Internal and external banking reference models: A multiple case study analysis

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ABSTRACT
Improvement of business process models (BPM) is often an expensive and large project. In this paper, we answer the question whether banks should use an external reference model for the improvement of their BPM or could perform such a project in-house. Through a market- and case study research at two providers and banks we developed an overview of possibilities at providers and through comparing this overview to the case studies we found that banks are capable of improving BPM in-house through internal reference models, though they should take some side notes in account.

Keywords
Business process models, reference models, banking, market research, case study research.

1. INTRODUCTION
With the current speed of technology improvement and innovation it is important to stay up-to-date as a modern company [1,2]. Especially for service providers it is challenging to keep up with customer demands and the possibilities that are offered through upcoming technologies like mobile internet. In this paper we will look at reference models that are created by consulting companies and software developers for banks and compare their services to the business process models that banks develop in their in-house BPM improvement projects. Through interviews and case studies we will answer the following question:

How capable is a bank to perform a business process model improvement project in-house compared to banking reference models?

In current literature, information exists on reference models; what they are [3,4,5], how they might be classified [3,6] and what correct guidelines [7] are for building them. A case study exists [8] on where they are implemented but we have not found any academic literature on whether a bank might actually be capable of doing this in-house.

In Section 2 we will discuss the term reference model as it is used in the paper, since it is a rather broad term and can be used in a lot of contexts. Section 3 will describe the methodology that is used in the research by explaining the scope and industry, the market research, case studies and the drawing of conclusions. In Section 4 we will explain both the approach to and results of the market research and in Section 5 we will present both the approach and outcomes of the case studies done at the banks. Finally, we will draw conclusions and answer the research question through comparing the results and literature.

2. REFERENCE MODELS
A reference model is a broad concept and can best be defined as a best-practice model that may be used as a blueprint for (future) information system construction [3,4] or improvement of existing (business) process models (BPM) for a specific industry such as retail, banking or insurance [1,5,8]. A reference model is thus an abstract representation of reality. It can be used to improve complete enterprise architectures or only some specific processes of the company [8,6]. Since innovation and increasing competition are becoming more and more important it is vital to keep processes up-to-date and as much as possible in line with best practices [1,2].

Reference models are often mentioned in the same literature as service-oriented architecture (SOA), BPM and enterprise resource planning (ERP) [7]. However, a reference models is a concept while e.g. SOA is a design paradigm that may be used for reference model development and ERP are complete systems that may contain reference models. Reference models can be used together with BPMs though BPMs are not reference models.

In this research we will take a closer look at a banking reference model that is created by an external consultant (provider) and compare it to reference models or business processes that banks created themselves through BPM improvement. Through the comparison we are able to state whether banks can improve their BPM in an equal way as an external party would have done. A more detailed explanation of the methodology is explained in the next chapter.

3. METHODOLOGY
3.1 Scope and industry
Banking reference modelling indicates that a specific target group is selected, also known as the Financial Service Industry (FSI). However, FSI is too broad because it is also used for e.g. insurance companies [5], which fall outside of the scope of this research. The scope is on banking only because it does not use input and output and delivers a unique set of services compared to other industries i.e. banks only deliver services in a customer-to-customer relationship wherein the bank is a middleman.

According to W. Wiers from SAP\(^1\), a banking architecture expert, another factor that differs banking from other industries is that they are more focused on the speed and reliability of their services and processes than production industries, which is also explained in [9]. Even more precise we are only looking at reference models that are applied in banks in the Netherlands and at providers that operate in the Netherlands.

3.2 Market research
The reason for performing a market research is to find out what models are available at external parties (providers) in order to state whether a BPM improvement project should be outsourced or done in-house. Thus, the purpose of the market research is to

\(^1\)Personal conversation at 28-04-2009
find out all the needed information in order to draw conclusions from the outcomes of the case studies.

As explained in Section 2, the aim is to find out what banks develop in-house compared to what an external provider could offer. Therefore, the market research was intended to generally answer the following questions (complete interview added in Appendix A):

- What models and/or solutions are offered?
- What process of implementation is used when performing a BPM improvement project?
- What outcomes are to be expected?

When these questions are answered we create an overview of possibilities that the providers offer and what expected outcomes are when BPM improvement is done by an external party e.g. a consultant.

3.3 Case study research

With market information available we can start to do the case study research. In this research multiple case studies are done in order to get a broader picture of the implementation of proprietary reference models and what the advantages or disadvantages are of doing this in-house.

The case studies will be performed at two Dutch banks of which one operates worldwide, though we will only look at the implementation at the Dutch offices. The following plan was set up in line with the guidelines of Robert K. Yin [10].

1. A study’s questions. [10] states that case study questions should ideally be in the form of ‘how’ or ‘why’. The main question for the case study is: How and why did this bank choose to improve their BPM and what were the outcomes? All the questions can be found in Appendix B.

2. Making theoretical propositions, assertions of which one can tell with some certainty that they are true or false. After studying literature, looking at provider information and having an interview with one provider, propositions were developed (see Table 2 in Section 5).

3. Units of analysis are the models that were created in the implementation process as well as the persons that guided the project or work with the models, because they have the most knowledge on them [5]. These two units of analysis provide all the information that is needed in the study and are studied through an interview combined with a review of the models.

4. Linking data from the case study with the propositions made under step two through logic. By doing this it is possible to check whether the propositions (based on market information and literature) are actually true or false for these cases.

All the results will be discussed in Section 5.

3.4 Drawing conclusions

With all the needed information available the processing of the data starts. The market research resulted in an overview of what is offered by two providers and the case studies resulted in a large interview and detailed information on the choices, implementation and results of the internal reference model.

The final conclusion of the research will be giving an answer to the research question through combining the gathered information. Also, we draw a conclusion on what aspects future projects should take in account and what the choice criteria might be for whether or not to use a reference model. The final conclusions do not provide a complete list of criteria or a holding list of benefits for every project. It will rather show what the results were for the case study objects and, combined with the market research, what might be derived from that, which may then be a basis for future result and discussion [10].

4. MARKET RESEARCH

4.1 The preparations

As explained, the market research provides an overview of what the reference models cover, what steps should be taken and what the implementation process is like. For the selection of useful providers criteria were developed:

- A complete reference model for the complete bank domain

When we want to compare the adjustments the banks made themselves to those of a provider, we need one that has reference models for all main banking processes, otherwise we cannot compare them.

- Experience in other banks

External parties, i.e. consultants must have experience in the banking sector before they are capable of creating a reference model.

- Operating in the Dutch market

Since we are looking at Dutch banks it is important to compare their outcomes with those of a provider that knows the Dutch market. Otherwise some aspects like governance or culture might influence the results. For example, on a European level recently, two new directives have been introduced i.e. the SEPA [11] and MiFID for payments and investments (shares, bonds etc.) [12].

Looking at these criteria, compared to the list of providers that Gartner [13] created and were found on the internet, there were four parties that fulfilled the three criteria: IBM, Accenture, Oracle and SAP. After making contact, only Accenture and SAP were willing or available to cooperate in this research. According to Gartner [14], both providers are market leaders for international retail core banking in 2008.

There were physical appointments with both providers and a lot of information was retrieved from these interviews and resulted in the basis for understanding what external parties offer. A general description of both providers is added below.

4.1.1 Accenture

Accenture is a consultancy company that operates worldwide using three segments: outsourcing, consultancy and technology. With 175,000 employees they are one of the larger players on the market and they offer a variety of services, e.g. CRM, supply chain management, business strategies, financial management, business solutions and strategies. Services are offered for many sectors, including banking. They have Dutch offices and a lot of experience in consulting at banks in the Netherlands as well as worldwide.

4.1.2 SAP

SAP is a software vendor and developer that also operates worldwide and supplies software for twenty-five sectors, including banking. They are focused on a variety of business software and are most well known because of their ERP systems. They have a Dutch office and also a lot of experience with banks in the Netherlands as well as worldwide. There is an estimate that SAP has about 240 clients in the banking sector worldwide, through which they were able to develop best-practice models.

4.2 Results

When both interviews (added in Appendix A) with the providers were held, the results were compared to each other.
4.2.1 Accenture

The interview was held at the main Accenture office in the Netherlands with an expert from the financial services and strategy department.

Accenture provides consultancy for complete solutions as well as stand-alone models. They provide the configuration of ERP packages that can directly be used by a bank and have reference models for consulting a bank in improving BPM. These models and packages are for the complete banking domain and cover all the processes that a bank has for each level (management to task level).

By looking at a lot of different banks worldwide they have gained experience, information and best-practices for each process and were therefore able to create their own ‘model bank’, which is updated when new information becomes available and is thus very dynamic and up-to-date.

Comparing banking models to other industries, Accenture finds that only on top management level a comparison can be made to other industries. The banking industry is unique because they mainly provide streams of money which is very important for all clients.

Accenture uses ARIS for their model bank, although the main purpose is not to provide the client with the model. Moreover, its purpose is to compare it with existing, as-is, models (when available) and then develop the desired to-be situation. This is done by first looking at existing process descriptions and when these are not available Accenture will first create them for the bank. After the comparison has been made they advise on the adjustments and based on financial consequences they decide whether to perform the adjustments. Results are subject to the unique project and can thus not be used for comparison in this research.

4.2.2 SAP

The interview was held at the main SAP office in the Netherlands with the solution architect for banking.

SAP provides two models for banking, one that has a predefined line of steps (developed by SAP) that the bank has to follow in order to use the models correctly (based on ERP ECC6 9, Suite edition). It is possible to adjust process parameters, though the steps in the processes are mainly fixed and only limitedly adjustable. The other package uses SOA and contains a set of services that are used by the business processes and it is thus possible for the client to fully adjust the processes and still be able to use the services of the package. The latter one is rather new (named BPP for Banking) and is only used by about forty clients; the former one is older and is used by about two hundred clients.

The newer model is different from other providers in the sense that it is completely developed from scratch and is not based on combinations of existing modules. Comparing banking to other industries, SAP explains that each industry is moving towards the use of SOA, although banking is leading because they need to be as flexible as possible. For production industries this is less needed because they have rather stable processes [9].

SAP provides a solution for all bank domains except investments (shares, bonds etc.) because they want to deliver the same products and process descriptions in every country. For the investments domain there is no single global process definition and therefore it was left out of the models. The processes are modeled from management to task level, however these are ‘default tasks’ which means that SAP provides a standard implementation of a process which can then be adjusted by the client. Figure 1 shows the banking reference model created by SAP on management level in adjusted form because it was not possible to add the complete model in this format. The figure shows the three architecture layers; front-end, BPM and Business Functionality. The latter contains all the services that are used to support the BPM in the second layer.

![Figure 1. The adjusted SAP banking architecture reference model](image-1.png)

Important is that SAP only provides models and processes for back-end processes (the processing of data) and does not at all focus on front-end applications. These front-end applications are the systems that clients work with, being the bank website, the ATM interface or forms they have to fill in as well as the systems that clerks use to lay in new orders. The systems used for e.g. solving order problems are not considered front-end. The back-end is generally the same for all banks and especially the front-end should be developed in-house because of the differentiation the bank must achieve there. SAP states that there is hardly any possibility in differentiating on the back-end processes.

SAP uses ARIS for the modelling and has created their own programming language, called ABAB that was created in order to build the systems. For clients, a ‘solution composer’ was created in order to compose the solution that the client needs as well as a ‘solution customizer’ that is used for internal purposes.

SAP finds culture and governance are of no or very little importance when performing the final product implementation.
although they are very important for the project in the sense of communication and development of the software and models.

The experience of SAP is that more and more banks are buying complete software packages and the main reason for that is that a bank should not be dependent on people that did an in-house project. When they leave, their knowledge and experience leaves. Through buying a package, a bank does not have that problem.

4.2.3 Comparing the providers

We first want to emphasize that the results do not apply for every provider or for every situation. With all the information gathered we were able to set up a list of properties for both providers and compare them (Table 1).

Important to mention is that Accenture is mainly focused on consulting and not on creating software, where SAP is mainly a software vendor / developer. However, for this research it is possible to compare them because they both have created a banking reference model.

<table>
<thead>
<tr>
<th>Table 1. Comparing properties of both providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides stand-alone reference models</td>
</tr>
<tr>
<td>Modelling tools</td>
</tr>
<tr>
<td>Existing tool support</td>
</tr>
<tr>
<td>SOA usage</td>
</tr>
<tr>
<td>Abstraction level</td>
</tr>
<tr>
<td>Process coverage</td>
</tr>
<tr>
<td>Costs</td>
</tr>
</tbody>
</table>

5. CASE STUDIES

The case studies are focused on finding out what steps a bank undertakes when improving BPM in-house as well as implementation and results of the improvements. We found two Dutch banks that were willing to help us in performing a case study there. A more clear explanation of both banks will follow.

The main part of the case studies is an interview with experts that were closely involved in the BPM improvement project. In line with [10], we have asked for another form of evidence based on documented project material. Both interviews lasted about two hours each and the questions were asked in the structure of the case study plan (explained in Section 3.3).

The interview is added in Appendix B and contains all the questions discussed with the banks. Before we started the interview we explained what our purpose of the research and the context of the case study within the research was, i.e. that we want to find out why banks chose to improve BPM in-house and not use an external consultant or provider and that we want to know how the banks improved the BPM, what process/plan they followed and what the results were.

From the answers to these questions we were able to derive all the necessary information, which will be explained in the following sections as well as whether the propositions were correct. For the development of the propositions, [2] and [15] were used as well as the interviews with providers.

Question 1: [2] explains the cause for BPM improvement

Question 2: no answer found in literature, proposition developed through interviews with providers

Question 3: no answer found in literature, proposition developed through interviews

Question 4 and 5: answer through interviews and [15], which explains outcomes of seven case studies of software and architecture integration projects.

5.1 Outcomes

Bank X is a large bank that operates worldwide. It is made up of business units per country and is focused on all market segments. The interview was done at the Dutch business unit. The interviewee brought a printed presentation that they use internally for training purposes and for explaining their process framework.

Bank Y is a Dutch private bank and exists over one hundred years. It only operates in the Netherlands and is a full subsidiary of the Rabobank. Because Bank Y is a private bank it cannot be fully compared to Bank X, because they have a larger focus on customer relations. However, for the back-end processes they can be compared, because the difference lies mainly in the front-end processes of the banks.

In Table 2 we added the five main questions of the case study (full interview added in Appendix B) and the answers to the questions per bank as well as the propositions that were made. By doing this we are able to make a comparison of the literature and market information and expectations (propositions) to the actual outcomes of in-house BPM improvement projects.
Table 2. Comparing case study answers to propositions

<table>
<thead>
<tr>
<th>Question</th>
<th>Proposition</th>
<th>Bank X</th>
<th>Bank Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why did the bank want to improve their BPM?</td>
<td>Keep up with competition</td>
<td>Back-end processes worldwide the same</td>
<td>Top management developed extensive new business policy</td>
</tr>
<tr>
<td></td>
<td>Current high costs</td>
<td>Wish for one ‘Central Process Framework’ i.e. internal reference model</td>
<td>IT had to be enabler of new policy</td>
</tr>
<tr>
<td></td>
<td>Customer complaints</td>
<td>Central terminology</td>
<td>Improving compliancy</td>
</tr>
<tr>
<td></td>
<td>Inconsistencies</td>
<td>Improve through SOA</td>
<td>Improving cost efficiency</td>
</tr>
<tr>
<td></td>
<td>Central terminology</td>
<td></td>
<td>Adjust to architecture of Rabobank</td>
</tr>
<tr>
<td>Why did the bank choose to do this in-house and not choose an external provider?</td>
<td>High costs for outsourcing</td>
<td>Use of SOA not known in banking in 2000. Not before 2006 [16,17]</td>
<td>Tailored systems are not upgradable</td>
</tr>
<tr>
<td></td>
<td>Upgrades not possible after tailoring</td>
<td>No publicly available internal information</td>
<td>Not one provider, but best for each function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large legacy of systems</td>
<td>Bank Y relatively small, outsourcing expensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know own systems best</td>
<td></td>
</tr>
<tr>
<td>How did the bank set up a plan for improving the BPM?</td>
<td>1. Look at errors, customer complaints, inconsistences</td>
<td>Plan already available in wish for CPF</td>
<td>1. Define IT scenarios</td>
</tr>
<tr>
<td></td>
<td>2. Decide on processes to improve, mainly bottleneck processes</td>
<td></td>
<td>2. Vote for best scenarios</td>
</tr>
<tr>
<td>How did the bank adjust the BPM?</td>
<td>Use internal experts</td>
<td>Form team of IT specialists for building CPF</td>
<td>3. Set up a roadmap; step by step plan over longer period; define steps, define activity diagrams, work instructions based on diagrams</td>
</tr>
<tr>
<td></td>
<td>Empirical adjustments</td>
<td>Based on existing legacy of systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use existing tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>How did the adjustment of BPM work out or what is the expected outcome?</td>
<td>Successful adjustment of bottlenecks</td>
<td>All new system architecture</td>
<td>All new system architecture</td>
</tr>
<tr>
<td></td>
<td>Some problems in consequence for other models</td>
<td>Successfully implemented SOA</td>
<td>Successfully implemented SOA</td>
</tr>
<tr>
<td></td>
<td>Positive results expected, no concrete figures</td>
<td>Used worldwide for all services</td>
<td>Full bank domain</td>
</tr>
<tr>
<td></td>
<td>Better information on personnel and efficiency improvement</td>
<td>All domains</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Successful, though external party could have done better and more complete, but more expensive</td>
<td>Intensive maintenance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reasonable costs (estimated on 100,000 euro’s)</td>
<td></td>
</tr>
</tbody>
</table>

The models that both banks created are added in Figure 2 and 3 respectively. Figure 2 shows the CPF as it currently exists in Bank X showing four layers of services and processes. The second layer contains all the business processes which are supported by services on the third and fourth layer. As can be seen in the model, there was a strong focus on service oriented architecture. The abstraction of the CPF is on the complete architecture meaning that even the smallest tasks are described and modeled. The modeling was done in ARIS, although the implementation of the model was done in the existing systems, being (among others) Mainframe, COBOL and Microsoft applications. This bank therefore still uses their old legacy of systems which are still fully integrated in the bank. This legacy will make it hard to ever implement a complete system using e.g. an ERP package. By using one framework that describes each task and by defining each task, there is no confusion on what is meant by e.g. a client and thus a large improvement on the central terminology is achieved.

When the CPF project was completed, the Dutch business unit also decided to develop a multi-channel approach for delivering
their services. This means that for each channel (i.e. internet, physical contact, mobile applications) the same processes are used. A framework was thus created so that e.g. a client process was handled and processed in the same way for each channel using SOA. For clients this means more stability in the services delivered and when the bank changes one process in the CPF, it is automatically adjusted in each channel.

Looking back, a large advantage for Bank X is that the CPF is consistently used in the business units globally. This means that each new product or adjustment in processes is created in the same way as any other product so that processes stay consistent. They would have done it the same way if they had the chance to do it all over, however if a SOA based reference model would have been available at that time, they might very well have chosen to use or buy it although the multi-channel architecture would still have been developed in-house. The personnel they do not need because of improved architecture and more efficient systems are now used for maintenance and ongoing improvements to the CPF and systems.

Considering costs, the bank expects that outsourcing the project would have been much more expensive, because the external party would have had to invest a lot of time in finding out how all the processes work.

For Bank Y it was also important to develop a SOA for a more central terminology as well as a more efficient way of adjusting processes and thus Bank Y also inserted all processes in the project and an important focus was therefore on the reusability of processes and services. They also wanted to develop a multi-channel approach so that for each channel the same back-end processes are used and the information is always available for each channel. The framework that was created is added in Figure 3. After comparing tools, Bank Y decided to use Microsoft Sharepoint as their graphical user interface (GUI) and workflow foundation. For the BPM they decided to use K2 and for the lower level data flows BizTalk is used.

Because the project is still going, no concrete outcomes can be stated at this point. However, some parts are already finished and improved efficiency is already noticeable. The greatest advantages will be made on cost and process efficiency as well as a more qualitative service to their customers. A purpose is to take over all client care and be more successful in their First Time Right policy (only requesting and storing information of a customer once in order to do things right the first time) as well as a better price/quality ratio. A final improvement is a more clear line between the business and IT side of the bank.

Comparing the models of the banks to each other we find that both are very much alike because of the use of SOA. Although the model of Bank Y shows more details on systems used and less detail on process descriptions they are the same in architecture.
6. RESEARCH OUTCOMES

6.1 Comparing outcomes to propositions

The main reasons for banks to improve their BPM are a need to be more flexible and to be more cost-efficient as well as making IT more of an enabler than the core of the company. Other reasons are increased compliancy or global integration with other business units. We thus find that the reasons for improving BPM are not in line with the propositions.

The reasons for performing the project in-house are in line with the propositions. Banks think they know their own processes best, do not want to give out sensitive information or providers are not able to deliver what the bank wants in the case of Bank X. For Bank Y there was also the plan for making it a rather long-term, ongoing, project and not a one-time implementation as well as the relatively high costs of using external reference models because it is a relatively small bank.

The propositions for the plan to improve BPM are not in line with the actual outcomes at all. There was a focus on the full scale of the bank and not just on some bottleneck processes.

The performing of the adjustments are the same as the propositions. The banks used internal experts, based their adjustments on in-house plans and mainly used the existing tools. Bank Y did however add some more tools for the modelling and implementation.

Finally, the actual outcomes are more successful than was expected in the propositions. It was expected that more problems would have come up, though the results were very successful and the banks would have done it the same way in a future project when possible.

Combining the outcomes we find that the propositions that were developed after reading literature are not in all cases in line with the actual outcomes. Based on these two case studies it is thus reasonable to conclude that literature is not applicable in all cases of in-house BPM improvement.

6.2 Comparing outcomes to market research

In the previous section we found that both banks used SOA for their models and implementation and remarkably the models are also similar to the reference model that SAP developed. SAP also explained that they developed no models for the front-end systems and the banks also confirm that they rather would do this in-house.

Still, what is remarkable is that banks have not fully researched the possibilities that exist in the market. For example, both banks have rejected an external party (among other reasons) because they would not be able to use upgrades in the future. However, in the interview with SAP it came out that this is an aspect that they have developed a solution for, using SOA.

A difference that exists between performing the project in-house compared to external is that internal personnel know the processes and can start the project relatively fast whereas external parties need to understand their processes first. However, where this might be an advantage, it might be a disadvantage for the long term because the people with the knowledge and the experience will leave the company eventually and take their knowledge and experience with them. It is thus highly important for an in-house project that extensive documentation is created in order to maintain the knowledge and experiences.

6.3 Research conclusions

Looking at the results that the banks made compared to what external parties could deliver and the propositions compared to the actual outcomes we find that the banks are capable of improving their BPM in-house.

We found that the two banks we did a case study at, were capable of performing the project in-house and did have the experience and knowledge to do it. Also, comparing the created models to the reference model of SAP, they use the same principles and architecture on the highest level. On lower levels more differentiation will be found, though mainly on the front-end applications and processes. On the basis of costs we cannot give any answer to the question because there is no indication
although Bank X was able to perform the project within reasonable amounts of money.

Looking at the reasons for doing it in-house we find that both banks did not do a thorough enough market research to base their decision on. It is advised to perform a thorough market research and look at all the possibilities before deciding whether to do it in-house. External parties may very well be able to provide what the bank needs and still support upgrades as well as deliver services for maintenance and improvements. Another reason is that knowledge may be available at the time of the project but might be lost through time ending up in a lack of information on the BPM. Finally, based on the projects that were performed it is advised to develop a double and complete plan for getting to that goal in order to succeed the in-house project [18].

7. DISCUSSION
In this research we found that banks are capable of performing a BPM improvement project in-house. Still, some side notes should be made and they will be divided into the market research and case study research.

7.1 Market research
The market research is only based on the information of two providers, which was caused by a lack of response from other providers and time restraints. In future research a more extensive market research should be done in order to have more certainty on the drawn conclusions.

The market research does show that for two providers that are considered market leaders [14], the models can be compared to what two banks have done. Also, the research is done without any prior knowledge of working methods or other information of the providers and the banks.

7.2 Case study research
The case studies were done at those banks that were available through contacts within (among others) the university. Still, more case studies should be done in order to confirm the research outcomes with more certainty.

We found that both banks use a SOA-supported multi-channel approach to their customers and that SAP supports this approach as well, although they do not provide a reference model for it. We might thus expect that it is normal to use a SOA-supported multi-channel approach. However, other providers and banks might also not (yet) use this because it is rather new.

We described the tools that were used by the banks and providers, but because we have not focused on the precise implementation and the working of the systems we want to address that we have no detailed knowledge on the usage of tools outside of the models we looked at.

8. CONCLUSIONS
In this paper we wanted to find out whether banks should use reference models of an external party for improving their BPM or whether they are capable of doing such a project in-house. In order to answer this question we performed a market research in which we interviewed two large providers of such information and inspected their implementation process and models. We found that both parties (Accenture and SAP) had experience in banking models and had developed a reference model that can be used by banks in order to improve the BPM. Secondly, two case studies were done at Dutch banks: one large bank that has offices worldwide and a private bank that has a more intimate relation with customers. Both have performed a project in-house for BPM improvement and both appeared to have developed a comparable model using SOA and looking at the results we found that they were indeed capable of performing such a project in-house. Through the interviews we finally found that (based on two providers and two case studies) banks may perform a BPM improvement project in-house although they should perform a thorough market research first, take in account that documentation is highly important and create a well defined goal and plan in order to achieve the improvement.

9. OUTLOOK
This research resulted in some interesting tips and advices as well as insight in benefits and available reference models for banks. However, as stated in the research this was mainly a case study research and therefore does not give a final conclusion or promised outcome for in-house BPM improvement projects. To be able to give more secure advices and experiences it is necessary to do more case studies in this industry. Also, a comparison could be made between Dutch banks and banks in other nations to show more differences in outcomes because of local governance and/or culture as well as a comparison to banks that did use external reference models. Finally, due to limits in time and resources the market research is not thorough enough to be used as a complete resource for choosing a provider, although it is useful to give general information on what exists in the market. This should be researched in more detail.

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REFERENCES
APPENDIX A: PROVIDERS INTERVIEW

This is the interview that was held with both providers, SAP and Accenture.

1. What is the generally the goal of your company; in what markets does it operate and what kind of products and/or services are delivered?

2. Concerning reference models, what does your company offer specifically for banks?
   a. Are these stand-alone models or are they delivered in combination with a total package such as ERP systems?
   b. What processes is your company able to improve through best practices, what domains are covered?
   c. How abstract are the models; are they only on management level or are they modeled to task level?

3. In what areas do these models differ from the models of other suppliers?

4. How do the models for banks differ from models for other industries?

5. What tools does your company use in the implementation of models or is it always possible to use the tools the customers have?
   a. Which modelling languages and/or techniques are used, e.g. ARIS?

6. In general, how does an implementation process work; what steps are taken?
   a. What information does a customer have to provide?
   b. Do you adjust as-is models or do you start all over?
   c. Are there any limitations i.e. governance or culture compared to other countries e.g. the European SEPA and MiFID guidelines?

7. What are generally the experiences with banks? Does it really result in improvements and/or advantages and how successful are most implementations?

APPENDIX B: CASE STUDY INTERVIEW

These are the questions that were asked during the case studies.

1. Why did the bank want to improve their Business Process Models (BPM)?

2. Why did the bank choose to do this themselves and not choose an external provider?

3. How did the bank set up a plan for improving the BPM?
   o What domains and/or processes were chosen?
   o What were the reasons for looking at these processes?

4. How did the bank adjust the BPM?
   o What tools were used?
   o How did the bank decide what had to be changed in the models and in what way?
   o Did the bank also look at a more central terminology?

5. How did the adjustment of BPM work out or what is the expected outcome?
   o Were there already concrete results?
   o Looking back, would the bank have done it the same way again or use an external provider?
   o What kinds of costs were made, would it be more expensive or cheaper than outsourcing?
   o What were other consequences for personnel, response times etc.?