How to Successfully Implement a BPMS?

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ABSTRACT

Business Process Management and supporting technology has gained much attention in the last few years. For this reason studies have been performed how to implement Business Process Management Systems in a successful way. While many studies propose a one size fits all implementation method there is a study by Ravesteyn and Versendaal (2007) that proposes a context sensitive method. Their method is based on success factors of BPMS implementation, for each factor a implementation fragment is developed that also takes into account an organizations situation. In this paper we address the applicability of this implementation method by applying an implementation fragment in a BPMS implementation project at a electricity infrastructure organization.

INTRODUCTION

Business Process Management (BPM) is considered by many researchers to be an holistic approach for managing the processes of an organization (Pritchard & Armistead 1999; Indulska, 2006; Rosemann, 2008). However a recent survey conducted by BPTrends (Wolf et al, 2010) revealed that practitioners have different ideas about what BPM actually means or represents. The survey included 258 valid respondents and 36% of these respondents see BPM as "a top-down methodology designed to organize, manage and measure the organization based on the organization's core processes". One third of the respondents of the same survey believed BPM is not such an holistic approach and see BPM as "a systematic approach to analyzing, redesigning, improving and managing a specific process". Having a holistic view on BPM is important because this view allows for the identification of the most important issues instead of endlessly zooming into detail causing a blur on the complete issue (Jeston, 2009).

As BPM is gaining popularity significant investments for the development of supporting information systems are being made by for instance SAP, IBM, Pegasystems, etc (Weske, 2004; Aalst, 2003). When BPM is implemented correctly, return on investment can be up to 20% within the same year according to Gartner (2009a). In 2004 Gartner also estimated that 43% of the investments in IT would involve BPM (Woodley, 2005). A survey conducted with over 1400 CIO's in 2007 revealed that Business Process Improvement was the top priority for their organization (Rudden, 2007) and until 2009 studies showed that BPM had the highest priority for CIO's (Gartner 2009b). There are many reasons why businesses would want to make these investment and implement BPM. Some of the main drivers are increased organizational effectiveness (Pritchard & Armistead 1999), higher quality of service

(Margulius, 2006), easier identification of bottlenecks within business processes (Vergidis et al. 2008), more consistency in execution (Rudden, 2007;Margulius, 2006), easier process diagnosis and analysis, increased reuse of existing functionality and reduced integration expenses (Maurizio et al., 2008) and as a result of all these a higher competitive advantage (Richardson 2006).
However these benefits can only be fully achieved by having a Business Process Management System (BPMS) implementation method or delivery strategy (Ravesteyn, 2007; Terlouw et al, 2009). This is needed to increase the chance of success of the BPMS implementation. Modeling the business processes extensively can give a clear overview of how the business should be run, but if there not executed it does not necessarily change the current business process. Implementation of BPMS is complex and are even more failure-prone as for instance ERP implementations. Reasons given for this fact are that BPMS implementations, just as ERP, require at least some sort of business process re-engineering and organizational change which require "to go beyond traditional project management principles" (Bingi et al, 1999). Furthermore the implementation becomes increasingly difficult as multiple BPM projects are being started because "a BPMS implementation is a continuous process consisting of multiple BPM Projects" (Ravesteyn, 2007). Another reason why specific implementation methods are needed, is because BPM is multidisciplinary, which requires multiple factors to be taken into consideration (Bandara et al, 2009).

An important technology development that has made the current BPMS possible is Service-oriented Architecture (SOA) (Chang, 2006). A Service-oriented Architecture ensures that activities can be approached as independent services. SOA demands a change in the software architecture, existing software components have to be modified to function as software services, and have to be added to the service network. To combine BPM and SOA, the service network has to be incorporated into the business network (consisting of business services) in an intelligent and dynamic way, enabling business processes to run over the service network (Liu, Li, Zhao, 2009). This approach creates the opportunity to be agile and efficient when changing processes or workflows, by reusing existing services that are dependable and optimized (Leymann, Roller & Schmidt, 2002).

The idea of Business Process Management Systems (BPMS) is to incorporate the organizational- and strategic level with the technical level. A BPMS has to delegate business tasks to the right people at the right time, using the right information resources. BPMS should also support modeling and analysis of tasks in order to verify, evaluate and modify both processes and organizational structures (Karagiannis, 1995). BPM is a convergence of many known and proven principles (Ravesteyn, 2007). Figure 1 shows the many different background principles that together lead to the existence of BPMS. Many of these principles are proven and implemented on several occasions while BPMS is a relatively new concept. Therefore developing a context-sensitive implementation method for a BPMS is a unique opportunity for any organization having multiple BPM projects. One such method is described in the following section and tested for applicability in this paper. Therefore the corresponding research question in this paper is: Can a situational BPMS implementation method be used to support BPMS implementation projects in the field?

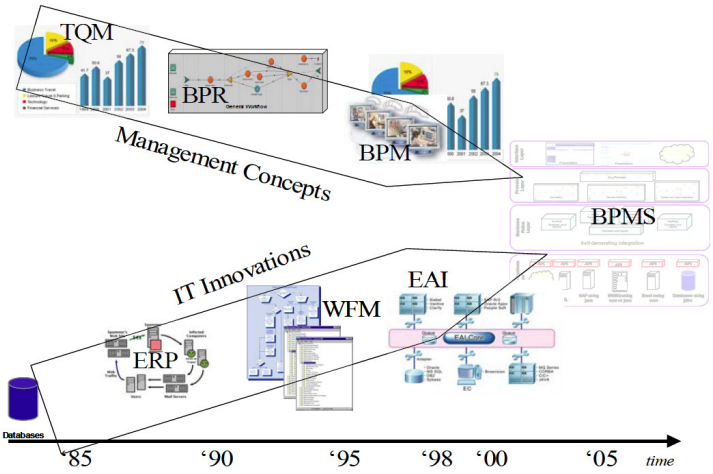

Figure 1: Convergence of proven concepts towards a BPMS (Ravesteyn, 2007)

The next section will describe the used method. In section three we will present the operationalization of the method which is validated by conducting a case study in section four. Finally we present our conclusions and discussion in section five.

A METHOD FOR BPMS IMPLEMENTATION

In the introduction of this paper we showed that BPM is a very broad topic and BPMS implementations need an implementation method in order to overcome the chance of failure. In 2007 Ravesteyn already stated that there are no proven implementation method for a SOA and BPM projects. A year earlier Reijers (2006) published research that, although it did not present a complete implementation method, did provide a checklist that determines the "process orientation prior to a BPMS implementation". While this checklist is not purely on identifying a best-fit method for implementing a BPMS "its aim is to predict the success of a BPMS implementation on the basis of the identified process awareness within an organization" (Reijers, 2006). Another form of guiding and improving the success rate of a BPMS implementation includes identifying the critical success factors for a company. Ravesteyn and Versendaal (2007) presented a list of 14 critical success factors (CSFs) of BPM systems implementation in comparison to the Process Orientation Checklist by Reijers (2006) (see table 1). These factors are extracted from the various concepts on which BPM is founded, such as BPR, TQM, and WFM.

Process Orientation Checklist (Reijers, 2006)	***Critical* Success Factors (Ravesteyn, 2007)**
1. Organizational structure 2. Focus Language 3. Documentation 4. Utilization 5. Information systems 6. Performance measurement 7. Management 8. Customer requirements	1. Know-how and experience with Project Management 2. Experience with Change Management 3. Understanding the Business Process Management concept 4. A well organized design phase (modeling) 5. Understanding the processes of the company 6. Using the 'best' modeling standards and techniques 7. Understanding interdependencies and integration of data sources 8. Well organized maintenance and (quality) control of the process models 9. Understanding how processes and data are linked

	together 10. Understanding how to use web services 11. Involving the right people in the project 12. Having a set of key performance indicators and measuring the change (improvement) 13. Ensuring that the BPM project is part of a continuous optimization effort 14. Creating a culture of attention to quality within the organization

Table 1: List of 14 Critical Success factors in BPMS implementations compared to the process orientation checklist (#9 is missing because it is redundant in this form of presenting the CSFs)

Both the checklist by Reijers (2006) and the critical success factors by Ravesteyn and Versendaal (2007) can be used in support of the implementation of a BPMS. However a step-wise or method-like implementation cannot be derived from these lists.
However in 2009 a situational method for implementing a BPMS was proposed by Ravesteyn and Versendaal (2009) which was constructed using method engineering. Method Engineering is defined by Brinkkemper (1996) as follows: "Method engineering is the engineering discipline to design, construct and adapt methods, techniques and tools for the development of information systems." Four major terms in method engineering are introduced, namely 'method, technique, methodology and tool. However this research will only focus on 'method'. The following definition on 'method' is given by Brinkkemper (1996); "A method is an approach to perform a systems development project, based on a specific way of thinking, consisting of directions and rules, structured in a systematic way in development activities with corresponding development products."

Situational methods are engineered from certain building blocks, called 'method fragments'. A method fragment in this case consists of two types, namely the process and the deliverable. The former refers to the actual steps being taken in order to complete a task, the latter refers to the outcome of a certain task or activity. A coherent set of method fragments together present a method if they reside on the same granularity level, have the same end-goal and have a clear description (Harmsen et al, 1994).

Using the critical success factors found in their earlier research Ravesteyn and Versendaal (2009) developed BPMS implementation method fragments. However the developed fragments have yet to be validated, because it was impossible to validate all factors in the studied project (some factors were not applicable and there was a limited amount of time available for this study). We conducted the following steps in our research:

1) Identify which critical success factor, out of the 14 provided by Ravesteyn and Versendaal (2007), is most applicable to the chosen case study company.
2) Validate the implementation method fragment for the critical success factor by holding a case study.
3) If applicable re-engineer the implementation method fragment to support the practical situation.

MODEL OPERATIONALIZATION

It is important to test the proposed fragments in a practical environment and validate them, as this will provide a both theoretical (meaning it conforms to the rules and techniques of method engineering) and practical sound fragment. A well defined fragment could be used by companies to understand the implications of BMPS implementation, and steer the company in the right direction when working towards such an implementation.

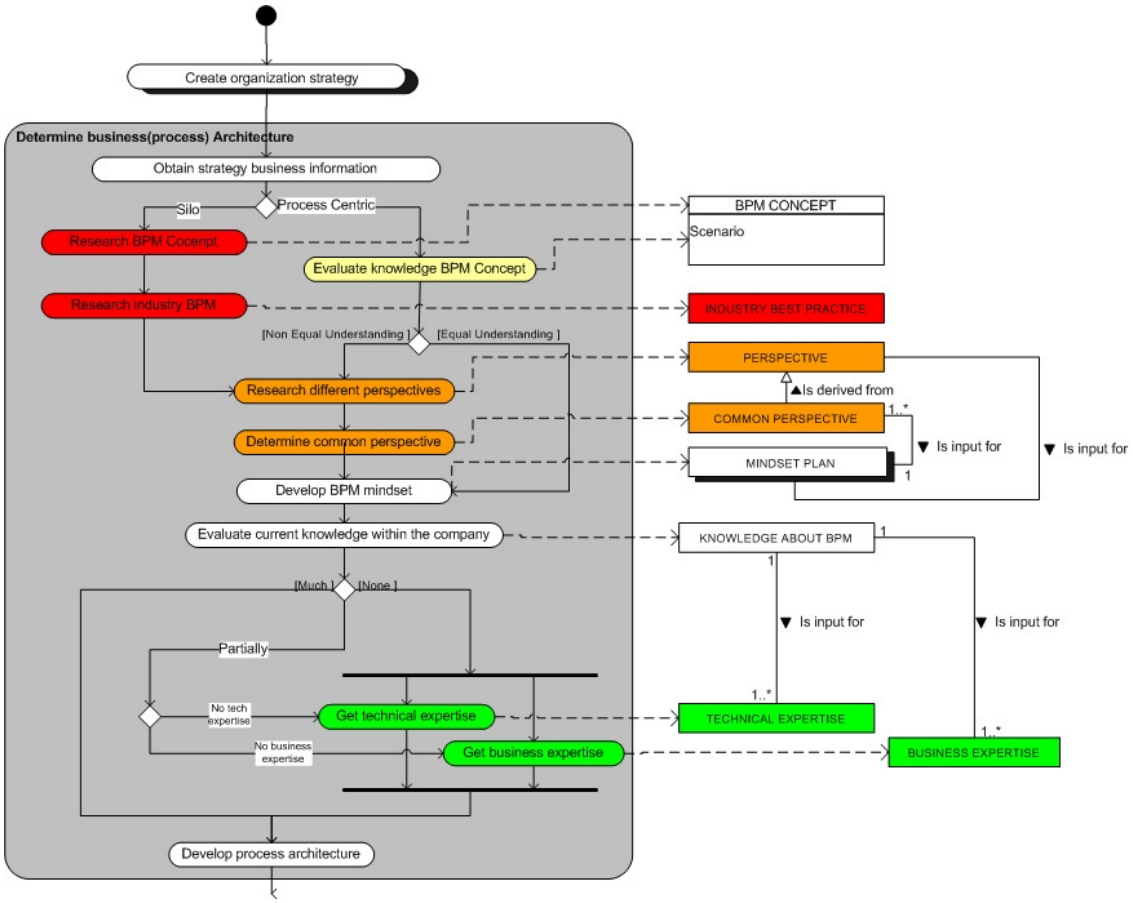

Figure 2: The proposed implementation method fragment for 'Understanding the BPM Concept' by Ravesteyn and Versendaal (2009)

To validate the implementation fragment related to the chosen critical success factor extensive, qualitative interviews will be held with people involved in the BPMS project such as an information manager or project leader. In these interviews all important implementation requirements, consequences and side notes of the chosen CSF will be addressed. In addition to this, the proposed implementation fragment will be presented and discussed. The expert can then relate the proposed fragment to the practical situation. If needed the implementation fragments can be adapted based on this validation process.

In two exploratory interviews the information manager of Stedin and the project leader from Creetion stated that the most important CSF for their project is 'Understanding the BMP concept'. The reason for this being that areas within the company do not have the same focus, causing failure to reuse existing processes and standards, which results in doing more work than needed. 'Understanding the BPM concept' is about providing a clear view of the level of understanding of BPM within an organization. This factor means that the organization should try and get an answer to what kind of mindset there is in place about the business architecture, the degree of common understanding of the BPM concept, and the kind and level of knowledge within the organization about the business and technology side of BPM. The information manager concluded that failing to understand the BPM Concept can result in de-maturing rather than maturing to the next level. The proposed implementation method fragment for 'Understanding the BPM concept' can be seen in Figure 2.

VALIDATION VIA CASE STUDY

The case study is performed at a utility company called Stedin in the Netherlands. Stedin is a Distribution network operator, a company that distributes gas and electricity. Stedin has hired Creetion (a BPM consultancy company) to lead the BPMS implementation project. The case study was setup according to the "guidelines for conducting and reporting case study research" by Runeson (2009) to increase the quality of the case study. Runeson explains the case study design and planning
,different methods for data collection, how to maintain quality with data analysis and how to ultimately report the findings. Using more validation tools for each research can compensate for the weaknesses of each validation tool. A weakness of a survey for instance is that they only provide association, and no causality. One of the weaknesses of a case study however is that the result can be very specific for the organization, while a survey can give results on various experiences from a great number of respondents (Kitchenham, 1996). A case study however can in turn compensate for the lacking causality of the survey. However the use of just one is not per definition incorrect (Flyvbjerg (2006). To give an impression, it only required one case study to falsify the natural sciences 'gravity law' by Aristotle.

The structure of a case study and the data collection techniques can vary (Runeson et al, 2009). We used data collection techniques of the first degree, meaning there was direct contact with the respondents. Benefits of this technique are the control over the way data is being collected, what the format is, how it is collected, etc. The case study was structured in such a way that questions were made upfront, and from the moment the first question was asked, we would 'go with the flow'. The questions were made up front to ensure every topic was covered and every step of the method got the same amount of attention, ensuring quality. Surprisingly, without showing the questions to the respondents, every question was answered in almost the sequence as they were defined.

At the start of each interview we asked what the driver was for the organization to implement BPM. With Stedin it turned out that the person responsible for promoting the BPM concept throughout the organization was the information manager. The driver then needs to make sure that the various managers in the organization understand that processes are running through the organization. After this consensus is created, a second step would be analyzing the processes that have such a high volume which makes it effective to automate certain tasks.

One of the assumed benefits of implementing BPM, or rather supporting these processes with BPM, is standardizing these various (business) processes that run through the organization in order to create consistency and reusability. Also the expected increase in control over the entire process, and control over the intermediate steps within the process was a very important factor at Stedin to support their processes with BPM. These intermediate steps were the source for errors and increased cycle times as data was copied and pasted between applications by hand, sometimes causing the loss of the current step on an instance within the end-to-end process. A typical step in the process where this would occur is between ('historical') departments. When control over the process is present at each department, this data, or more precise information, can be used to create control on the entire process. Nowadays most of the companies use information systems to support their information activities. Stedin researched how much a query would cost that collects all the data from the various information systems and turn it into valuable information which enables a certain level of control over the process. The result was shocking, as the query would cost the same

as 20 FTE's for 1 month, and this query would not even improve the process itself. However this information is very important when helping customers. When a customer wants to know what is happening with certain tasks (e.g. a complaint or a problem) you want to be able to help the customer with just one answer, instead of having to cal multiple offices. Apart from the improved control which could decrease overall cost because of more consistent and precise data, customer satisfaction would also increase because of better reporting.

After the support for the BPM concept is present, specific processes are identified that can be supported with BPM. In the case of the Stedin, three different types of business processes run by the organization were identified:

1) Process steered activities. Standardized projects with materials that are bought and stocked. About 55.000 unique projects are started every year that are related to customers and another 50.000 projects are started as part of inspection and maintenance activities.
2) Project steered activities:
    a) Serial. For instance removing or adding new connections for electricity in houses. These type of projects have a dedicated project manager which controls (almost) every step of a process. Each project manager has about 20 to 100 projects a year. Only a few thousand serial projects are started every year.
    b) Complex. These are on time, unique, large scale projects that take a very long time to complete. An example is the second "Maasvlakte" of the Rotterdam Seaport where electricity has to be supplied to a whole new extension to the Rotterdam harbor. A complex type of project has one or more dedicated project managers that are only working for that type of project. About 20 complex projects are being started every year.

When we take a look at the numbers, the process steered activities have a short cycle time which requires a simple process. Because of the large quantity of activities standardization would render more benefits than the other types of processes. However this knowledge must be present in the organization before determining where the BPM Concept is going to be implemented. The organization from this case study therefore made a business process model. This can help in creating insight into what processes the organization actually has and determine certain BPM activities for processes that can gain any benefits. The most important criteria that determines whether a BPM implementation is going to take place is still a positive outcome of a business case. An example Stedin is the reporting of malfunctions on the public road lightning. Because there was no control within the end-to-end process, almost every day communities would call the company asking when the malfunction would be fixed. Several times per month Stedin was sued for not repairing those malfunctions in time. This became such an agitation that many employees welcomed the BPM initiative. However the initial plan was to buy a separate application that was industry specific for handling malfunctions. If the information manager would have put no effort in solving the problem with BPM, instead buying another (legacy) application, the BPM solution would not have been implemented and a loss of many possible benefits would have been a fact.

The reality of an end-to-end process however includes multiples parties, often parties that reside outside of the organization. Another great effort has to be done by convincing these parties to join the BPM initiative. Stedin experienced resistance from the external parties to change their ways of working because they feared loss of income. By determining benefits specifically for the external party it should become clear to the organization why they should

join the BPM initiative. A dedicated employee of the external party that handles all the communication is important. This employee is required to know the processes, systems, and who is responsible for the sales related to the affected business process. Changing this 'contact person' was believed to be one of the tactics of the external party to slow down the BPM implementation.

To further make sure the 'BPM Mindset' is communicated throughout the processes a process owner must be assigned. This process owner must be integrally responsible for that process. Specifically for Stedin this meant that the process owner of all the malfunctions in the grid is responsible for keeping the grid up as long as possible but also the budget is in his/her hands. By choosing the same person for this, this process owner can determine whether an invoice for a specific repair is valid. When assigning the process owner the benefits of a BPMS implementation must be listed in order to convince employees that a process owner is necessary for the performance of the whole chain. This process owner is furthermore very important to promote and keep the BPM project alive until the BPMS is finally implemented successfully. "The initiative might die before it is even started" was pointed out by one of the information managers.

Stedin, before any BPMS project was started, researched what the benefits in terms of cost would be. While this was a rough estimation, the expected benefits were 2 to 3 million euro's in cost reduction in the first year (excluding BPM project costs). Apart from cost, the cycle times were expected to go down, and the quality of the internal information would increase significantly having three positive consequences:

a) More consistent execution, less room for manual errors and information that goes missing.
b) More precise procurement function, a better overview of what resources are required for the complete end-to-end process, possibly reducing cost due to ordering needed resources at the right time.
c) A better (public) image of the organization, because with the information on every malfunctions on demand, a customer can be informed quickly and more accurately which increases customer satisfaction.

For the BPM project that was started to handle malfunctions on the grid, besides the above benefits, the main benefit was to integrate and connect the existing applications to be able to have control and monitoring over the entire process. The process itself was not considered faster because before the BPMS was implemented an automated message was already sent to the contractor that would solve the malfunction. When communicating the benefits of BPM to general managers a comparison between the current way of working and the new way of working when using BPM is very important according to the people interviewed at Stedin. According to Stedin following this approach creates commitment from the management. The most important decision criteria still remains to be the business case for the organization however.

Because BPM has a lot of components, such as modeling processes, the setup of interfaces with other external parties, external portals, composite applications, the total concept is still not completely clear to most of the employees, and in particular and most importantly to the process owners. It is important for the process owner to be able to understand all the aspects and concepts that are part of the BPM paradigm order to understand its capabilities and benefits. The cause to this lack of understanding, according to Creetion, is that most of the process owners do not possess the required IT knowledge.

Having the same (clear) view on the BPM concept can be accomplished in two ways:

1) Reaching consensus with every part of the organization and the external parties.
2) Having someone in the organization with enough power to change the way of working committed to the BPM concept.

The first was presumed 'extremely difficult' by the consultancy firm as there are many islands to be found within the company. Luckily they had an executive sponsoring encouraging the 'BPM mindset'. The decision made by the executive of IT at Stedin was decisive for taking the 'BPM road' instead of buying an industry specific application.

When the whole mindset and concept is clear to all relevant stakeholders, a proof of concept was conducted in order to gain trust from the various parties. This proof of concept was a success and the start of an actual BPMS implementation was the result. Preferably, according to the consultancy firm, the governance is set up during the implementation project so people that are accountable for the process can be part of the project. However this is not the reality in this particular case, and governance will be set up after the implementation project goes live.

As a final remark the person interviewed from Creetion pointed out that after the project goes live, a report should be made on the actual added value. For Stedin this meant one to two years of gathering live data and then results could be calculated.

UPDATED IMPLEMENTATION FRAGMENT

The proposed fragment for creating understanding of the BPM concept has been re-engineered in such a way that it is more suited to support successful implementation of BPMS projects in the field, extracted from the practical experiences gained by the case study:

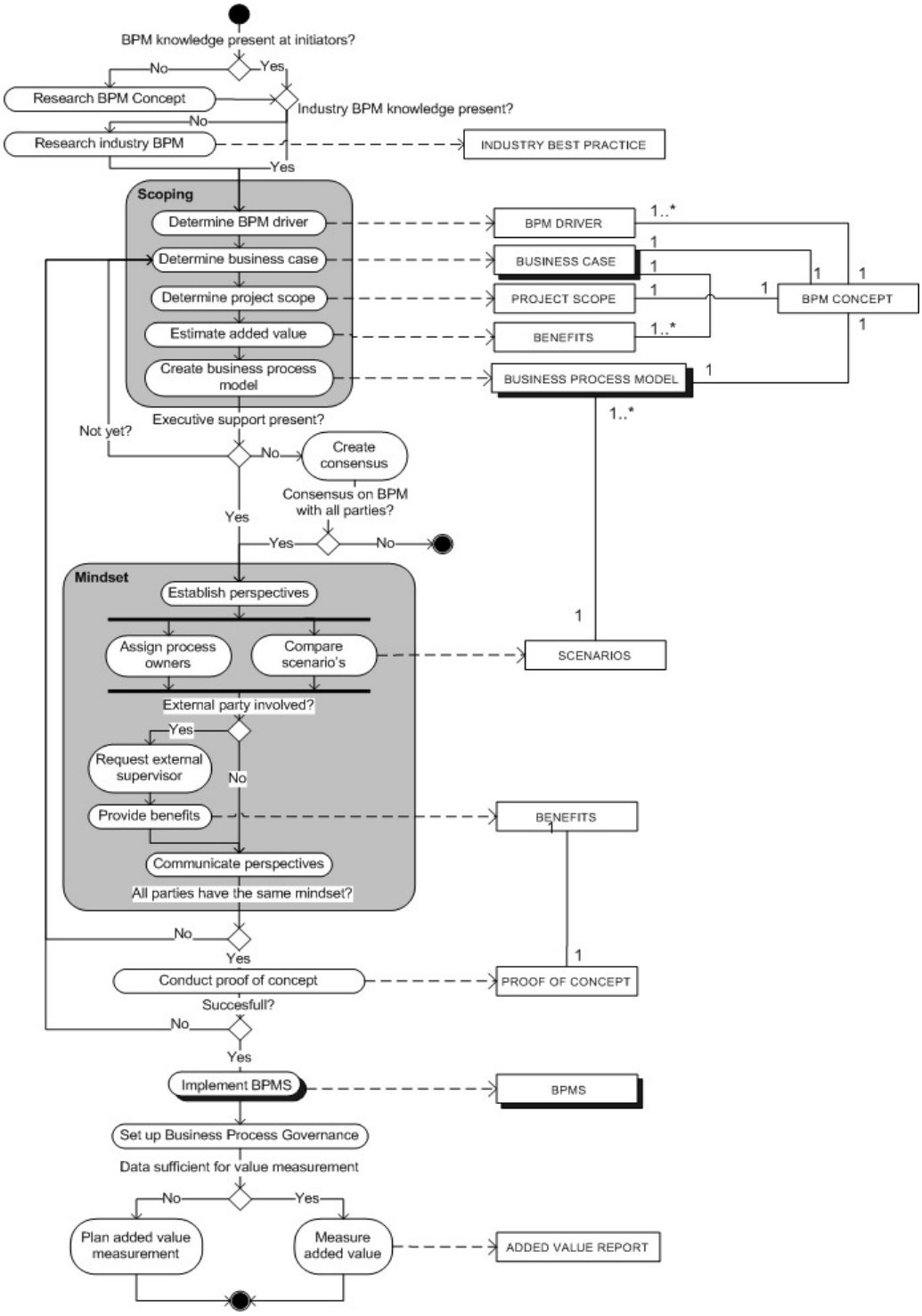

Figure 3: BPMS Implementation Method

The activities matching the method:

Activity	Sub-activity	Description
Research BPM Concept		When there is no knowledge present about BPM at the initiators, the first step should be to find out what the BPM concept means.
Research industry BPM		Researching BPM projects within the industry can give insights into industry specific risks and success stories.
Scoping	Determine BPM driver	A driver is necessary to keep the project alive. Determination of the BPM driver to gain knowledge on how to start promoting the BPM concept through the organization.
	Determine business case	Determine the business case for the organization, showing for instance the cost reduction and thus benefits of implementation of BPMS.
	Determine project scope	Determine the project scope, which process chains should be automated and which process chains have the largest benefit by starting a BPM project.
	Estimate added value	Estimate the added value of the implementation of BPMS within the project scope.
	Create business process model	Create business process models to see how the processes flow through the organization.
Create consensus		If there is no executive support present, create consensus for the BPM implementation project within the organization.
Mindset	Establish perspectives	Establish the perspective(s) that should be communicated and promoted throughout the organization, using the BPM concept and needed to reach a common understanding of this BPM concept.
	Assign process owners	Assign process owners for individual processes or larger parts of the end-to-end process. The process owner is responsible for the process performance and spreading & promotion of the understanding of the BPM concept.
	Compare scenario's	Compare the different scenarios for each specific (sub)process and standardize accordingly in order to create consistent outputs
	Request external supervisor	Appoint an external supervisor to make sure the external parties are aligned to the to-be BPM implementation of the organization.
	Provide benefits	Provide the benefits for the external parties to cooperate in the to-be BPM implementation.
	Communicate perspectives	Communicate the perspectives of the organization to the different departments and resolve any different perspectives or communicate them to the external parties.
Conduct proof of concept		Create and validate a proof of concept in order to persuade all the stakeholders.
Implement BPMS		If the proof of concept is successful, implement the BPMS.
Set up Business Process		Set up the Business Process Governance so the right people have the right decisional capabilities at the right processes

Governance		
Plan added value measurement		If the current data is insufficient plan the added value measurement somewhere in the future (when sufficient data is expected to be present).
Measure added value		When the current data is sufficient, measure the added value by the BPMS implementation.

Table 2: Activity table

The concepts explained in detail:

Concept	**Description**
INDUSTRY BEST PRACTICE	An industry best practice describes success stories for the implementation of BPM (Jeston & Nelis, 2006).
BPM CONCEPT	The concept for the to-be BPM implementation, consisting of the BPM DRIVER, BUSINESS CASE, PROJECT SCOPE, BENEFITS and BUSINESS PROCESS MODEL.
BPM DRIVER	The description of the driver that makes the organization want to implement the BPMS.
BUSINESS CASE	The business case, the reasoning for initiating the BPM project.
PROJECT SCOPE	The project scope describes what process chains are part of the BPM project.
BENEFITS	A description of the expected benefits that the organization will see after implementing the BPMS.
BUSINESS PROCESS MODEL	The current business process model, showing the procces flow throughout the organization.
PROOF OF CONCEPT	The proof of concept that shows whether or not the BPMS can successfully be implemented
BPMS	The actual Business Process Management System, all details for a BPMS are excluded for this method.
ADDED VALUE REPORT	A report that shows the added value of the BPMS implementation on the organization.

Table 3: Concept explained in detail

In the Process Deliverable Diagram scoping is needed to define the BPM concept, where the keystones are the business case and business process model to show that the implementation of a BPMS is useful and provides benefits. The BPM concept can then be used to spread the mindset throughout the organization and external parties, with process owners and a external supervisor in particular, which are responsible for bringing the mindset and perspectives to the people involved. The implement BPMS is a big step, with other method fragments that can be part of this step (which are key in successfully completing the implementation). After the actual BPMS implementation the Business Process Governance makes sure that the right people are responsible and have the correct decision making authority at the right level, so that processes are run and changed smoothly. Through these steps the method fragment tries to achieve to bring an understanding of the BPM concept within the complete organization and external parties.

CONCLUSION

The research question of the paper is: Can a situational BPMS implementation method be used to support BPMS implementation projects in the field?

The answer to this question is that we found that the implementation fragment we studied needed to be re-engineered to match a BPMS implementation project in the field. The validity of this conclusion is based on the presented final fragment, which conforms to both the method engineering rules and techniques, as the practical situation from the case study. The final fragment is based on the proposed fragment, which has been re-engineered to ensure the fragment is in synchronization with practical situations. The re-engineering is based on the information provided by the expert interviews from the case study.

We believe that organizations can use this fragment to achieve a good understanding of the BPM concept within the organization, and thus a greater chance on a successful BPMS implementation. In addition we believe it can help smooth out the organization's transition to a working BPMS implementation by creating consensus and knowledge about BPM, which would reduce the costs of successfully implementing a BPMS. Both these benefits are the added value of using this final implementation fragment.

However it has to be remarked that the case study is performed in a specific sector. Even so, we believe that the final fragment 'Understanding the BPM concept' could be applicable to all sectors (though if needed sector specifics should be added into the model).

With this in mind, even though the case study is extensive and detailed, it should be noted that the fragment could still have situational dependencies for the utility sector. Further research consists of validating the re-engineered fragment in other sectors, and see if it holds in these. If it is not successful in other sectors, common parts can be identified between the sectors (and thus a general model could be extracted on which the sector specific models can be based).

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