

# The Impact of SAP on the Utilisation of Business Process Management (BPM) Maturity Models in ERP projects

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**Abstract.** This research analyses the complex relationships between SAP, BPM and BPM maturity models. The aim is to investigate and analyse the interaction between the use of the SAP ERP software package and the deployment of BPM maturity models. Four BPM maturity models are examined in more detail using different data sources to investigate and examine the dependencies between the three approaches. As a follow-up step, this research develops ten management guidelines which improve the collaboration between SAP ERP, BPM and BPM maturity models. Finally, these management guidelines were reviewed through a web survey and rated by over 150 participants before the final recommendation of the management guidelines was made by the researcher.

**Keywords:** SAP; ERP; BPM; Business Process Management; Maturity Models; BPM Maturity Models

## 1 Introduction

SAP AG is a German company created in 1972 and the world's largest provider of enterprise software that, in 2017, served more than 345,000 customers in over 180 countries [1]. SAP's enterprise resource planning (ERP) system provides software solutions for various types of business process functionality such as manufacturing, finance, sales and human resource management and is the de facto industry standard for many industries [2]. ERP software is in general the dominant strategic platform and performs a variety of different business functions for holistic business approaches [3].

Business process management (BPM) is an approach to support and operate business processes in organisations and can be used with or without different IT systems or IT infrastructure. Basically BPM has nothing to do with IT, because the basic idea of BPM is to think in terms of processes and to deal with the questions: 'who does what, when, how and whereby?' [4]. In practice, companies often use IT software tools to administer the BPM of an organisation. Additionally, standard software such as SAP ERP assists a company in standardising and automating processes to make them as efficient as possible [5].

Both approaches promise an improvement in business processes in companies and can be used together. SAP offers standard business processes within its ERP software,

and BPM specifies the objective of improving business processes in an organisation as a general goal.

In conjunction with the two approaches, BPM maturity models can be used as diagnostic tools that allow an organisation to assess and monitor the maturity of its business processes [6]. Therefore it provides a framework to test, analyse and improve business quality [7]. Generally, a BPM maturity model measures the effectiveness and quality of processes and classifies them into different levels of maturity or provides a step-by-step guide to reach a more advanced use of BPM within an organisation [8].

This research analyses the complex relationships between the three topics, SAP, BPM and BPM maturity models, and investigates the impact of SAP on the use of BPM and the specific BPM maturity models.

## 2 The Use of BPM Maturity Models and SAP in Practice

This research assesses in particular the impact of SAP on the use of BPM maturity models, and evaluates the requirements for, and the restrictions to, BPM maturity models when used with SAP. To explore this behaviour this study is based on eleven personal interviews that were conducted with participants who have practical experience of about ten years or more in the three subject areas. Because of this long experience, the participants are also referred to as experts within this study.

A study with only eleven participants can provide a sufficient number of opinions. A sufficient number is reached if no new information or themes are observed in the additional data collection, and saturation occurs [9]. The research demonstrates that saturation already appeared after the tenth interview.

The semi-structured expert interviews examine a small number of organisations and their use of a specific BPM maturity model in depth. Four BPM maturity models, which feature in the interview statements, are examined in more detail. The models considered were:

- The eden maturity model.

This model was developed by a working party called 'Business Process Excellence' and is now provided by the BPM maturity model eden e.V. Association [10] since 2009.

- Capability Maturity Model Integration (CMMI).

CMMI was originally developed by the Carnegie Mellon University more than 20 years ago. Nowadays, the model is maintained and administered by the CMMI Institute [11].

- The Business Process Maturity Model (BPMM).

This model was developed by the Object Management Group (OMG). Version 1.0 of the maturity model was released in June 2008 [12].

- The SAP maturity model.

This model was developed directly by SAP AG. It was derived from the Process Enterprise Maturity Model (PEMM) developed by Michael Hammer and the CMMI [13].

With a total duration of 14.5 hours of interview material, the data from the interviews in their transcribed form constitute the foundation for this research.

The results of the interviews are then compared and analysed, in a second step, with the documentation of the four BPM maturity models for possible dependencies and the mention of SAP software or other general ERP software behaviours or recommendations.

### **3 Development of Management Guidelines**

The interview material confirmed that the SAP and BPM concepts are closely related. Theoretically, there is often no such link found in the documentation but, in practice, the SAP system is the leading ERP system in many companies and therefore there is a practical connection. Three of the four BPM maturity models examined currently consider only a small range of IT applications, and do not analyse any kind of ERP system. But in many companies SAP is the dominant system, and for this reason a BPM maturity model should also consider this.

Based on a qualitative analysis of frequent and important statements within the interview and documentation material, this research identifies some key statements through comparison, analysis and interpretation. Maturity models such as BPMM or CMMI are already very complex, but the interviews demonstrate that companies are often interested in guidelines that are less complex and require a smaller budget. As a result, ten principal guidelines are developed which are not always elaborated by the BPM maturity models analysed. Considering these guidelines could support a company in using a BPM maturity model in the best way possible if they use a BPM approach within an SAP environment. In general guidelines should give some form of advice for a manager and these ten principle guidelines are developed to be used as management guidelines for practising managers and other relevant stakeholders [14].

The research demonstrates that the success of the eden maturity model is due to the fact that the model has, in contrast to other models, fewer criteria and is easy to handle. For these reasons it is not necessary to develop a separate and totally new BPM maturity model to understand and show possible dependencies. The guidelines can be used to clarify whether the company uses an SAP system extensively in the sense of the BPM idea and in terms of output gets the best of both worlds.

### **4 Validation of Guidelines**

Collecting data from multiple sources strengthens the validity of the data and is described as triangulation [15]. The research uses the method of triangulation from various data sources to examine the relationship between BPM and BPM maturity models from the point of view of an SAP ERP system, and to develop guidelines that enhance collaboration.

The final step of the data triangulation examines the guidelines that were previously developed. Therefore a web survey was used to assess the general applicability of the guidelines developed and the general feasibility of the findings of the interviews.

Possible participants for this web survey were found above all through the German-speaking business network Xing. Over a two month period nearly 500 people were directly contacted and asked to participate in the survey through a URL. In the end 152 participants took part through a self-completed web survey. Participants were varied and included users, process managers, researchers and consultants for SAP process management or BPM in general. Respondents had to have several years of practical experience in at least two of the three subject areas investigated, SAP, BPM and BPM maturity models. For this reason, one completed survey was not used for further analysis because the participant reported zero years of experience in two of the surveyed areas.

The main purpose of the web survey was the clarification of the guidelines and whether these guidelines find support within business practice. Therefore all guidelines are questioned using a Likert Scale approach [9] whether the participant agrees to the guideline or not according to a four-point scale. Due to the even number of answers and with no mid-point, a participant was forced in one direction or the other, to agree or disagree [16]. In addition, it was also possible to omit the question or to answer with 'don't know'.

All guidelines received between 79% and 98% acceptance and were confirmed by the participants. The comments in the web survey demonstrate that only minor changes are needed, to avoid problems of understanding within the guidelines. For this reason, the analysis from the web survey revealed few changes, before the final recommendation of the ten management guidelines developed was made.

## 5 Conclusion

The main findings of this research demonstrate that there exists a much closer link between an SAP system and the application of BPM maturity models, as some experts suggested at the beginning of their interviews. SAP ERP is a dominant system in many companies and has an impact on the utilisation of the BPM approach. To identify and improve the dependencies within an organisation, this research develops ten guidelines which any organisation can use as management guidelines to use the SAP system in combination with a BPM approach in a more optimised way.

The results of the web survey illustrate that the guidelines developed met with broad acceptance from practitioners. Some of the guidelines received approval rates from the participants of up to 98%. This positive feedback demonstrates that these guidelines are quite applicable in practice and provide a practical contribution to improving the interaction between SAP, BPM and BPM maturity models. But every organisation is different and should always question whether all the guidelines are applicable, and which may be of particular relevance and value in the specific company context.

The web survey is only a first review and future research could examine the applicability of these guidelines in more detail. Future research may relate to other ERP systems or could involve some other BPM maturity models. So far, this research has considered only a very small number of BPM maturity models and it is quite possible

that the conclusions that emerged from this research are not generalisable to other and more specific BPM maturity models.

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