Towards a Maturity Model for E-Collaboration – A Design Science Research Approach

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Abstract

Introducing electronic collaboration (e-collaboration) is not a matter of introducing new software, but it is a matter of introducing new, and if applied correctly, more efficient working processes and methods (i.e., e-collaboration capability). As a first step before introducing a collaboration technology, managers should comprehensively examine their organization’s underlying capability. Accordingly, this study draws on literature of maturity models and success factors in the areas of e-collaboration and knowledge management as well as results of case studies of SharePoint introduction projects in order to propose a maturity model for e-collaboration as holistic approach which seeks to detect whether an organization exhibits the capability for efficient e-collaboration (i.e., analyze as-is situation) or what should be altered or implemented in order to achieve this (i.e., derive measures). Hence, this paper presents the first iteration of an e-collaboration maturity model instantiated as Excel assessment by using the design science research methodology and it results with the proposition of a situational alignment.

1. Introduction

Maturity models may be understood as “artifacts which serve to solve the problems of determining a company’s status quo of its capabilities and deriving measures for improvement therefrom” [2]. De Bruin et al. [6], moreover, state that maturity models have been designed to assess the maturity (i.e. competency, capability, or level of sophistication) of a selected domain based on a more or less comprehensive set of criteria. Essentially, maturity models can be used as: snapshot, a representation of the as-is situation (i.e., an evaluative and comparative basis for improvement); recommendation for action (i.e., in order to derive an informed approach for increasing the capability of a specific area within an organization), instrument for controlling (i.e. measuring the success of an action).

Following the design science research approach [cf. 14, 26], we are going to design an e-collaboration maturity model. This will be a holistic approach which seeks to detect whether an organization exhibits the capability for an efficient e-collaboration (i.e., analyze as-is situation) or what should be altered or implemented in order to achieve this (i.e., derive measures). Capability describes the ability of an organization to ensure that e-collaboration design, deployment, and practice is meeting the demand for an efficient e-collaboration. Critically, capability includes the ability of an institution to establish and sustain efficient e-collaboration by giving direct or indirect organizational support.

“Collaboration is a process or act of working with individuals to produce an outcome, product, or service” [3]. More specifically, e-collaboration is a direct and reciprocally influencing “discussion” held by two or more persons to solve or cope with a task or problem which is taking place in a jointly created and negotiated, computer-moderated context (joint acceptance-space, cooperative setting) using resources collectively [28]. Usually, e-collaboration is a process which lasts longer than a single talk or meeting, since it aims to achieve a certain goal or solve a certain problem.

Subsequently, we explain the research motivation as well as research gaps and our contribution accordingly. Afterwards, we describe our research approach according to Peffers et al. [26] which comprises in addition to problem identification (section 1.1 and 1.2), objectives of the solution (section 2), development (section 3), and evaluation (section 4). The conclusion (section 5) will discuss contribution, limitations, and outlook.

1.1. Problem identification and motivation

The recent (market) developments confront us with a mix of circumstances: (a) validated knowledge from past research on groupware or e-collaboration such as how to introduce new working styles and processes is still in the research knowledge base, but does not always apply to current developments, since (b) new
emerging collaboration technologies\textsuperscript{1} [cf. 7] enable new opportunities which are not yet researched widely such as wiki-style working, etc. [9, 10]. (e) IT departments are usually responsible for the collaboration technology and hence for e-collaboration itself (i.e., e-collaboration strategy, introduction, communication, technology training, corporate-wide change of working behaviors, etc.), but neither have the awareness nor the abilities to introduce a collaboration technology organizationally.

Already in 1992, Marca and Bock [18] have stated that the introduction of “groupware is a conceptual shift; a shift in our understanding [i.e. while] the traditional computing paradigm sees the computer as a tool for manipulating and exchanging data, the groupware paradigm, on the other hand, views the computer as a shared space in which people collaborate; a clear shift in the relationship between people and information.” Hence, instead of introducing a technical system, an appropriated manner of working (together) needs to be introduced; and a guideline should explain how to work collaboratively—and not how to use the system [9]. In fact, mostly, the IT department is seen to be responsible for introducing a collaboration technology [5], which must include a transformation in terms of working behavior which is not a typical core competence of IT staff. This lopsided focus leads unavoidably to disregard of crucial organizational and cultural factors. A technical implementation without an organizational adaptation mainly leads to a decline in user acceptance or understanding, and in the end, to non-efficient e-collaboration.

1.2. Research gap and contribution

This situation given, we have detected the following research gaps. First, these new circumstances demand for a reconsideration of proprietary software introduction procedure methods. Usually, an introduction procedure method is applied to implement enterprise software technically, but not organizationally like in a sense required for e-collaboration. Essentially, this paper will not provide a validated introduction method, but by providing a maturity model, it will enable managers to analyze the organizational as-is situation and determine the organizational capability in terms of e-collaboration which will probably serve to change the organizations’ initial situation. This, however, can be seen as a first to-be-done activity of an e-collaboration introduction method which will help to set up goals and define activities for the subsequent e-collaboration introduction project. Q1: How does the first step of an e-collaboration introduction method look like and what is its deliverable?

This leads directly to the second research gap. Managers are wondering increasingly why a technical implemented collaboration technology does not generate the promised benefits. They are asking for an as-is situation analysis of their organization in order to get insights into the weaknesses, and thereby, give starting points for their delayed organizational transformation. The common research knowledge base has no answers to all these questions altogether, but usually a maturity model serves very well in doing so. However, our literature review [cf. 2, 13]\textsuperscript{2} has revealed that maturity models for e-collaboration are rare, applicable and simultaneously rigor/sound maturity models have not been revealed, though, a huge amount of maturity models for knowledge management exits which can partly serve as assembly base. Q2: What are the preconditions for introducing e-collaboration successfully to an organization and how can those be measured? How must an organization be designed in order to benefit from the technology-given opportunities?

The decision (facilitated by praxis partners) to develop a maturity model entails a third gap, since “whilst maturity models are high in number and broad in application, there is little documentation on how to develop a maturity model that is theoretically sound, rigorously tested and widely accepted” [6] and this has not been improved yet. Hence, meta-research on the rigor development of maturity models is needed which cannot completely be answered in this paper, though some promising approaches can be derived. Q3: How can a maturity model be constructed, evaluated, and revised?

1.3. Research approach: applying a design science research methodology (DSRM)

For the development of the e-collaboration maturity model, we apply the objective-centered solution approach of the design science research methodology (DSRM) presented by Peffers et al. [26] and align our research to the seven guidelines for design science research by Hevner et al. [14]. We have selected the design science research approach for our research since it aims at solving practical problems by creating and

\textsuperscript{1} e.g., IBM Lotus Notes, Microsoft SharePoint (MSS), Jive SBS, O3Spaces, Open Text ECM Suite, or Oracle Beehive

\textsuperscript{2} To simultaneously focus this paper to the essential research parts and provide its rigor development, we decided to extract long tables to a web site to give readers the opportunity for an in-depth view to certain details: http://shresearch.blogspot.com/2010/09/results-of-literature-search-on.html
evaluating IT artifacts intended to solve identified organizational problems [14]. IT artifacts are broadly defined as constructs (i.e., vocabulary and symbols), models (i.e., abstractions and representations), methods (i.e., algorithms and practices), and instantiations (i.e., implemented and prototype systems) [14].

According to Becker et al. [2] and Mettler [21], it can be assumed that the development of maturity models falls within the application area for the guidelines by Hevner et al. [14], and accordingly, design science research (DSR).

The DSRM consists of six activities (i.e. steps) [26]. Figure 1 presents our applied techniques and performed activities in each DSRM step. In order to achieve rigorous as well as relevant research results, we draw upon the following DSRM steps, whereby the paper is structured accordingly:

- **Problem identification and motivation**: In the first section, we have specified the research problems and gaps, provided practical relevance and justified the value of a solution. Additionally, based on problem scope, we have derived research questions guiding this paper.

- **Define the objectives for a solution**: The second section provides objectives of the intended e-collaboration maturity model. Based on a literature review, design recommendations as well as traps in maturity model design and assessment will be identified and suggestions for circumvention will be proposed.

- **Development and design**: The main part of this paper describes the maturity model development. Based on a literature review and inductive case studies the maturity model will be designed and iteratively developed according to the requirements of maturity model construction [2]. Basically, in a first step, the maturity model will be build upon (critical) success factors for e-collaboration (or knowledge management) from literature as well as from the conducted case studies. Simultaneously, based on several identified maturity models produced for a diversity of domains, model adaptation mechanisms, i.e., configuration, instantiation, aggregation, specialization, analogy [29], are used to create the e-collaboration maturity model.

- **Demonstration**: By means of an application test with three participant organizations we demonstrated the applicability and usability. The utility of the maturity model for e-collaboration will be approved by several additional application tests in future.

- **Evaluation**: According to Hevner [14], the artifact will be evaluated in terms of quality, utility and efficacy which cannot be demonstrated fully in this limited space of this paper.

### 2. Objectives of the solution

Fraser [8] analyzed multiple maturity models and has found “different types […] [but] they share the common property of defining a number of dimensions or process areas at several discrete stages or levels of maturity, with a description of characteristic performance at various levels of granularity”. Additionally, he has found that the various components which may or may not be present in each model are: a number of levels (typically 3-6), a descriptor for each level (i.e., initial, repeatable, defined, managed, optimizing), a generic description or summary of the characteristics of each level as a whole, a number of dimensions or ‘process areas’, a number of elements or activities for each process area, a description of each activity as it might be performed at each maturity level [8].

Essentially, from reviewing maturity models and their documentations, it has become clear that an applicable maturity model consist of two parts: first, a model which is a structured collection of elements that describe certain aspects of maturity in an organization; and, second, an assessment or appraisal method which is a procedure that says how to apply the model in order to assess an organizations’ maturity. The model-like part comprises (1) a classification grid with a stepwise interpretation of maturity levels and (2) a maturity level description with assigned requirements for each maturity level. Contrary, the assessment method (method-like part) is responsible for (1) analyzing and classifying an organization and (2) finding recommendations and measures in order to improve organizational capability. Correspondingly, derived from the Capability Maturity Model Integration (CMMI) and other maturity models as well as from method engineering meta-model [11], Figure 2 proposes a simple maturity model meta-model which helps to understand the two parts and its interrelations.
Comprising the minimum elements of maturity models, this meta-model guides the development of a maturity model, with the freedom to add building blocks relevant for the considered domain or application context.

Figure 2. Example for a maturity model meta-model (with example values for some entities)

“Maturity models […] lack a clear definition and contextualization with regard to design science research” [22]. The current understanding of maturity models in design-oriented research tends to be somehow in-between the both artifact types, model (i.e., state description respectively maturity levels) and method (e.g., a number of key practices which comprise improvement activities in order to reach an intended level of maturity) [22]. The current model versus method discussion [cf. 30] where both are considered as the “other side of the same coin” also meets the maturity model definition. Moreover, this suggests that developing a maturity is related to both the development of a model and the development of a method.

Based on the critique and shortcomings of maturity models and their construction mentioned in maturity model literature, we extracted some fundamental problems and propose modifications accordingly in Table 1. Realizing these solution approaches, however, demands a broad maturity model understanding. Especially, the idea to prescind from maturity steps and aim for continuous maturity levels would not be approved by every maturity model definition.

Table 1. Maturity model design problems and proposed solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Description</th>
<th>Solution</th>
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<tbody>
<tr>
<td>Non-comparability of companies</td>
<td>In opposition to CMM, the intended e-collaboration maturity model does not focus on one organization type, i.e. software development industry and with CMMI also adjacent area. It needs to be applicable for all types of organizations. Though, it is not expedient to design one maturity model that fits all. For one reason, e.g., a high e-collaboration maturity in an innovation-driven software enterprise cannot be comparable with a quality-oriented local working bureaucracy. Moreover, by designing a maturity model and recommendations within, one must not force organizations to change their complete structure in order to reach a high maturity, but show them the way to make the most of their situation.</td>
<td>• Hence, the maturity model needs to be justified for at least the most occurring organization types, i.e. situations. This means that a generic maturity model provided with configuration rules, can be configured to specific situations resulting in a situational maturity model [cf. 22]. The method engineering concept of situativity will be used to typify organizations. In more detail, this means a definition of specific organizational situations by means of context types (see [4]).</td>
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Table 1 (continued). Maturity model design problems and proposed solutions

<table>
<thead>
<tr>
<th>Problem</th>
<th>Description</th>
<th>Solution</th>
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<tbody>
<tr>
<td>Definition of maturity levels</td>
<td>When defining the levels of maturity for a particular application area, a tradeoff between the state of an innovation's uncertainty and its actual diffusion (which assists in predicting whether and how an innovation will be successful) [21] has to be considered in order to guarantee 'useful insights' from the application of the model. When focusing on the assessment of emerging innovations the levels of maturity may be extremely uncertain given that no dominant design is found already. Recommended improvement activities therefore probably will be estimated as speculation [21]. On the other hand, when concentrating on mature innovations the levels of maturity are clear but the potential for improvement is only marginal [21]. In such a case the results from an appraisal may be understood as ‘bureaucracy’ or ‘platitude’ since no substantial benefits may be gained. Hence, the ways in progressing the levels of maturity may be clear (mature innovations) or extremely uncertain (emerging innovations) [21].</td>
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<tr>
<td>• Continuous maturity instead of steps (i.e., levels): Since this maturity model will not be the fundament for any party certification, there is no added value by knowing that an organization is exactly assessed to a certain maturity level.</td>
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<tr>
<td>Rigor and relevance</td>
<td>From science it is difficult to argue for certain maturity levels. On the other hand practitioners do not have a benefit of exactly knowing on which level their organization is, but they prefer to know how good the organization is compared to their competitors and where the ‘adjusting screws’ (and measures) are to perform better.</td>
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<td>• Average per organization type: Having an average per organization type makes it easy to compare organizations. (This assumes that the situations will be defined exactly so that an organization is in the same cluster like its competitor. This must be considered in the selection of context types, e.g., according to industry.)</td>
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<tr>
<td>Obsolescence by innovation</td>
<td>Maturity models inherently become obsolete because of changing conditions, technological progress or new scientific insights. If an unchanged maturity model is supposed to be permanently valid for its problem area, it needs to be validated regularly by appropriate evaluations. Modifications that may become necessary in time can be accommodated in a new model version [2]. Moreover, building a maturity model for a recent arising problem area (e.g., “e-collaboration 2.0”) implies that there are only a few good practices and even less scientific insights to the area so that the researcher can non-foreseen the developments and new insights so that a current model still can just reflect state-of-the-art knowledge. Hence, a maturity model in a still growing and “maturing” area needs to be “mature” accordingly.</td>
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<tr>
<td>• Modular composition: Using small (independent) exchangeable building blocks on the lowest granularity level, enables later adaptations.</td>
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<tr>
<td>• Moving average per organization: Calculating the average continuously in an interval of e.g. 6 to 12 month can avoid obsolescence. This moving average includes two indicators: first, an increase will suggest a trend; and second, on the long run, a significant difference with the default value will indicate obsolescence, and hence, a revision of the whole model.</td>
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3. Development and design: constructing a maturity model for e-collaboration

As stated before, there is little documentation on how to develop a maturity model that is theoretically sound, rigorously tested and widely accepted [6]. But recently, some researchers outline guidelines for a rigor maturity model design [cf. 2, 6, 21]. Becker et al. [2] emphasize some good maturity model approaches and have accentuated, which is most closely to our applications area, the e-learning maturity model (eMM) [19, 20]. Accordingly, we will follow these guidelines, but still need to provide a more specified procedure method for developing an e-collaboration maturity model. In future, this could probably serve as a procedure method for developing maturity models in general—on a from-scratch-strategy supported by an assembly-based sub-strategy.

3.1. Procedure method for developing a maturity model for e-collaboration

Since in design science research “a generic artifact consists of language aspects (construct), aspects referring to result recommendations (model), and aspects referring to activity recommendations (method) as well as instantiations thereof (instantiation)” [19, 30], a maturity model also needs to consist of these four elements.

Within method engineering Ralyté et al. [27] suggest strategies and sub-strategies for constructing a method or model. Since we have not one specific model—but multiple diverse models—to draw upon, we need to apply the from-scratch-strategy. And we use the assembly-based sub-strategy to build the “skeleton” (first step, see section 3.2) of the maturity model and enrich it with content/“meat” from success factors for e-collaboration (or knowledge management) from literature as well as from the conducted case studies (second step, see section 3.3).
First, in order to reuse artifacts, some authors have identified several model adaptation mechanisms: model type selection, element type selection, element selection, term variation, and illustration variation (i.e., generating model adaptation mechanisms, also called configuration) as well as aggregation, specialization, instantiation, and analogy (i.e., non-generating) [cf. 1, 29]. As mentioned before, results of a rigorous literature review [cf. 13] has revealed that there do not exit a rigor and applicable maturity model for e-collaboration. But within the area of knowledge management there have been several efforts in this direction. Hence, the first methodological step is conducted to apply model adaptation mechanisms in order to extract and adapt useful thoughts or aspects of existing maturity models. This refers to model, method, construct, and instantiation elements—not only the model-like part. Therefore, we only focus on maturity models of e-collaboration-related area, e.g., knowledge management, enterprise 2.0, or e-learning, since these are more promising in terms of integrating social and cultural aspects related to e-collaboration which seems to be most challenging.

Second, simultaneously, the second methodological step, which identifies success factors for e-collaboration as well as barriers and consolidates these, seeks to create a valid content basis. These success factors and barriers to success result from literature review and case study research. This combined methodological procedure (adaptation from related models and development from the scratch using success factors) is a promising approach to develop a new maturity model considering best practices from related fields and models.

### 3.2. Applying adaptation mechanisms to maturity models to define construct, model, method, and instantiation aspects

Why is knowledge management related to e-collaboration? “[E-]collaboration aims at a transfer and joint application of knowledge by direct interaction within a collective of participants” [17]. It is thereby closely related to socialization which is one of four knowledge transformation processes of Nonaka’s [25] SECI model [17]. Hence, management of collaboration is a subset considered in knowledge management. The relation of e-collaboration to enterprise 2.0 or business 2.0 is rather obvious, since enterprise 2.0 is a new term founded with the web 2.0 movement which seeks to transfers the web 2.0 paradigms to enterprises. As trend term enterprise 2.0 refers to the recent research base of knowledge management and e-collaboration. That is the reason why maturity models from those related domains are valid to analyze or to adopt from. Maturity models or assessment method from other domains can be used to adopt functionalities or design.

<table>
<thead>
<tr>
<th>Maturity Model / Appraisal Method</th>
<th>Construct</th>
<th>Model</th>
<th>Method (Assessment)</th>
<th>Instantiation</th>
</tr>
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<tbody>
<tr>
<td>E-Learning Maturity Model (eMM) [19, 20]</td>
<td>Dimensions cover aspects which are inherent in various layers/components (e.g., culture, management control definition of standards, planning, and delivery)</td>
<td>As-is situation (and information about strengths and weaknesses)</td>
<td>Simple self-assessment, simple questionnaire instead of complex interview and observations of a large amount of employees, complementary assessment handbook</td>
<td>Excel-file enables assessment via instant application</td>
</tr>
<tr>
<td>Factor 4 Index [23]</td>
<td>—</td>
<td>Up-to-date data base, for comparison with industry average</td>
<td>Questionnaire asks for current and desired</td>
<td>Results in form of spider web chart</td>
</tr>
<tr>
<td>Business Process Management Maturity (BPMM) [6]</td>
<td>Components and subcomponents cut a domain into subordinated parts (i.e., structure)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Knowledge Management Benchmarking Forum (KMBF-PSF)</td>
<td>—</td>
<td>Up-to-date data base, for comparison with industry average</td>
<td>—</td>
<td>Visualization of results in form of spider web chart</td>
</tr>
<tr>
<td>Development of Situational Maturity Models [22]</td>
<td>—</td>
<td>Continuous maturity; Situational maturity model</td>
<td>—</td>
<td>Visualization of results in form of spider web chart</td>
</tr>
</tbody>
</table>
Table 2 presents a selection of maturity models and appraisal methods which serve well as assembly base to adopt certain elements. In each column, we have described a special characteristic which we applied to our maturity model and adopted from the construct, the model, the method, or the instantiation of a specific maturity model or an appraisal method.

3.3. Developing the model-like part

3.3.1 Success factors and barriers to success for e-collaboration as basis for (sub) components

In the design of the e-collaboration maturity model, we have extended the concept of success factors (SFs). We have conducted interviews with 45 practitioners from eight companies of different sizes, nationalities, and industries. We have also analyzed SFs and barriers using about 50 research articles (published research studies).

Gain Success Factors for E-collaboration and Barriers to Success from Literature Research

Haas [12] has made a valuable contribution with his literature research on knowledge management success factors and barriers to success (which is an enhancement of [16]). He has analyzed more than 50 studies and meta-analysis studies which consolidated into an extensive list of success factors for e-collaboration. This is a promising starting point for extracting success factors for e-collaboration. Some of his “success factors” are not relevant for the maturity model for e-collaboration and will not be integrated; these are, among others: knowledge management tools, and concrete measures (activities). This basic set of success factors and barriers can be extended by success factors for e-collaboration from selected literature.

We have adopted a success factor if:

- it is not focused specifically on knowledge or knowledge management processes, but rather for knowledge sharing in general (i.e., e-collaboration),
- it is not system-dependent (i.e., does not characterize system features or use),
- more than one source identifies this as success factor, and
- the sources identifying this as success factor are ranked at least as A/B-conference or A/B-journal according to the AIS World ranking (in the specific field of knowledge management an international C ranking is still appropriate; hence, exceptions are: Journal of Knowledge Management and Hawaii International Conference on Systems Sciences (HICSS)).

Gain Success Factors for E-collaboration from Case Studies Research

Case studies are particularly suitable for understanding phenomena within their organizational context [31]. Klein and Myers [15] performed a study and concluded that “case study research is now accepted as a valid research strategy within the IS research community.”

In order to corroborate the findings from literature research, we did a second analysis. In this second analysis, we conducted eight case studies (each with 4–10 interviews à 1–2 hours) and asked CCOs, managers, IT staff, HR responsible, and employees (in their role as SharePoint applicator) as part of an interview about their SharePoint introduction and success (as well as changed processes). In sum, we asked about 45 employees in different organizational roles and completely different experience in terms of e-collaboration as well as different affinity to computer and technologies. Each interview was transcribed into a written report. We condensed both results from case study and success factor analysis to Table 3 (see Appendix3).

A consolidation of all valid success factors and barriers has led to five major aspects which need to be considered in a maturity analysis for e-collaboration: strategy, processes, people, systems, and culture. In the following, the first four will be called components (for a description of the components and sub components, we refer to Table 4, see Appendix3). Components and sub components are sub parts of a considered domain [6]. In Table 4, we present the complete list of components and subcomponent accompanied with some example questions which can serve as a quick assessment.

3.3.2 Dimensions of capability

However, culture is a difficult analysis element, since it cannot be measured easily. Rather, it needs to be analyzed by its occurrence. For this reason, and because of the fact that culture is mirrored in every component, the culture “component” will be one out of five dimensions which are measured across all components. According to Marshall [19], we invented the concept of dimensions which lie across to all sub components (cf. Figure 4). Since Marshall’s first four dimensions (D) completely fit to our model, we adopted them and replaced the fifth one with culture as mentioned earlier: D1 (Delivery) is concerned with the creation and delivery of (process) outcomes. D2

(Planning) assesses the use of predefined objectives and plans in conducting the work of the process. D3 (Definition) covers the use of institutionally defined and documented standards, guidelines, templates and policies. D4 (Management) is concerned with how the institution manages the process implementation and ensures the quality of the outcomes. D5 (Culture) captures the extent to which norms, values, behavior and power balance support an e-collaboration-friendly culture.

3.4. Developing the method-like part

In order to apply a maturity model, it requires an application context and procedure which is usually declared as assessment. Maturity appraisals or “assessments are formal evaluations of personnel, products, or services [and] are usually scheduled at regular intervals, and often use formal surveys, forms, and other materials to ensure consistency and to document results” [3].

According to the method meta-model [11], we defined in Figure 3 a self assessment method to guide the maturity assessment for an organization. A specialist in the role of a CCO or similar will perform the assessment by conducting interviews or surveys with knowledge workers (possibly his/her own estimation is good enough for a first status quo determination) using the recommended techniques.

![Figure 3. E-collaboration maturity model - self assessment method](image)

Depending on the demanded results level (need for improvement measures or just strengths and weaknesses analyses) all or some activities of the proposed activities are to be performed supported by the proposed input elements.

![Figure 4. Assessment (instantiation)](image)
We instantiated our maturity model in a, for now, quick assessment in form of an Excel-file according to Marshall [19]. Figure 4 presents a summary sheet, with calculated values for each sub component and dimension which serve to visualize the results in form of a spider web. A further development will be to compare a company’s results not only with its desire, but with comparable companies. This is referring to a situational maturity models development which will be our next step.

4. Demonstration and evaluation

Evaluation is one of the essential requirements in design science research. According to Hevner et al. [14], “the utility, quality, and efficacy of a design artifact must be rigorously demonstrated via well-executed evaluation”. The utility is demonstrated via feedback from practitioners who applied the maturity model. The quality will be assured if the maturity model complies with the requirements for good maturity models, more specifically: (a) evaluation of design product: in case studies, and (b) evaluation of design process (e.g., quality can be assumed as high, if the amount of required iterations was appropriated and the redesign results converge) [21]. Finally, the, efficacy will be demonstrated via testing, whether the maturity model works as intended.

As mentioned earlier, this paper cannot serve with a fully documented demonstration and evaluation. Nevertheless, we tried to summarize our major efforts and attempts: In a specialized Share Point introduction workshop, we conducted an application test with three participant organizations. Moreover, we ask experts (researcher and practitioner) from time to time to evaluate the current version (Excel-file and annotations) of the maturity model and receive their feedback as structured questionnaire as well as their personal notes which were reintegrated into the current maturity model.

5. Conclusion and future work

This paper presents a first conceptual and empirical step towards a maturity model for e-collaboration. It proposes a methodological approach for developing a maturity model from the scratch, identifies and consolidates success factors for e-collaboration, and finally, presents an instantiation of the maturity model for e-collaboration as quick assessment.

The maturity model for collaboration developed in this paper is a management instrument and ought to help managers (especially responsible for e-collaboration or platform introduction) to analyze the organizational status-quo, derive measures for improvement, build up a collaboration concept, or set up a collaboration technology introduction project. Moreover, it is one essential module (i.e., deliverable) of the structured holistic IMPACT³ introduction method for collaboration technology in enterprises. Hence, our research results will directly slip into the comprehensive IMPACT framework.

This paper makes a valuable contribution to the fields of e-collaboration, knowledge management, enterprise 2.0, and design science research. More specifically, our research project contributes to the knowledge base by providing an as-is analysis instrument for organizations considering recently changed conditions. Additionally, this paper also implicitly provides a first approach for the development of a rigor and relevant maturity model.

5.1. Limitation

In opposition to the CMM, the maturity model for e-collaboration does not focus on one organization type, i.e. software development industry and with CMMI also adjacent area. It needs to be applicable for all types of organizations (or business units). Anyhow, it is not expedient to design one maturity model that fits all. For instance, a high e-collaboration maturity in an innovation-driven software enterprise cannot be comparable with a quality-oriented local working bureaucracy. Moreover, by designing a maturity model and recommendations within, one must not force organizations to change their complete structure in order to reach a high maturity.

5.2. Outlook

Using the situational method engineering approach [4, 24, 27], we plan to design an e-collaboration maturity model for several types of organizations or business units (i.e., situations). Situational maturity models [cf. 22] apply the method engineering concept of situativity and typify organizations. In more detail, this means a definition of specific organizational situations by means of context types [4]. Hence, for the situational maturity model for e-collaboration (SiMMCo), organizations and business units, respectively, need to be clustered according to their context (e.g., multi-nationality) which increases e-collaboration complexity. This allows creating a specific model for each cluster.

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6. References


