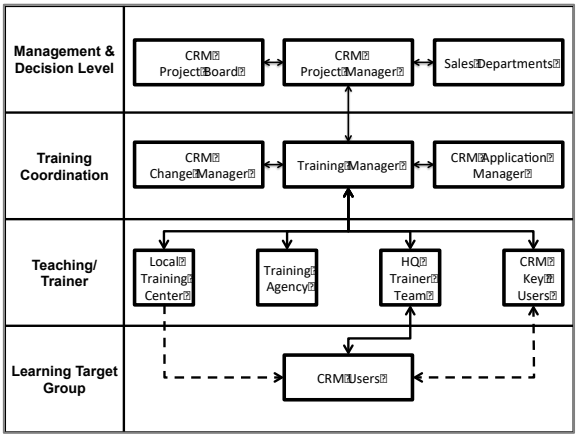

Figure 1. Involved roles in CRM Blended Learning at Krones AG

A particular challenge during the realisation of the project is the restricted requirements of means, concerning trainer resources as well as the budget and time scheduling. The project is to be implemented within a tightly calculated time schedule of a maximum of six months. Within the framework of a bachelor paper, the topic of developing a Blended Learning concept on the worldwide introduction of a CRM solution at Krones AG is to be treated in depth. For this purpose, the bachelor paper has been divided into three phases. In the "looking-out" phase, a literature review is to provide a general overview of the topics of Blended Learning. In the "looking-in" phase, a situation analysis was performed at Krones AG with the objective of determining the training tools and the use of media involved at Krones AG. This analysis was also to show the understanding of the topic

Blended Learning that prevails at Krones AG, and the current degree of the application of this training method in the company. In the concluding conception phase, the Cybernetic e-Learning Management Model was used to develop a viable Blended Learning strategy with the objective of developing a sustainable training strategy for CRM system training. Therefore the CeLMM was especially applied for the determination in the initalization and strategy phase as well as for the determination and design of the overall Blended Learning framework - bottom-line for the pre-uasage phase of the CRM Blended Learning training. A final evaluation was conducted to determine the sustainability of the developed training measure.

III. Results

A. *Literature review*

The present paper focuses on two theory complexes within the framework of the literature review: first, the existing scientific elaborations of the Cybernetic e-Learning Management Model, and, second, the central contributions for the Blended Learning complex of topics.

1) Cybernetic e-Learning Management Model

The central approach of the Cybernetic e-Learning Management Model, in short CeLMM, [5] is the support of internationally operating organisations with an effective and efficient management of in-plant further education measures that are created and implemented based on the use of new media in terms of e-learning. In the process, the model supports the different stages of development and stages of introduction or use of e-learning in an organisation: the so-called initial phase (first decision & set-up stadium), the development phase (incremental stadium), or the renewal phase (re-design stadium). The CeLMM is based on a phase-process role model, which, in turn, is based on the ISO/IEC 19796-1:2005 [1] standard. Within the framework of in-depth examinations in internationally operating enterprises such as the BMW Group or the adidas Group [4], the four scientific areas institutional issues, pedagogical issues, technological issues and socio-ethical issues have been identified and established as e-learning success domains in those enterprises. This approach of a holistic consideration of the e-learning management in enterprises bestows the attribute cybernetic on the model. In the context of those four domains, based on identified success paths (e-Learning Success Path), and by means of success factors (eL-CSF - e-Learning Critical Success Factor) and subsequently identified performance indicators (eL-KPI - e-Learning Key Performance Indicator), it is possible to proceed in a focussed way in the respective phases and processes of the e-Learning Management. For this purpose, Hilgarth's paper provides suggestions of methods and tools such as the readiness check, the activity plan or the use of a morphological analysis technique. Figure 2 shows the model and its elements as a cyclic model. It is basically process-oriented designed. Thus in the logic of this model for each process step domain-specific critical success factors are provided for the analysis of the current situation. Domains are respected in this model are *Institutional, Socio-ethical, Technological* and *Pedagogical.* With this, the model considers from a comprehensive view all necessary management issues over the training management process chain.

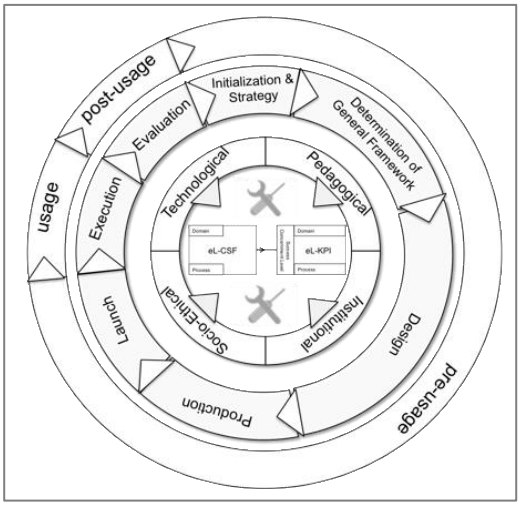

Figure 2. CeLMM and its elements [5]

2) Blended Learning

As second issue in the examined of scientific literature, the Blended Learning complex of topics has been studied.
In the examination of definitions for "Blended Learning", alternating terms such as hybrid learning arrangements, learning using the multimedia system, or multi-method learning appear frequently. According to Bendel, the term "Blended Learning" has prevailed in the past years. [11] According to the definition of Sauter and Bender, "Blended Learning" designates an integrated learning concept that makes optimal use of the network options provided by the internet or intranet, combined with the classical learning methods and media to produce a sensible learning arrangement. This approach facilitates learning, communication, information and knowledge management independent from time and place, combined with exchange of experience, roleplay and personal encounters in the classical classroom training. [12]
It has also shown that classical classroom trainings and virtual methods in terms of "Blended Learning" are combined in in-plant further education. This has been the result of a trend survey of the MBB Institute for media and competency research. In this survey that has been conducted in 2015, e-learning experts have been asked to forecast the scenarios for further education and digital learning. The outcome was that in the years to come "Blended Learning" will take over a leading position in the conception and implementation of in-plant further education, as shown in the following graph (see Figure 3).

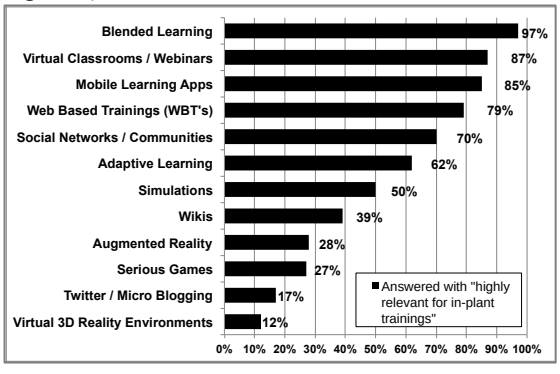

Figure 3. Importance of applications for in-plant learning in the enterprise [10]

Moreover, the examination and coverage of topics with the Blended Learning further education concepts is interesting for the present paper. According to a survey conducted by the MMB Institute in 2015 [10], the enterprises are focusing on areas and topics of further education such as standard IT applications, commercial expertise or IT business processes.

3) Conclusion from literature review

In the summary of the literature review, it can be stated that the *Cybernetic e-Learning Management Model* provides a potential framework for the management of adult education programmes in SME's based on e-learning and training programmes in a company's everyday business. Blended Learning, in turn, offers per definition sufficient conceptual freedom and meets the demands placed on the application of e-learning in in-plant companies education topics. It continues to show a trend for economically and pedagogically efficient training methods and does not rule out the adaptation of the CeLMM.

B. Case Study Results

1) Allocation of CeLMM phase in Krones case

The CeLMM [5] focuses three central stages. The research mainly focused on the "pre-usage" phase with the typical processes "initialisation & strategy", "specification of the general training framework", "design of training modules", "production of training modules" and "introduction of the training modules" for the introduction of CRM at Krones AG (see also grey highlighted sections in Figure 4).

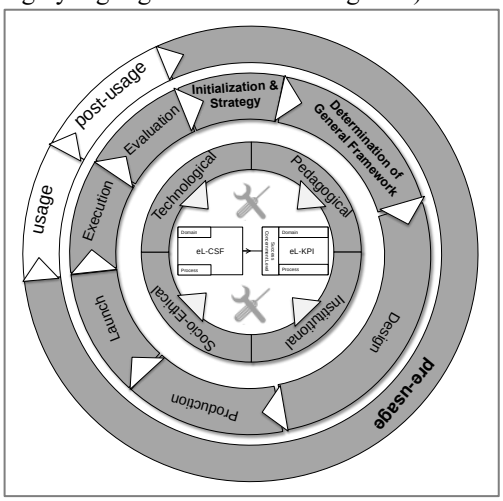

Figure 4. Matching of CeLMM phases in Krones Blended Learning case “CRM Training”

This phase comprises first of all the initialisation and the specification of a training strategy concerning the introduction of a CRM system throughout the company. For this purpose, an internal situation analysis based on the suggested critical success factors based on the CeLMM model has been performed that has shown which training methods had been applied and the understanding that prevails at Krones AG when it comes to the topic of Blended Learning. In this context, the advantages and disadvantages of Blended Learning have been discussed, and training methods which can be combined to a Blended Learning mix of methods have been identified. Subsequently, a general training framework has been created that treats, in a multidisciplinary and holistic sense, pedagogic-didactic (for example, simulative vs. situational learning methods), organisational (for example key user integration), technological (for example CBT vs. WBT), as well as socio-ethical (for example interpretation of foreign languages) questions in the training context. In the process, a key user analysis has been performed to identify the most important roles in the project.

2) Application of CeLMM Success Pathes and Factors

The developed Blended Learning strategy comprises three phases that serve to reach a successful and, in particular, sustainable training of the CRM user. Therefore, the Blended Learning approach of Krones AG consists of a virtual training as a first step before the classroom training of the employees is held subsequently. The training phase is terminated by an e-learning module that is to ensure the sustainability of the Blended Learning strategy.

To successfully introduce the Blended Learning strategy at Krones, all required resources must be available. For this purpose, a comprehensive questionnaire has been defined in a readiness check, according to Hilgarth. With the aid of these questions, the situation at Krones concerning the areas organisation, pedagogics, technology and socio-ethics has been examined more closely. [4] The following table shows, ordered by success factors, the questions for recording the status/the abilities at the time of the project process, and of the fulfilled preconditions for the application of a media-supported Blended Learning concept.

Id	CSF domain	CSF question	Readiness status
1	Institutional	Do resources (budget, FTEs) exist for designing, implementating and conducting the Blended Learning training concept for CRM?	not ready
2	Institutional	Does in the context of the intended decentralized trainings an coordinating training management team with the expected know-how exist?	not ready
3	Institutional	How are the regional training teams motivated in supporting/conducting trainings are prepared/intended with technology?	ready
4	Institutional	Does the KRONES subsidiaries have access, beside resources and capacities, to the necessary organisational setup (decentralized trainer with access to training platform) for trainings?	ready
5	Institutional	Is it possible for KRONES to support all subsidiaries with know-how in IT and training methods?	ready
6	Pedagogical	Is it in general possible to use Blended Learning toolings and pedagogical methods to support the CRM systems training?	ready
7	Pedagogical	Does a modular training curriculum exist at KRONES, so it is possible to use modules in different trainings style (for example partly in classroom, partly with self-paced learning units)?	not ready
8	Socio-Ethical	Does the existing KRONES training contents show standardized contents with respect of cultural differences in the learner group?	ready
9	Socio-Ethical	Is it in general and in the use case of CRM training possible to adapt parts of the training contents to cultural-individual aspects (like gender-orientation, role-specific, basic educational background, political correctness)?	partly ready
10	Technological	Does any central Learning Management System/Platform exist to handle the training modules and materials?	not ready
11	Technological	Does all central and decentral training organisations have access to the necessary technical equipment (computers, internet access, access to classrooms, social media for chatting) for conducting Blended Learning trainings?	ready
12	Technological	Does all involved roles in the teaching-learning process have access (online and/or offline) to the learning material?	partly ready

Table 1. Results of CeLMM Success Criteria in Krones Blended Learning “CRM” case

In the process of this check, the general situation concerning Blended Learning at Krones has been analysed under the item

organisation by using the multi-domain critical success factors are provided by the CeLMM [5]. The resources required for the development of a Blended Learning strategy and for an e-learning measure are playing an important role. Among those necessary resources, besides the budget, are hardware and software, as well as the availability of classrooms. At last, the support plays an important role for guaranteeing a successful implementation of Blended Learning in the enterprise.

The aspect of pedagogics focuses on the contents to be conveyed in the training. Here the question arises whether a Blended Learning strategy is suitable for the end user in the CRM project and whether a modular training program in terms of Blended Learning does already exist in the company. The socio-ethical aspect analyses the cultural differences and the involved different learning cultures that inevitably prevail in a globally operating group. Here it is necessary to evolve an understanding of in how far the training contents are relevant for all regions worldwide and in which languages translations are necessary.

Finally, there is the technological aspect. Here the focus is on technical know how and on the necessary technical infrastructure. One of the basic prerequisites for the support of a training by e-learning is that all staff at all sites have equal access to the e-learning system.

To simplify the readiness check at Krones, the most important success paths has been defined as questionnaire and has been answered by an expert team. After the design of the training contents (including the technological e-learning design) has been created and the contents have been produced, the training in the Krones AG sales organisation has been communicated, adapted to the requirements of the different nations (language adaptations) and released for application.

For the project "CRM introduction at Krones AG", the elaborated paper and the investigated result types have supplied important findings concerning the conception of a training. These findings at least were used to create a structured implementation plan and task list defines clear measures for the management of the implementation of the CRM Blended Learning training. The elaborated training framework could be the practically applied in the course of the project.

3) Conclusion from case study

The application of the CeLMM for approximately one year shows that Krones has preferred and implemented a combination of e-learning and classroom trainings. Thanks to the introduction of the model, systematic planning of the trainings under consideration of all relevant issues has been possible. So a sustainable training concept has been worked out and introduced. The implementation of e-learning represents for Krones a new type of user training and training documentation, and therefore needs to be optimised and further established in other projects.

IV. Conclusion and Further Research

As a guideline for the summary of the research study, the theses defined above have been assumed. From the point of view of the authors, the following can be concluded:

- ***About Thesis 1 (H1):*** The elaboration of the case study clearly shows that the application of the Blended Learning concept for in-plant further education in the area of business process innovations and IT applications in internationally operating SMEs such as the Krones AG is successful and constitutes a sensible support.
- ***About Thesis 2 (H2):*** The consequence of the decision in favour of the use of the Blended Learning concept is the requirement of a structured management for the introduction as well as for the realisation. Without the selection of a model or a framework for systematic decisions and an efficient management of the limited training resources - like the CeLMM framework - , sustainable effects of the Blended Learning approach cannot be realised from the point of view of the authors.
- ***About Thesis 3 (H3)***: The results of the present case study show that the CeLMM framework in the context of small and medium-sized enterprises with international orientation can be successfully adapted and applied for pedagogically mixed training methods. This confirms the previously formulated thesis 3 for the present case with focus on the "pre-usage" phase of the model. The framework offers the advantages of a descriptive procedure for managing the typical and necessary activities in the phases of the training management under consideration of the holistic success factors in the internationally oriented enterprise. The consideration of the different domains makes the interactions obvious and conveys them into a systematic management of the necessary activities. This allows for an efficient and comprehensive handling of the complexity that arises due to the roles - part of which is working on an international level - in the further education process.

The limitation of the obtained examination results is reflected in the restricted selection of the number of enterprises, as well as training processes in the study. In spite of the time-delayed check of the CeLMM application, a lasting proof of the effectiveness and efficiency of the applied theories is possible only after a longer application time. Also the use of the model in the case study with focus to the "pre-usage" phase and its typically processes of management might be seen as a limitation for this research.

In spite of the stated limitations in the implementation of this study, from the point of view of the authors it mainly contributes to the scientific treatment of in-plant further education processes and their management in internationally operating organisations. The application and adaptation of the Cybernetic e-Learning Management Model in SME organisations can be applied in the large quantity of existing small and medium-size enterprises in Germany and worldwide in order to improve the situation. This should show positive effects in the organisations (profit as well as non-profit) that nowadays have to deal with resource bottlenecks.

Beside the scientific relevance of this research activity the practical relevance is obviously. The considered organisation Krones improved its effectiveness and the efficiency especially the quality for managing the training for projects like the CRM system by using the comprehensive management model. Also the model was basically designed for e-Learning situations, the organisations can use the CeLMM framework as to start managing its training efforts also for further education trainings are a mix from classroom and e-Learning methods.

The following implications for future research can be derived from the study results and from the previously described limitations for the conducted study:

- ***Expansion of the study to other SMEs in a similar Blended Learning setup*** *for further education measures in business process innovations and introduction of IT applications, in order to increase the validity of the study results. An application of the CeLMM framework in different cases specified by the literature and practice of in-plant further education should be perpetuated by means of more case studies.*
- ***The development of the CeLMM in terms of examination and consideration of competency models*** *for the far-reaching coverage of possible further education contexts (in terms of expansion of the pedagogical domain) in the environment of SMEs is to allow for enhanced access to the traditional in-plant further education by means of media-supported trainings.*
- *A permanent verification of the effectiveness and efficiency of the application of CeLMM and Blended Learning setup translates the argumentation involved in the study into a useful and supportive issue for the CeLMM.*
- ***Respecting the on-going development of technological innovations in the CeLMM framework*** *in context of e-Learning like the use of the Internet of Things or the use of social media with the question how these will affect the need for the management issues for SMEs when using Blended Learning training concepts.*

Also in the future, the in-plant further education and the continuous, efficient development of know-how will be a key factor for success in small and medium-size organisations. As this study shows, a structured management instrument is required for this purpose from the point of view of the authors, which should systematically be considered in the plans of the enterprises.

At least it can be stated, that the from CeLMM framework research upcoming research topics are partly addressed by this work. Considering Hilgarth's work from 2011 [5], especially the *continuously investigating and improving* (of) *practicability and efficiency of the Cybernetic e-Learning Management Model* and the *periodical model evaluation and assessment* are addresse points with this research.

Acknowledgment

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Simon Bayer did his bachelor in Industrial Engineering and Management at the University of Applied Sciences Amberg-Weiden, Germany in 2012. First step in his business career had been project management at TGW. There he was leading projects for the development of intralogistics software solutions. Since 2014 he is working as an inhouse consultant at Krones AG in Neutraubling.