A Business Process & Rules Management Maturity Model for the Dutch governmental sector

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Preface

This document contains my master thesis which is the final product of nine month of research in order to graduate for my master degree. After finishing my bachelor Information Science at the VU University in Amsterdam I decided to start the master Business Informatics at the Utrecht University in February 2010. This master thesis research has been carried out at KPMG IT Advisory in cooperation with the Utrecht University. During my research I received many enthusiastic reactions on my research which explores the combination of Business Process Management (BPM) and Business Rules Management (BRM) at the Dutch governmental sector. I hope that the results of this research contribute to the knowledge on this topic and will add to the adoption of business process management and business rules management in practice.

Acknowledgement

This research project could not have been accomplished without the support of many people around me. First of all I would like to thanks my internal supervisors, Martijn Zoet en Johan Versendaal for their guidance, advice and support throughout the project. Their extensive knowledge in the field of business process management and business rules management and years of experience as researchers guided me towards the right direction in times that I was close to losing track. Secondly, I would like to thanks my supervisor at KPMG, Ruben de Wolf. Due to his many years of work experience in different fields, he was a great support and thanks to his critical but enthusiastic advice I was able to look at the problems from different angles and he always helped me to see points for improvements. I also want to thank Slinger Janssen and Sjaak Brinkkemper for their supervision during final phase of my research. Additionally I would like to thank all my KPMG I colleagues from the I&A team for always be willing to help even though they were busy with their own work and off course for all the pleasant days at the office. But most of all, I would like to thank my parents, thanks to them I was able to go to University and they supported me in handling and enjoying everything the that came on my way during my student days. I want to make a special note to my sister, who was always willing to help me, especially with my thesis and expressing her appreciation, gave me the confidence to go on. Last, but not least I would like to thank all my friends how supported me in good times to celebrate milestones with me, but who were also there when I needed to ventilate, whether about my research or not.
Abstract

Last decades technology is getting more and more important for all kinds of organizations. New technological developments happen in rapid succession and a growth in customer and market demands came along with this phenomenon. To deal with the growing requirements and demand to better and faster serve the customer, many organizations went through a time with many automation iterations quickly after each other. Besides meeting the changing demands from the market side, organizations wanted to become more agile and flexible and started to investments huge amounts of money in information technology (IT) and information systems (IS). However the result turned out to be different. Due to the many automation and investment iterations, organizations faced that their information spread across various (often) non-integrated IS, distributed in all sorts of ways. Various organizations more and more lost track of their actual business and the way their processes were executed. The same happened in the public sector. Although they do not strive for high profit rates or direct competitive advantage, they are a typical example of mass information processing organizations and the problems described above requires for changes within this sector.

Business Process Management (BPM) and Business Rules Management (BRM) are two topics that won ground the last years, in order to solve the above mentioned inconsistency problems. BPM provides methods to give more insight in business processes and continuously improve them (Rohloff, 2009). BRM is about the automation of the complex decisions within the business process of an organization (Kardasis & Loucopoulos, 2004). Business rules can be seen as building blocks of the business processes of an organization and although the research field of combining the two is young, it turned out to gain greater benefits from business improvement initiatives (zur Muehlen, Indulska, & Kittel, 2008). Measuring these improvements is often done by means of a maturity model which gives handholds for evaluating the organizations’ capabilities within a certain discipline. The Capability Maturity Model (CMM) proposed by Paulk, Weber, Curtis and Chrissis (1995) was originally developed to support organizations in improving their software process, but the success of the model made that soon different versions of the model appeared. As the benefits of combining BPM and BRM start to gain ground, a maturity model to support organizations in providing insight in these overlapping fields would support them in getting the most out of their process and rules management practices.

This research focuses on the development of such a maturity model for the Dutch semi governmental sector. The model gives them insight in their current state when it comes down to BPM and BRM, in order to support them in becoming a more flexible and agile organization. The strength of this model comes with three. First it involves process management and rules management which is benefits agility (Zoet, Versendaal, Ravensteyn, & Welke, 2011). Second, the development of the model had a practical approach which enlarges the suitability of the model in business, and third it is specialized for the Dutch governmental sector, which is a sector that is deals with many problems that can be minimized or even solved with BPM and BRM (Donner, 2011), (e-Overheid, 2009), (van Lieshout, 2010).

The research is based on a literature study to identify and analyze maturity models, BPM and BRM approaches and it gives insight in how the two topics are combined so far. This literature study forms the basis for consolidating the BPM maturity models into one unambiguous model and it the same is done with the BRM maturity models. After this consolidation phase, two rounds of semi structured interview are performed. The first round is held with subject matter experts in order to gain information and insight in how the two principles could be combined into one maturity model. The second round of interviews is held amongst domain experts from the Dutch semi governmental sector and is used to adapt the model to make it suitable for the chosen domain. During the last phase of the research the maturity model is going to be assessed at a large Dutch governmental agency. During the three iterations of developing the model, it will turn out that organizations support combining the two principles in order to give them the best support in becoming an agile and flexible performing organization.
# Table of Contents

1 Introduction .......................................................................................................................... 13
   1.1 Problem Area .................................................................................................................. 13
   1.2 Problem statement .......................................................................................................... 14
   1.3 Scientific research design .............................................................................................. 16
   1.4 Scientific and practical contribution .............................................................................. 17
   1.5 Outline of the research ................................................................................................. 18

2 Literature ............................................................................................................................. 24
   2.1 Business process management ...................................................................................... 24
   2.2 Business rules management .......................................................................................... 30
   2.3 Business process and rule management ....................................................................... 41
   2.4 Maturity and alignment ............................................................................................... 44
   2.5 The Public sector ......................................................................................................... 55

3 Research Methodology ........................................................................................................ 19
   3.1 Research questions ....................................................................................................... 19
   3.2 Methodologies .............................................................................................................. 20

4 Constructing the model: The literature basis .................................................................... 58
   4.1 Selection of the Models from literature ....................................................................... 58
   4.2 Development of the BPM maturity model .................................................................... 59
   4.3 Development of the BRM maturity model .................................................................... 66

5 Constructing the model: Combining the business process & business rules maturity models .......................................................................................................................... 71
   5.1 Subject matter experts interviews ............................................................................... 71
   5.2 Important issues according to the subject matter experts .......................................... 71
   5.3 Main adjustments ......................................................................................................... 73
   5.4 The BP&RM AM model .............................................................................................. 75

6 Constructing the model: Adoptions for governmental organizations .................................. 77
   6.1 government experts interviews .................................................................................. 77
   6.2 Considerations and important issues according to domain experts ............................ 77
   6.3 Adjustments and the governmental BP&RM Maturity Model ...................................... 81

7 Case study at a large Dutch governmental agency ................................................................ 92
   7.1 Introduction of the case study ...................................................................................... 92
   7.2 Application of the model ............................................................................................. 92
   7.3 Results ......................................................................................................................... 93

8 Conclusion .......................................................................................................................... 100

9 Discussion .......................................................................................................................... 104

10 Further research ................................................................................................................. 105
| 11 | Bibliography | .......................................................................................................................... 106 |
| 12 | Appendix | .......................................................................................................................... 112 |
| 12.1 | Process Delivery Diagram | ................................................................................................. 112 |
| 12.2 | Tables from literature | ................................................................................................. 113 |
| 12.3 | BPM maturity models from literature | ......................................................................................... 115 |
| 12.4 | BRM maturity models from literature | ......................................................................................... 118 |
| 12.5 | Literature extracted BPM maturity model | ......................................................................................... 120 |
| 12.6 | Literature extracted BRM maturity model | ......................................................................................... 121 |
| 12.7 | Subject Matter Expert interview transcription | ......................................................................................... 122 |
| 12.8 | Subject Matter Expert Interviews | ......................................................................................... 124 |
| 12.9 | BP&RM Maturity Model | .................................................................................................................. 130 |
| 12.10 | Semi structured interview questions | ......................................................................................... 132 |
| 12.11 | Domain Expert Interviews | .................................................................................................................. 132 |
| 12.12 | Governmental BP&RM Maturity Model | ......................................................................................... 147 |
List of Figures

Figure 1: Focus areas of the research .............................................................................................................. 15
Figure 2: Scientific research design .................................................................................................................. 17
Figure 3: Research Model .................................................................................................................................. 19
Figure 4: Research approach ............................................................................................................................. 21
Figure 5: Relation between business rules and business processes ................................................................. 30
Figure 6: Architecture for decision support of business rules lifecycle ............................................................ 32
Figure 7: Manchester BRM mapping ................................................................................................................. 36
Figure 8: The three main stages of the rule collection roadmap ............................................................................ 39
Figure 9: BRM and BPM: two complementary perspectives ................................................................................. 42
Figure 10: The influence of rules on processes ................................................................................................. 43
Figure 11: Visualization of the design principle framework .................................................................................. 44
Figure 12: Overview of the CMM ...................................................................................................................... 45
Figure 13: The business process maturity levels ............................................................................................... 46
Figure 14: Business Rule deployment maturity model (Nelson M. , Peterson, Rariden, & Sen, 2010) ............ 51
Figure 15: BPM life cycle (Hammer M. , 2010)with maturity levels ................................................................. 60
Figure 16: Framework of the literature based BPM maturity model ................................................................. 66
Figure 17: Framework of the literature based BRM models .................................................................................. 70
Figure 18: Low level of system integration versus high level of system integration .......................................... 74
Figure 19: BP&R Maturity framework ............................................................................................................. 76
Figure 20: Changes for the factor Strategy Alignment ....................................................................................... 83
Figure 21: Changes for the factor Information Technology ................................................................................ 84
Figure 22: Framework of the governance factor with its subjects. ....................................................................... 85
Figure 23: Changes for the factor People & Culture ........................................................................................... 87
Figure 24: Changes for the factor Decision Rules ............................................................................................. 88
Figure 25: Framework of the Governmental BP&R Maturity model ............................................................... 91
Figure 26: ‘Ist’ situation according to the interviewees before the interview .................................................... 94
Figure 27: Elaborate ist-situation after the interview ......................................................................................... 95
Figure 28: Averaged ist situation after the interview ......................................................................................... 96
Figure 29: Case study results of the mutual exclusivity and completeness test .................................................... 99
Figure 30: Research approach .......................................................................................................................... 103
Figure 31: Draft of a BPM pyramid according to an expert ............................................................................... 124
**List of Tables**

Table 1: Examples of the types of business rules defined by Kardasis & Loucopoulos ........................................ 33
Table 2: Examples of the types of business rules defined by Orriëns et al (2003) .................................................. 34
Table 3: PMMA dimensions and their strength and weaknesses (Rohloff 2009) ................................................. 48
Table 4: The ten maturity measurement factors according to the Rummler-Brache Group (2004) ......................... 49
Table 5: Characteristics for corresponding RMM level (von Halle & Goldberg, 2006) ......................................... 53
Table 6: Research questions and methods and corresponding chapters ............................................................ 19
Table 7: List of authors and their correspondingly developed maturity models ............................................... 58
Table 8: List of authors and their correspondingly developed maturity models .................................................. 59
Table 9: Maturity levels in literature .................................................................................................................. 60
Table 10: Final chosen maturity levels .............................................................................................................. 61
Table 11: Factors used in literature ................................................................................................................... 62
Table 12: Factors from scientists mapped to the chosen factors ........................................................................ 65
Table 13: Maturity levels in BRM literature ......................................................................................................... 67
Table 14: BRM characteristics per maturity level .............................................................................................. 68
Table 15: Final BRM maturity level explanation ................................................................................................. 69
Table 16: Factors used in BRM literature ............................................................................................................ 70
Table 17: List of subject matter experts and their function ................................................................................. 71
Table 18: Summaries of the subject matter expert interviews .............................................................................. 73
Table 19: List of domain experts ....................................................................................................................... 77
Table 20: Discrepancy between the two maturity level estimations ................................................................. 96
1 Introduction

1.1 Problem Area

The last decades new technological developments rapidly occur which immediately lead to new opportunities for every kind of organization. This phenomenon started to receive more attention in the early nineties and caused an enormous sprint in the field of automation (Thurlow, Lengel, & Tomic, 2004). Since then, technology is getting more and more important for all kinds of organizations. Organizations started to use the internet more for targeting their customers, which led to a growing target group from regional to all over the world. They also saw that using new technology approach resulted in time and money savings. Finally they found out that these new technologies could help them to better and faster serve their customers. To cope with these changes, organizations started to invest large amounts of money in new technological developments like Information Technology (IT) and Information Systems (IS). In a very short time huge parts of their organization became automated (Evgeniou, 2002).

Customer and market demands kept on growing as well as the technological developments and organizations faced growing problems in meeting the fast changing demands of their environment which is exactly the problem of many (especially larger) organizations (Cordys, 2008). Due to all the IT and IS investments organizations face big problems when it comes down to the information that runs through their business. The automation overkill leaded to an overload of information that was processed in a big amount of black boxes and a loss of overview of what is actually going on within and between these boxes. This resulted in an investment flow with the goal to become a more flexible organization, save money and serve their customer better, but the result after a few turbulent years is that many organizations lack insight of the way they want to do business and they lost focus because their strategy did not meet the business goals anymore. It is clear that an era that seems to become the era of creating flexible and cost saving organizations turned out to be one in which big, inflexible and incoherent organizations were created. (Melville, Kraemer, & Gurbaxani, 2004), (Pantazi & Georgopoulos, 2006)

The same holds for the public sector. Even though this sector is not striving to high profit rates or direct competitive advantage, they do cope with these problems as much as the private sector does (Ongaro, 2004), (Bryson & Roering, 1987). A good example is the Dutch semi-governmental sector (hence Dutch governmental sector). The Dutch government consists of municipalities, provinces, water conservancy, and some independent governing bodies. Due to extensive governmental retrenches, more demanding citizen, and a growing compulsion to comply with organizational and federal rules, governmental organization are obliged to invest in IT and IS as much as the private sector does. Governmental organizations are more than which private organization so ever information processing factories that offer a wide scope of services and products to a diversifying group of customers, namely, citizen. Because of the complexity of this type of organizations we focus on the Dutch governmental sector from now on.

Although no radical changing IT and IS developments (like the invention of the personal computer, the chip or the internet) appeared the last decade, organizations more and more see that the way they use and invest in these new technologies and systems need to change. Two main insights are important for organizations. On one hand they need more insight in the way they are doing business in order to gain profit from all the investments, and to meet and answer the demands of the ever changing environment they act in. On the other hand they need measures to judge how their organization is performing in a specific field of the business, often called the benchmark problem (Aalst, Hofstede, & Weske, 2003). To meet these two requirements several techniques and approaches are available. To solve the first issue, organizations should improve their organizational efficiency and effectiveness in order to become a flexible and agile organization. This can be achieved by business process management (BPM) or business rules management (BRM)
approaches (zur Muehlen, Indulska, & Kittel, 2008). Agility is related to the management and execution of 1) activities and 2) decisions. The first focuses on the effectiveness and efficiency of activities and the second on the effectiveness and efficiency of decisions related to activities to be executed. (Zoet, Versendaal, Ravensteyn, & Welke, 2011). A not is needed here, because not all activities and decisions are suitable for agility (Georgakopoulos, Hornick, & Sheth, 1995). A common tool to solve the second issue, the benchmark ‘problem’, is by using a maturity model. Since there are multiple maturity models for all kinds of business fields, organizations has to consider thoroughly in which field of business they want to benchmark themselves. In case of measuring efficiency and effectiveness a BPM or BRM maturity model can be used (Boyer & Mili, 2011), (Sadiq, Bandara, Indulska, & Chong, 2007), (Miers, 2005). Although BRM and BPM address distinct aspects of organizational practices, they share areas of overlap that allow for the linkage of the two approaches (zur Muehlen et al., 2008), so why not combining these two principles in a maturity model in order to give organizations the opportunity to analyze their current situation and support them in achieving the level of effectiveness and efficiency they want and thus support them in becoming an more agile organization?

The rough sketch of the previous explained developments form the base of this research: A combined BPM and BRM maturity model is developed for the Dutch Governmental sector. In order to achieve this goal, a literature review took place to identify and analyze BPM and BRM approaches and to get an understanding of the use of maturity models. In addition to this, expert interviews in the field of BPM and BRM are carried out. These interviews are used to analyze the practical side of this working field and to combine this with the available literature. In the second round of interviews, domain experts (Dutch governmental agencies) in different working fields and positions are interviewed to make the developed business process and rules management maturity model as much applicable as possible for this sector.

The research approach and construction of the model is based on the IS research framework of Hevner, March, and Park (2004). This framework is developed to describe the performance of design-science research in the field of IS by the use of a concise conceptual framework and clear guidelines for understanding, executing and evaluating the research. In Accordance to the framework of Hevner et al (2004), the maturity model developed in this research addresses the business needs as well as it uses applicable knowledge from current literature. In addition it serves the environment with a combined BPM and BRM maturity model, because little research has been done in this field and the working field asks for it, and finally, since a scientific paper about the research is written, it adds scientific knowledge to the knowledge base, because there is no maturity model that combines the two management techniques published yet.

1.2 Problem statement

The objective of this research project is to develop a business process and rules management maturity model (hence BP&RM MM) for the Dutch governmental sector to assess their current state and ability towards BP&RM and improving their maturity level in this area (Evgeniou, 2002), (Ariyachandra & Frolick, 2008), (Debevoise, 2009), (Kovacic, 2004) (Boyer & Mili, 2011). The maturity model that is going to be delivered can be used as a tool to help governmental organizations bringing them to a higher maturity level when it comes down on flexible and proactive process and rules management.
It is expected that the combination of the two management techniques makes the model useful because on one side BPM helps to optimize the organization’s processes and on the other side BRM makes it possible to deal with the steering information that influence the dynamics and flow of business processes, also referred to as business logic, that organizations face. In order to confirm (or reject) this hypotheses the following statement is going to be answered.

["how can business process management and business rules management be combined in a maturity model to reflect on and improve business process and rules management capabilities of organizations in the governmental sector? "]

In order to answer this problem statement it is split up into four research questions.

1) Which maturity models exist in BPM and BRM literature and how can the models of each subject be combined in a separate maturity model?

2) How can the two literature based models be combined and what are the considerations according to subject matter experts to deliver a Business Process and Rules Management (BP&RM) Maturity Model for organizations.

3) How does a BP&RM Maturity Model, to assess the maturity (both ist and soll) of a Dutch governmental organization, look like?

4) How does the developed governmental BP&RM Maturity Model assess the BP&RM maturity of a large Dutch governmental organization and what shortcomings and remarks are found during application of the model?

Every question is assigned to a specific phase of the research. This is made visible by means of a method modelling technique described by Verschuren and Doorwaard (2005). More information about this approach is given in chapter 2 Research Methodology.
1.3 Scientific research design

Hevner et al. (2004) developed an Information System (IS) Research Framework that can be used as a base to structure and execute scientific research. Because of the clear guidelines, structure and the relationship between the three important pillars of research (IS research, environmental, and knowledge base) the framework will be used to structure and execute this research in an appropriate way. Additionally, Hevner et al. (2004) their framework ensures a qualitative design research which makes it very suitable for this research.

Edmondson and McManus (2007) wrote a paper to guide the design and development of research projects that centrally involve collecting data in field sites. They suggest that theories in research can vary from mature to nascent. The latter is true for this research as it “proposes tentative answers to novel questions of how and why, often merely suggesting new connection among phenomena”. Nascent research is characterized by trying to get understanding of how a process unfolds, it develops insight about a novel or unusual phenomenon, and it explains the occurrence of a surprising event. Qualitative research turned out to be the best approach for these kind of problems. The research questions of nascent researches are often more open-ended. Data gathering is mostly done by performing interviews, observations, open-ended questions and longitudinal investigations. Based on the research done by Edmondson and McManus (2007) the qualitative approach applied in this research seems the best way to approach the problem described above.

In their paper Hevner et al. (2004) explain the IS Research Framework, they describe two paradigms that characterize much of the research in the IS discipline. The behavioural science paradigm and the design science paradigm. The first, behavioural science, aspires to develop and justify theories that describe or predict organizational and human phenomena all through the phases of the development and implementation of IT and IS. The latter, design science, aspires to create innovations that define the ideas, practices, technical capabilities and products all through the phases of the development and implementation. On the other hand design-research fulfills important unsolved problems in a unique or innovative way or it solves problems in a more effective or efficient way (Hevner et al. 2004). The domain of IS research exceeds the boarders of people, organizations and technology and put them together in one domain, which is also the objective of this research project. Hevner et al (2004) their framework combines the complementary research cycle of design-science and behavioural-science. This project combines these two research approaches as well, so Hevner et al. (2004) their framework is very suitable for executing this research project the way they describe design science.

The model is represented in Figure 2 and the building blocks of the model are explained in this paragraph. The environment defines the problem space of the research and is composed by people, organizations and their technologies. The business need or problem area for this research is defined in chapter 1.1. Given this need, IS research is carried out in two phases that are different for the two types of research (behavioural and design). On one side the development and justification of theories, which belongs to behavioural sciences is explained. This type of research explains or predicts phenomena related to the identified business need. On the other side the building and evaluation of artefacts, which belongs to design science, is explained. This type of research is designed to meets the business need described in the behavioural research. The development of theories is done with the help of the literature study and the justification hereof is done by means of expert interviews. The building is done based on a literature study as well, together with two rounds of interviews. In order to evaluate this built artefact, a longitudinal case study will take place. The knowledge base makes the raw materials from, and through which IS research is accomplished, available and is carried out by foundations (described in Chapter 3) and methodologies (described in Chapter 2).
1.4 Scientific and practical contribution

The scientific relevance of this research lies in the fact that, although BPM and BRM are two much-discussed topics, and it is clear that both principles can bring benefits to the public sector, however, combining the two has never been considered or applied in this sector (Gulledge & Sommer, 2002). BPM is about how organizations efficiently shape, execute and analyze processes all through their business (Weske, 2007). It includes all the methods, techniques and tools to support the design, management and analysis of operational business processes within an organization. BPM ensures a fit between the business environment and the business processes, it helps organizations to establish continuous improvement and establish a proper fit between business process tasks and information systems (Weske, 2007). Business rules are statements that define or constrain aspects of the business (Gottesdiener, 1997). A few years ago BRM started to get more and more attention because organizations had to deal with legislation and compliance more and more (van Setten, 2011). BRM helps organizations to improve the business agility which makes it easier to react on changing rules, legislations and business processes (Charfi & Mezini, 2004). Another characteristic of BRM is the ability to execute these rules with advanced technology to make straight-through processing possible (Ross, 2003). Both BPM and BRM are closely related with the business strategy of the organizations. According to Kovacic (2004) a broader view on business rules then analysis, classification, articulation and formalization is required in order to keep up with the constantly changing business rules. This need is what is intend to be solved in this research. Therefore, with combining these two practices and align them with the business strategy of a governmental organization, the scientific relevance of the research is tried to be met.

The practical relevance of the research is emphasized because a lot of work is there to be done to optimize processes in the governmental sector. This is proven by the fact that the government invests a lot in optimizing their IT architecture and infrastructure (Donner, 2011), (e-Overheid, 2009), (van Lieshout, 2010). Governmental agencies differ from private organizations in many ways. Their strategy definition is different and governmental agencies face red tape, legislations and rigid hierarchies more than organizations in the private sector do (Moore & Khagram, 2004). Together with issues like multiple stakeholders for many processes, sudden and dramatic changes in policy directions, cooperation with citizen and other third parties, makes it extremely difficult to simply apply management approaches that are successful in the private sector.
With combining BRM and BPM this research tries to serve the specific and comprehensive demands and requirements the governmental sector deals with. Hereby the first applicable business process and rules management maturity model, from now on called the BP&RM maturity model, is developed and the practical relevance of the research is emphasized.

1.5 Outline of the research

Within this chapter the problem area and the purpose of the research is explained. Together with a short introduction on the research questions that are going to be answered, this chapter gives a clear and brief overview of the aim of this research.

Chapter two discusses the methods that are used in the different phases of this research and the deliverables that come along with each of these phases.

In chapter three, important background information based on scientific literature is given to form a sound base for the rest of the research. This chapter is divided into five sections which can be appointed to the four focus areas presented in Figure 1. The first three sections of the literature chapter are about the two outer side focus areas of the research presented in this figure. Namely BPM, BRM and the third is about how these two are approached and discussed together in literature. The fourth section is about the maturity models in general and examples of BPM and BRM models are given, and the final section, section five, is about the public sector and especially the Dutch government.

Then, the most important chapters of the research appear, namely chapter four, five and six, in which the final model is developed and improved. Chapter four will form the literature base of the model, chapter five provides information for adjustments to the model and finally chapter six provides information to make the model as applicable as possible for the governmental sector. The final chapter of the actual research is chapter seven where the model will be tested by means of applying it at an governmental organization (The case study). Then, in chapter eight, the research findings and the conclusion derived from them are presented, and in the final chapters, chapter nine and ten, respectively the way the research is executed together with its limitations and recommendations for further research are discussed.
2 Research Methodology

This entire research project includes three parts, known as the set-up part, the research part, and the thesis part. In this chapter, the research part of the project is elaborated. Different methods are used to execute the research and each of them is explained here.

2.1 Research questions

As mentioned in chapter 1.2 Problem statement, the main question of the research is split up in four research questions which all cover a phase of the research and by means of using a method the scientific foundation of the answer is guaranteed. In Table 1 the research questions, the related research methods, and their corresponding chapter, are shown.

<table>
<thead>
<tr>
<th>Question</th>
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<td>RQ2 How can the two literature based models be combined and what are</td>
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<td>RQ3 How does a BP&amp;RM Maturity Model look like to assess the maturity</td>
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<td>(both-its and soll) in a Dutch governmental organization?</td>
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<td>RQ4 How does the developed governmental BP&amp;RM Maturity Model assess</td>
<td>Longitudinal case study</td>
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<td>the BP&amp;RM maturity of a large Dutch governmental executing organization and what shortcomings and remarks are found during application of the model?</td>
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Table 1: Research questions and methods and corresponding chapters

In Figure 3 the entire structure of the research is presented. This model is built upon a method described by Verschuren and Doorwaard (2005). An arrow in this figure symbolizes a confrontation, a vertical arrow implies items that are compared and combined, and a horizontal arrow implies a conclusion or a result.

Figure 3: Research Model
Phase (a) until (d) all present the input for one research question and the answer of that question is presented as a result in the next phase. For example, phase (a) delivers the input the answering the first research question, the result of this question is a literature based business process maturity model and business rule maturity model (see the box in phase (b)). In the upper right corner of every block the corresponding chapter is shown.

### 2.2 Methodologies

In Table 1, presented earlier in this chapter, three different methods are listed, a literature study, semi-structured interviews, and a longitudinal case study. In this section these three cycles are associated with the research design based on Hevner et al. (2004) their Information System (IS) research framework presented in Figure 2. In the remaining sections of this chapter the three different method types and the way they are applied in this research are explained. Figure 4 shows an informal and easy to understand presentation of the execution of the research approach. Every element of this figure can be linked to a different phase of the research and thus a chapter of this research thesis. The most left side of the diagram (the BPM MM’s and BRM MM’s) present the literature study presented in Chapter 3. The next step is the consolidation of the BPM maturity models discussed in literature into one BPM maturity model and the BRM maturity models discussed in literature into one BRM maturity model (the circled BPM MM and BRM MM). This step is executed in chapter 4. Then the Subject Matter Experts (SME) interviews are held and the BP&RM MM is developed (The circled people represent the first, and the circled BP&RM MM represent the latter) and discussed in chapter 5. During the next phase the domain expert interviews are held (presented by the circled Governmental logo) and the adjustments to the model in order to develop the Governmental BP&RM MM (presented by the Governmental BP&RM MM) are made. This phase is executed in chapter 6. The last phase of the research elaborates on the application of the Governmental BP&RM MM (presented by the picture at the bottom right) and is discussed in chapter 7. In Appendix 12.1 a more formal and elaborate presentation of this research’ executed processes and the corresponding deliverables, is presented. This so called Process Delivery Diagram (PDD) is the result of the method engineering technique proposed by van der Weerd and Brinkkemper (2008). The PDD shows the main activities of the research on the left hand side of the diagram. Every activity consists of one or more sub-activities and each of these delivers one or more concepts (deliverables). These concepts are presented on the right hand side of the diagram.

As discussed earlier the design research framework developed by Hevner et al. (2004) give handholds for building an artefact. The environment describes the business need for the artefact and the knowledge base delivers the information and knowledge needed to built it. This research has gone through the relevance - rigor cycle described by Hevner et al. (2004) three and a half times. For the first cycle, the business need and the applicable knowledge is delivered by the literature research. The built artefact is composed out of two maturity models, one for BPM and one for BRM. The second cycle is accomplished by the Subject Matter Experts with a maturity model that combines BP&RM as a result. The third cycle is accomplished by using domain experts to describe the business need as well as to deliver the applicable knowledge. The delivered artefact after this third round is a BP&RM maturity model for Dutch governmental agencies. The last step of this design research only covers only the ‘rigor’ part of the cycle. Reason for this is because it is executed by means of a case study and this approach refrains from giving inside in the business needs, it only tests the validity of the model built in this research.
2.2.1 Literature research
It is important to form a found knowledge base before the research can be performed. Therefore an elaborate literature study will take place. The main goal of the literature study is to gain knowledge about the different subjects mentioned in the problem statement. In chapter 4 the maturity models found during the literature study are used to perform the first step of the research which forms the basis towards the final goal of the research, a governmental BP&RM MM.

The literature study is carried out by the use of different kinds of search engines on the Internet. Google Scholar had the biggest yield (Harzing & van der Wal, 2007), but different search engines (Citeseer, Springerlink and Omega) and digital libraries (uba.uva.nl, library.uu.nl and oba.nl) also delivered articles and books. The literature study provided understanding of the problem area in order to form a base to execute the research. References of interesting and useful publications are used for a forward and backward literature scan in order to find other interesting publications. At a certain point in time the search did not deliver any additional information so the researcher decided to round off the literature research.

2.2.2 Semi-structured interviews
According to Ghauri and Grønhaug (1995), and Edmondson and McManus, (2007) semi-structured interviews are advantageous in the context of discovery of a specific field of knowledge with limited scientific support or a combination of two knowledge fields that is not much researched yet. Since the goal of the interviews indeed is discovering a relatively new combination of two knowledge fields, the semi-structured interview approach is chosen.

The research contains two interview rounds that are used to validate and optimize the two model developed in this research. The first round of interviews is with subject matter experts (SME’s) in the field of business process management (BPM), business rules management (BRM) and enterprise architecture (EA). The second round of interviews is with domain experts. These experts are familiar with or working for the governmental sector.
sector. Using these two kind of experts for validating and optimizing the model, makes the research very reliable and therefore as applicable as possible for Dutch governmental agencies.

Validity is the extent to which a test measures what it claims to measure. Guaranteeing the validity of a qualitative research method is more difficult than a qualitative method, especially when a semi-structured or unstructured approach is chosen. However the validity of the semi structured interview held in this research is enlarged by encrypting the interviews and apply this to the research. Also the selection of interviewees contribute to the validity of this phase of the research. Selecting different organizations and a variety of functions for the interviews avoids that the results of the interviews are biased. By using this approach multiple viewpoints of the problem are taken into account which gives a complete insight of the problem and the solutions to solve the problem.

2.2.3 Interview analysis
As described in the previous section, it might be difficult to encrypt the data. For this reason no encryption scheme is preliminary determined. The interviews are summarized and the issues important for the research are incorporated in the development and adjustments of the model. At the beginning of every interview the interviewer asked the interviewees’ view about BPM, BRM and the relation between that. This is necessary to gain insight in the way the organization deals with these subjects and to hold it against the light of the literature based models that form the bases for the topics. After the interviews the data is encrypted. For the subject matter experts this is done by categorizing the data to topics that are relevant for BPM and BRM. For the domain expert interviews, literal quotes are used to underpin changes that are made to the BP&RM MM in order to construct a reliable governmental BP&RM MM. There is chosen for different encrypting technique because the goal of the two types of interviews is different. The subject matter expert interviews are held in order to form the basis for building the BP&RM maturity model. Thus the data gathered from these interviews is categorized in such a way that development choices can be made. For the domain expert interviews the goal was different. At the time these interviews were held, the model was already there, and the interviews were used to fine tune this model. In order to fulfil this goal, more specific data is needed and thus quotes are used to underpin the adaption decisions.

2.2.4 Application by means of an in depth longitudinal case study
The last aspect of the research is the validation of the model by means of an in depth longitudinal case study, this is done by application of the model in practice. According to Hevner et al. (2004) implementation of the designed research model in a working system is very important in order to demonstrate feasibility, enabling concrete assessment of an artifact's suitability to its indented purpose. Besides that application enables the researcher to learn about the real world, how the artifact affects this real world, and how users appreciate the model. The maturity model designed in this research should serve the governmental sector with a tool that they can use to measure their current (ist), and desired (soll) maturity. To fulfil this goal it is important to test whether the model is understandable and applicable for this sector.

The model is applied at a large Dutch governmental agency (hence case study organization). This organization is chosen because it meets some important factors that are needed to make sure the case study contributes to a reliable application and validation for the research. First off all, case study organization falls within the target group of the research, an information processing governmental organization. Secondly, it deals with many external rules and legislations, and finally the case study organization have been working on improving and automating their organization the last years. This last factor is important to makes sure that a significant part of the maturity model is validated. An organization that does not deal with BPM or BRM at all is not a useful validation case because little steps in the model will be covered and thus, validated.
To enhance the quality and reliability of the case study design, the case study incorporate the following tactics:

- **Construct validity**: This type of validity is important in order to make sure the concepts are correctly made operational and measured. In this case study three issues are taken into account to guarantee this. 1) in advance of the case study interview an explorative interview is performed with an employee of the case study organization. This is done to enlarge the reliability and smoothen the proceeding of the case study interview. 2) The interviewees are well informed in advance of the interview. 3) a chain of evidence is to be delivered after the interviews.

- **Internal validity**: This type of validity is important to make sure the results really follow from the data. Two employees are interviewed in order to ensure the internal validity of the case study. The maturity model is developed in such a way that it should be performed by any person that is involved with the tactical and/or strategical goings-on of the organization. So employees purely working on the operational level are not suitable for fulfilling the task.

- **External validity**: This type of validity ensures the generalization beyond the immediate case study. For this research this is performed because the selected case is a ‘common’ governmental, mass-processing information fabric.

- **Reliable validity**: This type of validity presents that the same results can be found again when the case study is repeated. For this case study reliability is guaranteed because a fixed set of questions is presented. So when another interviewer performs the application of the model the same results will show up.
3 Literature

This research thesis has a two-topic character. This means that the research examines the relationship and cooperation between two variables. The two variables applied in this research are business process management (BPM), and business rules management (BRM). This chapter contains a literature research which is used to come to an understanding and explanation of both variables. After the discussion of the two topics individually, the literature about combining BPM and BRM is investigated. As this research develops a maturity model that combines two existing topics, the literature about how maturity and maturity models are interpreted and applied by scholars in the field of BPM and BRM is discussed in chapter 4. As BPM and BRM involves many angles of an organization from both the business side as the more technical Information Technology (IT) side, alignment between these two is an important issue when applying BPM and BRM, therefore Section 3.4 also provides the reader with some basic knowledge about business and IT alignment. The last section of the literature research is about the field in which the research is applied, namely the public sector, and governmental agencies in particular. With these topics covered the literature research for this research thesis is complete, and the research can start.

3.1 Business process management

This chapter discusses the principles of BPM and how it is explained in the literature. BPM can be described as a holistic management approach, this means that natural systems and their properties should be viewed as wholes instead of collections of parts and that the interrelationships between all the factors involved are complex and important which makes simply adding all the issues of the involved factors and draw a conclusion on the outcome impossible (Oshry, 2008). After an elaborate outline of all the important aspects of BPM given in this chapter the BPM approach should be clear. This is the first pillar in building and understanding the combined BPM and BRM framework.

3.1.1 Introduction to business process management

Although organizations depend more and more on IT practices, there is still a big gap between business and IT. In the attempt to continuously improve organizational performance, many approaches and methods have been analyzed. The one which received the most attention last years is BPM. BPM has its roots in Business Process Re-engineering (BPRe). The idea behind BPRe was to use the computer not only to automate existing business processes, but also to redesign them. The most typical feature that comes along with that proposition is that it could not be planned accurate and accomplished in small and careful steps but it is an all-or-nothing proposition with an uncertain result (Hammer M., 1990). For many years this was seen as the power of BPRe, but after all, most of the projects failed because were thrown over the wall (Baan, 2010). BPM comes with the solution on this point because the biggest problem within BPRe was that it mainly took place at the IT department of the organizations, and it forgot to involve the business side. BPM is less radical and seen from a combined business and IT viewpoint. Although the approach between BP-Reengineering and BRM is different, most of the success- and failure-factors are comparative. These factors are explained in more detail in section 3.1.6. Another request for change is described by van der Aalst et al. (2003). They describe three trends that took place in the last years. First; the shift from data to processes which resulted in the adoption of BPRe principles. Second; the explosion of the amount of functionalities of operating systems, and third; due to the omnipresent Internet and its standards, information systems changed on-the-fly, which caused a shift from carefully planned designs to redesign and organic growth. Especially the last trend could not be solved with a BPRe solution and BPM conquered.

Due to the growing need to automate, a lot of research is done in the field of BPM which result in many different definitions and interpretations of the concept. In the paper of Rohloff (2009) BPM is defined as follows:
“Business Process Management is a management practice which covers all activities of identification, definition, analysis, design, execution, monitoring & measurement, and continuous improvement of business processes”.

The definition above is commonly used in literature because it gives a comprehensive description of all the aspects of BPM. Therefore this is the definition that is used in this research as well. It explains that BPM not only deals with the analysis and modeling of the processes, but also with the organizational implementation, leadership and performance controlling of the processes. The most general and main objective of the introduction of BPM is to increase the effectiveness and efficiency of all business processes in the organization (Rohloff, 2009).

The way BPM is understood seems to be changed through the years. Smith and Fingar (2004) underscore this with distinguishing multiple waves of BPM; the first is about Business Process Re-engineering (BPRe), and the second and the third waves are on BPM. They explain that the second wave of BPM is only about replacing an old process for a new one, while the third wave is about the replacement of an entire process management capability. To develop these capabilities, organizations have to keep three business goals in mind. Organizations must establish:

1. capability innovation – this helps with the translation of business strategy to needed BPM capabilities that readily facilitate creating, deploying and managing executable business processes;
2. process innovation – continuous improvement of the design of business processes is needed for the discovery, invention and formalization of the process design that is going to be used;
3. operational innovation – continuously improvement of business operations. Its aim is the transformation of systems and practices, through which new processes are operated that lead to business results. Unlike reengineering, this approach delivers deep change in all process participants, systems, and practices simultaneously.

3.1.2 Processes

It is noticeable that the use of the word process is growing in daily business language. To prevent fragmentation of the meaning of the concept, ‘process’, which is clearly going to be used a lot in this research, an explanation about what a business process is, is needed. A process can be seen as a conversion of a certain input into a certain output that is used to achieve organization’s goals in such a way that all the resources of an organization are used in a reliable, repeatable and consistent way (Zairi, 1997). A more elaborate definition is given by Weske (2007):

*A business process consists of a set of activities that are performed in coordination in an organizational and technical environment. These activities jointly realize a business goal. Each business process is enacted by a single organization but it may interact with business processes performed by other organizations. “*

In this research we refer to this definition when we talk about business processes. It can be said that not every organization is aware of its processes. For example take a look at manufacturing organizations. but instead of talking in terms of business processes to which manufacturing might contribute, they rely on goals and measures associated with the manufacturing function (Harmon, 2004). Organizations that have defined their processes gain competitive advantage because they, amongst others, can reduce cost and production time, and improve quality. These advantages are the result of performance measurements along the production process. One very important element of a process is that it adds value to the business, together with the statement of Chang (2006) which states that when processes are not measureable, it is not possible to determine the value they add to your organization and thus you can say that undefined processes are not able to add value to your organization. This off course is pretty radically to say but it more or less is what it comes down to. Process definition is a first very important and valuable part of understanding your business.
3.1.3 The business process lifecycle

The BPM lifecycle as defined by Hammer (2010) is a model that shows all the steps and elements important for managing end-to-end business processes. The phases in the model are related to each other and are organized in a cyclical structure.

Hammer’s BPM lifecycle starts with creating a formal process. In this phase first, the process is designed, documented and implemented. The latter is often done as we are talking about processes that already exist, but not formally designed and documented yet. The second step of the process-creation-cycle is guaranteeing compliance of the process. The whole ‘creation of the process’- phase is an important step because many organizations lack any well-defined end-to-end processes or whatsoever. Once this is in place the next phase is about continuously managing this process. The first steps to accomplish this is measuring process performance and setting the targets. The latter can be done by mapping customer needs and benchmarking competitors. The next step is to determine whether the performance meet the target. To measure performance the targets for metrics like customer needs, and company requirements need to be compared with each other. When a gap is observed it is important to find the cause of the gap. It can either be a fold in the execution, then the problem is hard to find but easy to fix, or a design problem then the problem is easy to find but much harder to fix. Based on one of these two causes, an intervention plan is developed and implemented and the results are assessed. Once this phase is finished, the entire cycle, except the preliminary design phase, starts all over again.

3.1.4 BPM and organizational structures

The organizations that face the problems that are described so far think of themselves in terms of a bunch of functional stand-alone departments. This is called a silo-thinking-organization and often represented by vertical lanes in an organizational structure of process visualization. Managers are focused on their own department and pursue predefined targets relevant for their own department only. Often, every department is seen as a vertical, isolated silo, and every silo is working at its own island.

Defining processes can help organizations to get rid of their silo’s in order to add more value to the value chain and thus to the entire organization. In this case look at the business process perspective which shows that the functional departments represent different activities that are needed to create an achievable result for the company. Now the business processes are the ones that achieve the goals and objectives for the organization instead of the individual performing functions executed by one individual department and therefore the business processes are considered to be the foundation of the organization.

The term Value Chain has been introduced by Michal Porter in the eighties. It includes all the primary and support activities (processes) necessary for an organization to turn raw resources into finished products that you can sell to your customers. Some organizations cannot exactly tell what value chains they maintain, but usually they can describe their product lines, which usually is a bit more vague but it often serves the same purpose (Harmon, 2004).

To change from a functional organizations structure to a business process perspective, processes have to be seen and defined end-to-end. To achieve this, the focus of the organization has to change. Since the processes became less tangible, the need to process thinking and good management of these process was needed and this is exactly where BPM is developed for. Changing an organization from this traditional vertical way of thinking to a horizontal one has a severe impact on both employees and management as well as the entire enterprise culture (Miers, 2005).
3.1.5 Benefits of BPM

Hüffner (2004) defines in his book four types of benefits and drivers achieved by implementing BPM in an organization. These benefits can be classified into quantitative versus qualitative and internal versus external. The distinction between quantitative and qualitative lies in the level of measurability. The distinction between internal and external is made based on whether the people that take advantage of the improvement are from inside or outside the organization.

3.1.5.1 Quantitative internal

These benefits and drivers are visible, measureable and affect people from inside the organization. Reduced costs, reduced cycle time, reduced head count, and improved quality are benefits mentioned in literature (Gulledge & Sommer, 2002). Although quality improvements are hard to measure it is assumed that it leads to reduced overhead and cycle times, which undoubtedly reduce the cost of production. A remaining question is how improved quality can be achieved. Hammer (2001) explains this by using the concepts of non-value added work. This is work needed for supervision, controlling and organization due to a lack of process understanding. So he proved that process oriented work leads to less non-value added work. He also proves that a reduction of value added work leads to the benefits mentioned before, and thus it can be said that it leads to quality improvement. Much earlier, in 1996, Andersen Consulting (Hüffner, 2004) stated somewhat the same, namely that a process focus would lead to an increased efficiency by eliminating unnecessary activities. Finally Zairi (1997) provided some examples for achieved qualitative results due to business process improvement. For example a 60-90% quality improvement and a 30-70% inventory reduction. In a fast changing regulatory environment (which holds for governmental organizations) a fast closing of a process, so a short begin to end time, is a great benefit because the chance of failure due to changing regulatory shrinks. Drivers of this type, mentioned by Hüffner (2004), are reduction in load time and reducing costs.

3.1.5.2 Qualitative internal

These benefits affect the organization and cultural aspects of an organization. Organizational change and cultural change are seen as the main benefit together with the improved interaction between functions. BPM helps to avoid the ‘turf-mentality’ (every man for himself), limiting in-company barriers and improve communication inside the organizations because it gives a better inside in cross functional activities and processes floating all through the organization (Lee & Dale, 1998). Besides these benefits there is evidence that BPM improves teamwork (Zairi, 1997) and that restructuring leads to more effectiveness and efficiency (Gulledge & Sommer, 2002). The latter also discovered in their research that BPM builds a basis for creative and innovative environments which results in increased organizational performance. The increase in organizational performance is supported with the evidence for improved teamwork presented by Zairi (1997), because improved teamwork leads to more employee efficiency which in turn leads to better organizational performance. An example of a qualitative internal benefit of BPM is operating excellence because it can help organizations to fasten the settlement of outstanding bills.

Empowerment of employees, process-orientation and organizational complexity is seen as a qualitative internal driver, the distinction with the quantitative internal drivers is that these benefits are hard to measure, but nevertheless very important.

3.1.5.3 Quantitative external

Benefits and drivers of this type are measurable and affect people and aspects from outside the organization. The most important benefit of this type is market share. This is an example of a measurable factor of an external nature, and thus formally a quantitative external factor, however it is often seen as a result of all the internal benefits that are gained from BPM (Hüffner, 2004).
The only qualitative external driver mentioned by Hüffner (2004) that is not seen as a result of an internal benefit, is the need to improve quality. This need is driven by a low customer satisfaction or high production failure rate.

### 3.1.5.4 Qualitative external

For this type of benefits the same as for the previous type holds. Examples of qualitative external benefits are, competitive advantage, customer loyalty, improved relationship with customers, meeting changing demands, meeting customer needs, increased customer satisfaction and greater barriers for entry as a result of a process focus (Hüffner, 2004).

It is a lot easier to designate external drivers since many factors in the environment influence your organizations, but due to the fact it happens outside your organization they are hard to measure, therefore there are much more qualitative drivers then there are quantitative drivers. Hüffner (2004) mentions competitive threat, globalization, changing technology/ E-business, regulations, action of stakeholders and their power, eroding business boundaries and improved customer focus as examples of qualitative external drivers.

### 3.1.6 Critical/key success & failure factors for BPM

Peter Trkman (2010) makes a distinction between three types of critical success factors. The first type is based on the Contingency Theory (CT). The main idea of this theory is the fit between the business environment and business processes. The second type is based on Dynamic Capabilities (DC). This is about continuous improvement to assure sustained benefits from BPM. And the last type is about the fit between IT and business processes, this theory is called the Task-Technology Fit (TTF). In Appendix 12.2.1, the success factors of BPM found by Trkman (2010) are listed and mapped to their corresponding type of theory.

Sadiq et al. (2007) also wrote a paper about the success and failure factors of BPM. Although, unlike many other papers, the list of factors that they give is based on empirical research. They distinguish issues at three different levels, known as ‘strategic’, ‘tactic’, and ‘operational’. The entire list of factors can be found in Appendix 12.2.2.

Bandara, Indulska, Chong and Sadiq (2007) came with a list of success factors for business process modeling. Since process modeling is part of the BPM approach, the success factors cover a great part of the success factors of BPM. Therefor the list of Bandara et al. (2007) is affiliated here. One remark on these factors is needed because bandara et al (2007) stress that the interrelationship of the factors is of great importance too. The factors are:

- Project management
- Modeller expertise
- Communication
- Top management support
- User participation
- Modelling tool
- Leadership
- Modelling methodology
- Complexity
- Modeling technique
- Importance
- Culture
- User competence
- Team orientation

El-Mashari and Zairi (1999) composed a list of success and failure factors for a Business Process Re-engineering implementation process which they categorized in five different dimensions. As mentioned before BPRe can be seen as the precursor of BPM. Therefore most of the issues considered for successful implementation of BPRe and BPM are similar and thus used in this research. The entire table can be found in Appendix 0.
Burlton (2006) made a list of best practices for process management which need to be honored in order to maximize returns to the company, deliver business results to the customer and satisfy the needs of other stakeholders. Teams and organizations supporting these principles are less likely getting lost and distracted from the intent of the mission.

1. Business change must be performance driven;
2. Business change must be stakeholder based;
3. Business change decisions must be traceable to the stakeholder criteria;
4. The business must be segmented along business process lines to synchronize change;
5. Business processes must be managed holistically;
6. Process renewal initiatives must inspire and shared insight be conducted from the outside in, and in an iterative, time-boxed approach;
7. Business change is all about people and should be seen as a journey, not a destination.
3.2 Business rules management

It may be clear that today’s organizations are forced by their business environment to be flexible in accommodating their business processes in order to meet the fast changing market conditions, including swiftly changing consumer wishes, updated or new legislations and regulations and technological innovations. Unfortunately there are some obstacles inhibiting organizations from realizing this goal demand. An important one is that services often are composed by using large block-structured and graph-based languages (especially BPEL (Business Process Execution Language) that result in static and brittle composite services that are vulnerable for mixing up business rules with process logic. All together these characteristics create a fruitful base for an unmanageable business process and business rules spaghetti (Weigand, van den Heuvel, & Hiel, 2008). To increase the adaptability of a process, business rules management (BRM) is needed.

3.2.1 Understanding business rules management

Business rules management (BRM) primarily is about the automation of the complex decisions within the business processes of an organization.

In the paper of Kardasis and Loucopoulos (2004) a few definitions about business rules are cited, of which some are mentioned here to give one a feeling with the concept. “Business rules specify action on the occurrence of particular business events, including ‘state of being’ changes concerning individuals and groups of individuals, infrastructure, consumables, informational resources, and even business activities”. “Business rules are statements of goals, policies, or constraints on an enterprise’s way of doing business”. “Business rules are statements about how the business is done, i.e. about guidelines and restrictions with respect to states and processes in an organization”.

3.2.1.1 Introduction

Before starting with the introduction of BRM in more detail, clarity about the difference between processes and rules is needed. Processes are defined on a higher level then rules which means that rules can be used to implement processes and are usually exposed as services while on the other hand processes consume services. The visual representation hereof is shown in Figure 5. Ross (2009) explains a business rule as a rule under business jurisdiction, this means that the business can enact, revise and suspend their business rules when they have sound reasons for it. When the organization, or somebody outside the organization, does not have the authority to do so, the rule is not a business rule. Obviously the law of gravity is not a business rule, neither are mathematical rules.

![Figure 5: Relation between business rules and business processes](image)

3.2.1.2 Business rules capturing

In the broadest meaning of the word, a Business Rule is a statement that defines or constrains some aspects of the business. One must keep in mind that business rules are declarative statements, this means that they specify what has to be done, and not how (Rosenberg & Dustdar, 2005).

When diving into business rules literature many different ways on how they are interpreted are to be found. The Business Rules Group distinguishes two perspectives to explain business rules, known as the business-
A Business Process & Rule Management
Maturity Model for the Dutch Governmental Sector

Perspective, and the information system-perspective. “From the business perspective a business rule is guidance that there is an obligation concerning conduct, action, practice, or procedure within a particular activity or sphere”. “From the Information system perspective a business rule is a statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business”. Business rules aim to declare business structure or to control the behavior of the business (The Business Rule Group, (2000)).

After years of running seminars on business rules, Lam (2011) is composing a top 10 about the mistakes made by business analysts when capturing business rules. So far she wrote about 8 of these 10 mistakes. (Lam, 2011).

**Mistake #1: Treating Business Rules Initiatives Simply As IT Projects:** A big pitfall during the adaptation of a business rule approach is that IT is taking over the project. They will quickly discover a range of rule engines, but the organizations must keep in mind that the real value of the business rule approach is on the business side.

**Mistake #2: Not Focusing on Terminology:** Although business rules can be specified, in half the time, especially when they are not aligned with the business vocabulary and still look solid, issues will surface when damage is already done. Not using one and the same terminology will definitely cause problems later on when recovery activities are expensive but, nevertheless, necessary.

**Mistake #3: Assume Everyone Knows What a Business Rule Is:**: There need to be consensus about what a business rule is. This is important to make sure everybody in the project is talking about a ‘rule’ in the same way. Some people think rules are requirements, others think they are ‘if/then’ system statements, but they actual are statements that define or constrain some aspect of the business.

**Mistake #4: Not Managing Business Rules from the Start:**: Rules have a source, motivation, version, status and relationships. Not managing business rules from the start can cause a huge amount of work when organizations omit organizing rules right when they occur.

**Mistake #5: Not Having the Right Business Infrastructure:**: The main goal of applying the business rule approach to an organization is having the business rules managed by the business side of the organization. In many cases organizations have the right vision, recognize the benefits, and buy the appropriate technical tools, but they often overlook the fact that the business side needs to be prepared too. This so called governance needs to focus on guiding the behavior and decisions of the business and must flow top down from the executives of the organization.

**Mistake #6: Not Having Strong Sponsorship:**: The presence of strong sponsorship is important because both IT and business need to take on different roles then the ones they are used to. The key to strong sponsorship is having compelling business drivers. Some of these drivers mentioned by Lam are: Risk management, liability management, quality assurance, regulatory compliance and agility.

**Mistake #7: Not Having a well-defined scope:**: Because the business rules need to be defined at the business level which makes it necessary that the scoping elements are business friendly. Lam defines 4 common scoping elements. 1) by business process tasks – Identify in a business process model, the tasks that require business rules. 2) by decisions – Identify the decisions that require business rules. 3) by business concepts – Identify all the rules around the key concepts of the business. This way of scoping is very dangerous as any key concept can have many rules around it. 4) by source document – Identify the chapters, the section, or the pages of a source document.
Mistake #8: Not having the right skill set: A job cannot be done without the right set of skills, this holds for every job, so it does for BRM. Therefore training is needed. Practical skills that can be learned are rule harvesting, rule specification, rule analysis, rules management and vocabulary management. Besides the skills that can be taught, a rule analyst needs to have a certain mindset as well. This mindset refers to the ability to see business rules outside the context of process, people, or events. This seems to be difficult for people with an IT background as they are used to see things in a procedural manner while business rules thinking requires a type of declarative thinking. This is not a skill that can be taught right away so this need to be borne in mind when designating a rule analyst.

3.2.2 Business Rule lifecycle and BRM process

In Figure 6 the architecture for decision support of the Business Rule lifecycle describe by Rosca, Greenspan, Wild, Reubenstein and Maly. (1995) is presented. This lifecycle supports the encoding of business rules into operation systems in such a way that it contributes to the stability and determinism of the business rules, the confidence placed in the business rules analysis and the need to accommodate rapidly changing business rules. After the textual explanation of the rule lifecycle the process of BRM is given. In contrast with the rule lifecycle this process visualizes the set of activities necessary to administer business rules integral with the aim to deploy business rules for setting the business strategy.

3.2.2.1 Business Rule lifecycle

![Figure 6: Architecture for decision support of business rules lifecycle (Rosca et al. 1995)](image)

The entire deliberation process for business rules contains three main phases, development, operations, and evolution. In the development phase, the business process issues are discussed, the decisions rational are recorded and the set of business rules needed for the decisions are constructed. These rules are linked to their rationale. Later on in the development phase this information can be used to solve an issue. In the next phase, the operations phase, a distinction between deterministic and non-deterministic rules is made. Deterministic
rules uniquely characterize the situations in which they can be applied. They are either automatically applied by the system, or rigorously by humans if they are people oriented. Developers can choose to monitor decisions during the operational usage, this are conditional decisions. Non-deterministic rules require human input because several rules can be applied to a situation. The last phase is the evolutionary phase; here the information gained from the operation phase is used for refining existing rules or generating new rules.

3.2.2.2 The business rules management process

According to Coenen, Hermans, Roosmalen en Spreeuwenberg (2008) BRM includes a set of activities necessary to administer business rules integral with the aim to deploy business rules for setting the business strategy. It starts with the creation of business rules in which laws, legislation, strategy and policies are translated to rules. The second activity is the implementation of the business rule; here the rule is assimilated into information systems or other artifacts (handbooks, websites etcetera). The last activity is the analysis of the execution. The behavior of the rule is assessed by monitoring the way of working with the rules. Based on this information the law or interpretation of the law can be adjusted. This adjustment can be done in a last activity, which can be seen as a similar activity as the first activity.

3.2.3 Business rule categories

In the paper of Kardasis and Loucopoulos(2004) a framework is introduced to elicit, organize and manage business rules. An elaborate explanation of the framework will be given in section 3.2.7 Tooling. For now an explanation about the differences between the types of business rules they distinguish will suffice. They categorize three different types of rules, known as: ‘intentional rules’, ‘operational rules’ and ‘Information System (IS) implementation rules’. Intentional rules are business rules approached from a business context perspective. This type of rules communicate laws, external regulations or principles and good practices specifying the way an organization conducts business. Intentional rules are usually expressed in natural language statements. Operational rules are business rules seen from a business process perspective. They prescribe actions on the occurrence of some business event, or describe valid states of an organization’s information entities. Operational rules arise from the translation of informal intentional rules to formal rules statements developed in accordance with a convenient rule language and repository schema. The last group, the IS implementation rules, are business rules examined from a IS architecture perspective and the managing of these rules is often covered by IS development approaches. The rules describe valid states of data entities, or prescribe action on the occurrence of some system events. (Kardasis & Loucopoulos, 2005)

<table>
<thead>
<tr>
<th>Kardasis and Loucopoulos (2005) their business rule types</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intentional rule</td>
<td>‘Expiry date is February 2012’</td>
</tr>
<tr>
<td>Operational rule</td>
<td>IF : supplier has market Presence rank &gt; 15, experience rank &gt; 10 and capacity rank &gt; 50, THEN: ‘preferred supplier’</td>
</tr>
<tr>
<td>IS architecture rule</td>
<td>The chosen rule database has to be active.</td>
</tr>
</tbody>
</table>

Table 2: Examples of the types of business rules defined by Kardasis & Loucopoulos (2004)

Orriëns, Yang and Papazoglou (2003) distinguish five types of rules to classify business rules; structure rules, data rules, constraint rules, resource rules and exception rules. Below is a short description of each type given:

1) Structure rules govern the way things are need to be done in the composition and can have three functions, namely structure the activity, describe the dependency of the activity and describe the handling of an event.

2) Data rules regulate the use of date in the composition. This entails the relationship between messages, and it governs the necessary input/output messages for an activity.
3) **Constraint rules** can be used to describe a pre-condition for an activity.

4) **Resource rules** guide the use of resources in the composition in terms of services, providers, and event raisers selection.

5) **Exception rules** control the exceptional behavior of the composition.

<table>
<thead>
<tr>
<th>Orriëns et al. (2003) their business rule types</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure rule</td>
<td>If (Activity: functionality=&quot;flightTicketBooking&quot;, Activity: functionality=&quot;hotelRoomReservation&quot;) Then (Flow: pattern=&quot;parallelWithSynchronization&quot;)</td>
</tr>
<tr>
<td>Data rule</td>
<td>If (Activity: functionality=&quot;flightTicketBooking&quot;) Then (Message: input=&quot;(departureDate,returnDate,from,to)&quot;)</td>
</tr>
<tr>
<td>Constraint rule</td>
<td>If (Activity: functionality=&quot;flightTicketBooking&quot;) Then (Condition: argument=&quot;seatsAvailable&quot;, predicate=&quot;=&quot; value=&quot;true&quot;)</td>
</tr>
<tr>
<td>Resource rule</td>
<td>If (Activity: functionality=&quot;flightTicketBooking&quot;) Then (Role: type=&quot;airline&quot;, rights=&quot;approveSeatReservation&quot;)</td>
</tr>
<tr>
<td>Exception rule</td>
<td>If (Activity: functionality=&quot;flightTicketBooking&quot;) Then (Event: nature=&quot;seatUnavailable&quot;)</td>
</tr>
</tbody>
</table>

Table 3: Examples of the types of business rules defined by Orriëns et al (2003)

Regaining business rules from information systems and make them explicitly available to system users has three main benefits. It helps to enhance data quality, Evolve business rules, and Support system maintenance. (Shao & Pound, 1999). Three types of business rules are described by Shao and Pound (1999) in order to make the decoupling of the rules from their IS easier. The types are not very different from the types described by Kardasis and Loucopoulos (2005) and Orriëns et al. (2003). The first type concerns the structural business rules. In its simplest form these rules are a statement about the objects with which an organization’s business deals. The second type is called the behavioral business rules. These rules are statements about a dynamic aspect of a business, to specify what can or will be done to date objects in response to events; this may result in a change of state for the data object. The last type is the constraint business rules these are about the condition under which an organization’s business operates (Shao & Pound, 1999).

3.2.4 The need for business rules management

The last years a growing need for agility, transparency and control of business policies and rules is observed. This trend forces organizations into efficient definitions of the rules that govern their business in order to be successful in this field of working (Rosenberg & Dustdar, 2005), (Purchase, 2010). To do so, business rules should not be represented in the source code of the business logic, but as a separate entity. A business rule engine can offer a solution here. Modeling business rules as separate entities offers great flexibility as the business analyst does not need to have knowledge about programming to change the rule. This extraction of rules leads to a better decoupling of the system, which consequently increases maintainability. The whole process of thoroughly defining and establishing the business rules of your organization is the core competence of BRM.

At the same time a growing need for techniques to support the modeling of business rules emerged due to their growing change frequency. The lack of explicit modeling during system development has lead to two major problems that often occur in organizations nowadays. The first is about inconsistent enforcement of business rules. This means that the first implementation of business rules in IS synchronize well with the intended strategies and policies but when time goes by, the rules tend to stray from the proposed rules. This happened in many organizations as most of the systems grew enormously the last years and knowledge about the implemented business rules gradually fade. Consequently, maintenance work may not be carried out
correctly and introduce inconsistencies. Due to this, many organizations find that their legacy IS reduce their business growth and capacity to change. The second problem is the misunderstanding of business information. Many organizations face the problem that their legacy IS operates to business rules that are not visible or known by the users of the system. The result is that data and information delivered by such a system is often out-of-context and thus may cause misunderstanding or ignorance of the retrieved information (Shao & Pound, 1999).

3.2.5 BRM methods
Kardasis and Loucopoulos (2005) evaluated and compared some rules approaches. Before this comparison can be made, it is important to research issues that are mission critical when applying a rules approach. The issues that they found to be important are: Formalism, guidance, organization, rational, formality, and openness.

- Formalism: A rule is said to have a high level of expressiveness of formalism when the rule statement is written in natural language, on the other side, a rule written in Prolog for example has a low level of expressiveness of formalism. This rate is important because the higher the formalism the more likely it is that business people understand, modify or even write the rule from scratch.
- Guidance: This term refers to the methodological support the approach provides. The minimal guidance a methodology supposes to offer is how to use the approach. A good methodology gives precise information about the collection, organization, translation and expression of the rules.
- Organization: a good organization of rules is an approach that highly supports managing the rule models which allows retrieval of rules according to pre-described criteria by using proposed analysis and design activities.
- Rationale: a good rational makes decisions that enforce to change rules traceable, this contributes to the manageability of rule models as it is useful for changing and reflowing rules.
- Formality: The formality of a rule statement tells whether the rule statement can be expressed based on a formal language or not, and whether the rules are in accordance with other models that are necessary for the development of an IS.
- Openness: The last issue deals with the assumption that the IS will be developed according to a specific implementation paradigm or even platform. An open approach is more desirable as it allows choosing from multiple architectures and platforms.

3.2.5.1 Manchester Business Rules Management
The Manchester Business Rules Management (hence M-BRM) by Kardasis and Loucopoulos (2004) is an approach to a business rules centric development paradigm. M-BRM has its roots in the Enterprise Knowledge Development framework. As can be seen in Figure 7, the four activities involved in the M-BRM approach are all centered on the business rules paradigm. The first activity, elicitation, includes stakeholder identification, domain ontology and governance of the behavioral-rules of the business application. The second activity, representation, deals with the way that business rules are specified. The mapping activity is about how the business rules specification is connected to equivalent software design structures and the last activity is about the way the implementation of the software designs are realized in software code and data base structures. Organizations want to have business rules that are traceable to system components, therefore, the M-BRM approach supports BRM and traceability through a repository architecture.
3.2.5.2 E-POWER

The E-POWER method is particularly useful for governmental agencies because they deal with a lot of law and legislation. The method is established to serve customers and maintain the defined regulations. The definition of the method according to Glassée, van Engers and Jacobs (2003) is: ‘The POWER method is a regulation-intensive integrated organization of automated systems and knowledge workers’. A formal legislation and regulation analysis enables organizations to quickly and accurately change these variables in enforcement and customer service processes. The idea behind this method is explained here and a graphical presentation of the method can be found in Appendix 12.2.4

The six objectives of the POWER method are:

1. Improvement of the quality of legislation and regulations;
2. Improvement of the accessibility of legislation and regulations;
3. Fast implementation of legislation and regulations in operational business processes (time-to-market);
4. Cost-effective implementation of legislation and regulations in operational business processes (cost-of-ownership);
5. Efficient use of scarce expertise throughout the organization;
6. Unique and consistent interpretation of regulations throughout the organization, enhancing the quality of law enforcement and customer service.

The first step is formalizing the law. Normally concept legislation is used because it has to be adjusted to the political process. The speed of the POWER-approach must meet the fastest political decision-making process which only can be a few days. Using this formal description two activities can be executed; the anomaly check and simulations. The first provides a list of anomalies that would occur when implementing the law. The latter, the simulation action, gives insight in enforceability and in the desired or undesired effects that would surface when the law is implemented. These results are translated into suggestions (step 4) and to improve quality, these suggestions are used as feedback in order to improve the quality of the legislation. In some cases business processes have to be acclimatized to deal with the problems that possibly pop up.

3.2.6 Business rules management systems

BRM systems are used to support organizations to extract their business logic from muddled code in their IT components and manage this logic separate and independent from the business processes and with significantly reduced support from IT (Lam, 2011). Using these systems in a correct way can help organizations to reduce the policy and legislation change-release-cycles from weeks to hours. However, many adopters of this technology make the same mistakes which are described by Purchase (2010) and discussed in section 3.2.6.1.
Juric and Pant (2009) distinguish 4 key components of a BRMS. In the rule development environment developers translate business rules into code that can be implemented in the business rules engine. The service layers for the rules for integration with other applications will also be defined and implemented in this environment. The Business User Interface is a web-based interface where business users can write and edit the business rules. The centralized repository where these two components send their output to, receive feedback from, and where all the rule-related information is stored is called the rule repository. The last component Juric and Pant (2009) describe is the Rules Execution Engine which is responsible for the execution of the rules in the run time environment. For this reason this component is seen as the heart of the rules management system.

3.2.6.1 Often made mistakes
BRM System adopters are familiar with the advantages BRM can offer, but they also know that good implementation is crucial in order to gain as much advantage as possible. For this reason it is remarkable that organizations jeopardizing their efforts by all making the same mistakes. Purchase (2010) made a list of these mistakes.

- **Not Working Your Vendor Hard Enough** – make sure your organization get the most out of the vendors during Request for Proposals by using the proof of concept approach. Let them solve one small problem of your business.
- **Performance Anxiety** – in most processes where business rules are used, performance is critical. For this reason many organizations distract them from the big picture which leads to unreliable test environments and the ignorance of other architectural flaws.
- ** Unsure Offshore** – due to the lack of offshore business skills and BRMS experience some offshore vendors are dishonest about their competencies. Organizations should avoid using the project as a developers training for offshore vendors, unless it is priced on that basis and you accept the risk.
- **Deployment by Stealth** —although BPMS offer a more controlled environment for defining business policies, reduced testing is self-defeating.
- **Lack of IT Involvement** – some clients believe optimistic sales pitches of BRMS vendors when they say that business users can adopt BRMS and develop rules with little need for IT practitioners. This is indeed what BRMS suppose to do, but without a sustained involvement of an IT team most BRMS projects are fated to achieve the success it promises.
- **Lack of Governance processes** –The governance process defines who interacts with which project items, at what time, to what ends, and ensures this is recorded and coordinated with the right activity. Insufficient control and coordination here, can lead to chaos. Saving money on this part will quickly be overtaken by the mounting costs of production incidents, lack of accountability, meandering from the business drivers, and silent loss of intellectual property.
- **Niche or 'Silo' Adoption** – It is better to spread the licensing cost amongst several projects because most BPMS vendors lack enough knowledge to determine what constitutes a single business domain.
- **Underestimating Rule Development Costs** – some organizations can use off the shelf rule collateral with their BRMS but the majority will have to develop their own rules and most of them (over 85%) underestimate the costs of this. Some organizations try to limit this by assigning this job to a young developer or even worse, a business analyst, but at the end this makes the problems even worse.
- **Lack of Business Involvement** – On the other side the problem arises that the main support of the BRMS project is from the technical side of the organization. Consequence; the developed rules are neither an accurate reflection of the business nor are they written in business terminology. With this as a basis the rules will never be fully manageable by business analysts and the benefits of using a BRMS are negated.
- **Ineffective Requirements Capture** – the last, but undoubtedly the most common mistake, is lack of a deep understanding of the business requirements and/or behavior of upstream business processes and systems.
3.2.6.2 **Opportunities**

An automated way of managing business rules is very useful for organizations facing dynamism and volatile time to market, regulatory compliance, business participation, complexity, and consistency (Juric & Pant, 2009). These characteristics can be seen as the drivers for using BRMS. Ziegler and Albrecht (2008) list the following eight opportunities for using a BRMS:

- more transparency;
- Less coordination efforts between IT and business experts;
- Less testing and maintenance costs;
- Reduced cycle times;
- More flexibility in order to faster response to changes;
- No downtime needed because code change is not required;
- Faster application development because business rules are a powerful means for flexible application customizing;
- Graphical representation is easy to understand.

3.2.6.3 **Considerations for selecting a BRMS**

Juric and Pant (2009) mention six issues that an organization can take into consideration when selecting a BRMS that works well with their BPM and Software Oriented Architecture (SOA).

- **Standards based integration capability** – Is the BRMS able to integrate with the SOA landscape your organization is using?
- **Business user interface** – Does the BRMS support the business users in accessing and modifying the business rules through a user-friendly interface?
- **Rule language** – to what degree is the BRMS able to provide natural languages for expressing a complex set of rules?
- **Performance** – is the BRMS able to provide support for high-volume transactions for mission critical applications?
- **Rules monitoring and reporting** – does the BRMS support rule debugging, rule reporting and real time monitoring of rules?
- **Rules repository** – Is there a centralized repository for storing all rule specific artifacts which also support version management of the rules and provided audit capabilities?

3.2.7 **Tooling**

Hars and Marchewka (1996) distinguish two steps to map business rules to IS using a prototype Natural language processing Computer Aided Software Engineering (CASE) tool.

First, the tool must be capable of identifying condition-action structures used in natural language. Second, the tool must be capable of identifying the key concepts that are involved in each action and condition

3.2.7.1 **Rules development in the Oracle BPM suite**

Juric and Pant (2009) described four steps to understand rule development in the Oracle BPM suite. To give insight in how tooling and rules management get along, these steps are described here.

1. **Rule harvesting and discovery:** In this first stage, the business analyst and business communities will try to dig through all the rules that affect the business processes. This can be the policies and procedures the organization follows as well as rules embedded in existing systems.
2 Analyze model business rules: This is an important part of business rule analysis because there is a tendency that every rule is deployed as a business rule, this stage ensures organizations that the right set of rules are managed and controlled by the business.

3 Export process and rules: At this stage the Business Process Engineering Language (BPEL) for the BPMN (a process modeling standard) model can be generated to apply the changes into the process maps. Blueprints will give details about the business processes and the rules based information to support the configuration of the business rules in BPEL.

4 Implement rules: Now the framework for the business rules specified in the process models is available. An IT-developer links these with the rule engine.

3.2.7.2 The rule collection roadmap

In chapter 3.2.3 about Business rule categories a distinction between intentional rules, operational rules and IS-architecture rules is given (Kardasis & Loucopoulos, 2004). With this categorization in mind Kardasis and Loucopoulos (2004) proposed a roadmap for collecting business rules which can be implemented in an IS later on. Apart from the goal of this approach which is the elicitation of business rules, an important idea behind this roadmap is that different stakeholders have different views on the objectives of a particular enterprise and/or object. Therefore, three different steps can be distinguished. It can be seen in Figure 8 that the steps match the categorization of rules.

The intentional rule analysis is the first step in the rules collection roadmap described by Kardasis and Loucopoulos (2005). This step consists of four sub-steps. The first sub-step, business charting, is about studying the actors and roles that play in the organization. The result of this step are organizational charts and the visualization of the main goals of the actor roles and dependencies with other actor roles presented in a high-level actor-role diagrams. Then the project scoping starts. At the end of this step the enterprise goal graphs and connection to their leaf goals with related enterprise roles are clear. The next step, viewpoint analysis, represent a set of new goal graphs all constructed by different stakeholders and thus show different viewpoints. During the last step, intentional rule collection, all the goal graphs are analyzed and the business rules going with them are identified in accordance with the rules classification mentioned earlier (intentional rules, operational rules and IS architecture rules).

The second step is the operational rule analysis which consists of five sub-steps and concerns the identification of the distinct operational parts. The objective is fulfilled by a specific activity which involves one or more type of users (actors) and produces information objects and other enterprise resources (activity enablers). First, the context represents the activities of an organizational unit and should be selected. To represent all different operational interest within this context, the second sub-step is to identify all actors. An activity is an elementary unit of action to satisfy a particular business goal so the third sub-step is describing the actor activities. The fourth sub-step is bipartively, namely both information objects and activity enablers are the result of the actor activity identification and present the informational and infrastructural resources needed for activity execution. When these steps are completed, the last sub-step, collection of operational rules is the
result. The last thing that needs to be done now is to refine the rule collection to more precise statements which will determine the behavioral aspects of the system under development.

During the last step, the rules are transformed from operational rules to IS implementable rules. This finalizing step provides a more informed view on the IS architecture process. Now the IS designers can proceed with the development of the data scheme. The IS implementation rules make references to this data scheme, but not all the information objects described in the operational rules collection may be covered due to the constraints placed by the selected architectural solution. In the final step, operational rules are translated to the corresponding IS implementation rules but again there will be rules that cannot be projected on the IS architectural level in any way.
3.3 Business process and rules management

BRM can be seen as an extension of BPM as it adds intuitive and traceable mapping of rules. Business rules can act as the building blocks of a business process. By using BRM systems, complex decision rules can be used across processes and systems throughout the organization. It enables organizations to change and add rules without changing the entire business process (zur Muehlen et al., 2008).

Within organizations, and especially between departments, there is some degree of conflict when it comes down to the benefits contributed by a business process or a business rule. The main business processes realize course of action for an organization. These business processes are guided with business rules, but most of the employees working with the IS of the process think that business rules remove some degree of freedom. In some way they are right, because business rules guides business processes which means; that by defining business rules a process can be executed. The business rule group (2000) however stress that good BRM does not limit freedom but enlarge guidance and thus contributes to more continuity all through the organization and its rule compliance.

The combined field of BPM and BRM is a very young one. Often BPM does not yet separate the pure business logic of the business from the control flow organizing and orchestrating activities. The constraints placed on the business have to be outsourced to the IT department in order to be manageable. Through the separation of business processes and business rules, rule changes can be governed and implemented by the business without having to change the processes that are controlled by the specific rule. Reactivity to change is made easier and thus, agility, as far as allowed by the BRM methodology, can be achieved (El Kharbili, 2009).

The need for modeling and developing tools for BRM is closely related to the issues that come along with BPM. This notion points out the necessity to create business process models to accomplish the need of different analyses, while the creation of computer tools is necessary to support such a process. Business rules within a BPM system can be used to structure loose informal and formal business practices, business policies and all kinds of legislations. A second advantage of business rules in a BPM is that they can apply rigorous sets of conditions to a process which can help business analysts and domain experts to express essential requirements of the systems behavior. Business rules are the components in a process that implement the decision-making logic and compliance of business- and legal regulations (Maciol, 2008).

When applications make use of BRM and BPM the designers should consider which process parts are designed in the BRMS and which parts are designed in the BPMS. Flexible parts that are subject to frequent changes are delegated to the BRMS. According to Ziegler and Albrecht (2008) flexible parts comprise:

- Decision services
- Data validation and error detection
- Classification and derivation
- Matching
- Calculation
3.3.1 The BPM and BRM perspective

Although rules and processes are definitely two separate and totally different elements of a business, BPM and BRM go together very well. Harmon (2009) confirms this by saying that processes and rules are complementary. No process without rules and a single rule is meaningless without a solid context, which is given by a process. In Figure 9 similarities and differences between the two perspectives are shown. The figure also gives a clear overview of the fundamental topics for both perspectives at each level within the enterprise. An important task of BRM and BPM is to separate know from the flow, obviously this cannot be done without clear understanding of both the two subjects.

![Figure 9: BRM and BPM: two complementary perspectives (Harmon, 2009)](image)

3.3.2 Relation and alignment between business processes and rules

Although BPM and BRM both act at a different level within the organization, they need to go hand in hand for success (Coenen et al., 2008). In this chapter the relation between BPM and BRM discussed in literature so far, is summarized in accordance to create a maturity model that combines the two disciplines. After the literature research about both topics the most important relations between them are out lighted here.

According to Coenen et al. (2008) there are three relations between business rules and processes.

**Rules as a tool for processes** – rules can show how an activity should be performed and therefore can be seen as a deepening of the process.

**Process rules** - rules can also limit the process, which makes the process an implementation of the rules. An example of such a process rule is: “a request needs to be processed within three weeks”.

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Page 42
**Decision points in the work process** – a rule can be worked out in a workflow diagram. The work process then is a communication form for the rule, and the rules end up in the conditions of the decision points of a work process.

The latter relation given by Coenen et al. (2008) is how the relationship between business processes and rules is seen in this research.

In the paper of Zoet et al. (2011) it is stated that agility is related to the management and execution of both activities and decisions. This is an important note because activities imply processes and decisions imply business rules. This note is important to keep in mind when designing the combined maturity model.

Zur Muehlen et al. (2008) suggest an integrated methodology for process modelling and rule modelling. The framework consists of seven stages. The first stage is a shared stage that refers to both the modelling topics, and out of the other six stages three are about process modelling, and three about rule modelling. This is a good example of the way business processes and rules overlap and work together.

The above mentioned can be visualized in a scheme. This is done by Long (2011) and shown in Figure 8. From left to right the process is depicted. Looking at the guides and enablers of a process it should be considered how flexible they are. It are the guides, and more specific the rules within these guides, that make the process flexible. Additionally the enablers should be taken into account. Organizations can have flexible guides/rules but when the supporting technology is so rigorously structured that implementing this flexibility is not possible the flexibility of the guided will not pay out. Another problem can be that the human resources that support the process do not have enough experience or authority to apply that flexibility in serving the customer. The previous emphasizes the importance of looking at the entire organization when implementing flexibility in the processes and rules of an organization.

![Figure 10: The influence of rules on processes (Long, 2011)](image)

Some other quotes from scientist about combining BPM and BRM are presented here:

“Implementing business process correctly is as much (and perhaps more) about managing business decisions as it is about business process. By ensuring that a business pays attention to both sides of this symbiotic relationship, the business is more likely to achieve the greatest gains from business process improvement.” (von Halle & Goldberg, 2010)

“...even though process and rules are still discussed as separate topics by most people, they are really part of one concept that makes organizations successful. They should not be viewed, analyzed, or changed separately but as part of the whole group of elements that make an organization successful.” (Long, 2010)
3.4 Maturity and alignment

This chapter explains the concepts of maturity models and gives some relevant examples in the field of BPM and BRM. The second part of the chapter is about alignment. This subject is an important factor in both BPM and BRM and therefore literature about the two topics is needed for a reliable BP&RM Maturity Model. Later on in this research the choices made during the development of the BP&RM Maturity Model will be underpinned.

3.4.1 Maturity models

The general presentation and interpretation of maturity is by sketching a number of growth stages that illustrate the potential-upward development or performance of organizations during several periods of time (Batenburg & Versendaal, 2008). Every level has to be identified by a concise descriptor. Nolan developed a model in 1979 that is often quoted as the origin of the maturity perspective (Nolan, 1979). Since then this model have been revised, extended, specified and modified many times. After the publication of the Capability Maturity Model (Paulk, Curtis, Chrissis, & Weber, 1993) in 1993 by the Software Engineering Institute this model soon became notorious in the field of information systems. An immature organization is not able to objectively judge about product/process quality or solve product/process problems. Activities to enhance quality are often curtailed or even eliminated when projects lack time. In a mature organization, managers monitor the quality of the product/process and customer satisfaction continuously. Generally, a disciplined process is consistently followed because all the participants in the project/process understand the value hereof and the necessary infrastructure exists to support these processes (Paulk et al., 1993). With the definition of maturity explained, the model proposed in this research can be conceived and understood the same way it is meant by the author.

According to Pöppelbuß and Röglinger (2011) there are three types of maturity models; descriptive, prescriptive and comparative. A descriptive maturity model is used for ist-assessments. The current capabilities of the entity under investigation are assessed with respect to given criteria. At the end of the assessment a maturity level is assigned which can be communicated to the internal and external stakeholders. A prescriptive maturity model is extended with guidelines on improvement measures. The last and most extensive type of maturity models is the comparative maturity model. This type allows both internal and external benchmarking based on sufficient historical data from a large number of assessment participants. Pöppelbuß and Röglinger also propose a framework which suggest design principles that a maturity model need to contain in order to cover its purpose of use. The visualization of the general idea behind the construction of this framework is shown in Figure 11.

![Figure 11: Visualization of the design principle framework (Pöppelbuß & Röglinger, 2011)](image)

Figure 11: Visualization of the design principle framework (Pöppelbuß & Röglinger, 2011)

As can be seen in Figure 11 the framework is constructive, this means that a maturity model with a descriptive purpose of use should cover the basic design principles and the design principles prescribed for the descriptive purpose of use. And as a matter of course, a prescriptive maturity model needs the basic and descriptive design principles and the design principles prescribed for the prescriptive purpose.
3.4.1.1 BPM maturity models
It may be clear that BPM maturity models are a famous research topic for scientists. Many models are developed, analyzed, adjusted and applied. Every model says to have its own strength which makes none of them applicable to measure and guide maturity for a random general organization. In this chapter several maturity models are described together with their strengths and weaknesses.

3.4.1.1.1 The Capability Maturity Model by Paulk et al. (1993)
The Capability maturity model (CMM) is often seen as the most important maturity model ever made. It was originally developed for organizations to support them in improving their software process. After a few years of experience with the framework, the Software Engineering group (SEI) evolved the framework based on knowledge gathered from both industry and government into the CMM maturity model. The success of the model encouraged the development of maturity models for other processes. However it is still this model that forms a standard base for most of the maturity models ever made (Paulk et al., 1993). The model was designed to achieve consensus between managers and the professional staff on what improvement activities are important and thus undertaken first. It guides software organizations with gaining control of their processes and thus help them in selecting process improvement strategies by determining their current process maturity and identifying the issues most critical to software quality and process improvement. Today the Capability Maturity Model Integration is an approach for the assessment and improvement of product development processes in general (rohloff 2009).

[Image of the CMM model]

Figure 12: Overview of the CMM (Paulk et. al 1993)

The structure of the maturity model is shown beside in Figure 12. The CMM defines five stages of maturity, known as initial, repeatable, defined, managed and optimizing (Paulk et al., 1993). For every maturity level some key process areas are assigned which in turn are organized by common features. These common features indicate whether the implementation and institutionalizing of a key process area is effective, repeatable and lasting. At last, every key process area is described in terms of key practices to describe the infrastructure and activities that contribute most to the effective implementation and institutionalization of the key process area. All these steps make the CMM evaluation very time consuming, therefore many other maturity models take a more holistic approach or focus on a particular part of the organization (Fisher, 2004). According to Smith and Fingar (2004) CMM is written in times of the 2nd wave of BPM which is about the transformation from not having a process to having a process, while the 3rd wave of BPM is more about managing the business process. Therefore, a high CMM level does not simultaneously mean a high BPM maturity.
3.4.1.1.2 Business Process Maturity Model by the Object Management Group (2008)
The Business Process Maturity Model (hence BP MM) is based on best practices used in a specific domain. Essential elements of effective processes are described in order to provide a foundation for quantitative control of a process needed for continues improvement. The latter, as explained in the chapter about BPM, is the ultimate stage for BPM. To reach this ultimate stage, the model has different process area’s for every maturity level. To be precise; nine for level 2, ten for level 3, five for level 4 and six for level 5. In Figure 13 a brief explanation of the maturity levels and process area’s is outlined.

A great benefit of the model described by the Object Management Group (2008) is the broad applicable underlying process model. Even for domains other then the product and service domain, for example the finance domain, this model depicts the development and delivery of products and services. The biggest drawback of this generic description of the model is that it is very abstract, and many organizations do not know exactly what to do to grow in maturity because the model is too vague.

The BPM maturity model presented by Rosemann and de Bruin (2004) helps organizations with the evaluation and assessment of their BPM maturity in both the ist and soll situation. The aim of developing this model was that the model had a wide practical application and acceptance.

The proposed model is an updated version of earlier defined models as it addresses the requirements and complexities identified within BPM in a more holistic and modern-day way. The model is built as a three dimensional framework consisting factors, stages and a scope. There are 6 factors each representing an identified critical success factors for BPM. The stages show the level of maturity and 5 stages are distinguished. The scope covers time and organizational entity. Time is the point in time that the model is applied and organizational entity defines the unit of analysis, which is also the unit to which the model is applied. Finally, the factors are measured by analyzing how far (coverage) BPM activities are extended through the
A Business Process & Rule Management Maturity Model for the Dutch Governmental Sector

organization and how well (proficiency) BPM activities are conducted. This is measured by three criteria, for ‘coverage’ these criteria are:

- The number of processes included in BPM practices;
- Staff involvement/ level of staff undertaking BPM activities;
- Links to other management tools (such as budgets, KPI, organizational charts, etc).

For ‘proficiency’ the three criteria are:

- Response to BPM issues and initiatives;
- Frequency of conducting BPM activities and initiatives;
- Suitability of BPM tools, resources and practices.

The reason for the comprehensive definition of maturity stages is dual. First, it enables organizations to understand their maturity better and to make it possible to target BPM improvement strategies. Second, it reduces individual interpretations of stage meanings and therefore enlarges the change of developing a meaningful and consistent application of the model throughout the organization. After application of the model, a BPM progress roadmap for the organization is developed to assist organizations in reaching their soll situation.

Thanks to the elaborate approach this model has a wide range of value propositions for organizations. Besides defining the ist and soll situation of an organization it identifies the current BPM strengths and shortcomings along the different factors. It can also be applied as a longitudinal study, to support the measurement of actual progress in the BPM capabilities. Finally it allows to benchmark organizations within or across industries. The visualization of the three dimensional model can be found in Appendix 12.3.1.

In 2010 Rosemann and von Brocke extended this model with an extensive explanation of the factors and for every factor they defined five capability areas. The factors and their corresponding capability areas can be found in Appendix 12.3.2.

3.4.1.1.4 Business Process Management Implementation Maturity Model by Rohloff (2009)

Rohloff (2009) presents in his paper how to implement BPM in a large international company. First he outlines the objectives and the overall approach for implementing BPM. Here he introduces the process framework which includes the reference process house and the overall structure and content of the BPM implementation process. Second, he develops a process management maturity assessment (hence PMMA) model in order to assess and derive improvement measures for BPM in an organization.

The process framework shows the total set of tools, concepts, conventions, procedures and guidelines needed for any implementation and operation of process management, therefore it is the basis for a common language and understanding of processes, the configuration and design of specific business processes and end-to-end business process chains, process redesign based on commonly defined standards for future (hence soll) processes, cost reduction through faster implementation of standard processes and alignment of applications, and extensive benchmarking and best practice sharing. The framework guarantees clear communication processes, decision processes, and escalation processes by describing the roles and responsibilities necessary for effective process management on both strategic and operations levels.

The PMMA contains five maturity levels and is developed to identify the need for action and derivation of measures for process management improvement and to identify the requirements for further support. It is basically built upon the same structure as the CMM Integration Method developed by the Software Engineering group. The PMMA distinguishes nine dimensions. For each dimension detailed criteria and a set of
questions exist to determine the maturity level for every single dimension. In Table 4 the nine dimensions are listed together with some strength and weaknesses gathered during the assessment of the model.

<table>
<thead>
<tr>
<th>Category</th>
<th>Strength</th>
<th>Weakness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Portfolio &amp; Target Setting System</td>
<td>Specific tools, e.g. scorecards, as basis for deployment from business strategy.</td>
<td>No systematic deployment of process portfolio. Individual Training necessary. Objectives are often monetary.</td>
</tr>
<tr>
<td>Process Documentation</td>
<td>Process description contains all relevant information [e.g. Input/Output, Interfaces].</td>
<td>Sometimes lacking parts (milestones, metrics or interfaces).</td>
</tr>
<tr>
<td>Process Performance Controlling</td>
<td>Milestones and metrics are defined and used for controlling of most processes.</td>
<td>No integrated measurement system; focusing on process cost drivers to be enhanced.</td>
</tr>
<tr>
<td>Process Optimization</td>
<td>CMMI Assessments in PLM. Process Benchmarking with internal and external partners.</td>
<td>Organizational obstacles for end-to-end process optimization (interfaces).</td>
</tr>
<tr>
<td>Methods &amp; Tools</td>
<td>ARIS often in use. Several process management methods are used (e.g. six sigma).</td>
<td>Process description not based on RPH or at least level 4 processes not linked to RPH or documented in ARIS. Level concept/ conventions not used.</td>
</tr>
<tr>
<td>Process Management Organization</td>
<td>Process Management Roles are defined; organization is process oriented.</td>
<td>Process responsibility not clearly defined; no systematic job rotation between roles.</td>
</tr>
<tr>
<td>Program Management, Qualification, Communication</td>
<td>Process Management reports directly to BU Head; communication plan regarding process management.</td>
<td>Roadmap for migration to SPF is missing; no qualification plan available. No internal communication.</td>
</tr>
<tr>
<td>Data Management</td>
<td>Responsibility for data content and format defined Necessary measures are set up.</td>
<td>No mechanism to check data quality or integrity. No alignment with process landscape. Too few resources.</td>
</tr>
<tr>
<td>IT-Architecture</td>
<td>Requirements of process management are fully covered. Migration measures derived.</td>
<td>IT architecture not defined, nor communicated – process to derive the soil IT-architecture are not defined.</td>
</tr>
</tbody>
</table>

Table 4: PMMA dimensions and their strength and weaknesses (Rohloff 2009)

3.4.1.1.5 BPM maturity model by Gartner (Melenovsky & Sinur, 2006)
Gartner is a group of research professionals in IT. They offer world-class, objective insight on virtually any area of IT. Gartner developed a six-phase BPM maturity model that enlarges the understanding about where your organization stands by addressing critical success factors (Melenovsky & Sinur, 2006). Six success factors are recognized all through the six phases. The six success factors are: Strategic alignment culture and leadership, people, governance, methods and IT. The model is also provided with a description of the triggers which herald the transition from one phase to the next. After that, the needed competences to reach the organizations’ goal are explained. The last aspect of Gartner’s model is a brief explanation of the potential challenges for the organization. Determining and admitting these challenges will help the organization to see opportunities to grow to the next maturity level and become an agile business more and more.

3.4.1.1.6 The Process and Enterprise Maturity model by Hammer (2007)
The Process and Enterprise Maturity Model (PEMM) allows organizations to evaluate the openness of their organizations to process-based change and the maturity of their business processes. In contrast with the CMM, the PEMM is applicable for every industry and does not specify what a particular process should look like. One of the most important drawbacks of the framework is the lack of offering organizations some sort of roadmap to guide them to a higher maturity level.

The last two decades Hammer combined his experience in the field of process redesign and reengineering with studying organizations that were implementing new processes. The result of this research is a list of five
characteristics (Process enablers) that he found essential for any process to perform well. First, organizations need to include a detailed design to ensure people working on the process know what they are doing, second the performers must have appropriate skills and knowledge, third, the owner who has the authority and responsibility to ensure the delivery of the process results need to be designated, fourth to support the process the infrastructure of the organization needs to be aligned and finally the right metrics to assess the performance of the process over time need to be developed. With this tool an enterprise can assess the maturity of their processes.

In order to develop high performance processes, Hammer claims that organizations should dispose of enterprise capabilities in four areas, known as leadership, culture, expertise and governance. For every process enabler and enterprise capability some sub-elements are assigned. All the elements are described in four levels (P-1 until P-4 for the process enablers and E-1 until E-4 for the enterprise capabilities), so every element has a single maturity level. The higher the maturity level the more advanced the element is. The final maturity level of the enablers and capabilities is the lowest level of the elements for that enabler or capability. The only way to reach maturity level 3 for a specific enabler for example is to make sure that all elements for that enabler have at least maturity level 3. So the only way for organizations to proceed to the next level is to fulfill all the elements of the desired level. With this second tool developed by Hammer (2007), an enterprise can assess the maturity of their enterprise. An snapshot of the way this is done for the process enabler metrics can be found in Appendix 0.

3.4.1.1.7 Professional Performance Improver by Rummler-Brache-Group (2004)

The Rummler-Brache group, a professional performance improver through process innovation and change management principles, performed a field study among thirty-two US firms. This example is not a real maturity model but more a step toward developing one. However, the outcomes of the research are relevant to mention because they do use some sort of framework to measure process management and are relevant for identifying critical issues. The group uses ten factors to measure how well organizations manage their key business processes. These factors and a short explanation of them can be found in Table 5.

<table>
<thead>
<tr>
<th>Key Success Factor</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignment with strategy</td>
<td>Business processes are directly linked to the organization’s strategy and critical success factors</td>
</tr>
<tr>
<td>Holistic approach</td>
<td>Enterprise business processes are defined before launching improvement initiatives (e.g. Six Sigma, CRM, etc.)</td>
</tr>
<tr>
<td>Process awareness (management &amp; employees)</td>
<td>Key players understand the role of process management in improving performance</td>
</tr>
<tr>
<td>Portfolio of process management initiatives</td>
<td>Improvement efforts are prioritized according to process “health” and linkage to current issues</td>
</tr>
<tr>
<td>Process improvement methodology</td>
<td>Process management teams use a standard approach to navigate process analysis and design</td>
</tr>
<tr>
<td>Process metrics</td>
<td>Process performance is measured at the individual, process and enterprise level</td>
</tr>
<tr>
<td>Customer focus</td>
<td>Process analysis and design efforts focus on delivering value to the customer</td>
</tr>
<tr>
<td>Process management</td>
<td>Process owners monitor process metrics and continuous improvement efforts on a regular basis</td>
</tr>
<tr>
<td>Information systems</td>
<td>Process is the “master” and information systems are the “servants”.</td>
</tr>
<tr>
<td>Change management</td>
<td>People and cultural issues are effectively addressed when process changes are introduced</td>
</tr>
</tbody>
</table>

Table 5: The ten maturity measurement factors according to the Rummler-Brache Group (2004)

In the second step of the research they asked the participants to identify the three most critical issues they currently face. These issues varied a lot but could easily be grouped into eight key categories known as:
A Business Process & Rule Management
Maturity Model for the Dutch Governmental Sector

- Strategy
- Environment
- Process
- Technology
- Customer
- Product
- People
- Financial

The research distinguishes three stages of maturity: **Process Management Initiation, Process Management Evolution and Process Management Mastery.** The first stage is characterized by beginners when it comes down to business management via processes. Typical for organizations in this stage is that they have a strong desire to learn about process management. Second-stage organizations are process-aware and have instituted process improvement programs and sometimes use process and performance metrics to become more mature. The last stage characterizes organizations that have BPM as a way of life. Process owners are rewarded on their performance and every employee understands how the business processes deliver value to the business. Process management is fully integrated.

### 3.4.1.1.8 The Business Process Maturity Model by Fisher (2004)
Fisher introduces a holistic two-dimensional framework (Fisher, 2004). The first dimension he describes as: *the five levers of change* and is described as: Strategy, control, people, technology, and process. The second dimension of his framework he calls *the states of process maturity* and is distinguished by five states called: Siloed, tactically integrated, process driven, optimized enterprise, and intelligent operating network. Characteristic for a holistic approach is that the levels are constructive, which means that being a level three organization you should commit to all the requirements of level one and two as well, and it is not possible to skip levels. The objective of the model is not to benchmark organizations, but to supply organizations with knowledge about their own gaps from their current (hence ist) situation across each lever of change. Alignment between the levers of change is important for a mature organization, so identifying the gaps between them is the first step towards full maturity. The main drawback of the model is that it does not provide an assessment tool so organizations get inside in where to go, but are not assisted in how to get there. The entire two dimensional model can be found in Appendix 12.3.4.

### 3.4.1.1.9 Evaluating an organization’s Business process maturity by Harmon (2004)
Harmon’s interpretation of process maturity is a one-dimensional one. He distinguishes five different levels which are briefly explained in his paper (Harmon, 2004). The goal of his research was to develop a light-weight, generic approach to evaluate an organizations process maturity. An important step in this approach is establishing the scope. The ideal engagement is a small group that is responsible for one sub-process. If the organization under investigation focuses on more than one process, it is recommended to evaluate each process independently and thus to give every process a separate maturity level. In section 12.3.5 the different maturity levels and a short explanation of them is given, together with characteristics of every level.

### 3.4.1.2 BRM Maturity models
In this section some relevant BRM maturity models are explained. The literature about BRM maturity models is not as extensive as the literature about BPM maturity models but some interesting researches are done and useful for this research.
3.4.1.2.1 Business Rules deployment maturity model by Nelson et al. (2010)

Nelson et al. (2010) did a qualitative case study in order to bridge the gap between all the technical considerations researched by scholars and the few examined deploying and managing considerations of BRM. He researched five organizations in the United States that provide property and casualty insurance. Although the five organizations were active in the same field of business, the drivers for adopting a business rules approach were different for all of them. The drivers mentioned were: costs savings, rule consistency maintenance between various systems, compatibility insurance with parent corporations who were in the process of purchasing the company, to fight false and misleading information about their company in the marketplace, remain competitive, maintain business rule consistency with the balanced, multi-channel strategy and to better manage the rapidly growing business. Despite the wide-ranged drivers these organizations had, their approach to business rule development and deployment was quite similar. They all formed a Central Business Rule Group (CBRG) to guide and direct BRM development, rule maintenance, systems integration and to coordinate implementations. Furthermore, they all made use of a business rule repository and started their BRMS effort with a narrow scope. The result of these corresponding findings is the maturity model presented in Figure 14. This visualization not only shows the five stages with comparisons across the five dimensions but it also gives direct insight in the way communication and collaborations takes place by using the circles along the maturity growth. From stage four on, the BR service model is mentioned. In this stage the so called “Business Rules Factory” is built.

Figure 14: Business Rule deployment maturity model (Nelson M., Peterson, Rariden, & Sen, 2010)

The BR tasks/service model is covers three areas within an organization, relevant for a business rule approach. The areas that are meant here are the Central Business Rule Group (CBRG), the IT support unit (IT), and the Business Process Owners (BPO’s). In the first phase only BPO’s are involved and responsible for creation, retrieval, updating and deleting of the rules within the scope. From this point, the model should be read counter-clockwise. After the first step the BPO’s will ask for standards and direction from the CBRG concerning the rule architecture, authoring, and maintenance of the enterprise wide rule repository. Then the CBRG provide amongst others enterprise-wide BR guidance. After this, the IT unit within CBRG will develop business rules tools and standards, API-interfaces and key integration decisions. The core activity of BRMS development
will continue to combine all three parts (BPO, IT, and CBRG) and they together maintain the BRMS implementation schedule, establish formal mechanisms for knowledge sharing of lessons learned and technology standards of financial reporting. Finally, the BPO’s, together with the IT support unit, will be responsible for the implementation. After this factory is build, the expansion of the BR deployments to the next implementations business domain is important. The visualization of this model can be found in Appendix 12.4.1. Note that the ‘building’ starts in the lower right corner of model.

3.4.1.2.2 The Rule Maturity Model (RMM) by von Halle and Goldberg (2006)
The book of von Halle and Goldberg (2006) describes a six stage maturity model about rules management. The model is a simple and practical model that organizations can use to align their business objectives with the optimum BRM practices in order to achieve these business objectives. The model can help organizations to assess their current state with respect to the management of their business rules and at the same time they can use it to define their target state. When the desired level is achieved they can use the RMM to publicize the results of their maturity growth to internal and external audience to show the successes and benefits they achieved by better managing their rules. The last possible purpose of the model is to stimulate adoption of the business rule approach by determining the business value of the business rules approach incorporation.

The model contains six levels of maturity. Maturity issues are described along three vectors, business value, technical state and business control. The first vector addresses the influence over rule changes that occur at each RMM level. The second vector describes where rules are located and how they can be managed at each level, the last vector is the business control vector which focuses on the role, and evolution, of non-technical rule ownership. The entire model can be found in Appendix 12.4.2.

Von Halle and Goldberg also propose a set of questions an organization can answer before determining the desired target level:

- What objectives are achievable by better managing business rules?
- What are the short-term and long-term timeframes for achieving those objectives?
- Which business rules are worth managing?
- Who should play which roles in managing business rules? Specifically, who drives policies to new and changed rules for different parts of the business?
- Is there a need for joint stewardship for some policies and rules?
- How will political conflicts concern rules, be settled?
- What technology is needed to support each of the roles?

At every maturity level different characteristics are important. In Table 6 the issues described by von Halle & Goldberg (2006) are presented.
<table>
<thead>
<tr>
<th>Level</th>
<th>Use of Rules</th>
<th>Primary goal of RMM level</th>
<th>Comments</th>
</tr>
</thead>
</table>
| 1     | Re-orient of re-discover (existing rules) | Knowledge of rules | • Rules in business language  
• Rules tied to process models or use cases  
• Rules traced to systems implementation  
• Rules stored in spreadsheets |
| 2     | Re-act (to change) | Agility of rules | • Rules in formal form possibly with rule authoring software  
• Glossary of terms tied to rules  
• Rules analyzable  
• Standard rule reports  
• Source rule repository with extensive traceability of rules to rule metadata, process models, object models, etc  
• Rules in agile technology (BRMS) |
| 3     | Re-align (with objectives) | Consistency and alignment of rules | • Rule sets assigned to business metrics  
• Rule sets shared as services across processes and systems  
• Business rules center of excellence established  
• Possibly more than one BRMS  
• Standard methodology, templates etc. |
| 4     | Re-envision (short-term futures) | Future predictions with rules | • Potential events identified  
• Revenue, profit, people differences estimated  
• Rules recast according to analysis |
| 5     | Re-invent (long-term future) | Full stewardship with rules | • Rule stewards identified  
• Fast, first to define and respond  
• Ever-changing organization |

Table 6: characteristics for corresponding RMM level (von Halle & Goldberg, 2006)

3.4.1.2.3 The Business Decision Maturity Model (BDMM) by von Halle and Goldberg (2010)

Similar as the Business Rules Deployment Maturity Model described by von Halle and Goldberg (2006), the business decision maturity model can be used by organizations to determine the maturity level they have, the level they want to achieve, and it supports them with a way to reach this desired level. The model measures the quality of the Business Decision Management process, where the goal is that a good-quality process delivers high-quality business logic behind business decisions.

The model is provided with three vectors. The first one, Business Value, identifies the relevant business consequence of a particular level of maturity. This vector is a good starting point for assessing the current or target maturity of the business decision management. The Business Architecture vector describes the architectural maturity of the organization. The last vector describes the business governance and is measured against a set of characteristics for stewardship or governance described in architectural maturity models. The entire model can be found in Appendix 12.4.3.

3.4.1.2.4 Business Rule Maturity Model (BRMM) by Coenen et al. (2008)

The maturity model proposed by Coenen et al. (2008) has a somewhat different approach then the ones discussed so far. This model is fully based on the CMM Integration for Development (CMMI-Dev) model discussed in the book as well (Coenen et al., 2008). CMMI-Dev assumes that an organization should familiarize itself with a particular capacity or discipline in order to grow into development processes like BRM or BPM. Coenen et al. apply the CMMI-Dev model on BRM as a capacity. There are five capacity levels distinguished and for every level three characteristics come up. 1) every level has a label given as a name, 2) the organizational scope and 3) a two-angle description, first the description about managing and continuously improving the definition of business rules and subsequently the description of the implementation of the business rule. For the entire model the author refers to page 81 of the book of Coenen et al. (2008).
3.4.2 Alignment

Since the 1980’s scholars, analysts and even consultants have supported an aligned business and IT approach when it comes down to introduction and deployment of information systems (Batenburg & Versendaal, 2004). In the paper of Chan and Reich (2007) an overview of approximately 150 articles about alignment is given. Due to the emergence of the Internet, Porter stated in 2001 that an Internet strategy and business strategy should always go hand in hand. But Porter was not the first one who claimed that technical and organizational issues need to be aligned (Porter, 2001). Sowa and Zachman (1992) developed a framework which pays attention to six aspects/views of a business against five different perspectives that are involved during the architecture of the business. The views that they distinguish are; data, function, network, organization, strategy and scheduling. Henderson and Venkatraman (1993) describe the shift of IT from an administrative support tool towards a more strategic role within an organization. However, they acknowledge that organizations lack in understanding the potential benefits of IT. For this reason they developed a framework which conceptualizes and directs the emerging area called strategic management of IT. The framework suggests that business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes, should be in balance through strategic fit, and functional integration.

There are other models that have a wider view on organizations and include for example the organization’s corporate culture, employees and their roles. One example of such a model is made by Scheper (2002). He defines five dimensions that need to be aligned. 1) Strategy and policy, 2) monitoring and control, 3) organizational structure and processes, 4) IT, and 5) employees and organizational culture. Scheper assigned maturity levels to each of the five dimensions to operationalize the model. In this way the balance between the dimensions can be made visible. It is now clear that alignment is an important and often researched topic within organizations.

3.4.2.1 Business/IT-Alignment

Luftman (2000) wrote a paper to assess the maturity of an organization’s business/IT alignment. The assessment he declares is the first one in this field of working. The building blocks for this model are reproduced from Luftman’s research from 1996 which present twelve components that are responsible for alignment. These components are divided into four categories each assigned to three components;

1) **Business strategy**: Business scope, distinctive competencies, business governance;
2) **Organization infrastructure & processes**: Administrative structure, processes, skills;
3) **IT strategy**: Technology scope, systemic competencies, IT governance;
4) **IT infrastructure and Processes**: Architecture, processes, skills.

The relationships between these twelve building blocks further define business/IT alignment. Luftman emphasizes that achieving alignments is evolutionary and dynamic.
3.5 The Public sector

3.5.1 Private vs. public

A lot of research is done when it comes down to the differences between the public- and private sector. The main difference between the two according to Rainey and Bozeman (2000), and Perry and Rainey (1988) is about bureaucracy. Research also proves that the goals distinct for public and private sector organizations differ from each other (Lachman, 1985). According to Boyne (2002) profit and self-interest are the main goals of private firms, while the public sector’s main goal is social improvement. Investigators assume that these differences in goal orientation provide different institutional milieu and therefore different organization-environment, relations, internal structures and management processes. Lachman (1985) describes three aspects of the role of the environment that are important for executives. The first is about environmental influences on the decision-making autonomy of the CEO, the second deals with the extent of external control to which CEO’s are subjected and the third is the CEO’s level of satisfaction with the rewards their environment provides. These aspects play an important role in the way non-governmental organizations set, execute and achieve their goals.

Although defining the Critical Success Factors (CSF) for BPM and BRM implementation seem a widely discussed topic and every research about this topic emphasize the importance of these success factors for successful implementation of BPR in the private sector, they lack to involve the public sector. In the paper of McAdam and Donaghy (1999) some public sector characteristics that probably have a bearing on BPR, which is a precursor of BPM, are listed. These include:

- Rigid/formal hierarchies;
- Culture;
- Multiple stakeholders for many processes – strict boundaries;
- Suddenly and dramatic changes policy direction can occur;
- Wide scope of activities.

The result of their research was a list of critical success factors for successful BPR implementation in the public sector. The top 10 of these CSF is as follows:

1) Top management understanding of BPR;
2) Top management commitment to BPR;
3) Top management support for BPR;
4) Re-engineering team’s commitment to BPR;
5) Communication of reasons for BPR to all staff;
6) Willingness of top management to accept re-engineering team’s recommendations;
7) Readiness of organization to adapt to change;
8) Setting of realistic expectations for BPR;
9) Involvement of staff from all grades in BPR;
10) Willingness to dismantle existing structures.

This list can be of help in this research as the activities and actions taken during BPR, BPM, and BRM are somewhat the same. One remarkable recurrent factor in this list is the support needed from top management in different ways. This factor is called a soft factor as it deals with the human aspects of an organization instead of the business aspects. This is a typical characteristic of public sector organizations as their entire business model is more about serving the soft sides of the organization then the ‘hard’ ones (revenue, costs, efficiency)
3.5.2 Governmental sector

Governments at all levels are under high pressure when it comes down to becoming a smart organization. For governmental organizations smart business means collaboration across departments and communities, in order to give citizens access to their own information, to become more transparent and accountable, and to manage resources more effectively (IBM, 2010).

Governmental organizations have to deal with many different parties, think of other domestic and international governmental organizations, non-governmental organizations, community-based programs, and citizens. At these parties have growing and fast changing demands, and to fulfill these changing circumstances, governments have to collaborate across organizations. This forces them to use new IT solutions in order to create smart governments which will enable innovation, agility, integration connectivity and high performance. Another important reason for governmental organizations to create smart governments is because of the trend of decentralization. This is also faced by the Dutch government. This decentralization means that lower governmental agencies, e.g. provinces and municipalities, get more responsibilities. At the same time, this means that governmental agencies have to communicate with more parties when it comes down to law-, and regulation changes, thus new ways to manage their business rules and end to end processes are necessary. (Binnenlandse Zaken, 2011)

Gulledge and Sommer (2002) mark an increase in effectiveness and efficiency as the primary benefit of BPM in the governmental sector. This is achieved from the restructuring of the organization along cross-functional processes. They distinguish two incentives for governmental organizations to move to process management. The first one relates to the public law and the second one relates to the interaction between organizational processes and new information technologies.

Moore and Khagram (2004) write in their paper about the differences in organizational strategy between the governmental sector and the for-profit sector. For example, they mention the major source of money is not coming from consumers which buy the products or investors that choose to invest in the organization, it are citizens, taxpayers, clients of governments, and their elected representatives who collectively choose that there is a product or service that can probably be produced by the government and is worth taxing ourselves to produce. Another difference is the level of management discretion to define the purposes of the organization. The last example they give is about the way to measure performance. Governmental agencies can not measure revenues earned by the sale of goods and service, but have to measure performance by focusing on the social outcomes of their mandated production or customer satisfaction of their services.

In his earlier work, Moore describes the difference between non-profit organizations and governmental agencies (Moore, 2000). He mentions the distinction in public purposes. For the non-profit sector this is established simply by the fact that contributors embrace them. Meanwhile, governmental purposes have to be debate in collective deliberation or enacted in legislation. Every decision about whether something is publicly valuable has to be taken in agreement with citizens and their representatives. The same holds for the strategy and mission of the organization. Non-profit organizations are free and flexible to change their minds about this, whereas governmental agencies are more required to stick to their mission.

3.5.2.1 Problems in the Dutch governmental sector

It is clear that imposing governmental officials to work electronically is a difficult job. Although both officials and citizens know exactly how they want to collaborate, initiatives to achieve this are rare. Four problems of this phenomenon are written down by van Setten (2011). Although this list is not complete, it gives a clear understanding about the issues faced by the government in order to fail in the area of automating their processes. The first one is ad-hoc thinking. For a long time governmental departments only thought about solving bottlenecks. This resulted in a mix of software packages each working in their own domain, which in
time leads to work against each other, instead of working with each other. The second is the conclusion of the previous mentioned problem, inability to approach technology integral namely the inability to approach technology integral. Every problem was seen as a new project that needed a solution, which resulted in many different software packages all working on their own island. The third problem is about the speed of choosing and implementing a tendering project. Once a project is started it takes about two to four years and often after such a long period the technological progress stagnates. Along a project there is no room for new technological innovations and by the time the project is finished the solution is already outdated. The last problem lies in the same line as the previous one, namely, once there is a new solution there is no policy about upgrading it, which lead to very high maintenance costs and a cumbersome IT environment.

3.5.2.2 Chances for the Dutch governmental sector
The last years many different initiatives towards a flexible and efficient government service are discussed. In this chapter some of these plans are discussed in order to show the need for governments to rethink their processes and to step into the field of BPM and BRM.

In the coalition agreement of 2010 a change in budget is included under the name ‘smaller government’ (‘kleinere overheid’). The realization of this change requires a compact/neat government when it comes down to their IT domesticity. The first step is to connect the governmental service (Rijksdienst) to a government wide infrastructure for the supporting business operation. This project consists of several parts of which the ICT issues are the centralization of ICT management and creating a digital work-environment for governmental service (Overheid, 10 February 2011).

Since 2007 the ‘Tweede Kamer’ is active in gathering information about solving the problems around the wage-reporting chain. This means a new cooperation between ‘Uitoeringsinstituut Werknemers-Verzekeringen’ (‘UWV’), and ‘De Belastingdienst’ is under construction. In 2008 agreement on the changes needed for a stable wage-reporting chain was made and clustered. From 2009 until now some of these clusters are undertaken and solved, while others are still on the agenda. It should be said that although a lot of work is already done in this field they are, by far, ready for the next level, which is a totally integrated wage-reporting chain with a governmental wide infrastructure and a decreased complexity within the process. According to the plan this should be finished in 2015, which demonstrates the complexity of the project and the work that needs to be done (Belastingdienst & UWV, 20 April 2011).

At the end of 2010 all the CIO’s accepted the program called ‘Uitvoering Compacte Rijksdienst’. The power of this program is to bundle overlapping or similar tasks. In order to make this successful it is important to give substance to the entire document-logistic chain by an integral thinking approach. A chain consists of the input site, the processing within the own organizations and the document distribution (van Setten, 2011).
4 Constructing the model: The literature basis

As presented in the literature chapter, many maturity models about BPM and also some models about BRM are developed. Due to the variety of models within both the subjects, it is hard to see the similarities between the models of each subject, not to mention the similarities of the model between the two different subjects. The reason for this lack of clarity is mainly because scientists use different vocabulary and they interpret the concepts a differently, which changes the focus of the models. To ensure the quality of this research it is important to have one unambiguous view on each of the two subjects. Therefore this chapter explains and describes the development on the creation of one maturity model for BPM and one maturity model for BRM, composed of models described in literature.

The reason to preserve the distinction between the BRM and BPM maturity models in this phase of the research is because there are some differences between the two practices. The most important difference is that BPM maturity models span a much wider scope than the BRM maturity models do. Most of the BRM maturity models, give a description on how to capture and translate the business rules into a form that is useful for systems that have to deal with the rules. The technical capturing of business rules is outside the scope of this research; therefore we focus on the decisional/transactional rules of the business on a higher level, which is about where and by whom they are captured, stored and accessed. After the selection of the models, the final models for each subject are presented and with these two maturity models as a base, the rest of the research can be executed.

4.1 Selection of the Models from literature

To construct a maturity model that can help governmental agencies with improving their process and rules management, it is important to have an unambiguous approach for both topics. This also influenced the selection of the models. Some maturity models see BPM as a very technical approach to organize your processes and only discuss the technical side of the implementation of BPM systems. This is not the way this research approaches BPM, therefore these kind of maturity models about BPM are excluded. The same holds for the BRM maturity models that have a very technical focused way of approaching and applying BRM.

The nine BPM maturity models described in literature all see BPM as a holistic management approach for managing business processes. Holistic in this context means that BPM is seen as a whole rather than an analysis of parts of it, and it emphasizes the importance of the interdependencies of the parts of it. Also, eight of the nine selected BPM models are based on the Capability Maturity Model (CMM) principles (Paulk et al., 1993). This model has been proposed by the Software Engineering Institute in 1993. Although the original model has a specific focus on the evaluation of software development processes, it is extended multiple times in a variety of approaches and is now applied for the evaluation of amongst others, enterprise architecture management, which is the discipline BPM (and also BRM) falls into. For these reasons CMM is seen as a valid common denominator for the input of the development of the BP&RM maturity model that is aimed at.

<table>
<thead>
<tr>
<th>Author</th>
<th>Maturity Model Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paulk et al. (1993)</td>
<td>Capability Maturity Model (CMM)</td>
</tr>
<tr>
<td>Gartner (Melenovský &amp; Sinur, 2006)</td>
<td>Business Process Management Maturity Model (BPM MM)</td>
</tr>
</tbody>
</table>

Table 7: List of authors and their correspondingly developed maturity models
For the BRM field less models are described, and most of them describe in great detail the technique of translating and describing the rules in, for example BPEL. These activities are outside the scope of this research and therefore those types of models and technical approaches are not discussed in the literature research.

BRM started to become popular in the late 80’s, but research in this field mainly considers the software technology aspect of the modelling and tooling of organizational behaviour (Maciol, 2008) (Wan-Kadir & Loucopoulos, 2005). The more business-approach of managing business rules found its source in the introduction of the Business Rule Approach (Ross, 2003) and therefore it is still in its infancy when it comes down to scientific research. This is the most important reason why maturity models about BRM are developed by organizations themselves and do not have a very solid scientific ground (Nelson, Peterson, Rariden, & Sen, 2010). This directly leads to the main difference between the selected BPM models and the selected BRM models. The four BRM maturity models that are used for this research describe have a more practical approach, they describe BRM as the automation of the complex decisions within the business processes of an organizations.

<table>
<thead>
<tr>
<th>Author</th>
<th>Maturity Model Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Von Halle &amp; Goldberg (2010)</td>
<td>Business Decision Maturity Model (BDMM)</td>
</tr>
</tbody>
</table>

Table 8: List of authors and their correspondingly developed maturity models

4.2 Development of the BPM maturity model

Now that the rational for the selected input models is given, the consolidation of the models can start. In this section (4.2) the consolidation of the BPM maturity model selected from literature is explained and in section 4.3 the same is done for the selected BRM maturity model.

4.2.1 Extract the Maturity levels

The majority of the maturity models use a five stage maturity approach (Paulk et al. 1993), (Object-Management-Group, 2008), (Rohloff, 2009), (Rosemann & Brocke von, 2010), (Harmon, 2004), (Fisher, 2004), and only a few use a three (Rummler-Brache-Group, 2004), four (Hammer M. , 2007) or six stages approach (Melenovsky & Sinur, 2006). The maturity model described by Hammer (2007) does not give a description of general characteristics for each of the four maturity levels, and therefore not used as an input for the extraction of the maturity levels. The BPM approach explained by the Rummler-Brache Group (2004) does not represent, nor explains maturity levels and is therefore not used for this part of the research. Given these two exclusions there are seven maturity models left that are used for extraction of the levels that are going to form the base for the BPM maturity model. In Table 9 the different levels of every model are presented.
A Business Process & Rule Management  
Maturity Model for the Dutch Governmental Sector

<table>
<thead>
<tr>
<th>Author</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paulk et al. (1993) their CMM</td>
<td>Initial</td>
<td>Repeatable</td>
<td>Defined</td>
<td>Managed</td>
<td>Optimized</td>
<td></td>
</tr>
<tr>
<td>OMG’s BPMM (2008)</td>
<td>Initial</td>
<td>Managed</td>
<td>Standardized</td>
<td>Predictable</td>
<td>Innovating</td>
<td></td>
</tr>
<tr>
<td>Rohloff’s BPM IMM (2009)</td>
<td>Initial</td>
<td>Managed</td>
<td>Defined</td>
<td>Quantitatively managed</td>
<td>Optimizing</td>
<td></td>
</tr>
<tr>
<td>Gartner’s BPM MM (Melenovsky &amp; Sinur, 2006)</td>
<td>Acknowledge operational inefficiencies</td>
<td>Process aware</td>
<td>Intra-process automation and control</td>
<td>Inter-process automation and control</td>
<td>Enterprise valuation control</td>
<td>Agile Business structure</td>
</tr>
<tr>
<td>Harmon (2004)</td>
<td>Initial</td>
<td>Repeatable</td>
<td>Defined</td>
<td>Managed</td>
<td>Optimizing</td>
<td></td>
</tr>
</tbody>
</table>

Table 9: Maturity levels in literature

Since the BPM maturity model of Gartner (Melenovsky & Sinur, 2006) is the only one with a six level approach. CMM, as well as all the others, use a five level approach, therefore the five level approach is chosen for the final BPM maturity model. After a more comprehensive look at Gartner’s (Melenovsky & Sinur, 2006) model, it turned out that, contrary to the other models, Gartner (Melenovsky & Sinur, 2006) makes a distinction between intra process automation and control (level 4), and inter process automation and control (level 5). Since the other authors do not make this distinction these two levels can easily and without a loss of profound, be combined and threatened as one, in order to make all the models consistent when it comes down to the amount of maturity levels. Figure 15 gives a graphical presentation on the different maturity levels and how they cover each phase of the BPM lifecycle of Hammer (2010).

Figure 15: BPM life cycle (Hammer M., 2010) with maturity levels
4.2.1.1 Final maturity level classification
Below in Table 10 the definition of the five maturity levels, based on the way the literature interpret them, are described. The name of the level is not copied from literature because some names do not always cover the content very clear. The names as presented in the first column are chosen in such a way that the name correspond with the explanation as much as possible.

<table>
<thead>
<tr>
<th>Siloed activity awareness</th>
<th>Gartner (Melenovsky &amp; Sinur, 2006), Fisher (2004), Rohloff (2009), Harmon (2004)</th>
<th>The organization is not aware of its processes and have not described them. The organization’s data and information is siloed as well, which causes massive duplication of BP effort.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repeated</td>
<td>Harmon (2004), Gartner (Melenovsky &amp; Sinur, 2006), Fisher (2004), Paulik et al. (1993)</td>
<td>The organization start to understand and organize its processes, repeat successes, attention is paid to enforcement of data and information integration and process standards are defined. There is no alignment around end-to-end enterprise wide processes yet.</td>
</tr>
<tr>
<td>Valuation control</td>
<td>Harmon (2004), Rohloff (2009), Gartner (Melenovsky &amp; Sinur, 2006), Fisher (2004)</td>
<td>Outcomes of the measurements are collected understood and controlled. Processes are controlled continuously and there is craft process control across the enterprise, customers and trading partners. Dynamically link the valuation of the business to process execution. The role of BPM technology finally finds a home at this level.</td>
</tr>
<tr>
<td>Intelligent operating organization</td>
<td>OMG (2008), Harmon (2004), Gartner (Melenovsky &amp; Sinur, 2006), Fisher (2004), Rohloff (2009)</td>
<td>Continuously process improvement by benchmarking and best practice sharing. Possibly even through the whole ecosystem. Innovate new businesses products and services through an agile business structure is used for continuously improvement</td>
</tr>
</tbody>
</table>

Table 10: Final chosen maturity levels

4.2.2 Extract the factors
In this section the factors from literature are reviewed and where possible consolidated.

4.2.2.1 Explanation of the factors from literature
Not every maturity models discussed in the literature chapter is used for the extraction of the factors (sometimes called dimensions). Most of the maturity models do not distinguish a fixed set of factors. Gartner (Melenovsky & Sinur, 2006), Smit and Fingar (2004), Harmon (2004), and the OMG (2008) for example use maturity levels but for every level they describe they assign different topics. According to them there is not one clear acknowledgement of factors that are important along the whole journey of becoming a BRM agile organization. This is in contrast with the choices made to build this research’ combined BPM maturity model, because in this research there is chosen to distinguish factors to make the model consistent all the way up to a fully agile organization. Also, using factors makes the model easier to understand and applicable for organizations because of the stepwise approach of the solution to become more mature agile. Organizations can focus step by step on a specific factor, measure where they are at the moment, and where they want to be in future.

In Table 11, an overview of the factors used in literature is given, together with the author name. After this brief overview, an explanation of every factor is given. Although some factors may seem to explain the same issues but use a different factor name for it, all the factors are discussed they way the author of the particular model discuss them. Later on in this chapter duplicate factors are consolidated and removed.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Author</th>
<th>Dimension name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rosemann and von Brocke (2010)</td>
<td>Strategic alignment</td>
</tr>
<tr>
<td></td>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>Strategic alignment</td>
</tr>
<tr>
<td>Methods</td>
<td>Hammer (2007)</td>
<td>Expertise</td>
</tr>
<tr>
<td></td>
<td>Rosemann and von Brocke (2010)</td>
<td>Methods</td>
</tr>
<tr>
<td></td>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>Methods</td>
</tr>
<tr>
<td></td>
<td>Hammer (2007)</td>
<td>Design (specification of the process execution)</td>
</tr>
<tr>
<td>People</td>
<td>Fisher (2004)</td>
<td>People</td>
</tr>
<tr>
<td></td>
<td>Rosemann and von Brocke (2010)</td>
<td>People</td>
</tr>
<tr>
<td></td>
<td>Hammer (2007)</td>
<td>Performance, leadership, owner, expertise(skills)</td>
</tr>
<tr>
<td></td>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>People</td>
</tr>
<tr>
<td>Governance</td>
<td>Rosemann and von Brocke (2010)</td>
<td>Governance</td>
</tr>
<tr>
<td></td>
<td>Hammer (2007)</td>
<td>Governance</td>
</tr>
<tr>
<td></td>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>Governance</td>
</tr>
<tr>
<td>IT</td>
<td>Rosemann and von Brocke (2010)</td>
<td>IT/IS</td>
</tr>
<tr>
<td></td>
<td>Fisher (2004)</td>
<td>IT</td>
</tr>
<tr>
<td></td>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>IT</td>
</tr>
<tr>
<td></td>
<td>Rohloff (2009)</td>
<td>Data management, IT Architecture</td>
</tr>
<tr>
<td>Culture</td>
<td>Rosemann and von Brocke (2010)</td>
<td>Culture</td>
</tr>
<tr>
<td></td>
<td>Hammer (2007)</td>
<td>Culture</td>
</tr>
<tr>
<td></td>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>Culture and leadership</td>
</tr>
<tr>
<td></td>
<td>Rohloff (2009)</td>
<td>Qualification &amp; communication</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Hammer (2007)</td>
<td>Infrastructure</td>
</tr>
<tr>
<td>Metrics</td>
<td>Hammer (2007)</td>
<td>metrics</td>
</tr>
</tbody>
</table>

**Table 11: Factors used in literature**

Remarkable in this table is the use of totally different dimension names by Rohloff (2009). Reason for this is the difference in the way Rohloff comes about his BPM maturity model. He distinguish nine implementation topics covering all aspects of an organisation's development, that are important for the implementation of BPM. The mapped categories correspond to the ‘BPM process and Implementation Topics’ listed in his paper (Rohloff, 2009)
4.2.2.1.1 Strategy alignment
Fisher (2004) describes the factor ‘Strategy’ as “The strategic understanding of the role, positioning and focus for enterprise-wide decision making in support of overall company objectives”. Rosemann & von Brocke (2010) extend this with stressing the need to align BPM with the overall strategy of the organization. This requires a tight linkage between organizational strategy and enterprise processes to ensure continual and effective action to improve business performance. Processes have to be designed, executed, managed and measured according to the strategic situation, and it works the same the other way around when process capabilities offer opportunities leading to process-enabled strategies. This is in line with the way Gartner (Melenovsky & Sinur, 2006) interpreted it. Rohloff (2009) emphasises the strength of good deployment of the business strategy at forehand.

4.2.2.1.2 Method
The use of a good method is important as every organization has to facilitate process modelling, process analyses and process improvement techniques along the process lifecycle described by Hammer (2010). The maturity models of both Rosemann & von Brocke (2010), and Hammer (2007) acknowledge this by incorporating this factor in their maturity models, although Hammer (2004) calls it ‘expertise’. According to Rosemann & von Brocke (2010) methods can be described as a set set of tools and techniques needed to perform BPM. Associating a method to a specific process lifecycle stage is seen as an advantage because the method can then be assessed with regards to a specific purpose. Gartner (Melenovsky & Sinur, 2006) uses almost the same definition for the factor ‘method’, namely “the approaches and techniques that support and enable consistent process actions and outcomes”. Hammer (2007) explains this factor by assigning it to the level of usage of a formal approach for, amongst others, process management. Besides ‘Methods & Tools’ Rohloff’s (2009) ‘Process Documentation’, ‘Process Optimization’ and ‘Performance Controlling’ can be classified under the factor ‘Method’, which means that with these topics he points at the provisioning of standard methods and tools required for the operation of the issues.

4.2.2.1.3 Process
This factor is discussed by both Hammer (2007) and Fisher (2004). They define it as the specification of how the processes are performed. Fisher (2004) includes the policies and procedures that determine the way the processes are executed in this factor. Hammer (2007) calls this factor ‘Design’ and explain this factor as “The comprehensiveness of the specification of how the process is to be executed”. He examines the purpose, context and documentation of the way processes are carried out. This comes close to the ‘Method’ factor explained in the previous section, but due to the fact that Hammer uses the word ‘comprehensiveness’ in the explanation, and thus points to the broader view of this topic, it better fit the factor ‘Process’.

4.2.2.1.4 People
Fisher (2004) defines the factor ‘People’ in one sentence: “The human resource environment, including skills, organizational culture and organizational structure”. Gartner (Melenovsky & Sinur, 2006) adds the continually enhancement and application of the process related expertise and knowledge of the individuals and groups. With this the definition given by Rosemann and von Brocke (2010) is covered. Hammer (2007) distinguish several factors that can be classified under the factor people, namely performance, which according to Hammer (2007) is about the skills and knowledge of the people who execute the process, and leadership and owner which point to the executive who is responsible for the creation of the process.

4.2.2.1.5 Governance
Governance is a very wide understanding. It can be seen as the process whereby organizations make decisions, determine whom they involve and how they render accountable. In the field of BPM this factor is included by Rosemann and von Brocke (2010), Gartner (Melenovsky & Sinur, 2006), Hammer (2007), and Fisher (2004). The first explains governance as: “Establishing appropriate and transparent accountability in terms of roles and
responsibilities for every level of BPM”. Gartner (Melenovsky & Sinur, 2006) adds to this the design of decision-making and reward processes to guide process-related actions. The third (Hammer, 2007) sees it as: “A mechanism for managing complex project and change initiatives”. And the latter of the four (Fisher, 2004), which does not mention governance as factor literally but he calls it ‘Control’, explains it as: “The governance model for the management, administration and evaluation of initiatives, with a strong focus on the appropriate metrics applied for measurement”. Although in the paper of Rohloff (2009) he maps his ‘Process management organization’ factor to the ‘People’ factor of Rosemann and von Brocke their model (2010), for this research it is classified in the ‘Governance’ factor as he explains this factor as ‘the roles that are to be defined’, which is a typical governance issue. Program management is seen as a governance issue as well because it gives information about the who reports to who.

4.2.2.1.6 Information Technology
Fisher (2004) describes IT as the set of information systems (IS), applications, tools and infrastructure needed in order to convert IT solutions into process aware IS. ‘Process aware’ in this context means that the software has an explicit understanding of the executed process. Both Gartner (Melenovsky & Sinur, 2006) and Rosemann and von Brocke (2010) mention the factor IT in their maturity models but they limit it to the software, hardware and information management systems that enable and support process activities. It should be noticed that Rosemann and von Brocke (2010) elaborate on the tools in the factor method, these tools refer to the same tools as the one’s Fisher (2004) points at here. Rohloff’s (2010) ‘Data Management’ elaborates about the data content and format supported by IT. The ‘IT Architecture’ issue he mentions, examines the requirements of process management and defines the IT architecture.

4.2.2.1.7 Culture
Although the ‘Culture’ factor is often considered to be a soft-factor and therefore sometimes forgotten or marked as unimportant, Rosemann and von Brocke (2010), Hammer (2007) and Gartner (Melenovsky & Sinur, 2006) all acknowledge the importance of this factor. In the field of BPM it is important that a facilitating environment that respects the BPM initiatives is created. This means a willingness to change need to arise, and teamwork and personal accountability are important. Rohloff (2010) included one soft factor in his model. He calls it ‘Quality and Communication’ and it stress the internal communication regarding process management.

4.2.2.1.8 Infrastructure
Hammer (2007) is the only author who mentions infrastructure. He sees it as an important process enabler and defines it as the information and management systems that support the process. In the measurement of this factor he distinguish IS infrastructure from human resource systems infrastructure. It should be noticed that this factor contains about the same explanation as multiple other scientists give to the ‘IT’ factor.

4.2.2.1.9 Metrics
Hammer (2007) is the only one who describes this factor and he divide it into two measurements. The first is ‘definition’ and is about the scope that is covered by the metrics, and the second is ‘uses’ which explains the goal the metrics are used for by the managers.

4.2.2.2 Final chosen factors
In the previous chapter, nine factors that are distinguished by multiple scientists are explained. It may be clear that some factors show overlap which would make the model unnecessary complex. In order to make the model consistent with the literature and easy to understand, overlapping factors are consolidated. The factors ‘Process’, ‘Infrastructure’ and ‘Metrics’ show overlap with other factors and thus, to ensure simplicity of the model, they are respectively classified under the factors ‘Governance’, ‘IT architecture’, and ‘Governance’. Also, the factors people and culture are consolidated.
Table 12 gives an overview of the factors mentioned by scientists in literature, mapped to the final chosen factors. In the sections below a summary of the five factors that are remained is given, together with a rationale of what happened with the deleted and consolidated factors.

<table>
<thead>
<tr>
<th>Author</th>
<th>Strategy Alignment</th>
<th>Methods</th>
<th>IT Architecture</th>
<th>Governance</th>
<th>People &amp; Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rohloff (2009)</td>
<td>Strategy</td>
<td>Methods</td>
<td>IT</td>
<td>Governance</td>
<td>Culture</td>
</tr>
<tr>
<td>Gartner (Melenovsky &amp; Sinur, 2006)</td>
<td>Strategy</td>
<td>Methods</td>
<td>IT</td>
<td>Governance</td>
<td>Culture, People</td>
</tr>
<tr>
<td>Hammer (2007)</td>
<td>Process</td>
<td>Methods</td>
<td>Infrastructure</td>
<td>People, Metrics, Governance</td>
<td>People, Culture</td>
</tr>
<tr>
<td>Rosemann &amp; von Brocke (2010)</td>
<td>Strategy</td>
<td>Methods,</td>
<td>IT</td>
<td>Governance</td>
<td>People, Culture</td>
</tr>
</tbody>
</table>

Table 12: Factors from scientists mapped to the chosen factors

4.2.2.2.1 Strategy alignment

This factor covers both strategic decisions and alignment issues. BPM needs to be in line with the overall strategy of the organization. It is very important that BPM is not only an IT related issue but is totally in sync with the business. Processes and rules have to be designed, executed, managed and measured according to the strategic business situation but the strategy need to be able to change too when process and rule capabilities offer opportunities. All the authors mention the factor strategy alignment, so the previous is a summary of the description given by them. Hammer’s (2007) process factor is incorporated in this factor because he explains ‘Process’ as the specification of how processes are performed and thus can be seen as a strategic issues.

4.2.2.2 Methods

‘Methods’ describe the set of tools and techniques needed to perform BPM. In every organization the use of good methods is important. So it is for BPM. Every maturity level has to deal with different issues when it comes down to choosing the right method. Not having thought about using methods for, e.g. process design, or business/IS architecture, refers to an ad-hoc way of working and is distinctive for immature organizations.

4.2.2.3 IT Architecture

The Information Technology (IT) Architecture factor is a crucial factor in the BPM approach because BPM is all about how technology can support organizations to manage the information needed to execute their processes. This factor defines standards to develop organization wide consistent and valid process definitions, and outlines how processes and rules are included in the organization. It describes the software, hardware and IS that enable and support process activities. In this factor, the shift from rules that are written in hard code languages somewhere in the process, to rule engines and repository is defined. Hammer’s (2007) factor ‘Infrastructure’ is included here as he describe this process enabling factor as the information and management systems that support the process.

4.2.2.4 Governance

A summary of the result of the literature research says that this factor describes three issues, namely; control, measurement and roles. To cover those issues the RACI model is often used; RACI stands for: Responsible (who makes the decisions), Accountable (who is accountable), Consulted (Who needs to be consulted), Informed (Who needs to be informed). Governmental questions are, who defines, approves, enforces, and implements policies and standards (Kofman, Yaeli, Klinger, & Tarr, 2009). Hammer (2007) describes the factor ‘Metrics’ as the definition and goals of metrics used by managers. For this research this factor is mapped to ‘Governance’
because Hammer’s explanation fits the RACI model. Some of Hammer’s (2007) factors that are mapped to the people factor (leadership and ownership) are seen as governance issues as well as he describe them as the leadership and ownership of the executive that is responsible for the creation of a particular process.

4.2.2.5 People & Culture
People and culture are often mentioned as two separate issues, however they can easily be combined in one factor because they both describe the soft issues of an organization and are complementary. The people within the organization together are responsible for the culture of the organization. It is important that all the people in the organization know their role within the organization and the corresponding tasks they have to fulfil. To manage this, competence development measures can be derived. To create awareness and support the implementation, the organization need to know exactly about the skills and knowledge of its employees, which can be supported by target group specific information. The use of cross functional teams can show the level of maturity in the BP&RM field. On the other hand, culture is an important factor in order create a willingness to change and also manage this change. Without the right people at the right place, change is never going to happen, leave alone creating an agile organization.

4.2.3 Key issues for every factor
Below in Figure 16 the empty maturity model that is established by the consolidating the existing models discussed in this research so far, is shown. The horizontal axis presents the maturity level and the vertical axis present the factors. The model is only a framework of the entire model, but due to size limitation the full model is not presented here but can be found in appendix 12.5. In this complete maturity model every cell is filled with issues discussed in this research’ literature and forms a base for the final BP&RM maturity model.

<table>
<thead>
<tr>
<th>Maturity level</th>
<th>Factor</th>
<th>Siloed activity awareness</th>
<th>Repeated Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy alignment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT Architecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People &amp; culture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 16: Framework of the literature based BPM maturity model.

4.3 Development of the BRM maturity model
Compared to the amount of literature about BPM maturity models less research is done in the field of BRM maturity models so far. Four maturity models are found and compared in order to develop a reliable maturity model that represent the literature. It should be mentioned that research in the field of BRM maturity models is still in its infancy but starts to become more popular. According to Edmondson and McManus (2007) research about new topics like BRM is called nascent research. Nascent research subjects are characterized by practical approached research. For this reason the maturity models about BRM have a more practical approach then the once used in the field of BPM. However, the same consolidation approach as the one for
the consolidation of the BPM maturity model is used. Starting with the explanation of the maturity levels, then the factors and at the end the fully combined maturity model is presented.

4.3.1 Extracting the Maturity levels

In pursuance with the CMM maturity model (Paulk et al., 1993) and the maturity models proposed in this research' literature (Coenen et al., 2008), (von Halle & Goldberg, 2006), (Nelson, Peterson, Rariden, & Sen, 2010), five levels of maturity are asserted to the model. In Table 13 the maturity level names used by the different authors are shown.

<table>
<thead>
<tr>
<th>Author</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nelson et al. (2010)</td>
<td>Stage 1</td>
<td>Stage 2</td>
<td>Stage 3</td>
<td>Stage 4</td>
<td>Stage 5</td>
</tr>
<tr>
<td>Coenen et al. (2008)</td>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
<td>Level 5</td>
</tr>
</tbody>
</table>

Table 13: maturity levels in BRM literature

As presented in Table 13 two of the BRM maturity models discussed in literature (Coenen, et al., 2008 & Nelson et al., 2010) use numbers instead of names for their maturity levels, the other two use names. To be consistent with the BPM maturity model developed earlier in this research, similar names are used for the BRM maturity framework. The only big difference is the name corresponding to level 4. The reason for this is given later in this section. The two maturity models of von Halle & Goldberg (2006, 2010) are built upon the same base principles and thus they describe the same characteristics for the maturity levels. In the next table (Table 14) the characteristics of the four BRM maturity models from literature are summarized and mentioned only once.
<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siloed rule awareness</td>
<td>Organization seeks knowledge of some of its rules and IT separates them from other business or requirements artefacts. Business people know where to find these rules and can trace them to business processes and systems. Business experts provide input and review the output but not play an important role in creating the rule statements for the rule repository (von Halle &amp; Goldberg, 2006 &amp; 2010). Initial BR project with a single group of applications. The IT department is owner of the project. Emphasis is particular on technical feasibility and compatibility (Nelson et al, 2010). Individuals take initiatives to make rules explicit in e.g. Excel. Sometimes rules are programmed in software systems by IT. No tracing between implemented and explicit rules (Coenen et al., 2008).</td>
</tr>
<tr>
<td>Repeated</td>
<td>This level demands separation of rules and traceability of rules to business systems and system artefacts. Rules are understood and collected in a repository which captures standard terms and related reusable rule clauses but the rules are seen as a separate aspect of the business logic and analysis is done manually. BPMS technology is not employed (von Halle &amp; Goldberg, 2006 &amp; 2010). Successful implementations occur. During this stage reporting shifts from the IT unit to the business side once successful BRMS deployments occur (Nelson et al, 2010). The lifecycle of the rules are controlled on project or departmental level. This lifecycle includes amongst others: defining or changing, validating and verifying, testing and approving the rules. BRM is organized on a small scale. Rules are annotated in a formal and structured way with the aid of a rule repository. Traceability from definition to implementation. Translation from the rule repository to executable rules is still necessary which means that ICT plays an important role (Coenen et al., 2008).</td>
</tr>
<tr>
<td>Managed</td>
<td>Consistency and alignment among rules to current and changing objectives. Level 3 demands BR governance across projects, systems and perhaps even business units. The organization identifies business-driven benefits for standardizing or sharing business rule techniques and even automated business rule services across projects. Automated rule analysis and simulation capabilities and rules expressed in business-friendly languages can be translated into executable rule automatically or with the aid of intelligent software (von Halle &amp; Goldberg, 2006 &amp; 2010). The BR project grows in scope and begins to assume an enterprise focus. The business side is totally involved. The split between development and implementation responsibilities is made at this stage. (Nelson et al, 2010). Lifecycle of the rules is controlled on the level of end-to-end business processes. Reuse and consistency of rules. Standardized methods, techniques and tools on organizational level. BRMS is used (maybe even cross departmental and synchronized). Automated business rules are realized and with this, meeting law and regulations is guaranteed (Coenen et al., 2008).</td>
</tr>
<tr>
<td>Business rule factory</td>
<td>Organization sees business rules as prediction for future success and safety. They anticipate and manage their destiny, creating its own, safer world. Tools are employed for capturing and analyzing rules, and metrics are developed against which the desired impact of rules are managed. Organizations look out over a short-term horizon (von Halle &amp; Goldberg, 2006 &amp; 2010). Applications are interoperable with an online repository that centrally stores the firm’s BR (Nelson et al, 2010). Traceability between KPI’s and business rules or groups of BR. Deviating signals can be associated with rules that need to be changed. Different changing scenarios have been developed (Coenen et al., 2008).</td>
</tr>
<tr>
<td>Fully agile</td>
<td>Enterprise wide stewardship of business rules is embraced. This means business rule governance is built into business processes. The rules are entirely managed for refining and re-invented the organization as necessary. Organizations have a longer-term perspective. BR governance is integrated into business processes (von Halle &amp; Goldberg, 2006 &amp; 2010). Emphasis shifts to expanding the BR deployments to the next implementation business domain (Nelson et al, 2010). Systematically insight of the relationship between KPIs and business strategy. Anticipating on long term events is possible (Coenen et al., 2008).</td>
</tr>
</tbody>
</table>

Table 14: BRM characteristics per maturity level
4.3.1.1 Final maturity level classification
In Table 15 below, the explanation of the final maturity level classification is given.

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siloed rule awareness</td>
<td>Rules are stored in documents, spreadsheets, and people’s head. Individuals take initiatives to make rules explicit and they might be programmed in software systems. The rarely occurring business rule projects have their emphasis particular on technical feasibility and does not involve the business.</td>
</tr>
<tr>
<td>Repeated</td>
<td>Separation and traceability of rules. Rules are understood and collected in a repository. Analysis is done manually. Reporting shifts form IT to the business side. Rules are annotated in a formal and structured way. The rule lifecycle (including, defining or changing, validating and verifying, and testing and approving the rules) is controlled on departmental level.</td>
</tr>
<tr>
<td>Managed</td>
<td>Business-driven benefits are identified for rule standardizing or sharing business rule techniques. Business rules governance across projects, systems and perhaps business units. Rule analysis and simulation is done automatic, and business-friendly rules can be translated into executable rules automatically. BR project grows in scope and the business side is totally involved. The rule life cycle is controlled on end-to-end business process level. Reuse and consistency of rules is present. Guarantee of rules meeting law and regulations.</td>
</tr>
<tr>
<td>Business rule factory</td>
<td>Business rules are seen as prediction for future success and safety. Tools are employed for capturing and analyzing rules, and metrics are developed against which the desired impact of rules are managed. Applications are interoperable with an online repository that centrally stores the firm’s BR. Deviating signals can be associated with rules that need to be changed. Multiple changing scenarios have been developed.</td>
</tr>
<tr>
<td>Fully agile</td>
<td>Business rule governance is built into business processes (stewardship) and organizations have a long term perspective. Expand BR deployments to the next business domain systematic insight of the relation between KPI’s and business strategy.</td>
</tr>
</tbody>
</table>

Table 15: Final BRM maturity level explanation

4.3.2 Extract the factors
Although the literature about BRM maturity models is not very comprehensive, a set of models is found to act as a basis for extracting the factors for the maturity model presented in this research. The models of von Halle and Goldberg (2006) and Nelson et al. (2010) are the only BRM maturity model that use factors to measure maturity. These factors are explained below and in Table 16 the classification amongst some common dominators is presented. In order to be as compatible as possible with the BPM model, the dimension names used in this model are altered a little bit.

Von Halle and Goldberg (2006) describe three vectors to measure maturity. The first one addresses the influence over rule changes materialized by each rules management maturity level and is called ‘business value’. The second vector, ‘technical state’, describes where rules reside and how they are managed at each maturity level. The last vector describes the role of non-technical rule stewards and how that role evolves at each level of the rule maturity model.

Although the names of the factors of the model of Nelson et al. (2010) are somewhat different, they did compare some rules management related dimensions along the 5 stages. The first factor is ‘organization scope’. This factor elaborates about the scope of the business rule project within the organization. The second dimension is about ‘ownership’ of the Central Business Rule Group (CBRG). This group guides and directs the BRM development, rule maintenance, systems integration and coordinate implementations. The third is about the structure of the CBRG activities. This can shift from an informal project team to a joined service group consisting of the CBRG, business process owners and IT. The last two dimension are ‘development responsibility’, and ‘implementation responsibility’. The first of these two shows the shifts from an initial project team to a coordinated modelling team from CBRG, business process owners and the IT department and the latter from an initial project team to a delegated modelling team headed by the concerning line of business and business process owners with CBRG oversight.
A Business Process & Rule Management
Maturity Model for the Dutch Governmental Sector

<table>
<thead>
<tr>
<th>Factor</th>
<th>Dimension name by author</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy/organizational scope</td>
<td>Business Value (von Halle &amp; Goldberg, 2006)</td>
<td>Addresses the influences over rule changes</td>
</tr>
<tr>
<td></td>
<td>Organizational scope (Nelson et al, 2010)</td>
<td>Scope of the business rule project</td>
</tr>
<tr>
<td>Governance</td>
<td>Business Control (von Halle &amp; Goldberg, 2006)</td>
<td>Describes where rules reside and how they are managed at each level</td>
</tr>
<tr>
<td></td>
<td>Ownership Structure (Nelson et al, 2010)</td>
<td>Ownership of the CBRG Structure of the CBRG</td>
</tr>
<tr>
<td>Technical</td>
<td>Technical state (von Halle &amp; Goldberg, 2006)</td>
<td>Altitudes to the role of non-technical rule steward and how that role evolves at each level of the rule maturity model.</td>
</tr>
<tr>
<td></td>
<td>Development responsibility Implementation responsibility (Nelson et al, 2010)</td>
<td>Structure of the development group Structure of the implementation group</td>
</tr>
</tbody>
</table>

Table 16: Factors used in BRM literature

The first column of Table 16 presents the final chosen factors for the BRM maturity model, the second column shows the name given by the original author and the last column gives a short description about the content of the factor.

4.3.3 Key issues for every factor

Below in Figure 17 the maturity model that presents the maturity model, established by the consolidation of the existing models discussed in this research so far, is shown. The horizontal axis presents the maturity level and the vertical axis present the factors. The model presented in Figure 17 is only a framework of the entire model. Due to size limitation the full model is not presented here but can be found in appendix 12.6. In this model every cell is filled with issues discussed in this research’ literature in order to form a base for the final BP&RM maturity model.

Figure 17: Framework of the literature based BRM models
5 Constructing the model: Combining the BPM & BRM maturity models

In this chapter the development of the consolidation between the business process management (BPM) and business rules management (BRM) maturity models into one model, called the BP&RM Maturity Model, is described. Input for this model are the models developed in chapter 4.2 and 4.3, and the interviews held amongst BPM and BRM and enterprise architecture (EA) experts.

5.1 Subject matter experts interviews

For the first validation and optimization iteration of the research, subject matter experts (SME’s) in the field of BPM, BRM and EA are interviewed. The selection of the interviewees took place in accordance between the researcher and the external supervisor. Ten SME interviews were held; four amongst BPM experts, two amongst BRM experts, and four amongst enterprise architects. One BRM expert, one BPM expert and the four enterprise architects are working as an IT-consultant for KPMG, the other four experts, are from outside KPMG. Each of the experts have different backgrounds and work experiences. The four BPM experts all have a minimum of five years work experience in the field of process optimizing. The BRM experts both have a different background in the field. The one came in contact with BRM by working as a consultant for many years and therefore knows about the chances and problems in this field. The other BRM expert did extensive research in this field and thereby became an expert. The four enterprise architects have a minimum of four years work experience as an IT consultant. Due to the variety of backgrounds of the subject matter experts, the information gathered from the interviews is all valuable in their own range of application which gives the researcher a wide range of knowledge about the different topics. This variety of viewpoints is important to keep in mind when analyzing the interviews, because due to this variety it might be difficult to analyze the different interviews according to a fixed encrypting scheme. Table 17 shows the function and industry description of the domain experts.

<table>
<thead>
<tr>
<th>Function/title</th>
<th>Industry</th>
<th>Expert field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior manager consultant</td>
<td>IT &amp; services</td>
<td>BPM</td>
</tr>
<tr>
<td>Chief architect, director</td>
<td>IT &amp; services</td>
<td>BPM</td>
</tr>
<tr>
<td>Consultant</td>
<td>IT &amp; services</td>
<td>BPM</td>
</tr>
<tr>
<td>Performance &amp; quality manager</td>
<td>Food &amp; beverage</td>
<td>BPM</td>
</tr>
<tr>
<td>Consultancy partner</td>
<td>Management consulting in IT &amp; services</td>
<td>BRM</td>
</tr>
<tr>
<td>BRM expert</td>
<td>Research, variety of industries</td>
<td>BRM</td>
</tr>
<tr>
<td>Senior manager consultant</td>
<td>Management consulting in IT &amp; services</td>
<td>Enterprise Architect</td>
</tr>
<tr>
<td>Manager consultant</td>
<td>Management consulting in IT &amp; services</td>
<td>Enterprise Architect</td>
</tr>
<tr>
<td>Manager consultant</td>
<td>Management consulting in IT &amp; services</td>
<td>Enterprise Architect</td>
</tr>
</tbody>
</table>

Table 17: List of subject matter experts and their function

5.2 Important issues according to the subject matter experts

In this section important issues mentioned by the experts are listed, duplicates are filtered and mentioned in the summaries only once and can be found below in Table 18. Important issues from the interviews are highlighted according to the factor they belong to. The last four interviews with the enterprise architects are not summarized and transcribed because the interviews had a different aim. These interviews were less explorative and more focused on structuring the knowledge gathered so far. The transcription scheme can be found in Appendix 12.7 The entire interview reports can be found in Appendix 12.7. Due to privacy considerations not all the interviews are recorded and thus some will have a less extensive report.
## A Business Process & Rule Management Maturity Model for the Dutch Governmental Sector

**Interview summary**

<table>
<thead>
<tr>
<th>Function</th>
<th>Summary</th>
</tr>
</thead>
</table>
| Senior consultant manager (BPM) | Organizations need to focus on their core activities when they start to implement BPM and BRM. So an ever important first step is a mapping of the core activities. 20% of the processes are responsible for 80% of the revenue.  
Level 1: Indicate key drivers.  
Level 2: Translation to functions, map the drivers in the enterprise architecture. Going high over the processes; make the processes clear and transparent by using a (rule) repository which guarantees standardization, reuse and inheritance. Make and use a governance matrix which defines who defines/approves/enforces and implements policies and standards.  
Level 3: Execution starts. Start to design KPI’s and start to operate change management activities  
Level 4: show measurement results. Business application measuring for providing a real-time summary of business activities to operations managers and upper management.  
Level 5: tackle waste handling, and provide feedback by an automated loop. |
| Chief architect, Director (BPM) | Process modelling is the first important step within BPM. First with a graphical tool (visio), later on in something more clever tool (ARIS) that uses a repository to keep things together and that can recognize, re-use and inherit steps.  
Processes are embedded by rules. A distinction between processes and rules is almost zero. A disadvantage of separating rules from processes is the mainly they way to test them, because delicate application testing is not possible anymore.  
Important questions to be asked are: Are processes and rules described? is there a shared repository? is there talk of re-use? are the processes and rules implemented? Is there continues improvement possible? A distinction can be made between processes and rules separated and processes and rule together.  
Use BPM and BRM for all the processes and Rules that change often. For large organizations is a more traditional way for doing BPM and BRM more suitable because you have planned a route in advance which guides you where to go and how. In this case, tooling is not immediately important.  
Main problem is that organizations lose ownership of their processes so nobody has oversight anymore which is the root cause of fragmentation of the process and activities that took place the last decades.  
BPM is more than Lean or Six Sigma, because with BPM your organizations is fully agile. Consistency and channel dependency is important for every customer. |
| Consultant (BPM)              | BPM mainly is about end-to-end processes and together with BRM it is an important driver for a case-oriented approach for working with chains instead of silos. Business rules can be seen as the decision points within a process and therefore, BRM is needed in order to manage your processes right. To see fast results BPM has the potential to start with small projects and to execute this project from start till end. After successful implementation the scope of the project can be extended. The big advantage of this approach is to create support from the working field which can be done by good training.  
The downside of BPM and BRM at this moment is that tooling requires conventions.  
A large pitfall of BPM is that organizations 'forget' to execute their ideas because they go into too much detail about the process from start. This delays the project and enlarges the risk that it remains a project thought out by the top, but not executed to lower levels of the organizations. Good communication all through the organization is needed. |
| Performance & Quality manager (BPM) | An ever important first step is to decide what the organization wants and what they need to achieve this. When this is clear, the tool selection is important. Governance is about functional and process owners and who makes the decisions. Line managers all have the same authority now. A few years ago ISO standards were used to embrace business/IT alignment. Standardization is typical level 2 and talking about self improvement this is a level 4 characteristic. It is important to know you core processes. In the whole automation process we developed new positions for knowledge sharing and standardizations issues. Working more efficient is needed and seen by the employees as well. Business processes and business rules were always just IT issues, but the shift to the business is needed in order to make management of them more effective. Control is now in hands of the line managers. Risk management is an important issue. There are so many rules and to little control. More insight is needed so rules management is there to bring the relief. Communication through the whole organization is important and mostly accomplished by setting up communities and seminars. |
| Consultancy Partner (BRM)     | The business- and IT-departments of organizations need to intensify their collaboration. The biggest problem is that employees from the business do not understand IT, and they do not need to, but this makes a good change environment very important. For this reason change management on the level of people and culture is unprecedently important. |
Important shift is that rules are no longer about compliance alone. Rules are the content of the processes. Important is to focus on transactional rules.

Important BRM issues are: ‘time-travelling’ and the speed of carrying through new rules. (metrics)

Translate the rule from hardcode to a language that is understood by a BR engine. (infrastructure)

Communication between employees from the business working with the rules (for example lawyers, judges, accountants and managers) with technical people is of great importance. The business employees and IT employees are both experts in their own field and use their own language to talk about their requirements, needs, problems and so forth. Although there is a big gap between the two spoken languages, cooperation between the two is of great importance in order to create and proved the organization with meaningful process and rules organization.

The interviews with the four enterprise architects took place to give form to the knowledge gathered so far in this research. BPM and BRM are both topics that cover many divisions and issues within the enterprise. It deals with change management, governance, strategy planning, and business/IT alignment. For this reason the researcher decided to use the knowledge of the enterprise architects in a somewhat different way than the knowledge of the BPM and BRM experts. Typical of an enterprise architect is that the knowledge he has covers many aspect of the organizations. For this reason he had a good overview of the goings-on in organizations, which, as said, is key for good understanding of BPM and BRM. Because the architects work for a consultancy firm, they have seen many different organizations and can structure and filter the information gathered in this research so far. The interviews had a more conversation and consultation character then the other interviews, and had the aim to create a combined business process and rules management model. This is done by using the literature based models as handholds, together with the knowledge the researcher have gathered from the BPM and BRM experts.

### Table 18: Summaries of the subject matter expert interviews

#### 5.3 Main adjustments

In this section the important decisions with regard to the consolidation of the BPM and BRM maturity models into a combined BP&RM maturity model, are discussed. Every factor that is used in the first version of the BP&RM maturity model is explained. With regard to the maturity level division, the literature is guiding because the different literature researchers are in agreement with each other on this point, and the expert interviews implied that in the working field there is not a strict distinction between the levels. They approach it as a long journey with stages but a strict subdivision of the stages in levels remains forthcoming.

Both the literature (see Section 2.3.2) , as the experts agree that BRM can be seen as a division of BPM. For this reason BPM and BRM are not totally amalgamated to one maturity model. After the interviews it became clear that BPM is still in the lead and covers a broader organizational scope then rules management does. This can be reduced in the model because most factors are process management related and one specific factor is related to BRM.

#### 5.3.1 Strategy

The content of the strategy factor did not change compared to the factor discussed in literature. The interviewees agreed on the fact that at the start of a big and and successful process improvement approach, focus and insight in the organization is important. Within the factor ‘Strategy alignment’ three subjects are mentioned that characterize this factor, the first is: ‘responsiveness/efficiency’. This subject describes the way the organization improves and changes its strategy. Is this active, or do they employ a more ‘wait and see’ approach. The second subject ‘scope of the processes’ matters how processes are seen and approached within the organization. Are processes seen as separate activities or does the organization view it much wider and do they give coherence to the individual processes or maybe they are even coupled with the organizations strategy. The last one is ‘strategic impact of the processes’ and discusses the way in which processes and strategy influence each other. Are the processes organized based on a particular strategy or is the strategy created based on the opportunities that can be created by process management?
5.3.2 Methods
In literature this factor is mainly explained as the set of tools and techniques needed to perform BPM. In the BRM literature this factor is not quoted at all. The input from the experts on this factor is that they indicate methods are important in BRM as well, therefore, this factor is about the tools and techniques to perform BPM and BRM. After the interviews with the architects it is decided to divided the factor into two subjects. First ‘The use of formal methods’, which is about the use of modelling techniques and the goal which the methods are used for, think about the ‘Plan-Do-Check-Ack’ cycle for method using. The second subject is the ‘use of tooling’ which measures to what extent tooling is used for BPM and BRM.

5.3.3 IT Architecture
This factor is mainly about the way IS support the processes. One subject is called ‘system integration’ which measures whether an organization is organized by a siloed process approach, or by one integrated systems, the two situations are presented Figure 18. The second subject is called ‘Business Process Automation (BPA) tooling’. This indicates the strategy a business uses to automate processes in order to contain costs. It consists of integrating applications, restructuring labour resources and using software applications throughout the organization. BPA can be applied by an organization at different levels. The more BPA is used, the closer an organization is to really start using a real BPM, and/or BRM tool within the organization or even within their entire chain. The literature does not elaborate on this factor much, but the interviewees did point this factor out, and therefore it is included in the model as an individual subject to measure maturity.

Figure 18: Low level of system integration versus high level of system integration

5.3.4 Governance
The governance factor is a vexed question in literature, and it is mentioned by the experts many times as well. Most of the times it is about three issues, namely, control, measurement and roles. Combining the literature about these three issues with the experts thoughts on this, resulted in three subjects. The first is about the governance ‘structure’ which gives insight who has the authority and who is held responsible for the achieved results, this factor indicates ownership as well. This subject can be matched with the ‘roles’ issue described in literature. The second is about ‘decision making’. Are decisions made at the top of the organization or are employees who do the real work involved in the decision making. This subject can be matched with the ‘control issue described in literature. The last subject is called ‘KPI monitoring’ and measures how error handling is settled, and for what purpose KPI’s are established. This can be done ad-hoc (immature) or organizations are able to steer on their KPI’s directly and a fully automated control loop is established (very mature). This last subject can be matched with the ‘measurement’ issue described in literature.

5.3.5 People & culture
The expert interviews presented that three issues need special attention when you talk about this (soft) factor. The first important quality for BRM and BPM maturity is the way the organization trains their employees. Therefore the first subject for this factor is ‘training’. The second one is good support for the new developments from top level management, which affects the way the organization handles change management as well. People all through the organization are affected when BPM and BRM is implemented so
these additional changes need to get managed to guide, and make the change successful. For this reason the two are combined in one subject which is called ‘change mentality/management commitment’. The last subject gives more insight in the way the organization shares its knowledge. At the lower levels this is indicated by the way the organization shares its knowledge, and at higher levels this is indicated on the way they choose and select employees and built teams.

5.3.6 Business rules

Because of the view of the experts and the literature about the relationship between BRM and BPM, BRM maturity is mentioned as a separate factor. The experts gave the advice to change the factor name ‘Organizational scope’, to ‘Business’ because the scope is already measured in the factor strategy. After the interviews and the literature research, three typical factors can be distinguished. One is business related and elaborates about the way rules are described and who it affects the business. The second is the ‘technical’ factor which describes how the rules are stored and managed. The last one is about ‘governance’ of the rules.

The experts advised to separate this factor from the process management factor governance, because ownership of the rules is very important and individual element of the organization.

5.4 The BP&RM AM model

Now that the explanation of the construction of the model is given, the BP&RM Maturity framework (which is a skeleton of the entire model) can be presented (see Figure 19). The entire version of the BP&RM Maturity Model is presented in Appendix 12.7. The issues in the boxes of the final model are based on the issues mentioned by scientists and, where needed according to the experts, adjustments are made.
<table>
<thead>
<tr>
<th>FACTOR</th>
<th>SUBJECT</th>
<th>MATURITY LEVEL</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
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</thead>
<tbody>
<tr>
<td>Strategy alignment</td>
<td>• Responsiveness/ efficiency</td>
<td>FAC-TOR</td>
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<td></td>
<td>• Scope of the processes</td>
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<td></td>
<td>• Strategic impact of the processes.</td>
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<td></td>
<td>• Process importance/ Process optimization</td>
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<td>• Business / IT alignment</td>
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<tr>
<td>Methods</td>
<td>• Use of formal methods</td>
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<td></td>
<td>• Used tooling for design</td>
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<td></td>
<td>(Determination of architecture, process mapping and modeling)</td>
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<tr>
<td>IT Architecture</td>
<td>• System integration. How do processes</td>
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<td>cooperate along the systems.</td>
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<td></td>
<td>• Business Process Automation tooling</td>
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<td>Governance</td>
<td>• Governance structure. Who is the boss?</td>
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<td></td>
<td>Ownership of processes. (Roles from business process analyst to process owners up to potential chief process officers).</td>
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<td></td>
<td>• Decision making. Decisions about process</td>
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<td>design &amp; business logic/rules. (Decision boards such as process councils and process steering committees)</td>
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<td></td>
<td>• KPI monitoring Tools (How is process improvement/ progress/timeliness measured?)</td>
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<tr>
<td>People &amp; culture</td>
<td>• Training (Leadership style)</td>
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<td>• Change mentality/ management commitment</td>
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<td>• Culture en mentality</td>
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<td>Business rules</td>
<td>• Business</td>
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<td></td>
<td>• Technical</td>
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<td></td>
<td>• Governance</td>
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Figure 19: BP&RM Maturity framework
6 Constructing the model: Adoptions for governmental organizations

In this chapter the Business Process & Rules Management Maturity Model (BP&RM MM) for the governmental sector is build. Based on the previous version of the model, the BP&RM MM and the assessment questionnaire to provide governmental agencies with giving them insight in their maturity and supporting them to become more mature in the field of business process and rules management, is developed.

Interviews are held with several Dutch governmental organizations. The interviews had a semi-structured character. This means that a minimum list of questions was prepared and that most of the direction of the interview was determined by the conversation itself. The list of questions can be found in Appendix 12.10. The organizations under investigation all deal with business process management (BPM) and/or business rules management (BRM), however it might be at a different level. Also, the interviewees all have a different role within the investigated organizations which gave the researcher a varied insight in the way BPM and BRM are approached. After the transcription of the interviews the first mapping took place. This transcription entails summarizing the interviews and the mapping consists of translating the issues discussed during the interviews into characteristics and actions suitable for the model.

The assessment questionnaire is used to apply the maturity model and consists of a list of questions, one for each subject of the maturity model. These questions are established with the help of the enterprise architectures that were also used as subject matter experts in the previous chapter of the research. Due to their consultancy background, these people all have very a broad knowledge about the ins and outs of a variety of organizations.

6.1 government experts interviews

For the second validation and optimization iteration of the research and the development of the model, six interviews are held amongst six different governmental organizations and two interviews are held with consultants working in the governmental sector. All the selected organizations are information factories and the interviewees are working for the information processing, or information/process architecture department of their organization. Table 19 shows the function and industry description of the domain experts.

<table>
<thead>
<tr>
<th>Function/title</th>
<th>Industry</th>
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</thead>
<tbody>
<tr>
<td>Operational manager application expertise</td>
<td>Government administration</td>
</tr>
<tr>
<td>Enterprise architect</td>
<td>Government administration</td>
</tr>
<tr>
<td>Senior manager consultant public sector</td>
<td>Management consulting IT in public sector</td>
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<tr>
<td>Consultancy partner public sector</td>
<td>Management consulting IT in public sector</td>
</tr>
<tr>
<td>Business architect</td>
<td>Government administration</td>
</tr>
<tr>
<td>Head information policy department</td>
<td>Municipality</td>
</tr>
<tr>
<td>Head department of permissions and assertions</td>
<td>Government administration</td>
</tr>
<tr>
<td>Concern architect</td>
<td>Government administration</td>
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</tbody>
</table>

Table 19: List of domain experts

6.2 Considerations and important issues according to domain experts

In this section a summary of the issues that are mentioned by the domain experts and important for this research are presented. The researcher made this selection. The entire interviews can be found in Appendix 12.11. Some of the interviews are literal translations of the interview and some are not, this is because the to privacy policy of some organizations did not allow to record the interview.

Operational manager application expertise - Non-governmental organizations have the freedom to execute a project somewhat different than planned, when governmental organizations do this, a lot of questions and
legal matters from the Upper House of the Parliament, and media, can arise. This often causes huge delays in projects and after such a delay it is often decided to pull the plug on the project. In 2007 our organizations started with the tender of a big project to dramatically change the entire ICT infrastructure. The factor ‘People and Culture’ was totally forgotten in this project because at governmental organizations this is a hollow phrase. It just takes too long to do so. People need to be enforced to change. First the means need to be available and thereafter it is important that the entire process is directed by the business. The put-through time of a change project is nine month now, and need to be lowered down by; using more standard packages which gives the opportunity to transit changes without the help of the IT department, and the three branches of the organization need to be stored in one generic system. The following issues were important during or project.

- Knowledge and functionality need to be separated and modeled in an architecture. Our organization started with a Greenfield. The three important issues we kept in mind were: 1) backwards planning with the result to see what is the minimum needed. 2) create building blocks and erase duplication and 3) work result focused.
- With rule handling there was limited involvement of the end user and guidance was mainly top down.
- Pitfalls are: change to fast from vision to execution; choosing the right moment to give the project back to the business; determine tempo of the change project, recalibrate scenario’s, and decide carefully when you transfer customers because they cannot act partly in the new and partly in the old system; business is constantly running behind and takes an expectantly position because of recurring postponement.
- A strong vision and maintain this vision is important. In order to fulfill this strong vision mandate is needed together with trust in and within the board.
- Business activity modeling is important. Is the process working as it should be, therefore continuous control between two systems is needed this is done by statistical control and validation. The latter is done in threefold: 1) check question and outcome, 2) black box testing and white box testing, 3) build in guardians, for example capture it that (and is so when) two options cannot appear together.
- management of the rules need to be as much as possible a business thing, because modelers of the rules are no information technologists.
- DEMO used as method the steps are 1)treatment plan, 2) start success path, 3) backwards reasoning. BelInformed is used as a tool.
- The use of only generic principles is important. Temporary solutions stay temporary and are never used to built upon.
- Getting the right people with you is a matter of cherry picking. Everybody who want to change is in and rewarding employees is done with reduce seduction.
- The last important aspect of this project is combining the rules used by the business with the ICT knowledge within the organization.

**Enterprise architect** - Or organization has a CIO that supports enterprise architecture. He and his department ensure the alignment between the business and the technical operational management. They are the chain between the vision and changes. There are five divisions which are process focused. The ICT architect is brought into action by executing the rules. A policy advisor translates the rules explained by law and a business analyst translates them to the way they are going to be executed. At the end, this business analyst should be able to adapt the rules (Oracle Policy Automation is used for this). Service oriented approach from a client-view. A case oriented approach is a fundamental in governmental organizations. The know is separated from the flow and individual quality-tests are at random. BRM has less influence on staff then BPM.

**Senior manager consultant public sector** - BRM should be used as a means for BPM. Organize your processes before you furnish them with the rules. The connection between business and ICT is vital. Employees using the rules are approaching rules different then IT employees so bothering the business with rule based management systems does not work. Somebody need to be in between or the organization need to give management of the rules back to the IT development.
- Organizations need to get rid of the big amount of individual applications. Important is to decide what the aim, and more important, need of the organizations is with an eye on BPM and BRM. Characteristics of good performing organizations are, trust, collaboration, result-orientation, and continues improvement and renewal. Most important with all of this is determination of the right aspiration level.

Consultancy Partner public sector - In many governmental organizations the business model turns out to be outdated in such a way that recovery attempts are useless and fundamental changes needed. To succeed, starting small is important and gradually connect chain-partners. There is difference between IT tooling and BPMS tooling. IT tooling is to maintain the planned IT environment. Although every governmental department has a CIO, the difference between the wish of the CIO and the doings of the head of the ICT department is still too big.

Business architect - The big problem we face is the communication between the jurists and the IT employees. The first need to deliver the content, and the latter has to make the translation into logical models. But they both see rules in a different way. It is important that BPM and BPR kind of changes projects are managed by an intermediating department to reduce backroom politics and enlarges the communication between the business people working with and within the process and IT department who has to make things work the way it is requested by the business. For IT projects it is very clear what should be done but this is not connected with the cultural changes that come along with the planned IT changes. Due to obliged savings governmental organizations are forced take a broader change viewpoint and the strategy will need to change too. Via Internet intelligent services can be given, which forces an organization to coherent the soft side (culture) of the business with the hard side (IT).
- Performance measurements are getting more and more important. Often process owners act on the business side of the organization, and they do not know anything about the technical process atlas, this gap can partly be bridged with something like an Information Management department.

Head information policy department - Having a CIO is an important starting point for developing architectural standards, managing the project portfolio and supporting the business during a project. Linking the business architecture with the information architecture is as important as it is difficult. The main cause is because IT becomes more and more the leading business within the organization instead of being limiting. IT should talk the business language more in order to built the architecture components the business need.
- Using BPM systems is very important for managing the big amount and complex parallel-running processes municipalities have. But having one single systems is not (yet) necessary.
- Process owners receive a toolbox which they can use to physically built the process. Feedback from the process owners inform the information policy department about the completeness and correctness of the toolbox.
- By trainings, workshops, and information markets, process owners are stimulated to work as a service providing organization more than a siloed one. The next step is security and risk analysis, this is the task of the Chief Information Security Officer (CISO). This person should look at the business processes and the BPM modelled steps to find out what these steps mean for the business.
- Testing is the process owners responsibility. Use cases and scenarios are written down and a systems is tested on that.
- There is not really talk of competitive advantages, but we do have to anticipate on market developments to serve and satisfy the customer/citizen, but all the profit we get is electoral profit, and a high raking on performance-lists.
- Decision making is seen bottom-up. Decisions need to come out of the process (bottom) but the given solutions need to be embedded within the organizational standards.
- Change mentality is important but difficult. Some employees are process focused and do not ask themselves why they are doing things, others are product focused and want to add value. An even more difficult is to
know your activities and to oversee the results for adjacent processes. So you need a higher abstraction level and a wider focus. Collaboration and thinking outside your domain is difficult. The service focused way of working obliges us to follow this direction and forces organizations to take a critical view of the way of working of their processes. This is typically done by IT people.

Head department of permissions and assertions - Separate units within the organization want to have an overview of the organization thus the main processes and coherence need to be modelled. Modelling decisions are very important and thus need to be concrete. Guidance need to come from the top otherwise different approaches and divisions are used within the organization. Modelling your processes is important, customers viewpoint need to be central here. One central automation plan is important for good guidance within the firm. Individual rules are easy, but the coherence between them is difficult to capture. Or rules are stored in an Oracle system but an Excel spreadsheet is used as well. We have fifteen pages of rules and we cope with them intelligent because we know them and take them into account when organizing ourselves. Two years ago the government changed one law which resulted in a big automation project for us. The establishment of this project took about one year. Important with such a big project is that you know what is going to happen and being attentive on the things that are going to change. When a permission request enters the system a few questions are preliminary modelled. When all the questions are passed. These criteria are buried at different places now. We want to automate this with the help of using standards. The rules are easy, but the cohesion is difficult to model.

- One big e-plan is strategically thought out by the management team and each department considers which investment is needed to fulfil this plan. Communication goes mainly via the head of the department and functional application owner, at the lower levels of the organization communication is more ad-hoc.
- The criteria are not black or white. Permission requests are considered, underneath these soft criteria there are strict rules which can be automated, but we do not see the need for that yet as are not a mass processing fabric.

Concern architect – At our organizations we are talking about the rules which are a direct manifestation of the law. Question is, how do you get to an executing organization with an information provision that meet this law. For a governmental organization completion is less important. You are more following then leading. The main driver for automation is cost reduction, but consistency of the performing task is getting more and more important. Most systems are silo focussed but information exchange between these silo’s is needed and possible as well. Governance has always been important at governmental organizations. The biggest problem with this was that there were a lot of isolated people responsible for their own island. Decisions within the process are well structured. When you look at the more managerial decisions you see that the people in charge know everything of the last 30 years from begin to end but this is dangerous because these people are leaving now and since the processes are executed in the cellar of our main office so insight in what is happening within these systems gets lost and good recording is necessary. KPI’s are not much used for quality improvement but. We are measuring our image in society and for the target group approach measurements are important too. We do have a very good damage control for when something goes badly wrong.

- With the big automation turn brainless work is eliminated and thus the more coaching approach in the way employees are working is landed. Creating public support for you change ideas is very important. Luckily this is getting more attention and thus people are more involved in the plans that are made at the top. This is part of the new way of sharing and exchanging knowledge. Thinking about the borders of one process is central in this and an intensive network of knowledge sharing is built.
- Traditionally rules are bared in peoples head but we are getting now insight in where these rules are doing their job This is a first step in order to be flexible, but having this in a BRMS system is still in the future. The initiative of changing is in hands of the business. They call the IT department. Years ago, the IT department implemented the law with a law book on the side. Luckily there are people at the business site that bring the two departments closer to each other. The IT department changed the structure of the code, but the business
failed in taking the lead in this. There is a Babylonia created which confirms the use of a model like this even more

6.3 Adjustments and the governmental BP&RM Maturity Model

In the previous section the important issues according to the domain experts are presented and following these interviews some of the level classification changed a bit in accordance to suite the governmental sector the best. Most of the characteristics retained but some of them moved up or down in maturity level because the experts did not agreed with the literature. With an eye on the expertise and knowledge the experts have in their field, and the founded arguments they always had, most of the changes they suggested are carried out. The main difference are a change in the factor division and factor name.

In this section firstly a textual explanation on the maturity levels is given. Below this explanation the most important changes and adjustments to the model are explained, categorized per factor, and every sub sections closes with the explanation of the factor means of it subjects. At the end of the chapter, the framework of the final governmental BP&RM maturity model is presented (see Figure 25). This means that the factors and subjects are presented, but the boxes are kept empty this because the model is too big to show here. The entire version of it can be found in Appendix 12.12.
6.3.1 maturity level explanation

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siloed activity awareness</td>
<td>The organization is aware of its processes but has not described them. Massive duplication of BP effort. There is talk about solving the intermingling of rules and dig them out code, documents en peoples. Information is siloed. The rarely occurring business rule projects have their emphasis particular on technical feasibility and does not involve the business.</td>
</tr>
<tr>
<td>Repeated</td>
<td>The organization start to understand and organize processes, repeat successes, enforcement of data integration and process standards, no alignment around end-to-end enterprise wide processes. BR are understood and collected in a repository, but seen as a separate aspect of the business logic and analysis is done manually. Separation and traceability of rules. Reporting shifts form IT to the business side. Rules are annotated in a formal and structured way. The rule lifecycle (defining and changing, validating and verifying, and testing and approving the rules) is controlled on departmental level.</td>
</tr>
<tr>
<td>Managed</td>
<td>Organization wide understanding on the processes and the relation between them. Measurements are determined (KPI’s and KRI’s). An organizational mind-set-shift is needed (change management). Craft process automation across the enterprise, customers and trading partners. Organizational wide governance on processes and rules is tried to be achieved. Rules and methods are implemented in the process management. Business-driven benefits are identified for rule standardizing or sharing business rule techniques. Rule analysis and simulation is done automatic, and business-friendly rules can be translated into executable rules automatically. BR project grows in scope and the business side is totally involved. The rule life cycle is controlled on end-to-end business process level. Guarantee of rules meeting law and regulations.</td>
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<tr>
<td>Valuation control</td>
<td>Outcomes of the measurements are collected understood and controlled. Processes are controlled continuously and craft process control across the enterprise, customers and trading partners. Dynamically link the Valuation of the business to process execution. The role of BPM technology finally finds a home at this level. BR are associated with business metrics and traceable to business value. Business rules are seen as prediction for future success and safety. Tools are employed for capturing and analyzing rules, develop metric against which the desired impact of rules are managed. Remediate applications are interoperable with an online repository that centrally stores the firm’s BR. Deviating signals can be associated with rules that need to be changed. Multiple changing scenarios have been developed.</td>
</tr>
<tr>
<td>Fully agile</td>
<td>Continuously process improvement by benchmarking and best practice sharing. Possibly even through the whole ecosystem. Innovate new businesses products and services through an agile business structure is used for continuously improvement. At this level the organization aims full enterprise wide stewardship of rules for refining and re-inventing itself as necessary. BR governance is integrated into business processes and organizations have a long term perspective. Expand BR deployments to the next business domain. Organizations have systematic insight on the relation between KPI’s and business strategy.</td>
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Table 20: Maturity level explanation of the governmental BP&RM MM

6.3.2 Explanation of the factors

6.3.2.1 Strategy alignment

This factor covers the strategic issues of an organization based on their ability to react on their environment, scope of their processes and the influence of the strategy on the processes. Business process and rules management (BP&RM) needs to be in line with the overall strategy of the organization. It is very important that BP&RM is not only an IT related issue but is should be in sync with the business and the strategy of the organization. Processes and rules have to be designed, executed, managed and measured according to the strategic situation but the strategy need to be able to change when process and rule capabilities offer opportunities. The higher the maturity of this factor, the more the business strategy and IT strategy are aligned. The changes for this factor are explained with the help of Figure 20 and the quotes from Box 1 and the textual explanation can be found underneath Box 1. After the explanation of the establishment of the maturity division of the factor the content per subject is explained.
### A Business Process & Rule Management Maturity Model for the Dutch Governmental Sector

<table>
<thead>
<tr>
<th>Maturity level</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation Control</th>
<th>Fully agile</th>
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**Strategy alignment**

- Responsiveness/efficiency
- Scope of the processes
- Strategic impact of the processes
- Process importance/process optimisation
- Business/IT alignment

**Quote 1** *Enterprise architect* – “The CIO ensures the alignment between the business and the technical operational management.”

**Quote 2** *Consultancy partner public sector* – “every governmental department has a CIO”.

**Quote 3** *Head information policy* – “Having a CIO is an important starting point for developing architectural standards”.

**Quote 4** *Head information policy department* – “There is not really talk of competitive advantages, but we do have to anticipate on market developments to serve and satisfy the customer/citizen, but all the profit we get is electoral profit, and a high ranking on performance-lists.”

**Quote 5** *Concern Architect* – “The governmental sector deals with competition to a lesser degree. Therefore you are more following than leading.”

**Box 1: Quotes from domain experts strategy**

Firstly the subject business/IT alignment which was marked as important by the SME’s is deleted after the domain expert interviews. The rational to do so was because the domain expert acknowledged that alignment between business and IT is an important topic within governmental agencies, but mentioning it as a separate subject will not add value to the model because most organizations already have a CIO or some sort of intermediate department. Furthermore they mentioned that every factor deals with business/IT alignment issue [Quote 1 – 3]. Secondly, the characteristics of the first subject are changed. The reason to change these characteristics is because the domain experts mentioned that governmental organizations often don’t have a direct competitor. They serve the customer and idealistic they want to do this as good as possible [Quote 4 and 5].

**Reaction on environmental changes:** At the lowest maturity level organizations do not have the customer focus at all and only focus on their selves. The higher the maturity the more focused organizations are on the environment and are maybe even able to predict the future and anticipate on this.
Scope: This subject is about the scope that organizations maintain to approach their processes. At a low level organizations are not aware of their processes and only see single activities that act within the organization. The higher the maturity the higher the level processes are approached and organized.

Strategic influence on the process: This factor is about how activities and processes are developed and optimized. This can either be done ad-hoc without taking the strategy into account or, at a high level, the entire chain is involved to organize the processes such they reach strategic benefits.

6.3.2.2 Information Technology

The information technology (IT) factor is a recurring factor in both the BRM and the BPM approach. Good thought of what kind of methods and tools to support IT are going to be used, is crucial because from the selection point onwards it will leave a mark on the feasibilities of the way of working with IT within the organization. The IT factor does not support this decision making, this is something personal for every organization, but it measures how methods and tools for process and rule modelling is done and at what level tooling is used. Not having thought about using methods for, for example process design, or business/IS architecture, refers to an ad-hoc way of working and is distinctive for immature organizations. In this factor, the shift from rules that are written in hard code languages somewhere in the process, to rule engines and repository is defined. The changes for this factor are explained with the help of Figure 21 and the quotes from Box 2 and the textual explanation can be found underneath Box 2. After the explanation of the establishment of the maturity division of the factor the content per subject is explained.

<table>
<thead>
<tr>
<th>Methods</th>
<th>Information Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gebruik van formele methoden</td>
<td>Gebruik van formele methoden</td>
</tr>
<tr>
<td>Gebruikte tooling voor ontwerp (ARIS/Bwise → vaststelling van architectuur, process mapping/modelling)</td>
<td>Tooling voor ontwerp en uitvoer</td>
</tr>
<tr>
<td>Systeem integratie. Hoe lopen processen over de systemen</td>
<td>Systeem integratie</td>
</tr>
<tr>
<td>BPA tooling</td>
<td></td>
</tr>
</tbody>
</table>

Figure 21: Changes for the factor Information Technology

Quote 1 Enterprise Architect - “Business architecture need to be linked to the IT architecture, thus it is an information technology issue.”

Quote 2 Senior manager consultant public sector - “The ICT architecture should be built with enterprise architecture to map the processes. This is a matter of good usage of the methods and tools available.”

Quote 3 Senior manager consultant public sector - “Many loose applications is a high frequency problem at many governmental organizations which can, and should be solved by using the right BPM and BRM technology”.

Quote 4 Consultancy partner public sector – “the difference between tooling for formal methods and business process automation is not significant...”

Quote 5 Head information policy department – “architecture is a vague concept that covers both IT and governance issues.”

Box 2: Quotes from domain experts about IT
The first change for the IT factor is the consolidation of the factors ‘Methods’ and ‘Architecture’. This is done because the domain experts had difficulty with definition of the word architecture. They found it too vague and did not see a real difference with the factor ‘Methods’. Using the term IT gives better insight in what is going to be measured with the factor. The reason to consolidate the two factors into one is that the domain experts found that there is too many overlap between two of the four factors. Some quotes that supported this change can be found in Box 2 [quote 1-5].

Use of formal methods: this subject measures the way in which methods are used along the lifecycle of BP&R. Methods are defined as the tools and techniques that support and enable consistent activities on all levels of BPM. At the lowest level methods are used to identify and conceptualize the ‘is’ and ‘soll’ situation while at the highest level evaluation of all the methods that are used within the organisation for managing their Business processes and rules takes place. A sound integration of BP&R methods with specific project management approaches. core of such methods is to process analysis methods along the entire organization Tooling for design and execution: This subject gives insight in the level of tooling that is used within the organisation. At the lowest maturity level organisations start to invest in process discovery technologies and start to built a process architecture in an appropriate tool. The higher their maturity the more support the tool offers.

System integration: The last subject within the IT factor is about the way the systems are connected and integrated with each other. An organisation can either be characterized by a lot of independent-acting systems or there is one big system that supervises all the process. The more mature the organization is the less independent systems it has and the more communication and information-exchange between the processes and systems take place.

6.3.2.3 Governance

This factor describes three issues, namely, the roles of process authority and responsibility, decision making, and measurements. With governance the RACI model is often used which stands for: Responsible (who makes the decisions), Accountable (who is accountable), Consulted (Who needs to be consulted), Informed (Who needs to be informed). Governmental questions are, who defines, approves, enforces, and implements policies and standards (Kofman, Yaeli, Klinger, & Tarr, 2009). Although the names of the factors did not change radically, the content of the subjects and the maturity growth division did change. With the help of Figure 22 and the quote boxes 3 until 5, changes are made visible and explained. The textual explanation of this factor and its corresponding subjects can be found underneath Box 5. After the explanation of the establishment of the maturity division of the factor the content per subject is explained.

<table>
<thead>
<tr>
<th>Maturity level</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governance</td>
<td>• Governance structure</td>
<td>• A1</td>
<td>• A2</td>
<td>• A3</td>
<td>• A4</td>
</tr>
<tr>
<td></td>
<td>• Decision making</td>
<td>• B1</td>
<td>• B2</td>
<td>• B3</td>
<td>• B4</td>
</tr>
<tr>
<td></td>
<td>• KPI monitoring</td>
<td>• C1</td>
<td>• C2</td>
<td>• C3</td>
<td>• C4</td>
</tr>
</tbody>
</table>

Figure 22: Framework of the governance factor with its subjects.
A Governance structure

A1 changed from ‘individual process authority and responsibility’ to ‘no formal roles described’ [Quote 1]. Furthermore, the ‘governance structure’ subject now involves the scope of the responsibility as well and three issues are shifted (A 2 -> A3, A 3 -> A4 and A4 -> A5)[ Quote 2-5].

Quote 6 Head information policy department – “Decision making shifts from de-central to central”.
Quote 7 Senior manager consultant public sector – “Decisions can be supported by software”.
Quote 8 Operational manager application expertise – “to ensure some generic principles it is important where the decisions are taken. The higher the decision are taken the more consistency can be guaranteed”.

Box 4: Quotes from domain experts about decision making

B Decision making

The core of this factor changed from ‘who makes the decision’ to ‘how are the decisions made’. This mainly because the who is already described in the governance structure [quote 6-8].

Quote 9 Consultancy partner public sector – “KPI’s are possibly less important motivators in the public sector compared with the private sector”.
Quote 10 Operational manager application expertise – “KPI’s are determined later”
Quote 11 Head information policy department – “There is a Chief Information Security Officer for risk analysis”.

Box 5: Quotes from domain experts about monitoring

C Monitoring

The only difference within this subject is the use of the word KPI. Some experts admit that KPI’s are less important for the public sector, others say that they are as important as they are in the private sector. To suite every viewpoint, they are called metrics instead of KPI’s but with this vocabulary change, the meaning and use of the subject stays more or less the same [quote 9–11].

Structure: With this subject the level of roles descriptions and responsibility is measured. At the lowest level this is characterized by the absence of any formal description of roles and responsibility. The more mature the organisation is, the more responsibility is given to the head of the process or even department.
Decision making: This subject is about the ‘Consulted’ and ‘Informed’ part of governance. Who needs to be consulted and who needs to be informed? At the lowest level these two questions are not regulated at all which means that decision are made ad-hoc. The more mature the organization is the more structured they work. This means that they show in their decision-making that they have learned from decisions made, and documented and/or otherwise, in the past. At the highest levels decisions are made with the interest of the process and may even be process-exceeding.

Monitoring: The last important subject when it comes down to governance is about monitoring the processes that are executed. The more mature an organization is, the more measurements are available and the better the measurements are used for process optimizing. Just like with decision making, monitoring is done ad-hoc at the lowest level and organizations with the highest maturity level are able to directly steer on the outcomes of their control loop.

6.3.2.4 People & culture

People and culture are two issues, however they are combined in one factor because they both describe the soft issues of an organization. It is important that all the people in the organization know their tasks and role within the organization. This need to be done by training and the way an organization trains their personnel say something about the maturity of the organization. Another important factor is change mentality and management involvement. To achieve this good communication between employees and management is important. The last important soft factor to measure maturity is knowledge culture and mentality. Sharing knowledge contributes to better BP&RM performance and thus to a higher maturity level. The changes for this factor are explained with the help of Figure 23 and the quotes from Box 6 and the textual explanation can be found underneath Box 6. After the explanation of the establishment of the maturity division of the factor the content per subject is explained.

<table>
<thead>
<tr>
<th>People &amp; culture</th>
<th>Maturity level</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training (leadership style)</td>
<td>•</td>
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<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Change mentality/management commitment</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Culture en mentality</td>
<td>•</td>
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</tbody>
</table>

**Teams worden opgebouwd op basis van soft skills (karakter eigenschappen en kwaliteit) en kennis**

**Bij werknemer en partner selectie wordt rekening gehouden met cultuur elementen van de organisatie**

**Communicatie en kennisdeling tussen afdelingen verloop soepel via afdelingshoofden**

**Er wordt buiten de grenzen van de organisatie flink geïnvesteerd in kennisdeling. Enerzijds in de selectie van partner organisatie maar ook doo oudem van kennisdeling tijdens congressen met ‘concurrenten’**

**Figure 23: Changes for the factor People & Culture**
A Business Process & Rule Management Maturity Model for the Dutch Governmental Sector

Quote 1 Concern architect – “...Knowledge belongs to employees, so people know who needs to do what”.
Quote 2 Concern architect – “Nowadays there is a network of knowledge sharing”.
Quote 3 Business architect – “...a co-worker becomes a knowledge-worker”.

Box 6: Quotes from domain experts about knowledge culture and mentality

The two characteristics that are changed are characteristics typical for the private, and especially, consultancy sector. For governmental agencies working in teams and partner selection is no daily business. Also, the maturity growth within this factor was not constructive. Because the first few steps were about knowledge sharing and the last two about how knowledge is used. In the new situation the steps follow a holist approach [quote 1-3].

Training (leadership style): The first of the three subjects measured for the factor people & culture is about the training and leadership style of the organization. At the lower levels employees are trained on the way they should work, the higher the maturity the more employees are stimulated to think about the ‘how’ and ‘why’ of their job and are trained on skills instead of executing a specific task.

Change mentality / management involvement The second subject is on the flexibility of the employees and their attitude towards change. Lower levels are characterized by little flexibility and a large resistant when changes, like new system updates or a different way of working, occur. Organizations with a high maturity on this subject are able to adapt to the changes often and easily.

Knowledge culture and mentality: The last subject is about the way knowledge is gathered, saved and shared. Lower level organizations are inclined to have a lot of experts on a variety of subjects, but the experts are not willing to share this expertise. More mature organizations acknowledge the advantages of knowledge sharing and this is carried out both top-down and bottom-up. At the highest levels organizations built their entire network with an eye on knowledge-sharing advantages and also invest in this topic by visiting and participating in congresses and conferences.

6.3.2.5 Decision rules

Since decision rules form a part of the processes a separate factor is assigned to this part of the Governmental BP&RM maturity model. Besides measuring the process management maturity, the maturity of rules management is important as well since becoming an flexible and agile organization this subject is as important as they way the organizations manages its processes. The factor is divided into four subjects; ‘change approach’, ‘autonomy/control’, ‘system’, and ‘architecture’. All these subjects give insight in how the organization deals with rules and organizes its rules management.

The changes for this factor are a bit different then the changes for the previous factors. Not all the characteristics for all the maturity levels were yet defined. The changes are explained with the help of Figure 24 and the quotes from Box 6. The textual explanation can be found underneath Box 6. After the explanation of the establishment of the maturity division of the factor the content per subject is explained.

Figure 24: Changes for the factor Decision Rules
Quote 1  Senior manager consultant public sector – “Support decisions with software”.
Quote 2  Business architect – “Many legal resources are needed for a particular decision”.
Quote 3  Concern architect – “We are talking about rules that are a direct manifestation of the law”.
Quote 4  Operational manager application expertise - “Create building blocks and remove duplicate decision rules”.
Quote 5  Enterprise architect – “BRM is the discipline of administer and organizing rules en decisions that take place within the process”.
Quote 6  Head department of permissions and assertions – “The rules you point at are transactional/desicional rules…municipalities are an outstanding example of knowledge processing organizations, information fabrics.”

Box 7: Quotes from domain experts about business / decision rules

Quote 7  Head department of permissions and assertions – “…this rule change has an big influence…we know what happens when it happens…”
Quote 8  Operational manager application expertise – “continues control by means of statistical analyse”.
Quote 9  Business architect – “Rule analysis is a different kind of analysis then process analysis…many resources are necessary for decisions so analysis of these decision is needed”.
Quote 10 Business architect – “…they analyze the law, which results in a logical model that can be managed”.

Box 8: Quotes from domain experts about the rule change approach

Quote 11 Operational manager application expertise – “Our goal is a standard package in which you can make changes without the help of IT”.
Quote 12 Enterprise architect - “Translation of the rule is done by a policy advisor and a business analyst translates this to a form in which it can be executed. We want to abandon this last step”.
Quote 13 Business architect – “Information analysts became rule analysts and this is not what you want, we would like to bring this work closer to the business”.
Quote 14 Concern architect – “the time that the IT department implemented the rules with the help of the law book is behind us”.
Quote 15 Head department of permissions and assertions – “We came from a autonomy managers with each their own process with their own money and IT and so forth to a world of which he only knows the content of the primary process and buys the means for it”.

Box 9: Quotes from domain experts about the rule business autonomy/control

Quote 16 Head department of permissions and assertions – “We don’t have a rule engine, but rules are nationwide modeled, we have delivered the rules at the backside”.
Quote 17 Business architect – “In the entire set of Oracle systems there is a rule engine. First we had them in Cobol”.
Quote 18 Operational manager application expertise – “..from only black box testing to white box testing too”.
Quote 19 Head department of permissions and assertions – “…you can hardcode them but this is less flexible”.
Quote 20 Operational manager application expertise – “Knowledge and functionality need to be separated”.
Quote 21 Enterprise architect – “…rules are separated from the processes..”.

Box 10: Quotes from domain experts about the rule system

Quote 22 Operational manager application expertise – “From black box to white box testing”.
Quote 23 Concern architect – “The rules are separated from the processes”.

Box 11: Quotes from domain experts about the rule system integration
Box 11: Quotes from domain experts about the rule architecture

The first change is the name of the factor. The term Business Rules is changed to Decisional Rules. The reason for this is the use of the term decision rule in the governmental sector, almost all the interviewees see a business rule more often as a decision point, decision rule or transactional rule [see Box 7, quote 1 – 6]. In order to make sure we are talking about the same rules, the term decision rule suits the model better. The second change is the subject division based on an informal brainstorm session with a BRM expert who is familiar with the governmental sector. The three subjects established in Chapter 5 are reconsidered during this conversation and a new factor division came about. The four new subjects are distinctive for decisional rules. Quote 7 – 10 (Box 8) show some thoughts of the experts about the change approach for rules. Quote 11 – 15 (Box 9) do the same for the subject business autonomy/control and quote 16 – 21 (Box 10) for the subject System. The last quotes 22 – 24 (Box 11) present what the experts said about the architecture subject. These quotes, together with the BRM literature and some informal think aloud sessions with BRM and enterprise architectures from interviewed before formed the input for the final version of the model.

Change approach: The first subject for measuring the maturity of decision rules managing is how rule changes are approached. This is not possible without changing the process at the lowest level, but the higher the maturity, the less ad-hoc changes can be handled and the more organizations are able to estimate the result of the change or even change policies real-time to prevent the predicted changes in business models and metrics.

Autonomy/ control: This subject gives insight in who has responsibility and control over the rules. This varies from the IT department with little communications with the business and thus a high risk of losing business control to the business who can change the rules at any time without the help of the IT department. At this level, stewardship of the rules by IT takes place at organizational wide level.

System: this measurement gives insight in the way rules are buried in or linked with the rules. Low maturity is characterized by encrypted rules that are buried in the process, ore are ‘documented’ in peoples head. Maturity comes along with more organized rules approaches. The stages are: spreadsheets, a shared source repository, ability to rule simulation, and using an BRMS system.

Architecture: The last subject is about the maturity of the decision rule architecture within the business architecture. Important here is to look at whether or not standards for the decision architecture are established and aligned with the business decision architecture and whether the organization is able to continuously improve this architecture.
<table>
<thead>
<tr>
<th>Factor</th>
<th>Subject</th>
<th>Maturity level</th>
<th>Siloed activity awareness</th>
<th>repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy alignment</td>
<td>Reactie vermogen op veranderingen in de omgeving</td>
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<td>Scope</td>
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<td></td>
<td>Strategische invloed op het proces.</td>
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<tr>
<td>Information technology</td>
<td>Gebruik van formele methoden</td>
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<td></td>
<td>Tooling voor ontwerp en uitvoer</td>
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<td>Systeem integratie</td>
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<td>Governance</td>
<td>Governance structuur</td>
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<td></td>
<td>Decision making</td>
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<td>monitoring</td>
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<tr>
<td>People &amp; culture</td>
<td>Training (leiderschapsstijl)</td>
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<tr>
<td></td>
<td>Verander mentaliteit/management betrokkenheid/inzet</td>
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<tr>
<td></td>
<td>Kennis cultuur en mentaliteit</td>
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<td>Decision rules</td>
<td>Verander aanpak</td>
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<tr>
<td></td>
<td>Business autonomie/controle</td>
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<tr>
<td></td>
<td>Systeem</td>
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<tr>
<td></td>
<td>Architectuur</td>
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Figure 25: Framework of the Governmental BP&RM maturity model
7 Case study at a large Dutch governmental agency

The third validation iteration of the research is done by means of an in dept case study. This is done by applying the model at a large Dutch governmental agency (hence case study organization) A case study is: “an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003). It is a qualitative research approach suitable for explanatory, descriptive and exploratory research. Case study research offers a valuable approach to investigate scientific and business problems, where results may provide essential insights into why and how certain processes work as they do, and address the requirements to move towards the intended direction (Blumberg, Cooper, & Schrindler, 2008). The aim of this case study is to check the model on three elements; mutual exclusivity of the content of the boxes, completeness of the boxes in the model, and correctness of the model. This chapter gives insight in these three issues and given this, conclusions on the reliability of the model can be drawn.

7.1 Introduction of the case study

The case study organization has more than 30,000 employees which are responsible for numerous activities. Most of these activities are so-called bulk processing activities that are checked via an automated system. Issues that cannot be processed automatically, are processed annually. More and more other processes are to be automated in future.

For a data processing organization such as the case study organization, ICT is very important. Their ICT is primarily aimed at supporting the business processes. The ICT organization operates 7 days a week and 24 hours a day, managing one of the largest customer databases in Europe. This database contains specific information of millions of private individuals and enterprises. In addition, the database stores the historical as well as the current data. Apart from data management, the central computer processes millions of transactions, involving many billions of euro’s on an annual basis.

7.2 Application of the model

The governmental Business Process and Rules management maturity model, developed in this research, is applied at the case study organization. To accomplish this, two senior employees are interviewed. One of them is working as a senior employee for the information management department, and the other one is working as a senior policy advisor for the case study organization. From now on the two are referred to by their function name.

The goal of this case study is testing mutual exclusivity of the content of the boxes, completeness of the boxes in the model, and correctness of the model. By answering the following two questions these three elements can be tested.

1) Do the factors measure the right maturity?

2) Do the interviewees recognize the steps that, according to the proposed maturity model, are completed?

With the first question the correctness of the model is tested. To answer this question, the interviewees are asked to estimate the maturity of their organization on the basis of the given explanation of the maturity levels and factor description preceding to the interview. During the interviews the maturity level is again estimated but this time on the basis of the maturity model assessment questionnaire. Comparing these two outcomes gives inside in a possible discrepancy between the two and hereby gives an answers to this first question.

With the second question mutual exclusivity and completeness is tested. These two elements are more difficult to answer and requires two steps. However it can be fulfilled by measuring the maturity level for every
subject of the five factors described in the model at two periods in time and discuss the growth that the organization experienced. By putting this next to the growing steps that are described by the maturity model the second question can be answered. However, the execution hereof is a bit different, because it turned out to be difficult to estimate the maturity level as it was a few years ago of every single factor and the corresponding subjects. For this reason it is estimated that the maturity a few years ago was zero for all the factors. By assuming this all the steps from zero until the ist situation are validated.

7.3 Results

The results of this case study come in twofold. First the preliminary answers of the interviewees are presented. Here the two employees give their view on the organization based on the questionnaire, maturity level explanation and factor explanation. With this information as a base, the interview was held and the results hereof are shown in the second section.

7.3.1 Preliminary results

As explained above, the interviewees estimated the overall maturity level of the organizations, prior to the interview. The maturity level the two interviewees gave to the organizations varies a bit. Below the results hereof are explained.

The senior employee thinks the overall maturity level of the organization is at the start of managed, he declares that about five years ago the maturity level was lower, namely at the start of repeated. When it comes down to rules management the organization came from nothing or zero so to say and now the senior employee estimates the organization in the awareness phase. His colleague, the senior policy advisor, is slightly more negative. He confirms that the organizations was in his early repeated maturity level five years ago. However, he sees less progress than his colleague because he estimates the organization’s ist situation at the end of the repeated phase. For the rules management aspect the senior policy advisor agrees with his colleague and sees a growth from no rules management at all to small steps towards the awareness phase. As became clear, in the overall estimation of the organization’s maturity the two interviewees differ a little bit. Since this is a very rough maturity estimation, the discrepancy does not mean the model is useless, later on the discrepancy is explained in more detail. In the next paragraphs of this section the selection of the maturity level per factor is explained in more detail by the interviewees. Mark that this maturity estimation is still based on the textual explanation of the maturity levels (described in section 0) and the factors (described in section 6.3.2).

Now the overall maturity level is estimated a more detailed estimation on the maturity of every factor is given by the two interviewees. Their considerations are presented below.

strategy alignment: The senior employee estimates the organization at the Managed level, with a cautious step to valuation control. This because within the central administration he sees a clear managerial focus on operational excellence and continues process improvement. They are trying to get rid of the ‘firefighting’ culture. At some places he sees carefully steps towards value chain management. When you look at the ability to react on the environment the case study organization is pretty passive but that can be blamed to the fact that it is a passive welfare agency, so that might incline to repeated. The senior policy advisor is a bit more negative, he estimates the organization on the border of repeated and managed.

Information Technology: The senior employee thinks the organization is somewhere between repeated and managed. They do think in requirements but still have many point-to-point couplings. On the other side many processes are almost completely supported by tooling. According to the senior policy advisor they are repeated when it comes down to the use of formal methods, but managed when you look at tooling and system integration.
Governance: The senior employee maps the organization at managed with an excursion to valuation control when you look at the governance structure. Managers are responsible for their result, but there are no developments yet on measurements/metrics versus process improvement. The senior policy advisor thinks they are repeated especially when you look at decision making and monitoring.

People and culture: According to the senior employee they are managed. There is always resistance during changes, but employees are stimulated to think along with the management. The senior policy advisor they are repeated and on a few places they make the step to managed with Lean solutions.

Decision rules: Both the senior employee and the senior policy advisor estimate their organization at awareness with possibly an excursion to repeated because they are working on impact analysis driven by business analysts, rules are still buried in code and peoples head and there is no talk of any rule architecture or what so ever. Only in the assessment chain some parts are repeated.

Figure 26 gives a clear overview of the maturity level of each factor for both the interviewees.

Figure 26: ‘1st’ situation according to the interviewees before the interview

7.3.2 The preliminary results
As presented in the previous section, preliminary to the interview the two interviewees estimated the maturity of three of the five factors differently, namely ‘strategy alignment’, ‘Governance’, and ‘People & Culture’. Since the difference is not more than half a point and it is only a first rough estimation on the maturity level of the organization, no conclusions are drawn based on these results yet. Later on in this chapter, when the assessment questionnaire is used for the maturity estimation, the discrepancy is explained in more detail.

7.3.3 The interview results
During the interview with the senior employee and the senior policy advisor the BP&RM Maturity assessment questionnaire is administered. Every question of the questionnaire was completed which resulted in a maturity level for every subject of the maturity model. The graphical result of this assessment can be found in Figure 27. In this diagram, abbreviations are used to keep the figure clear. The first few capital letters refer to the factor
of the model. SA= Strategy alignment, IT = Information technology, GOV = Governance, P&C = People and culture, and DR = decision rules. This letters are followed by a short version of the subject description. The full subject description can be found in the Governmental BP&RM Maturity Model, presented in Appendix 12.12.

The establishment of these diagrams are as follows. The questions of the assessment questionnaire where asked to the interviewees and based on these answers the interviewer mapped the answer, according to the model, to the right maturity level. This mapping is done based on a best fit between the maturity explanation of a box and the answer of the interviewees. After this mapping the maturity levels were translate to numbers to make calculating with them easier. Translating the levels to numbers does not change the meaning of the maturity levels because for the matching an ordinal scale is used to distinguish the maturity levels from each other. Siloed activity awareness = 1, repeated = 2 and so on. When the interviewee thinks that for a specific factor the organization is on the border of (or in between) two levels, the maturity is presented as the average between the two numbers. For example, the maturity level of the subject ‘SA- reaction ability’ is at the border of repeated and managed, the number 2,5 is given to the factor. Only whole and half numbers are used, however, when averages are calculated with half numbers, other figures after the comma appear. These numbers are not round off. The spider diagram presented in Figure 28 is an averaged version of the one presented in Figure 27. So for every factor the average of the subjects is calculated and presented in Figure 28.

Figure 27: Elaborate ist-situation after the interview
7.3.4 Findings
The findings of the case study are two folded as explained earlier. In the next two sections the two questions that are tried to be answered with this case study are explained.

7.3.4.1 Is the right maturity measured
The first question that was intend to be answered with this adapted longitudinal case study was: “Do the factors measure the right maturity?” In the second and third column of Table 21 the maturity level estimated by the interviewees preliminary to the interview, is plotted. In column four and five the maturity level estimated by means of the assessment questionnaire examined during the interview is presented. For the preliminary maturity level estimation the textual explanation of the model is used, and for the second estimation, the assessment questionnaire is used. As can be seen, there are some small differences between the two measurement techniques. Underneath Table 21 the differences for both the interviewees per factor are explained and the differences between the two interviewees are discussed in the second part of this section.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Ist situation estimated before the interview</th>
<th>Ist situation estimated during the interview (assessment questionnaire)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Senior employee</td>
<td>Senior policy advisor</td>
</tr>
<tr>
<td>Strategy alignment</td>
<td>3</td>
<td>2,5</td>
</tr>
<tr>
<td>IT</td>
<td>2,5</td>
<td>2,5</td>
</tr>
<tr>
<td>Governance</td>
<td>2,5</td>
<td>2</td>
</tr>
<tr>
<td>People &amp; culture</td>
<td>3</td>
<td>2,5</td>
</tr>
<tr>
<td>Decision rules</td>
<td>1,5</td>
<td>1,5</td>
</tr>
<tr>
<td>Average maturity level</td>
<td>2,5</td>
<td>2,2</td>
</tr>
</tbody>
</table>

Table 21: discrepancy between the two maturity level estimations
**Strategy alignment**: The senior employee estimates the strategy alignment maturity in both situations the same, namely 3. The senior policy advisor estimates this factor 0,17 lower by means of the assessment questionnaire.

**IT**: The senior employee estimates the maturity of this factor 0,17 higher by means of the assessment questionnaire. The senior policy advisor gives in both situations the same rate to the maturity of the IT of the case study organization.

**Governance**: Both the senior employee as the senior policy advisor value the governance factor higher by means of the assessment questionnaire. The first differs 0,5 points and the latter even 1,0 point. This is remarkable because it is quite a big difference.

**People & culture**: according to the assessment questionnaire, this factor is estimated 0,17 points lower by both the senior employee as the senior policy advisor.

**Decision rules**: Both the two interviewees estimate this factor the same, namely 1,5 in both the two situations.

The averaged maturity level of the case study organization is estimated a bit higher with the assessment questionnaire. As can be seen in the table the difference in maturity for the senior employee is 0,06 points and for the senior policy advisor 0,13 points. The difference between the senior employee and senior policy advisor is in the preliminary assessment 0,3 points and in the interview assessment 0,23 points. In both situations the senior policy advisor was a bit more sceptic about the maturity of the organization. Reason for this difference can be the difference in function. The senior policy advisor has probably a better insight in what is really going on in the organization when it comes down to BPM and BRM because he probably is more involved in the action taken in this field. The senior employee knows about the goings-on within the organizations but is a less involved in the realization hereof. However, the difference is only 0,07 and therefore can be neglected in answering the question the case study was developed for.

The answer on the question whether the factors of the model measure the right maturity can be answered with a ‘yes-but’. The difference between the estimated maturity levels of the factors based on the textual explanation of the model and the maturity level of the factors based on the assessment questionnaire is market as inconvenient when the difference between the two is more than 10%. This is only the case for the governmental factor. This explains the but in the answer. The possible causes of the ‘but’ are explained in the conclusion of this research.

### 7.3.4.2 Is the maturity measured right

The second question that is to be answered by this case study is: “Do the interviewees recognize the steps that, according to the BP&RM MM, should be completed?” During the interview the questions from the assessment questionnaire were asked to the two interviewees. For every subject of all the five factors the maturity level was estimated. The results hereof were already presented in Figure 27 and Figure 28. For every subject of the assessment, the interviewees gave comments on the steps that, according to the model should be covered. Obviously this could only be done for the steps up and until the maturity level estimated by the interviewees, because they do not have experience with the goings-on at a higher maturity level than the maturity level of their organization. These comments per subject are summarized and listed below. The comments vary from a remark on sequence of the subject steps to a confirmation on the described steps. Remark that abbreviations of the factor and subject names are used again and that the comments can be read as quotes but are not marked like this because it are not the literal words of the interviewees.

- **SA - reaction ability**: Often there is a difference between departments when you look at the ability to anticipate on the environment. Some departments don’t have the need to anticipate on changes in their
environment, while for other departments change is daily business. Up to the valuation control level the steps are recognizable and logic.

- **SA – scope**: It is hard to say that all the processes are in coherence with each other. It is not as black or white as stated in the model.

- **SA – influence**: The steps up to and including managed are understandable

- **IT – formal methods**: The term ‘use’ has a very wide understanding. Often organizations distinguish plan, exist, and operation when they introduce a new method. When this approach is adapted in the model organizations can probably find themselves better.

- **IT – tooling**: It is difficult to state it the way it is done in the model, because you work with people. Everything can be available and ready to use, but the actual step to bring the tool into use can be a long course because people are inclined to fall back on old tools that they know very well. Often the design is there but the step to take it into usage is a very big one and should go step by step. So a distinction between design and execution would make the model more realistic.

- **IT – system integration**: This subject is clear and logically set up, but it should be kept in mind that this factor comes along with design decisions. Sometimes it is chosen to not have one big coordinating system and thus being fully agile is not always the ambition/need.

- **GOV-structure**: Within the case study organization, the governance structure is captured by the law. So this factor is not very applicable for our organizations because we do not have a choice or influence on this.

- **GOV-decision making**: Emphasize that the model points to the learning circle of decision making here. The entire learning cycle is completed in the managed phase.

- **GOV-monitoring**: There is a difference between having KPI’s and using them for quality measurements, this distinction is made between repeated and managed, which is good.

- **P&C-training**: Some departments do not have the need to go further than the repeated level, but there are departments where the stimulation of employees is possible, so the steps up to and including the managed level are recognizable.

- **P&C-change mentality**: The difference between the willingness to change and the know-about this change is typical. The steps described in the model up to and including managed are recognizable.

- **P&C-knowledge culture**: Knowledge can only be shared when you manage this process. Knowledge is power, and when you want to grow in maturity management from the top is needed. The steps described up to and including the managed level are clear and recognizable.

- **DR-change approach**: To create more flexibility and adapt to changes fast, automation of the rules is needed. Although we are not that far up to and including the managed level we recognize the steps.

- **DR-autonomy/control**: The first step is strange, because when the rules are not described, then nobody is responsible for them. Later on, at the start of rules management the business is indeed leading the rule discovery, but later on the IT department needs to be involved. So the steps up to and including managed are correct.

- **DR-system**: We have one project that deals with arranging the rules on a small scale. Although our organization is not further then the level siloed activity awareness, our ambition is at least managed, and we recognize those steps described in the model.

- **DR-architecture**: There is no architecture, even not informal. But we see the need to have business rule standards. So changing the first two steps would be more logical. After determining the need for standards, the definition of these standards needed. So the first three steps are recognized. The word ‘decision standards’ is confusing here, the advice is to change this to rule standards.

As could be read above, the interviewees made comments to compliment the model, but also a few comments to improve the model. Comments of the latter type are summed up here.
A Business Process & Rule Management
Maturity Model for the Dutch Governmental Sector

- **SA – Scope.** The difference between ‘repeated’ and ‘managed’ is not as black or white as it is defined in the model.
- **IT – Formal methods:** explain the meaning of the word ‘use’ better and introduce the terms ‘plan’, ‘exist’, and ‘operation’ in the steps.
- **IT – Tooling:** As you talking about the employees that are to work with these tools, a distinction between design and execution would make the model more realistic.
- **GOV-decision making:** The steps are correct, but emphasize that it is about the learning circle of decision making here. The entire learning cycle is completed in the managed phase.
- **DR-autonomy/control:** The first level should change because when the rules are not described, there are no responsibilities coupled to them. So this step should say something like: ‘rules do not have a responsible owner which causes a high risk on losing business control’.
- **DR-architecture:** first the need is determined, only then there is talk of a architecture, whether this is formal or informal does not matter.

Before this section can be closed a last remark about the differences between the two interviewees in maturity estimation should be made. Two subjects show a discrepancy of 0.5 and three subject differ even 1.0. The case study was not designed to check this difference so an grounded explanation hereof cannot be given. Further research is needed to research the origin of the discrepancy. However, the discrepancy is not of such influence on the results that it can be neglected in this research.

The final answer on the question: “Do the interviewees recognize the steps that, according to the proposed maturity model, are completed?” can be answered by means of Figure 29. Every box that contains a ‘✓’ is recognized and confirmed by the case study. Every box that contains a ‘○’ are subjects that are only validated when the suggested adaptations given by the case study interviewees are carried out by the author. The empty boxed could not be validated by the experts, because their lack of experience. Remind that with this case study three elements are validated, namely mutual exclusivity, completeness and correctness.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Subject</th>
<th>Maturity level</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy alignment</strong></td>
<td>Reactie vermogen op veranderingen in de omgeving</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Scope</td>
<td>✓</td>
<td>○</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Strategische invloed op het proces.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Information</strong></td>
<td>Gebruik van formele methoden</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>tooling voor ontwerp en uitvoer</td>
<td>✓</td>
<td>○</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Systeem integratie</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td>Governance structuur</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Decision making</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>monitoring</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>People &amp; culture</strong></td>
<td>Training (leiderschapsstijl)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Verander mentaliteit/management betrokkenheid/inzet</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Kennis cultuur en mentaliteit</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Decision rules</strong></td>
<td>Verander aanpak</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Business Autonomie/controle</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Systeem</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Architectuur</td>
<td>○</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Figure 29: Case study results of the mutual exclusivity and completeness test
8 Conclusion

In this chapter the main question and the corresponding sub questions will be answered in order to draw conclusions from the research. The aim of this research project is to develop a model for governmental agencies in order to map the maturity of their business processes and rules management. The following research question was formulated in order to answer it by means of this research:

“how can business process management and business rules management be combined in a maturity model to suite a strategy for process improvement in the governmental sector?”

In order to answer this main research question four sub questions are formulated and answered in this chapter.

Question 1
Which maturity models exist in BPM and BRM literature and how can the models of each subject be combined in a separate maturity model?

In chapter 4 the most reliable maturity models according to scientists are presented and summarized in two models. One for BPM, and one for BRM. The two subjects are not consolidated and presented in one model because the two subjects are both different approached by scientists. The two practices are described here which gives the rationale and conclusion for the models that are developed in order to answer this first question.

BPM is seen as a management practice which covers all activities of identification, definition, analysis, design, execution, monitoring & measurement, and continuous improvement of business processes. With an eye on the drivers and benefits of BPM, four groups can be distinguished. The most important drivers and benefits according to this research are enumerated here. For the first category, quantitative internal, the drivers and benefits are: improved productivity, cycle time reduction, increased quality. The second category contain qualitative internal drivers and benefits. Namely: increased flexibility and efficiency and understanding of the work, better cross-functional working and empowerment of employees. The driver of the third category, quantitative external, is the need to improve quality and the corresponding benefit is greater market share. The last category include qualitative external benefits and drivers and examples hereof are the ease of meeting changing demands and customer need and more customer loyalty. The BPM maturity model composed of the most important models explained in literature is explained in section 4.2.2.1 and 4.2.2.2 and presented in Appendix 12.5.

BRM primarily is about the automation of the complex decisions within the business processes of an organization. This includes the whole process of thoroughly defining and establishing the business rules of your organization which subsequently leads to more flexibility and better maintainability. Due to the enormous growth of systems at many organizations, a big loss of alignment between the originally implemented rules and the once used for executing the process appeared which result in a reducing change capacity and business growth. BRM can help organizations in getting out of this negative vicious cycle. The BRM maturity model composed of the most important models explained is explained in section 4.3.1 and 4.3.2 and presented in Appendix 12.6.
Question 2

How can the two literature based models be combined and what are the considerations according to subject matter experts to deliver a Business Process and Rules Management (BP&RM) Maturity Model for organizations.

BPM covers a broader scope within the organization than BRM does. However, during the research it became clear that the big advantage of BPM and BRM lies in the fact that they are both applied in order to create a more flexible and thus successful organization. The two can be of great help for each other in achieving this goal. Rules and processes are complementary. A process without rules has the same input as output, and a single rule is meaningless without a solid context, which is given by a process. The interviews with the subject matter experts acknowledged this statement. They gave insight in the relation between rules and processes. Two relations between the processes and rules came up during this research. Rules can be seen as a tool to give meaning to the processes, on this level rules can also be conceived as a limitation of the process because the rules can give guidance to the process. The rules a kind of input for the process. The second relation is that rules are decision point in the work process. In this last relations the need to separate the rules from the process grows exponential with the complexity of the process. After the interviews it turned out that both the BPM and BRM experts as well as the enterprise architects agreed that, although process and rules act on a different level, when managing the two, the one management technique cannot be executed without involving the other. Most BPM maturity models incorporate general organizational maturity issues such as governance and people & culture. Although the existing BRM maturity models do not incorporate these principles, this research proved that these issues should be taken into account for more successful BRM and thus also BPM. Therefore this second question is answered by means of providing a maturity level that combines BPM issues with BRM issues. The result hereof is a maturity model with six factors. Four of the five factors are already proven to be important for BPM in literature. And during the interviews for this research it turned out that these factors need to be taken into consideration for successful BRM as well. One factor is specific for BRM, because business rules are seen as a deepening of business processes. During the research it became clear that organizations want to achieve the most effective and efficient and thus, agile organization. Agility is related to the management and execution of activities and decisions, therefore a direct relation between the two management practices can be established in order to become more agile.

The previous is the rational for building the model the way it is done in this research, an explanation on the content of the model given in section 5.3 and the full model is presented in Appendix 12.9.

Question 3

How does a BP&RM Maturity Model look like to assess the maturity (both ist and soll) in a Dutch governmental organization?

Governmental organizations and private organizations have multiple point in common when it comes down to cost savings, deliver quality and serving their customer the best. However during this research’ literature study and the interviews with the domain experts, some crucial differences came up as well. Private organizations often produce and sell products where governmental organizations mainly produce and sell services. The way governmental organizations make money is quite different from private sector organizations as well. Governmental organizations often offer their service to citizens without directly charging an amount of money to the one who receives the service. Often the governmental organizations even offer a services to citizen or require something from a citizen, who did not ask for the service or request. Another difference that came up during the interviews is that governmental organizations have to deal with a lot of laws and regulations enforced by external influences (mostly the federal law). These differences have a great impact on the business model of the two type of organizations. During the interviews the domain experts gave insight in how their organization approaches BPM and BRM and how they think about BPM-, and BRM principles. This
A Business Process & Rule Management
Maturity Model for the Dutch Governmental Sector

resulted in some changes in the model. The role of rules management became bigger in the governmental BP&RM maturity model. Reason for this is that flexibility in rules was often mentioned by the domain experts. Also a difference in terminology caused some changes in the model. The most noticeable ones are the change of the factor name ‘business rules’ into ‘decision rules’ and the disappearance of the factors methods and architecture and the introduction of the factor ‘Information Technology’.

The previous gives insight in the reasons to change the BP&RM maturity model to the final governmental BP&RM Maturity Model as it is delivered by this research. In section 6.3 the entire process on how the model is established is explained and in Appendix 12.9 the maturity model itself is presented.

Question 4
How does the developed governmental BP&RM Maturity Model assess the BP&RM maturity of a large Dutch governmental agency and what shortcomings and remarks are found during application of the model?

Chapter 7 of this research elaborated on the application of the model at a Dutch governmental organization. This was done by means of a case study in order to test mutual exclusivity of the content of the boxes, completeness of the boxes and correctness of the model. This problem is split up into two questions.

1) Do the factors measure the right maturity?

2) Do the interviewees recognize the steps that, according to the proposed maturity model, are completed?

In chapter 7, both the questions were already answered but a short summary of them is given here, together with the conclusion that can be drawn out of these answers. The answer on the first question was ‘yes, but’. The ‘but’ was added because for the factor governance, a significant difference was measured between the two measurement approaches. For one of the interviewee the difference was 0,5 points, for the other interviewee it was even 1,0 point. Reason for this can be the remarkable high maturity level that is given to the subject governance structure. During the interview the interviewees mentioned that the governance structure for their organization is captured by the law and thus very well-developed. They did not take this into account when they estimated the maturity of the governance factor by means of the textual explanation of the maturity model. This might be the reason for this significant difference, but more research should be done to exclude possible faults of the model.

The answer on the second question is a bit harder to summarize, therefore the reader is referred to section 7.3.3 (from page 94 on). As can be seen in this overview, 60% of the model is validated, whether or not with a small remark. The reason that a part of the model is not validated is not because the steps were wrong, but just that at the time the interview was held, the case study organization was not so far with carrying out BPM and BRM so the interviewees could not reliably validate these steps.

The overall answer on question 4 is that the model is applicable for this particular case and does measure the right maturity level. According to the case study there were some shortcomings. An elaborate overview on these shortcomings can be found in 7.3.3 (from page 94 on). All of these shortcomings were suggestions to swap or alter the content of one or two boxes, and in two cases the explanation of the subject needed to be explained better.

Main research question
“how can business process management and business rules management be combined in a maturity model to suite a strategy for process improvement in the governmental sector?”

Adding the results of the four sub-questions of the research to the main research question, the final conclusion of the research is that combining BPM and BRM is valuable and important for organizations in creating more
flexibility, serving the client better, and reducing costs. The two have much in common which make them even more powerful when they are combined. This research proofs this and the result of the research presents that the same hold for governmental organizations. During the research a maturity model that combines the two management principles was constructed. In order to realize the establishment of the model many experts in the field of business and scientific literature was used which makes the model scientifically well founded. The last validation step in a line of three was the application of the model and even in this phase the model succeeded its goal. In spite of this successful application of the model there are some remarks too. The differences between the different governmental organization turned out to be such different that making a model to suite hem all perfectly is difficult. This came clear during the interviews and the different views the interviewees had on BPM and BRM. Therefore it should be kept in mind that this model is not a guide for every governmental organization that want to become fully agile. Every organization has to estimate its ist and soll situation before going into the technical details of BPM and BRM. This maturity model can help organizations to give insight in the issues that are important for BPM and BRM, and it supports them in efficiently combining the two management principles.

In Figure 30 the research approach is presented again. This figure gives a clear and straightforward view on the development of the BP&RM MM. By using this approach the answer on the main research question is answered. Recapitalizing; the first step was a literature research which resulted in a BPM MM and a BRM MM. Then the first round of interviews took place with the subject matter experts. The result hereof is the BP&RM MM. The second round of interviews was held amongst domain experts from the governmental field. These interviews were the input for some important adjustments to the model in order to make the model suitable for the governmental sector. With this knowledge the governmental BP&RM MM, also the final deliverable of the research, was created. The last step in order to completely give an answer on the research question the model was applied to a large governmental organization by means of a case study. This case study was the last step in order to serve both the scientific and practical field with a governmental BP&RM MM which at the same time is a reliable answer to the main research question.
9 Discussion

During the preliminary literature study it soon became clear that both business process management (BPM) and business rules management (BRM) are hot topics in both the literature and the practical field, however little research is done in combining the two and soon after this observation, the research question was there. Since both topics can be applied in a variety of matters, scoping was needed and thus the Dutch semi governmental sector was chosen because this sector is in the middle of many restructuring and reorganization and to perform this, they are searching for BPM and BRM solutions. As the two management approaches covered comprehensive aspects a structured approach turned out to be necessary to compare and combine the numerous models that exist in the literature field and information gathered during the many semi-structured interviews. The IS Research framework of Hevner et al. (2004) supports such a structured approach and was therefore selected to support the research.

To enlarge the applicability of the model within the governmental sector, multiple maturity models that were found during the scientific literature study were selected. Each of these models were chosen because they focused on disciplines that are vital to achieve BPM and BRM benefits. All the models were consolidated with the models of its interest (so all the models about BPM with each other, and all the models about BRM with each other) to give an unambiguous insight in each of the topics.

These two models formed the basis for the subject matter expert (SME), and domain interviews. The goal of these semi structured interviews were threefold. Firstly they were held to given more insight in how BPM and BRM principles are approached in the business field, secondly to search for possibilities to combine BPM and BRM and thirdly to validate the so far developed model. This three folded goal was accomplished by means of ten SME interviews and eight domain expert interviews. At the end of the two iterations of field research and validation the governmental Business Process and Rules Management Maturity Model (BP&RM MM) was there and one final step was left to be done, the validation of the application of the model. This was done by means of a longitudinal in dept case study at a large Dutch governmental agency. Although the applicability of the model was tested with only one case, during the development of the model two iterations of validation already came along. First the consolidated BPM and BRM models from literature were validated and adapted by the SME, and second the BP&RM Maturity Model was validated and adapted by the domain experts. The latter resulted in the final Governmental BP&RM MM.

The goal of this research is to provide the Dutch governmental sector with a tool to give insight in their current (ist) and future (soll) status when it comes down to BPM and BRM. They can see what issues are important for good BPM and BRM and what factors and subjects need more attention. It provides guidelines to support the evolution toward their desired state. It does not provide a detailed roadmap or measurable activities or KPI’s since this is not the goal of the BP&RM maturity model. On note have to be kept in mind the selection of the respondent which is going to answer the questions of the assessment questionnaire because the person in question should have appropriate experience and knowledge of the organization’s practices and activities, as he or she has to indicate the ist and soll situations of a wide-range of factors. The ideal situation is to fulfil the assessment with two or more employees so they can discuss about the topics with each other and with this, a clear insight in the organization’s goings-on can be given.

The research also had a few limitations which are discussed here. The first limitation was knowledge the researcher had about daily business topics within organizations, not to mention the governmental organizations. During the interviews this caused the biggest problem. Although extensive research on the organization that was going to be interviewed was done in advance, it took the researcher a while to get grip on how the different organizations work. It would have improved the research if two interviews with every expert could have been held. The first would have had an explorative character about the way of working of
the particular organization, after which the researcher could have some time to prepare a list of interview questions and focus points for the expert which could be answered during the second, more in depth, interview. The second limitation of the research is about the variety of positions the interviewed experts had. On one hand this was a positive contribution for the research because it enlarges the validity of the model at the end, but on the other hand it made it difficult for the researcher to position all the different viewpoints the expert had on BPM, BRM and the built model. For the sake of the research, the Enterprise Architecture experts were there to help the researcher to clear it all up. With an eye on the validity of the case study some comments should be made as well. In Section 2.2.4 (page 22) four types of validity are explained, but nevertheless, the research has a limitation related to the validity of the case study. Although initially the four types of validity were covered, at the end this turned out a different for some of the validity types. First, the construct validity; due to privacy considerations, the chain of evidence of the case study could not be delivered because the entire details of the case study interview could not be published. Looking at the internal validity of the case study, which ensure that the results really follow from the data, doubts can be thrown upon the reliability of this validity type. Reason for this is because there was talk of some discrepancy between the two interviewees when you look at their estimation of every single subject. Reason probably is the difference in function of the two, but this research states that the assessment could be done by every employee working at a tactical and/or strategically level, so in fact function should not influence the result, which is obviously the case for some subject. Another reason for the discrepancy can be that one of the two employees are not involved with the tactical and/or strategically goings-on of the organization. In fact, the external validity is performed but the reliability is weak because only one case study is performed. A final note on the research and the developed governmental BP&RM MM need to be made. It might be possible that other maturity models about BPM or BRM are more appropriate to establish a stable, respectively BPM or BRM environment, however, this maturity model incorporates issues that deal with BPM and BRM and it deals with issues on combining these two principles.

10 Further research

Further research could focus on enlarging the reliability of this research. The maturity model is applied at one governmental organization and for more external validity, more case studies are necessary. Also, some governmental agencies that were interviewed for this research said to have difficulty with how to exactly apply BRM within their organization, so a step by step roadmap for BRM implementation is a good initiative in imitation of this research. A last suggestion for further research is that research can be done in finding out where the discrepancy between the two interviewees of this research’ case study comes from. Although the differences between the two interviewees were small, it would contribute to a stronger conclusion when the cause of the differences can be reduced.
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12 Appendix

12.1 Process Delivery Diagram
### 12.2 Tables from literature

#### 12.2.1 List of critical success factors of BPM found by Trkman (2010)

<table>
<thead>
<tr>
<th>Theory</th>
<th>Critical Success Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency Theory</td>
<td>- strategic alignment</td>
</tr>
<tr>
<td></td>
<td>- level of IT investment</td>
</tr>
<tr>
<td></td>
<td>- performance measurement</td>
</tr>
<tr>
<td></td>
<td>- level of employee’s specialization</td>
</tr>
<tr>
<td>Dynamic Capabilities</td>
<td>- organizational changes</td>
</tr>
<tr>
<td></td>
<td>- appointment of process owners</td>
</tr>
<tr>
<td></td>
<td>- implementation of proposed changes (quick-win strategy)</td>
</tr>
<tr>
<td></td>
<td>- use of a continuous improvement system</td>
</tr>
<tr>
<td>Task-Technology Fit</td>
<td>- standardization of processes</td>
</tr>
<tr>
<td></td>
<td>- informatization</td>
</tr>
<tr>
<td></td>
<td>- automation</td>
</tr>
<tr>
<td></td>
<td>- training and empowerment of employees</td>
</tr>
</tbody>
</table>

#### 12.2.2 List of critical success factors of BPM found by Sadiq et al. (2007)

<table>
<thead>
<tr>
<th>Level</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic</td>
<td>- Lack of understanding on process orientation</td>
</tr>
<tr>
<td></td>
<td>- Lack of common mindset</td>
</tr>
<tr>
<td></td>
<td>- Customer resistance</td>
</tr>
<tr>
<td></td>
<td>- Lack of governance</td>
</tr>
<tr>
<td>Tactic</td>
<td>- Lack of standard methodology</td>
</tr>
<tr>
<td></td>
<td>- Lack of lifecycle management</td>
</tr>
<tr>
<td></td>
<td>- Difficulties in identification of processes</td>
</tr>
<tr>
<td></td>
<td>- Lack of standard language</td>
</tr>
<tr>
<td>Operational</td>
<td>- Difficulties in Integration</td>
</tr>
<tr>
<td></td>
<td>- Difficulties in use of product functionality</td>
</tr>
</tbody>
</table>
### 12.2.3 List of critical success factors for BPRe found by El Mashari and Zairi (1999)

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Success Factors</th>
<th>Failure Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change management and culture</td>
<td>-- Revising reward and motivation systems&lt;br&gt; -- Effective communication&lt;br&gt; -- Empowerment&lt;br&gt; -- Human involvement&lt;br&gt; -- Training and education&lt;br&gt; -- Creating an effective culture for organizational change&lt;br&gt; -- Stimulating the organization’s receptiveness to change</td>
<td>-- Problems in communication&lt;br&gt; -- Organizational resistance&lt;br&gt; -- Lack of organizational readiness for change&lt;br&gt; -- Problems related to creating a culture for change&lt;br&gt; -- Lack of training and education</td>
</tr>
<tr>
<td>Management competency and support</td>
<td>-- Committed and strong leadership&lt;br&gt; -- Championship and sponsorship&lt;br&gt; -- Management of risk</td>
<td>-- Problems related to commitment, support, and leadership&lt;br&gt; -- Problems related to championship and sponsorship</td>
</tr>
<tr>
<td>Organizational structure</td>
<td>-- An adequate job integration approach&lt;br&gt; -- Effective BPRe teams.&lt;br&gt; -- Appropriate job definitions and allocation of responsibilities</td>
<td>-- Ineffective BPRe teams&lt;br&gt; -- Problems related to the integration mechanism, job definition, and allocation of responsibilities</td>
</tr>
<tr>
<td>Project planning and management</td>
<td>-- Aligning BPRe strategy with corporate strategy&lt;br&gt; -- Effective planning and use of project management techniques&lt;br&gt; -- Adequate resources&lt;br&gt; -- Appropriate use of methodology&lt;br&gt; -- External orientation and learning&lt;br&gt; -- Effective use of consultants&lt;br&gt; -- Building a BPRe vision&lt;br&gt; -- Effective process redesign&lt;br&gt; -- Integrating BPRe with other improvement approaches&lt;br&gt; -- Adequate identification of BPRe values</td>
<td>-- Problems related to planning and project management&lt;br&gt; -- Problems related to goals and measures: &lt;br&gt; -- Inadequate focus and objectives&lt;br&gt; -- Ineffective process redesign:&lt;br&gt; -- Problems related to BPRe resources:&lt;br&gt; -- Unrealistic expectations&lt;br&gt; -- Ineffective use of consultants&lt;br&gt; -- Miscellaneous problems</td>
</tr>
<tr>
<td>IT infrastructure</td>
<td>-- Adequate alignment of IT infrastructure and BPRe strategy&lt;br&gt; -- Building an effective IT infrastructure&lt;br&gt; -- Adequate IT investment and sourcing decisions&lt;br&gt; -- Adequate measurement of IT infrastructure effectiveness on BPRe&lt;br&gt; -- Proper IS integration&lt;br&gt; -- The effective re-engineering of legacy IS&lt;br&gt; -- Increasing the IT function competency&lt;br&gt; -- Effective use of software tools</td>
<td>-- Problems related to IT investment and sourcing decisions&lt;br&gt; -- Improper IS integration&lt;br&gt; -- Inadequate IS development&lt;br&gt; -- Ineffective re-engineering of legacy IS</td>
</tr>
</tbody>
</table>
12.2.4 Visualization of the E-POWER methods by Glasséé, et al. (2003)

12.3 BPM maturity models from literature

12.3.1 Three dimensional BPM maturity model by Rosemann and de Bruin (2004)
12.3.2 The six factors of BPM and their capability areas by Rosemann and von Brocke (2010)

The white boxed at the right-hand-side of the table need to be colored according to the legend at the top to give a clear view on the maturity of the organization. The assessment of the enterprise is done in the same way, only the process enablers are then enterprise capabilities and the content of the cells are different.

12.3.3 snapshot of PEMM audit tool by Hammer (2007)

The white boxed at the right-hand-side of the table need to be colored according to the legend at the top to give a clear view on the maturity of the organization. The assessment of the enterprise is done in the same way, only the process enablers are then enterprise capabilities and the content of the cells are different.
12.3.4 The Business process maturity model by Fisher (2004)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Siloed</th>
<th>Tactically Integrated</th>
<th>Process Driven</th>
<th>Optimized Enterprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>Reactive to market conditions within 1-2 years, typically chasing a competitor</td>
<td>Adaptable to market dynamics within 12 months</td>
<td>Adaptable to market dynamics within 3-6 months</td>
<td>Adaptable to market dynamics within weeks</td>
</tr>
<tr>
<td>Process</td>
<td>Integrate within functions</td>
<td>Integration between process areas</td>
<td>Business processes are executed in parallel</td>
<td>Enterprise organized around processes</td>
</tr>
<tr>
<td>People</td>
<td>Subject matter experts</td>
<td>Process leaders define, deploy, enhance, maintain core processes</td>
<td>Process owners focus on high quality execution</td>
<td>Utilize Business Process Management (BPM) solutions to automate processes based on customers</td>
</tr>
<tr>
<td>IT</td>
<td>Independent systems</td>
<td>IT leads cross-functional initiatives (systems focused)</td>
<td>IT supports process leadership team in initiatives</td>
<td>Utilize Business Process Management (BPM) solutions to automate processes throughout the ecosystem</td>
</tr>
</tbody>
</table>

12.3.5 The BPM maturity levels by Harmon (2004)
12.4 BRM maturity models from literature

12.4.1 The business rule tasks/service model by Nelson et al. (2010)
12.4.2 The rule maturity model by von Halle and Goldberg (2006)

12.4.3 The business decision maturity model by von Halle and Goldberg (2010)
### 12.5 Literature extracted BPM maturity model

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Process activity awareness</th>
<th>Required</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td>No relation between strategy and processes</td>
<td>Adapt/read to market dynamics within 12 month</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Driven by cost and efficiency</td>
<td>Some cross-functional integration to solve pains</td>
<td></td>
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<tr>
<td>Reactive to market conditions within 1-2 year. Typically to chase the competitor.</td>
<td>Bidirectional linkage between strategy and business processes.</td>
<td></td>
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<tr>
<td>Strategy alignment</td>
<td>Enterprise-wide process leadership established</td>
<td></td>
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</tr>
<tr>
<td>MATURITY LEVEL</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Siloed activity awareness</td>
<td>Business processes are linked in such a way to achieve strategic benefits.</td>
<td></td>
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<tr>
<td>Alignment around a functional area, product line and geographic and domicile</td>
<td>Global business processes and they are linked to organizational goals.</td>
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<tr>
<td>No formal value measurement program</td>
<td>Methods for communicating the models and escalation matrices are used to help transform process models into executable business process specifications.</td>
<td></td>
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</tr>
<tr>
<td>Hierarchical structuring of project and processes</td>
<td>Business management is leveraging Six Sigma, Lean and Value Stream mapping methods for process improvement initiatives.</td>
<td></td>
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<tr>
<td></td>
<td>Methods that provide guidance for the collection and consolidation of process related data. (e.g. process control or process performance measures)</td>
<td></td>
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<tr>
<td></td>
<td>End-to-end metrics derived from customer requirements</td>
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<tr>
<td></td>
<td>The process for both management and engineering is documented, standardized and integrated by an organization methodology.</td>
<td></td>
<td></td>
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<tr>
<td>Methods</td>
<td>A collection of methods is best practiced drawn from Six Sigma, Lean and other methodologies.</td>
<td></td>
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<tr>
<td></td>
<td>Methods that facilitate the development of improved business processes like process enhancement, innovation, utilization and, derivation</td>
<td></td>
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<tr>
<td></td>
<td>Process metrics are used to compare its performance to benchmarks, best in class performance, customer needs and to set performance targets.</td>
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<tr>
<td></td>
<td>Value chain analysis methods are adopted and proper visual tracking solutions are created.</td>
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<tr>
<td></td>
<td>Valuation of the methods that are used for the overall enterprise-wide management of BPM</td>
<td></td>
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<tr>
<td></td>
<td>Managers present the metrics to process performers for awareness and motivation and use dashboards based on the metrics for day to day management of the process.</td>
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<td></td>
<td>Metrics and targets are reviewed continuously and used in strategic planning</td>
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<td></td>
<td>New methods will emerge to support creating goals scenarios to address settings of intense competition.</td>
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<td></td>
<td>Total process integration across the ecosystem</td>
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<td></td>
<td>Key processes flow seamlessly across firewalls</td>
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<td></td>
<td>Utilize Business Process Management (BPM) solutions to automate and monitor process execution throughout the ecosystem</td>
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<tr>
<td></td>
<td>A modular architecture that adheres to industry standards.</td>
<td></td>
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<tr>
<td></td>
<td>Process improvement is enabled from piloting innovative new solutions and technologies.</td>
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<tr>
<td></td>
<td>The IT organization focuses on leveraging real-time events and rules management.</td>
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<tr>
<td></td>
<td>Total process improvement initiatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inter-enterprise teams own process performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Relevant process metrics are used to measure bi-directional partner performance</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Continuous process improvement programs</td>
<td></td>
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<tr>
<td></td>
<td>Enterprise process teams own performance</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Relevant process metrics are used to measure bi-directional partner performance</td>
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<tr>
<td></td>
<td>Inter-enterprise teams own process performance</td>
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<td></td>
<td>Relevant process metrics are used to measure bi-directional partner performance</td>
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<tr>
<td></td>
<td>Continuous process improvement programs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inter-enterprise teams own process performance</td>
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<td></td>
</tr>
</tbody>
</table>
### 12.6 Literature extracted BRM maturity model

<table>
<thead>
<tr>
<th>Factor</th>
<th>Repeated</th>
<th>Managed</th>
<th>Building BR factory model</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategy/organizational scope</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siloed rule awareness</td>
<td>• Cost in business language</td>
<td>• Ability to predict business impact</td>
<td>• Ability to predict business impact</td>
<td>• Fast, first to define and respond</td>
</tr>
<tr>
<td></td>
<td>• Cost of change is high. Ability to predict business impact is low</td>
<td>of changes is common practice, reducing cost of BR change and testing even lower. Ability to predict</td>
<td>of change is possible.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cost of change is lower. Ability to predict business impact of change is still low</td>
<td>predict</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Business process implemented</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>• Successful implementations occur and the underlying business drivers are met.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>People (structure/ownership)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT support unit is the ‘owner’ responsible for the project during this initial stage</td>
<td>• The CBRG leaders are typically one from IT and one from business staff</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• BR Center of Excellence established</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The responsible of the project become the de facto BR experts. The CBRG shifts to the business side of the firm.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• IT focus begins to shift to technical enablement and infrastructure. Business staff focus begins to shift to interpretation of the BR for implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Governance (development/implementation, responsibility)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technical architecture</td>
<td>• Rules tied to models or use cases</td>
<td>• Rules traced to systems implementation</td>
<td>• Potential rules simulated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• BR are intermingled and buried in code, documents and peoples’ heads</td>
<td>• Rules stored in spreadsheets</td>
<td>• Potential events identified</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• BR are understood as separate aspects of business logic. BRs exist in a separate source rule repository, maybe separate automation technology</td>
<td>• Rules in formal form, possibly with rule-authoring software</td>
<td>• Revenue, profit, people differences estimated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Business processes are loosely coupled, informal group with an emphasis toward developing technical feasibility and compatibility of the particular BRMS solution with the underlying application(s)</td>
<td>• Standard rule reports</td>
<td>• Rules recast according to analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Business analysts know the business process and challenge the rules. IT traces rules to systems.</td>
<td>• Standard methodology, templates, etc.</td>
<td>• BRs are separated as a standard practice through integration of source repository and execution technology</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reporting to the business side once successful BRMS deployments occur and technical feasibility and viability are established.</td>
<td>• Rules in agile technology (BRMS)</td>
<td>• BRs are defined in repository, associated with business metrics, and traceable to business value</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Rules sets shared as services across processes and systems.</td>
<td>• 'What if' scenario capability enables business analysts to generate and test automated BRs</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>• Possibly more than one BRMS</td>
<td>• Business analysts can assess business impact because relevant data is integrated with BR infrastructure for business prediction purposes.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• BRs are separated through structured BR templates and BR analysis/Design techniques. BRMS technology is adopted.</td>
<td>• BRPs will seek standards and direction from the CBRG concerning rule architecture, authoring and maintenance of the enterprise wide rule repository.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• Business analysts define and change the business process and business form of rules</td>
<td>• IT unit within CBRG provide the most technical services including development of BR tools and standards, API interface, establishing BR architecture and integration standards, providing interoperability labs, and making key integration decisions.</td>
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<tr>
<td></td>
<td></td>
<td>• Split in responsibility between BRMS development vs. BRMS implementations. Implementation through leveraging lessons learned, capturing issues, resolutions and coordinating and communication to the various business rules activities and pockets of expertise from across the firm.</td>
<td>• Core BRMS development will continue to be the combined responsibility of all three organizations, BPO, IT and CBRG. This group also maintain the BRMS implementation schedule, establish formal mechanisms for knowledge sharing of lessons learned.</td>
<td></td>
</tr>
<tr>
<td>Red= von Halle</td>
<td>Green = von Halle KPI’s maturity</td>
<td>Blue = nelson</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12.7 Subject Matter Expert interview transcription

In this Appendix the interview summaries with the experts together with the transcription scheme can be found. Remark again that the last four interviews with the enterprise architects are not summarized and transcribed because the interviews had a different aim. These interviews were less explorative and more focused on structuring the knowledge gathered so far.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Highlight color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td></td>
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<tr>
<td>People &amp; Culture</td>
<td></td>
</tr>
<tr>
<td>Methods</td>
<td></td>
</tr>
<tr>
<td>Architecture</td>
<td></td>
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<tr>
<td>Governance</td>
<td></td>
</tr>
<tr>
<td>Rules</td>
<td></td>
</tr>
</tbody>
</table>

Legend for the interview transcription

<table>
<thead>
<tr>
<th>function</th>
<th>Interview summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior consultant manager (BPM)</td>
<td>Organizations need to focus on their core activities when they start to implement BPM and BRM. So an ever important first step is a mapping of the core activities. 20% of the processes are responsible for 80% of the revenue. <strong>Level 1:</strong> Indicate key drivers. <strong>Level 2:</strong> Translation to functions, map the drivers in the enterprise architecture. Going high over the processes; make the processes clear and transparent by using a (rule) repository which guarantees standardization, reuse and inheritance. Make and use a governance matrix which defines who defines/approves/enforces and implements policies and standards. <strong>Level 3:</strong> Execution starts. Start to design KPI’s and start to operate change management activities. <strong>Level 4:</strong> show measurement results. <strong>Level 5:</strong> tackle waste handling, and provide feedback by an automated loop.</td>
</tr>
<tr>
<td>Chief architect, Director (BPM)</td>
<td>Process modeling is the first important step within BPM. First with a graphical tool (visio), later on in something more clever tool (ARIS) that uses a repository to keep things together and that can recognize, re-use and inherit steps. Processes are embedded by rules. A distinction between processes and rules is almost zero. A disadvantage of separating rules from processes is the mainly they way to test them, because delicate application testing is not possible anymore. Important questions to be asked are: Are processes and rules described? Is there a shared repository? Is there talk of re-use? are the processes and rules implemented? Is there continues improvement possible? A distinction can be made between processes and rules separated and processes and rule together. <strong>Use BPM and BRM for all the processes and Rules that change often.</strong> For large organizations is a more traditional way for doing BPM and BRM more suitable because you have planned a route in advance which guides you where to go and how. In this case, tooling is not immediately important. Main problem is that organizations lose ownership of their processes so nobody has oversight anymore which is the root cause of fragmentation of the process and activities that took place the last decades. BPM is more than Lean or Six Sigma, because with BPM your organizations is fully agile. <strong>Consistency and channel dependency</strong> is important for every customer. <strong>BPM mainly is about end-to-end processes and together with BRM it is an important driver for a case-oriented approach</strong> for working with chains instead of silos. <strong>Business rules can be</strong></td>
</tr>
</tbody>
</table>
A Business Process & Rule Management Maturity Model for the Dutch Governmental Sector

| Performance & Quality manager (BPM) | seen as the decision points within a process and therefore, BRM is needed in order to manage your processes right. To see fast results BPM has the potential to start with small projects and to execute this project from start till end. After successful implementation the scope of the project can be extended. The big advantage of this approach is to create support from the working field which can be done by good training. The downside of BPM and BRM at this moment is that tooling requires conventions. A large pitfall of BPM is that organizations ‘forget’ to execute their ideas because they go into too much detail about the process from start. This delays the project and enlarges the risk that it remains a project thought out by the top, but not executed to lower levels of the organizations. Good communication all through the organization is needed. |
| Consultancy Partner (BRM) | An ever important first step is to decide what the organization wants and what they need to achieve this. When this is clear, **the tool selection is important.** Governance is about functional and process owners and who makes the decisions. Line managers all have the same authority now. A few years ago ISO standards were used to embrace business/IT alignment. Standardization is typical level 2 and talking about self improvement this is a level 4 characteristic. It is important to know your core processes. In the whole automation process we developed new positions for knowledge sharing and standardizations issues. Working more efficient is needed and seen by the employees as well. Business processes and business rules were always just IT issues, but the shift to the business is needed in order to make management of them more effective. Control is now in hands of the line managers. Risk management is an important issue. There are so many rules and to little control. More insight is needed so rules management is there to bring the relief. Communication through the whole organization is important and mostly accomplished by setting up communities and seminars. |
| BRM Expert (BRM) | **Important shift is that rules are no longer about compliance alone.** Rules are the content of the processes. Important is to focus on transactional rules. Important BRM issues are: **‘time-traveling’** and the speed of carrying through new rules. **(metrics)** Translate the rule from hardcode to a language that is understood by a BR engine. **(infrastructure)** Communication between employees from the business working with the rules (for example lawyers, judges, accountants and managers) with technical people is of great importance. The business employees and IT employees are both experts in their own field and use their own language to talk about their requirements, needs, problems and so forth. Although there is a big gap between the two spoken languages, cooperation between the two is of great importance in order to create and proved the organization with meaningful process and rules organization. |
12.8 Subject Matter Expert Interviews

In this appendix the complete interview reports can be found. Not all the interviewees agreed with recording
the interview, for this reason some interview reports are more comprehensive than others.

12.8.1 Senior manager consultant

The construction of the theoretical BR&PM framework is built upon three base pillars. The first is about BRM
maturity, the second about BPM maturity and the third pillar covers the alignment between the two.

20/80 rule (20% of your processes are responsible for 80% of your business)

Level 1: Indicate key drivers by using e.g. Business Canvas Modeling

Level 2: Translation to functions, map the drivers in the enterprise architecture

Level 3: High over processes, make them clear and transparent by using a repository (with rules for example)
and a governance matrix — issues like Who defines/approves/enforces and implements policies and
standards?

Level 4: Execute, offer it as a working tool to stakeholder.
choices for tools that can import the steps/requirements
Design KPI’s
Change management

Level 5: show measurement results (for example time between start and run) Business Application Measuring
for providing a real-time summary of business activities to operations managers and upper management.

Level 6: Waste handling, which methods to provide feedback
Six Sigma, Total Quality management

Figure 31: Draft of a BPM pyramid according to an expert.
A Business Process & Rule Management  
Maturity Model for the Dutch Governmental Sector

12.8.2 Chief architect, director
Hoe hebben we BPM gedaan?

1) Gestart met proces modeleren, dit doet de business \( \rightarrow \) maturity level -22

- Modeling in Visio
- Modeling in visio met swimlanes
- Onderscheid tussen handmatig en geautomatiseerd ook in Visio

2) dit doen in ARIS. Repository houdt het bij elkaar. ARIS kan in tegenstelling tot Visio, stappen hergebruiken en herkennen, ook wel overerving genoemd. Dit vergt wel goede opleiding en kwaliteit van de mensen die dit doen. Je hebt hier erg te maken met mensen en kennisdeling als het gaat over het overstijgen van proces silo’s. bijvoorbeeld een business analist die claims doet en één die new business doet, beseffen zich niet dat ze met hetzelfde bezig zijn.

Voordat IT werd geïmplementeerd was operational excellence het in rammen van processen in mensen. Toen kwam IT en de nieuwe/aparte discipline BPM kwam is de business owner (directeur) zich gaan distantiëren van het proces wat hij uitvoerde omdat het door de IT afdeling werd uitgevoerd. Hierdoor is er weinig te vinden over proces beschrijvingen bij bedrijven.

Rules en processen zijn hetzelfde, processen zijn embedded, vastgelegd, door rules. Uitkomsten van een actie zijn regels. De scheiding proces en regels is nihil. Veel pakketten scheiden dit. Wat zorgt voor een procesflow waar niks gebeurd aangezien de regels er later door middel van een rule enige aangehangen worden. Het nadeel bij het scheiden van Rule engines en processen zit het nadeel hem in het testen. je stapt over de grenzen van een applicatie. Dus discreet applicaties testen is moeilijk. Want er is orhestratie nodig van de juiste rule op het juiste moment. Dus beter samen.


BPM goed implementeren zorgt ervoor dat je kan rapporteren over je KPI’s.

Maturity model begint bij het (op twee lagen zou ik het doen) 1: governance model, is er erkenning binnen het bedrijf dat dit soort dingen moeten gebeuren, tot welk niveau is een bepaald maturity level. Dan is het puur vanuit je besturing, zijn de silos zich bewust van dat er processen zijn, zijn ze actief bezig deze processen te beheersen, en zijn ze actief bezig deze te verbeteren. Parallel hieraan kan je natuurlijk altijd zeggen als ze zich bewust zijn van processen, gebruiken ze deze dan om hun rapportage eruit te halen of Hebben ze die rapportage waarop ze hun business doen gerelateerd aan processen of regels.


iedere applicatie is BPM. Je hebt een applicatie, de onderkant is data daar bovenop is processen en daarbovenop zijn rules. BPM is: je haalt Processen en rules uit die silo applicaties en legt ze over je enterprise. ERP koop je omdat het beter is iets te kopen dan zelf te bouwen maar enkel een oplossing voor niet core business processen. BPM kan je inzetten op alles dat vaak veranderd. Want zo kan je sneller anticiperen en sneller is beter en goedkoper.
ING is gaan kijken op activiteiten niveau waar ze BPM wilde implementeren. Voor elke activiteit kijken in welke type applicatie ze gemanaged gaan worden. We hebben een bolletjes poster die de processen laat zien. Die processen hebben we opgedeeld per afdelingen, die afdelingen hangen dan weer onder buisness owners, we hebben CFO, COO en, CRO, die heeft een aantal processen waar hij eigenaar van is. In de processen hebben we op activiteiten niveau aangegeven welke stuk data en rules, behandeld moeten worden. Op dat niveau hebben we het uitgesplitst.

Als voorbeeld: bepalen van bonus van de agent. De data die we daar voor nodig hebben is het aantal verkochte polissen in een periode, de rules zijn de contractueel afgesproken regels per product, hoeveel hij daarvan krijgt. Dit wil je in een rules proces engine zetten. Terwijl een suspensie account voor inkomend geld, doen we in een oude cobol machine. Dit onderscheid hebben we actief gemaakt. Wat je ook zou kunnen doen door met de business users te gaan zitten en BPM in korte cycli te implementeren. Wij hebben vanuit een architectuur en IT wereld beeld gekeken waar dingen terecht moeten komen. Dus van te voren is gefineerd dit stukje proces gaan we hier doen. Als je met de business owners gaat zitten ga je kijken waar de behoefte is. Want BPM is ook geschikt om in kleine korte runs te implementeren. Gemeenschappelijkheden moeten dan goed vastgelegd worden en hier komt ook meteen tooling om de hoek kijken. De rules engine moet stukjes herkennen zonder dat hij ‘krak’ zegt. Deze manier is the other way around, want nu ga je met de mensen zitten die weten waar geld te verdienen valt. En zo haal je eigenlijk dus het meeste uit je BPM.

ING heeft de meer traditionele methode gebruikt omdat je eerst de route bepaald waar je heen gaat. In dit geval komt tooling pas later om de hoek kijken omdat je het eerst uit stippelt en pas later gaat toepassen. Het beschrijven van processen en rule is een metafoor van wat er echt moet gebeuren binnen een bedrijf. BPM: a: beschrijft het processen b: faciliteerd in dit proces. En een extra stap nu is dat je de rule kan automatiseren in het proceswaar dit kan.

Tussen maturity 3 en 4 zit IT architectuur, want de business architectuur gaat over processen en de IT architectuur gaat over hoe gaan we executie van deze processen mogelijk maken. Hier zeg je dus hoe je het daadwerkelijk uit gaat voeren.

Voeg ook Key Risk Indicators toe. Want KPI’s zijn er om managers op ‘af te rekenen’ terwijl KRI er zijn om geld te verdienen, en ze zijn je control framework.

12.8.3 Consultant
De roep van IT om business & IT te alignen. Business is ‘always on the run’ wat er voor zorgt dat IT het niet kan bijbenen.

BPM gaat om end-to-end processen. Zaak gericht werken in ketens. As-is en To-be beschrijving is niet eens nodig bij kleine cyclische aanpak. Klein beginnen en dit meteen oppakken en langzaam uitbureiden en proces in steeds kleinere stukjes knippen.

KPI’s omschrijven om processen te optimaliseren. Snelle doorvoering van BPM (met KPI’s die behaald worden) om enthousiasme van de werknemers en daardoor draagvlak te vergroten.

Vanaf moment 1 stakeholders betrekken

Tooling zorgt ook voor conventies, dit moet voorafgaand aan de implementatie goed in ogenschouw worden genomen.

Valkuilen van BPM zijn dat processen vaak meteen te precies beschreven (willen) worden. Hierdoor blijft het geneuzel in de top en wordt er weinig van gemerkt op de werkvloer. Het moet is zijn wat de business DOET en niet alleen beschrijft. Hierin is de communicatie tussen business en IT belangrijk.
Focus waar bpm ingezet kan worden en doe dit ook meteen en in kleine stapjes zodat het direct inzicht & structuur geeft.

12.8.4 Performance & quality manager (PIETER)
Ik werk 25 jaar bij Heineken. 14 jaar in de productie. Nu al 11 jaar bij global IT met name over het beschrijven van processen. We staan hier een paar stappen voor op de rest. In 2006 zijn we begonnen met het selecteren van een pakket voor BPM. We wilde een centraal SAP platform en alle partijen moeten werken met dezelfde documentatie. In 2006 ARIS geselecteerd. Business controls en systemen konden worden vastgelegd. In 2008 zijn we gaan kijken hoe we efficiëntie konden gaan meten.

ARIS is geen volledige BPMS tool.

Governance
Functional owners → global business process owners. Wie beslist. Ownership is bij Heineken slecht op back office

Business / IT
in 2006 werd alles nog lokaal gedaan. ISO standaarden werden gebruikt voor productie → standaardisatie (level 2). Dit hebben we gedaan voor purchasing. Zelf verbetering is level 4

Core processen van Heineken: Innovating market, Demand to warehouse (market 2 cash), Source2pay, market2cash.


Meer efficiency is nodig en wordt ingezien.

BR /BP Van IT naar de business → controle bij lijn managers.

Important issues: Risk management

Interne standaarden → teveel regels, geen controle. Meer inzicht is nodig daarom wordt nu gekeken naar rules management oplossingen.

Alle 200, communicatie dmv communities en seminars.

Risk procedures . knowledge sharen is lastig.

De relatie tussen externe wet

12.8.5 Consultancy partner
http://www.youtube.com/v/mXiyV6KRMoc&hl=nl_NL&fs=1&autoplay=1

Gaston Vankan is partner at KPMG Management Consulting, in the field of IT Strategy. He has a lot of experience with projects in the public sector. The interview with Gaston Vankan was held to give the researcher more insight in and feeling with the Dutch governmental sector. According to Gaston there is an important shift going on among the Dutch governmental agencies. About 3 years ago they wanted to focus more on central governmental services like healthcare and education. On the way to a governmental vision they were forced to rethink the governmental strategy and processes. To support this shift, a Governmental CIO has been appointed. Every department now have its own CIO which is held responsible for the ICT vision of the department. The main reason for appointing this role is to abandon the struggle between policies and their implementation. NORA is the name for the Dutch Governmental Reference Architecture (Nederlandse Overheid Referentie Architectuur). This reference architecture forms the base for the shift that is going on and
supports the government to get rid of the siloed approach every department has. Every department is called a chain, and the most important project now, due to the retrenches, is to integrate these chains and to develop a chain vision. The leading project for this change is started in December 2010 and is called ‘Nota compacte rijksdienst’.

The problem in the Governmental sector is that although there is a CIO, the CIO has no mandate. Only a dialogue, conviction and creating a supporting platform are ways to get things done. A big bias about the governmental sector is the lack of ambition, but although most agencies do not have the ambition to make profit, there are many awards and rewards to win in this world, which drives the ambitious focus probably as much as within the private sector. A very good example hereof is the IND. This is the Dutch Integration and naturalization service and is part of the Dutch Ministry of Internal Affairs (Ministerie van Binnenlandse Zaken). Due to the many rules and legislations the immigration procedure deals with, the process was not flexible enough which leaded to many questions from above (Tweede Kamer). The conclusion was the IND needed a new business model and with this project IND’s computer system ‘INDiGo’ won the international CMG Architecture Excellence award in the category ‘BPM’.

One big mistake with Business Rule and Process Management (BR&PM) is that people forget to involve the IT department. Often it is thought that the current business department can handle the BR&PM change with their knowledge about change management and their processes, but BPM and BRM is such different that good information provisioning from the IT department is needed to know the technical issues that need to be taken into account, and to manage and maintain the BR&PM system.

Governmental members do not understand IT the way it should be for good BR&PM, and they do not need to, for this reason change management covering people & culture is important together with good communication between the CIO and the head of the IT department.

The fundamental difference within the governmental sector according to Gaston Vankan is complexity. The government has to deal with many players and chain partners which makes information management immediately more difficult, because collaboration between governmental departments takes effort and time due to the lack of using standards. Another important difference is the need and internal drive to change to BRM and BPM. Governmental organizations are more service driven and have different kinds of customers, for this reason thinks like KPI’s are possibly less important motivators then in private organization because ‘Better’ in the governmental vocabulary is better for the citizen en not doing the same with less resources, time and money. The business case for governmental agencies is more focused on quality instead of quantity.

12.8.6 BRM Expert
Het meeste onderzoek naar business rules is gedaan in de jaren 60-70. BPM heeft een ‘activity’ en ‘recourses’ oogpunt terwijl BRM taken benaderd vanuit een richtlijn en kennis oogpunt. Agility is verwant aan management en uitvoering van activiteiten en beslissingen, om deze reden kan een directe relatie tussen de twee management praktijken bewerkstelligd worden. Aan de ene kant worden zulke activiteiten gemodelleerd en uitgevoerd binnen de muren van de business processen terwijl ze aan de andere kant business regels nodig hebben om leiding te geven aan de volgorde van uitvoering zodat beslissingen consistent gemaakt kunnen worden.

BRM = compliance → zo kijk KPMG er waarschijnlijk naar maar dit standpunt doorgaat de laatste jaren grote veranderingen.
E-power project bij de overheid.
Model van processen -- > en wetten.
1 afdeling voor rules management
Infra – regels staan vaak nog in Cobol → omzetten naar BR engines
pega → DATE-REGELS-PROCESSEN

Metrics – hoe snel kunnen regels ingevoerd en doorgevoerd worden
wat zijn de kosten/opbrengsten
Tijd reizen is belangrijk voor de belastingdienst aangifte van vorig jaar vergelijken

Method – E-power, manchester

Process – Rule kant

People – 1) advocaten, juristen, accountants, managers, wetgevers
2) subject matter experts

Governance – ligt aan land (US vs. EU)
## 12.9 BP&RM Maturity Model

<table>
<thead>
<tr>
<th>MATURITY LEVEL</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Responsiveness/efficiency</strong></td>
<td>De concurrent achtervolgen</td>
<td>Reageren op de markt dynamiek (passief)</td>
<td>Anticiperen op resultaten uit het verleden (er wordt geleefd van het verleden)</td>
<td>Continue verbetering/vooruitgang (PDCA-cyclus, pro-actief)</td>
<td>Mogelijkheid om de markt te voorspellen.</td>
</tr>
<tr>
<td><strong>Scope of the processes</strong></td>
<td>Losstaande activiteiten vinden plaats. (nog geen processen)</td>
<td>Een proces wordt gezien als losse elementen in de organisatie.</td>
<td>Processen zijn in samenhang met elkaar en houden rekening met andere processen</td>
<td>Processen zijn in samenhang met elkaar en houden rekening met andere processen binnen de waardeketen</td>
<td>Processen zijn gekoppeld aan de strategie van de organisatie.</td>
</tr>
<tr>
<td><strong>Strategic impact of the processes. process importance/Process optimisation</strong></td>
<td>Processen worden puur geoptimaliseerd/ingericht om kosten te besparen. (er wordt geen rekening gehouden met de strategie)</td>
<td>Processen worden zodanig ingericht dat aansluiting met ondersteunende (secundaire) processen mogelijk is. (Cross-functional)</td>
<td>Processen zijn driver van het organisatie ontwerp</td>
<td>Processen (optimalisatie) vormen basis van de strategie. Problemen oplossen door breder te kijken.</td>
<td>Samen met ketenpartners wordt gezocht naar strategische verbetering op basis van processen</td>
</tr>
<tr>
<td><strong>Business / IT alignment (Luftman)</strong></td>
<td>- No alignment</td>
<td>Head of the IT keeps in contact with head of the business department(s)</td>
<td>There is an integrated information department</td>
<td></td>
<td>Business and IT are fully integrated.</td>
</tr>
<tr>
<td><strong>Gebruik van formele methoden</strong></td>
<td>Methoden zijn in concept – methoden voor proces ontwerp &amp; modellen voor as is en to be situatie worden in overweging genomen. (plan)</td>
<td>Methoden voor vertaling van process modellen naar uitvoerbare business proces specificaties. (DO)</td>
<td>Methoden die sturing geven voor de verzameling en samenvoeging van proces control- en performance measurement- data (Check)</td>
<td>Methoden die de ontwikkeling van process verbetering faciliteren. (Act)</td>
<td>Evaluatie van de methoden die organisatie breed worden ingezet, is mogelijk. (elaborate act)</td>
</tr>
<tr>
<td><strong>Gebruikte tooling voor ontwerp (ARIS/beweis → vastelling van architectuur, process mapping/modelling)</strong></td>
<td>Aanvraag/proces niet of nauwelijks ondersteund door tool</td>
<td>Aanvraag/ proces deels ondersteund door tool</td>
<td>Aanvraag/ proces grotendeels ondersteund door tool</td>
<td>Aanvraag/ process Volledig ondersteund → geen integratie</td>
<td>Volledig ondersteund door tooling + integratie ander process tooling.</td>
</tr>
<tr>
<td><strong>System integration. How does process run over the systems.</strong></td>
<td>Organisatie kenmerkt zich door veel losstaande systemen</td>
<td>Point-to-point integratie tussen systemen (lokale systemen met interfaces ertussen)</td>
<td>Meerdere systemen binnen het process zijn aan elkaar gekoppeld en wisselen data uit. Hoewel de integratie nog steeds point to point is, is er wel sprake van integratie denken.</td>
<td>Meerdere systemen binnen de enterprise zijn aan elkaar gekoppeld en wisselen data uit. Hoewel de integratie nog steeds point to point is, is er wel sprake van integratie denken.</td>
<td>De systemen van een process worden beheerd door één overkoepelend systeem.</td>
</tr>
<tr>
<td><strong>BPA tooling</strong></td>
<td>Er wordt geen gebruik gemaakt van BPA tooling</td>
<td>BPA wordt gebruikt ter ondersteuning van handmatige processen (vast leggen process)</td>
<td>BPM tool voor systeem integratie binnen de afdeling. Er wordt buiten de systemen om ‘kennis/informatie’ over de processen gedeeld.</td>
<td>BPM tool voor systeem integratie binnen de enterprise. Er wordt buiten de systemen om ‘kennis/informatie’ over de processen gedeeld.</td>
<td>BPM tool voor systeem integratie binnen de waardeketen. Er wordt buiten de systemen om ‘kennis/informatie’ over de processen gedeeld.</td>
</tr>
</tbody>
</table>
### Governance structure
- Individual process authority and responsibility
- Responsibility and authority is tuned among the department
- Leidinggevende wordt verantwoordelijk gehouden voor de resultaten
- Manager is held responsible for entire service which is process transcending.

### Decision making
- Bestluiten over proces richting & business logic/rules (decision boards such as process councils and process steering committees)
- Iedereen heeft eigen knoppen om te besturen. Bevelen komen van boven af en geen besef van het geheel (autonomo orgaan, individuele autoriteit)
- Leider stuurt openbaar maar iedereen voert enkel eigen taak uit. (Uniform process model)
- Er worden democratisch knopen doorgehaakt maar het heft ligt in één iemands hand.
- Er wordt samen een richting gevoerd, maar 1 gaat er met de eer vandoor / is verantwoordelijk
- Team spirit. Enkel zichtbaar wat relevant is. Teams worden ingedeeld op kennis en kunnen. (end-to-end process eigenaar)

### KPI monitoring
- Hulpmiddel (Hoe meet je proces verbetering/ tijdigheid)
- Error handling is adhoc (no KPI’s defined)
- Metrics are used to error control
- KPI’s worden ingesteld voor analyse van process. Meten van kwaliteit
- Sturing op metingen is direct mogelijk (regelkring)

### Training
- (leiderschapsstijl)
- De organisatie traint personeel door uitleggen wat er gedaan dient te worden.
- Personeel weet wat en waarom bepaalde taken uitgevoerd dienen te worden.
- Personeel wordt gestimuleerd mee te denken. Coaching, triggering van personeel. Hoe zou jij het doen
- Coachende benadering en uitdagen dit daadwerkelijk uit te voeren
- Training op vaardigheden. Middelen worden beschikbaar gesteld om kennis zelf op te doen.

### Change mentaliteit/ management commitment
- Organisatie wil niet veranderen, grote weerstand gekenmerkt
- Team leiders zien noodzaak en zijn bereid te veranderen, ware het niet op puur uitvoerend niveau.
- Organisatie breed wordt de theorie van veranderen geaccepteerd maar er is geen kennis over het hoe en wat omtrent veranderen.
- Er is algemene bereidheid voor Verandering maar deze is enkel gericht op eigen team/task.
- Verandering wordt gezien als een natuurlijk iets binnen de organisatie en dit wordt door management ook uitgestraald.

### Cultuur en mentaliteit
- Local heroes bevechten hun eigen kennis zonder dit te delen uit angst. Ik tegen de rest
- Kennis wordt gedeeld maar enkel binnen kleine teams. Wij tegen de rest
- Top down wordt ingezien dat er over koepelender gewerkt dient te worden, echter op de werkvloer is nog enige weerstand merkbaar (gelijk ook vice-versa dus bottom up)
- Teams worden opgebouwd op basis van softskills (karakter eigenschappen en kwaliteit) en kennis.
- Bij werknemer en partner selectie wordt rekening gehouden met cultuur elementen van de organisatie.

### Business
- rules in business language
- minimal analysis of business rules possible
- change driven by business analysts

### Technical
- rules tied to process models
- Rules buried in code, documents or peoples head
- Business rules seen as a separate aspects of business logic
- Rules stored in spreadsheets
- Formal formulation and traceability of business rules
- Structured business rule templates and analysis design techniques.
12.10 Semi structured interview questions

- Wat zijn de fundamentele verschillen tussen overheid en bedrijfseven?
- Worden Kritieke Prestatie Indicatoren en Kritieke Risico Indicatoren beschreven bij de overheid, zo ja, hoe zien deze eruit?
- Hoe ziet u de relatie tussen BRM en BPM.
- Welke aspecten binnen de organisatie spelen een rol bij het invoeren van BPM / BRM.
- Welke aspecten acht u belangrijk als het gaat om governance van de processen/regels
- Wat zijn de belangrijkste drijfveren voor BPM, BRM en een SGA (Service Georiënteerde Architectuur)
- Hoe vangen jullie veranderende wet en regelgevingen op in hun processen?
- Welke methoden worden gebruikt om processen te beschrijven?
- Zijn er standaarden voor proces beschrijvingen?
- Hoe wordt de gehele organisatie/afdeling betrokken bij proces management
- Welke methoden worden gebruikt om processen te beschrijven?
- Zijn er standaarden voor proces beschrijvingen?
- Hoe kan IT op elk niveau / factor worden toegepast?

12.11 Domain Expert Interviews

12.11.1 Operational manager application expertise

Bij de overheid is het alles of niks. In het bedrijfseven kan nog wel eens gezegd worden, het is niet helemaal zoals het moet, maar vooruit we doen het ervoor. Bij de overheid is dit ‘not done’ omdat er vragen en rechtssaken gaan komen wat vervolgens meer vertraging en problemen oplevert waardoor er beter meteen de stekker uitgetrokken kan worden.

IND is in 2007 begonnen met de aanbesteding van een groot project om hun hele ICT infrastructuur drastisch onder handen te nemen. People en culture is hier weinig bij betrokken. Bij de overheid is dit een holle frase. Het duurt oneindig lang als iedereen eerst zijn zegje mag doen voordat er begonnen wordt met het opstellen van een plan. Eerst moeten de middelen er zijn en het is van belang dat het hele proces vanuit de business geleid wordt. Het duurt nu 9 maanden voordat een verandering doorgevoerd is. Dit moet veranderen. Doel:

1) Standaard pakket, waar wijzigingen in doorgevoerd kunnen worden zonder dat IT er bij nodig is.
2) De 3 takken van de IND (aanvraag inburgering, gezinshereniging, naturalisatie) naar 1 generiek systeem

Kennis en functionaliteit moeten gescheiden worden.

IND is begonnen met een greenfield. Ze hebben zich echt afgevraagd. Wat doen we eigenlijk.
- terug plannen met als doel bekijken wat het minimaal noodzakelijke is.
- bouwblokken creëren en ontdubbelen van beslis regels bewerkstelligen.
- resultaat gericht werken

Case en regel handeling wordt bij de overheid erg belangrijk.
de eind gebruiker is weinig betrokken geweest bij het project, sturing kwam vooral van boven af.

People & culture is nu van belang. De organisatie moet er klaar voor zijn dit in verband met trainingen.

Het project heeft plaats gevonden in een paar grote stappen en nu komt het aan op fine-tuning wat kleine projecten met snellere oplevering betekend. Ik ben van mening dat je een goede basis nodig hebt om pas
daarna te kunnen kijken wat en waarop je kan gaan meten. Je KPI’s worden dus pas later bepaald. Het hele project had een architectuur gedreven focus.

Valkuilen:

- Te snel overschakelen van visie op uitvoering
- Moment kiezen om business een plek terug te geven gedurende het project.
- Tempo bepalen. Voorzichtigheid is niet altijd goed, de druk moet op de ketel zitten om succes te creëren
- Scenario’s herijken → wanneer worden klanten over gezet, het kan bijvoorbeeld niet zo zijn dan een klant deels in het ene deels in het andere (nieuw/oud) systeem ‘zit’.

Afdwingen te willen veranderen is nodig anders blijven mensen in hun oude stramien vast zitten.

Het project is van A-Z uitgezet voordat er begonnen werd. (dit is niet direct noodzakelijk bij de overheid)
Sterke visie neerzetten en hier aan vasthouden. Hier is sterke mandaat voor nodig en vertrouwen in en binnen de top.

Methodologie: DEMO aanpak.
Waar zijn ze nu: 3.1 opschalen.

Organisatie liep er steeds een beetje achteraan omdat deze terug houdend is naar veranderingen. Ook vanwege terugkerend uitstel zijn ze voorzichtig en afwachtend geworden.

BAM (business activity modeling) – Doet hij(het proces) zijn werk goed? Continue controle tussen 2 systemen is noodzakelijk → a) validatie:
1 TOVERSTAF METHODE : Vragen en antwoorden checken.
2: BLACKBOX: TESTEN & WHITE BOX TESTEN.
3: BEWAKEN: bijvoorbeeld 2 opties kunnen nooit tegelijkertijd plaatsvinden.

b) Statistische controle.
c) Risico bepaling.

Een architectuur fout is slecht te herstellen. Daarom is het belangrijk vanuit hier te denken.

FACTOREN:
Strategy alignment: Business / IT alignment. Beheren van regels zover mogelijk naar buisness. Modelleurs zijn geen IT’ers
Methods: Tool: BeInformed. 1) behandelplan 2) succespad starten 3) terug redeneren. Dit kan gezien worden vanuit DEMO.
Architecture. Kennis architectuur
Governance: Generieke principes. Tijdelijke oplossing blijven tijdelijk en er wordt NO-way op doorgebouwd hier speelt een grote rol waar en hoe de beslissingen genomen worden. Hoe hoger het niveau hoe meer er op deze regels wordt toegezien. Informeren is hier van belang. Validatie wordt gedaan door wettelijke instanties.

Regels uit de business combineren met ICT kennis is een belangrijk aspect van INDIGO.
12.11.2 Enterprise architect

CIO ondersteuning Enterprise Architecture. Ze zorgen voor alignement tussen UWV en de technische bedrijfsvoering. Ze zijn de schakel over visies & veranderingen breed over de verschillende 5 divisies.

Klant & service – portalen, brieven, communicatie binnen en buiten.
Uitkeren – op tijd betalen beoordeling van uitbetaling.
Sociaal medische zaken – wat kan iemand nog?
Werk bedrijf – mensen aan het werk zetten (oud CWI), omscholing.
Gegevens diensten – ook naar extern.
Twee directoraten : 1) Bezwaar & beroep 2) Handhaven, fraude onderzoek


BRM is de discipline van het beheren en organiseren van regels en beslispunten die in het proces plaatsvinden. UWV heeft het streven om business analisten de regels te kunnen laten aanpassen. Oracle policy automation (OPA)

De meeste regels zijn declaratieve regels met if then else. BRM is niet puur op systemen gericht.

Processen

De overheid richt zich op zaak gericht werken. Situaties schetsen op websites. Hier worden de klant fasen aangegeven en de klant kan aangeven waar in het proces hij zich bevind.
Processen in kaart brengen – klant & service. Hoe het nu is. Optimaliseren van de plaat die nu aanwezig is.
In de processtap worden regels gebruikt. Processen worden versimpeld en regels ontkoppeld. → know wordt van de flow gekoppeld.
Business architectuur MOET aan IT architectuur gekoppeld zijn anders is het gedoemd te mislukken.
Lokale kwaliteitstoets wordt gedaan door streekproeven.
BRM heeft minder invloed op staff dan BPM.

12.11.3 Senior manager consultant public sector


Ik zie BRM als middel voor BPM. Je moet eerst kijken wat je processen zijn voor je kan inrichten waar je rules in gaat zetten.

BPM = IT driven of in ieder geval IT enabled.
Bij het OM: ICT architectuur bouwen met EA voor het in kaart brengen van de processen.
Quality management staat los van BRM.

De link tussen ICT en Business is van groot belang.

Het OM had een rule based management systeem. Beslissingen ondersteunen met software. Gebruikers moeten dit gaan onderhouden maar aangezien dit juristen zijn en geen IT’ers is dit gewoon weg niet haalbaar aangezien zij op een heel andere manier bezig zijn met de regels dan de IT’ers. -- > Het advies dat ik hier gegeven heeft is twee ledig : 1) iemand op de scheidslijn moet dit gaan beheren 2) beheer van het systeem moet terug naar IT.
Veel losse applicaties is een nog veel voorkomend probleem bij organisaties. Zo ook bij de organisatie in kwestie.

1e stap is het inrichten van je processen. Daarna kan je verder gaan kijken naar hoe ver je door wilt gaan in BPM. Vanaf fase 2 of zelfs pas 3 is rule management aan de orde. Het probleem bij veel organisaties is dat ze allemaal streven naar het hoogste niveau terwijl voor velen helemaal niet relevant is. INK is hier een goed voorbeeld, hier wordt aangegeven hoe kwaliteitsmanagement ingericht kan worden.

5 kenmerken van een goed presterende organisatie zijn: Inspirerend leiderschap, bouwen op vertrouwen, samenwerking, resultaatgerichtheid, continu verbeteren en vernieuwen.

Ambitieniveau bepalen is van cruciaal belang.

**12.11.4 Consultancy partner public sector**

INDIGO bij IND is ingericht met de BPM gedachte. En dit is het succesvolste verhaal op dit gebied bij de overheid. Dit project is voornamelijk business gedreven. Het vreemdelingen proces is onderhevig aan veel wetswijzigingen en het systeem bleek niet flexibel genoeg aangezien wijzigingen 9 maanden duurde voordat ze doorgevoerd werden. Er kwamen kamer vragen en toen bleek dat het business model fundamenteel anders moest.

Een wetswijziging is geen functionaliteit, maar zit in een rule base. Dus de inhoud en gegevens en functionaliteit zijn echt gesplitst. De business was hierin leidend. Ze zijn nu zo ver dat het systeem werkt, maar voor de IND is het fundamenteel dat ze veel ketenpartners en dus koppelvlakken moeten gedefinieerd worden en dit vraagt naar performance. De IND is nu stapsgewijs de ketenpartners aan het uitbereiden.

Het model: IND heeft understanding van hoe hun processen in elkaar zitten. Je hebt onderscheid tussen IT tooling en BPMS tooling terwijl hier eigenlijk geen onderscheid tussen gemaakt wordt. Het onderscheid tussen business en IT is belangrijk. Het is van groot belang dat je zorgt de IT die je plant te bouwen ook kan beheren en dat is mis gegaan bij defensie. Probleem bij de overheid is dat de bewindslieden ver van de materie van IT afstaan en het dus ook niet begrijpen. Elk departement heeft een CIO maar ook een hoofd van de ICT en het probleem is nog steeds dat er een groot verschil zit tussen wat de CIO willen dat ICT doet. Een CIO moet samen met ict directeuren visie bepalen.

**12.11.5 Business architect**

*Hoe ziet de SVB BRM en hoe wordt dat geaccepteerd bij de SVB*

De vraag is of in werkelijkheid BRM voor overheid en BPM voor de business wel zo strikt gescheiden is? Bij de SVB zie ik dat aan de IT kant mensen wel degelijk erg proces-mindend zijn. Alle processen zijn in kaart gebracht, er is een proces atlas in bij designer met alle rollen en stapjes gedefinieerd, dit wordt ook bijgehouden. Dit was enkele jaren geleden wel anders. Toen was dit allemaal niet formeel beschreven. De ‘business/diensterverlening’ bij IND heeft 2 manifestaties, het echt uitvoerende werk wat wij doen. Deels is dit wat mensen op kantoren doen, telefonische beantwoording van telefoontjes en ingewikkelde zaken, de andere zijn de systemen. Het grootste deel van onze business wordt vol automatisch uitgevoerd. Aanvragen hoeven maar één keer ingediend te worden en dit wordt elk jaar verlengd. Ook nodige uitzonderingsregelingen. De meeste regels zijn erg makkelijk omdat de gegevens zijn vast te stellen bij de GBA. De behandelaar/SVB medewerker die de zaak behandeld, die krijgt een tekst systeem op de computer. 2 ingrediënten. 1 is juridische info en achtergrond info, dit is tekst en uitleg over de wet met allerlei finesses die er nog inzitten, en 2) procedurele kennis. Als je dit en dit krijgt, wat moet je dan doen, dan moet je dit dit dit en dit doen. Hier staat dit op een rijtje, hier zit dat procesachtige in. Het juridische deel is niks formele of bedrijfsregels, maar puur een verhaal. De vol automatische systemen, zogenaamde legacy systemen, heeft de regels in cobol geschreven. Dit is de situatie tot voor kort. Bedrijfsregels op een logisch niveau zodat bedrijfsregels
geïmplementeerd kunnen worden in een systeem is er van oudsher niet, maar zijn ze nu aan het introduceren. Dit heeft een technische kant, ze zijn bezig hun legacy systemen te vervangen door nieuwe systemen van Oracle. In dat geheel van Oracle systemen zit een rule engine, OPA (Oracle policy automation). Die gebruiken ze als rule engine, maar dit is echt aan de technische kant. We zijn bezig met migratie van oude systemen naar dit nieuwe platform, en vanuit het team Informatie management zijn we bezig om die regels in plaats van Cobol in OPA te zetten, wat bedoeld is om wat gebruiksvervriendelijker te zijn en beter te begrijpen. Hoe krijgen we voor elkaar dat de business hierin kan werken, en niet alleen die IT'ers. Dit is een flinke worsteling. Het is nog lang niet klaar om hierin een weg te vinden. Wat er praktisch gebeurd is dat informatie analisten regel analist zijn geworden, en die zitten in dat migratie project die regels op te stellen vanuit de wetgeving zodanig dat het in OPA terecht kan komen. Dit is nog niet ideaal. Want dit zijn nog steeds informatie analisten vanuit de IT Hoek. De business (juristen) zitten hier nog niet, maar valideren het alleen. Ik ben nu met een praktisch onderzoekstraject bezig om dit dichter bij de business te brengen, OPA is hier eigenlijk niet geschikt voor. Want OPA is nieuw van Oracle, dit is gekocht van HELIE Systems, die hebben wel altijd gepromoot de natuurlijke taal interface te gebruiken, maar dit zit er op een specifieke manier in die je moet leren kennen. OPA heeft twee gezichten, 1 de natuurlijke taal, dit betekend dat je in word en Excel kan aanpassen, dit is vriendelijk. Je kan dus een zinnetje maken: ‘pensioen gerechtigde heeft recht op pensioen als …’. En dan deze condities netjes op een rijtje zetten, en je moet zeggen dat dat condities zijn, en dat het eerste zinnetje een conclusie is. En dat moet kenbaar maken wat wat is. Hij maakt dit alleen vrij plat, hij ziet alles als een boolean, dus ja of nee, en de rest zijn ook statements. Dan is het gebruiksvervriendelijk, maar zodra je daar wat vanaf stapt, dus als een object waardes heeft in plaats van alleen ja of nee, en je wil dit vanuit je informatie model goed formuleren dan krijg je al een programmeer taal voor je kiezen. OPA is dus te technisch en hierboven op wil je dus iets hebben om echt goed te beheren. We zijn nu aan het onderzoeken hoe en waarmee we dat gaan doen. We willen op juridisch niveau zorgen dat we logische modellen maken op basis van wet en regelgeving. We hebben nu één casus uitgewerkt, geanalyseerd en opgeschreven, en dit is een enorm gepuzzel. Het HELE proces van a tot z staat hier in. En dan niet als procesgezien. Toen ik dit de eerste keer vroeg hoe beoordeel je dit nou kwamen ze ook met een procesbeschrijving, zo van: dan doen we eerst dit en dan dat onderzoeken. Ik heb ze toen uitgedaagd, laat het proces even zitten, want wat zijn nou de regels, waar moet het aan voldoen? En dat is een ander soort analyse dan procesanalyse. Het proces is redelijk irrelevant want het gaat om die regels. Iemand heeft recht op iets als hij aan die voorwaarde voldoet. Heel veel juridische bronnen zijn nodig voor een soort beslissing. Dit gaat niet in OPA gebeuren, althans, het systeem zal OPA gebruiken. OPA is voor de beslisservices, en dit wordt gevoed door logische modellen die eerst gemaakt moeten worden. Hier gaat het heel erg om het formeel opschrijven van de beslisregels. We zijn nu met een leverancier bezig dat met een druk op de knop de regels voor OPA geleverd worden. Dit is The Rule Management Group. Zij analyseren de wet, en hier komt een logisch model uit wat je kan beheren. We moeten nog toetsen of die druk op de knop ook echt OPA oplevert. Dit geheel wordt vanuit IM aangezengeweld en wij proberen de juristen te porren om dit voor elkaar te krijgen. Dit logisch denken is toch anders dan juridisch denken. Gelukkig zitten er een paar op de juridische afdelingen die bekend zijn met die logica. Maar deze hobbel is best groot. Want op den duur heb je toch weer IT’ers nodig, en hier moet je oppassen dat je niet weer direct vast komt te zitten in die IT Hoek.

Het invoeren van dit project, hoe gaat dit in de gehele organisatie, wie initieert dit:
De veranderingen komen vanuit de Informatie management hoek. Wij zijn de schakel tussen IT en de business en ook verantwoordelijk voor het verander budget. Project portfolio.

In je boek staat ook een maturity model, en kijkend met die lens naar de SVB, hoever zijn jullie dan? dat maturity model is heel erg voor, wat we hebben genoemd ‘business engineering’. Daar is de SVB nog echt niet aan begonnen, dat gaat een stap verder, het gaat heel erg uit van het idee dat je eigenlijk zou willen dat je veranderingen gaat bekijken als geheel, en gaat modelleren. Dit staat echt nog in de kinderschoenen, niveau
nul eigenlijk. Bij ons wordt het nog heel erg, onmiddellijk, gesplitst, in IT projecten of organisatie projecten. Het enige voordeel is misschien dat we nu wel de regie centraal in handen hebben. Dus de afstemming er tussen kunnen we gaan bewerkstelligen. We hebben onlangs ook een voorstel gehad van een project waarbij eigenlijk alleen maar gezegd is: een intranet project, dat wordt gedaan met bepaalde pakketten en dit moet vervangen worden door iets van Oracle. We hebben als architecten ervoor gezorgd dat we dit op een heel samenhangend geheel gingen bekijken. Dus als je dan een nieuw platform introduceert wat doe je dan met sociale media. Dit is niet alleen techniek, maar moet je als geheel bekijken, dat komt gewoon niet aan. Er is nog geen manager dit het op die manier ziet en dat je zoiets als geheel moet bestrijken. Er is dan een manager die tegen één iemand zegt ga jij maar dat platform doen, en ow ja ik moet iemand anders een opdracht geven aan cultuur verandering te doen, maar dat sneveld hier meteen. Die techniek is heel helder wat je moet doen, maar die cultuur verandering wordt hier niet mee in samenhang gebracht. Dus daar is een bredere scope om te kijken dat we hier op een laag niveau mee bezig zijn. Maar door bezuinigingen zal dit wel veranderen en de strategie die hierbij hoort, meer via internet, dwingt je te automatiseren. Ook in het klant contact. Mijn stelling is dat als je via internet een intelligente dienstverlening op te zetten ontkom je er niet aan een sociaal aspect. Is er communicatie met andere organisaties over welk systeem werkt?

Er is wel contact met de belasting dienst, omdat zij er al veel langer mee bezig zijn, ze lopen wel redelijk voorop, en ook de IND met kennis gericht modelleren. Dat staat bij ons nog in de kinderschoenen. Bij de SVB is er wel altijd een veel belangrijk aspect, wij hebben veel meer te maken met de sociale kant van dienstverlening omdat we uit betalen in plaats van innen zoals de belastingdienst. SVB heeft daardoor vaak de houding gehad dat ze de aardig zijn omdat ze geld ‘geven’. Maar dit gaat verder omdat we ook oog hebben voor mensen met minder capaciteit om te communiceren met de overheid. Dus onze communicatie moet ook deels afgestemd zijn op bijvoorbeeld analfabeten en gehandicapten. Dus internet is aardig maar een deel zal dit toch nooit doen en die moet je op een andere manier bereiken. Er is een campagne geweest over kappers die inlichting gaven over een bepaald onderwerp in armere wijken. Dus sommige problemen zijn niet met automatisering op te lossen. Het deel dat dit wel kan, moet meteen goed en degelijk gedaan worden. In het boek staat ook dat we naar een situatie moeten waarin de medewerker een kenniswerker wordt. Deze kan wel iemand te woord staan maar dit is meer uitzondering dan regel. Kennis moet aan systemen geleerd worden.

Meetpunten in aanvragen

we hebben hier niet echt overzicht over. We zijn dit wel aan het opvoeren. We hebben wel performance metingen over aantallen aanvragen. Op basis niveau zit dit niet en dit missen we wel, onze metingen zitten nu vooral op procesniveau. Wel hebben we bezwaarschriften waar we fouten aan kunnen opmaken. Dit gebeurd weinig. Je weet niet of gevallen waar geen bezwaarschrift tegen wordt ingediend wel goed zijn. Omdat we uitbetalen is dit lastig. Dit is niet duidelijk. We zijn wel bezig om de komende tijd veel meer te meten. Dit wordt nu nog gedaan vanuit BI, vanuit strategisch management oogpunt. Dan praten we over dashboards en rapportages. Ik weet niet of dit ook gaat helpen in de regelbeheersing. We moeten boven tafel krijgen wat we hier precies voor nodig hebben.

Onze business / IT alignement hebben we redelijk op orde. Dit is in 2 jaar gebeurd met het inrichten van de IM afdeling. Voorheen was ICT heel erg uitvoerend. ICT had het hele verander budget. Dat ligt nu bij ons. Dus we
redeneren nu meer vanuit de business. Er werden dus ook weinig prioriteiten gesteld omdat alles gewoon gedaan werd. Het was een luxe situatie, alles kon altijd. We hebben nu meer inzicht dat elk project eigen kosten en baten heeft.

Ownership van processen: dit is een best lastig onderwerp want binnen SVB hebben we proceseigenaren. Dit zijn managers op het hoogste niveau, dit zijn er maar een paar, deze zitten echt aan de business kant. Maar die hebben weinig met de procesatlas, ze weten dat het er is, maar doen er weinig mee. IT’ers beheren deze atlas. Dus daar zit een groot gat. Als IM hebben we eigenlijk voor het eerst plannen gemaakt voor komend jaar. Elk project moeten we nu van te voren weten, alles was we niet weten en wat dus niet in de plannen staat wordt niet uitgevoerd, dit was voor iedereen een stok achter de deur om alles te melden. Daar zie je dat het denken van wat is onze strategie en wat zijn onze prioriteiten. Ook zie je de proceseigenaren groeien in hun rol, requirements komen veel meer aan het licht. Wat vinden we belangrijk, dit bewust zijn is aan het groeien.

Tijdreizen. Dit is een heikel punt. Lastig uit te leggen. Dit zit in nieuwe systemen, en zat ook al in de oude. Vertrouwen: De introductie van IM heeft wel kwaad bloed gezet, omdat er opeens een schakel ging beheren, daarvoor kreeg iedereen alles altijd wel via ‘de achterdeur’ voor elkaar, dat is nu niet meer aan de orde.

Testen: 1: testen op systeem niveau. Zodra iets wordt opgeleverd waar zo’n beslis service inzit, wordt dit in zijn geheel getest. Maar daarvoor worden de regels afzonderlijk ook al gevalideerd door de juristen. Dit is soms best lastig want soms klopt één regel juridisch niet, maar in zijn geheel klopt het dan wel. Er zit dus een gat tussen het juridische denken en het logische denken en we weten niet of dit helemaal black box behandeld kan worden. Is dit wel veilig genoeg. SVB is veel massaler, IND is individueel. Hun tooling zit wel echt goed in elkaar. Dat heeft het bij de SVB niet gehaald.

12.11.6 Head information policy department

Interview met charley beekhuizen gemeente Den Haag.

Je bent hier bij de bestuursdienst, wij doen hier het informatie beleid. We hebben een CIO (concern information officer) daar zijn wij het ondersteunende bureau van. Wat onze rol vooral is:

* architectuur standaards ontwerpen.
* het programma portfolio management van de gemeente beheren om te zorgen dat allerlei projecten gestart worden om die architectuur te realiseren en ook voor de ondersteuning van de business en dat al die projecten dus passen bij de gemeente brede architectuur.

Beide activiteiten zijn complex want de gemeente organisatie heeft heel veel producten en diensten (500-600) waarin ze echt afwijken van het bedrijfsleven waar de core business bestaat uit een beperkt aantal producten, bijvoorbeeld verzekeringen of bancaire diensten. Het varieert van de zorg tot onderhoud van de stad, inrichting van algemene ruimte, sport, rijbewijzen en beleningen voor minder vermogende.. Brede scope beleningen. Je wordt wel beperkt door wet en regelgeving die bepaald wat wel en niet tot het domein van de gemeente behoort. Dit is een dynamisch begrip, want door de tijd kan dat veranderen Dit hebben we niet zelf in de hand en hier moet je beleid op maken. De relatie met de stad veranderd, van een autoritaire benaderingen tot een open gemeente te willen zijn. Dit veranderd ook van alles in de architectuur.

Onder architectuur verstaan wij een gestandaardiseerde manier van werken. Je hebt architectuur op 3 niveaus

*Business niveau
* Informatie (waar ook applicaties gegeven worden)
*infrastructuur niveau.
architectuur is een erg breed begrip, want er vallen IT vraagstukken onder maar ook veel governance issues als je kijkt naar ‘decision making’ en KPI inrichting.

Op deze 3 niveaus doen wij aan architectuur ontwikkeling. En waar we het nu over hebben is vooral het scheidvak tussen business en architectuur, dus processen en informatie architectuur. Deze aansluiting is lastig. IT was ooit een speeltje van specialisten waar de business nauwelijks bij betrokken was. Toen was het gebruiksonvriendelijk en moeilijk en voelde de business zich niet aangesloten. En nu is IT bijna randvoorwaardelijk bij het doorvoeren van de organisatie. Zonder IT geen innovatie meer, een gemeente is bij uitstek een gegevens verwerkende organisatie, een informatie fabriek. Dit is onze kernactiviteit en dat moeten wij zo goed mogelijk organiseren. Dus we hebben nu een aantal kern punten zoals enkelvoudige opslag, meervoudig gebruik, dat soort kunsten. De aanleiding was dat de rol van de IT steeds meer bij de business kwam te liggen. Nu gaat het steeds vaker de bedrijfsvoering beïnvloeden. Vroeger moest IT aansluiten bij business processen en nu zie je dat de IT een aanjager is voor verandering van de business. Je kan met IT zoveel. En dat is een belangrijke omslag. En dat maakt het zo moeilijk voor de IT, want business eigenaren kunnen dat niet delen. Deze integratie moet tot stand komen. De business moet veel meer betrokken worden bij de IT want er gebeuren dingen die ze beter moeten weten, en wat met IT opgelost moet worden. Denk aan informatie beveiligen, de business/proces eigenaren zijn verantwoordelijk want die hebben de IT geïmplementeerd in hun processen.

IT’ers moeten de taal van de business spreken. Maar al teveel hult de IT zich in vak jargon waardoor de business afhaakt. Onze architectuur concepten zijn onbegrijpelijk voor de business. Personen op de scheidslijn van IT en business moeten doelgroep gericht de IT presenteren

Bij de gemeente kan je een 8-tal hoofdprocessen onderscheiden waar de 600 processen in kan plaatsen. Onder andere subsidieverleningen (onderwijs, gezondheidszorg, woning), vergunningsprocessen, zorg (uitkeringsprocessen), beroep en bezwaar. De proceseigenaren van die 600 waren autonoom en die moet je met IT ondersteunen. 600 systemen die allemaal een klein proces ondersteunde. Dit is niet te onderhouden dus zijn we gaan kijken of er een grote gemene deler van de processen te vinden was. Dit moet je modelleren, en per proces de stappen uitwerken en welke IT component moet je daar voor inzetten. Wij hebben gekozen voor een service gerichte architectuur. Dat wil zeggen dat je architectuur componenten bouwt of binnen de organisatie hebt, een soort lego kist, die je voor zaken inzet. Dus als je 8 hoofdprocessen hebt, wat heb je dan nodig om van een begin tot een eind te komen. Die processtappen bekijk je en je BPM tool is er dan om die stappen te managen. Dat moet je dan ontwerpen en hier zit de gereedschapskist aan tools achter. Zo’n business proces werd vroeger ondersteund door 1 informatie systeem met een data base. En nu ga je gebruik maken van gemeenschappelijke IT componenten en die ga je dan inzetten en die modeleer je dan maar en dat betekend misschien dat je aspecten van je business kan weglaten omdat ze overbodig blijken. Dit is het belang van BPM. Je kunt het ook hard coderen maar dit is minder flexibel.

Op het moment hebben we meerdere BPM systemen. We bekijken nu welke eisen we hebben en gaan we opstellen zodat we 1 of 2 BPM systemen kunnen gebruiken. We hebben alfresco, oracle, Ultimus, een open source, Maar BPM wordt bij ons heel belangrijk om die processen goed te managen.

Hierdoor krijg je steeds meer te maken met private en publieke-ketenpartners. Dit moet je allemaal in je architectuur inrichten.

De gemeente zorgt voor de gereedschapskist, en de proceseigenaren zorgen dat dit fysiek gebouwd gaat worden. Wij zorgen voor de kaders en bouwen de componenten. De lego kist is bij ons in beheer, en via de proceseigenaren krijgen wij te horen of dit werk of niet. Wij verstrekken de subsidies om projecten door te voeren.

**Hoe wordt toezicht gehouden op hoever de proceseigenaren zijn qua implementatie en handhaving:** Handhaving is lastig. 8000 ambtenaren, en 600 processen die ook weer eigen leveranciers hebben. Soms is het heel aantrekkelijk om gewoon een tool aan te schaffen, wij weten dat dan niet. En als je het wel weet dan bepaal je of het wel of niet in de architectuur past. Als het ellende oplevert omdat het niet past betaal je de ‘vervuiler’. Dit is een ontwikkelingspad waar we de laatste 10 jaar op gegaan zijn. Van autonome manager met elk een eigen proces met geld, huisvesting, IT, noem maar op, naar een wereld waarvan hij alleen maar het inhoudelijke deel van het primair proces weet en middeën hiervoor moet inkopen.

Het gaat om de stad, en de burger, door de kokers werkt dat niet meer. We willen als een transparante organisatie functioneren. We hebben nieuwe media om dit te communiceren, Twitter, Jammer maar ook workshops en informatie markten, dit om proceseigenaren om te laten inzien wat ze met ‘iets’ (bijvoorbeeld geo mapping) kunnen. Zo proberen we te stimuleren tot vernieuwing.

**Welke methode gebruiken jullie bij het modelleren en inrichten van de architectuur?** Dia en archimate als modelleringtechniek.

**KPI en risico management.** We hebben een Chief information security officer (CISO), beveiliging en privacy aspecten, risico analyse. Dit staat in de kinderschoenen. Deze CISO is net begonnen. Het zou zijn rol ook moeten zijn om te kijken naar business processen en BPM gemodelleerde stappen, dat hij gaat kijken “wat betekend dit nou?”. Het is iemand die zich bezighoudt met rechtmatigheids aspecten dus hij zou dit goed moeten kunnen managen.

**Testen:** Verantwoordelijkheid van de Proceseigenaren. Er worden use-cases gemaakt, scenario’s, wat als dit, dan wordt dit uitgeschreven wat de uitkomst moet zijn en daar wordt een systeem op getest. Een Specialist vanuit de business beschrijft dit want die kent alle afwijkingen en voorwaarden. De projecten worden via Prince 2 gemanaged. Een project specialist heeft een bijzondere rol want die stuurt de regelgeving vanuit het proces. Enkel als er fundamentele tekortkomingen zijn in je toolbox krijgen wij dat te horen, maar anders niet.

**BR&PM model: Ik geef uitleg over model**

De eerste factor van strategie. Niets menselijks is ons vreemd. Mensen willen scoren en zich onderscheiden, en van wie willen wij ons onderscheiden, van andere gemeenten, dus we willen scoren op lijstjes. Bijvoorbeeld, wij willen de beste ‘gepersonaliseerde’ website, of de meeste processen ondersteund door BPM. Dit slaat eigenlijk nergens op, want in het land der blinden is 1 oog koning. In het bedrijfsleven gaat het nog om winst maken maar wij willen alleen maar sier maken. Dit zou de eerste rij aan moeten geven. Dit is niet om vernieuwend te zijn, maar om electorale winst. Natuurlijk reageren wij wel op de markt en we kijken naar wat de mondiale ontwikkelingen zijn, bijvoorbeeld als opeens cloud computing komt dan moet je daar wat mee en je ziet gewoon dat iedereen in dit gebouw denkt: “Dropbox, dat ga ik ook gebruiken”, daar gaat je beveiligingsbeleid. Dus je moet de markt en de technologische ontwikkelingen in de gaten houden want daar moeten we wat mee.

**Decision making hoe zien jullie dat, hoe gaat besluitvorming:**

wat je dus ziet is van decentraal naar centraal, bottom up... Het moet vanuit het proces komen. Geen individuele oplossingen maar oplossingen die gevraagd worden ingekaderd worden in gemeente brede
standaards. Dus wat je moet doen is dat je standaards definieert op alle niveaus en dit in veranderingsprojecten implementeren. Je moet een project start architectuur maken door hier, ingebed in je gemeentelijk architectuur, de oplossing te geven. Je geeft soort richtlijnen hoe dingen uitgevoerd dienen te worden. Zo krijg je een geïntegreerde en volwassen manier van werken en zorg je ervoor dat je bedrijfsprocessen een aanpalende relatie houd met je overige processen. Samenhang wat hier is.

Bepaalde keuzes zijn belangrijk zoals bijvoorbeeld bij DigiD, daar is in het ontwerp bewust gekozen voor geen wachtwoord management. Bij de gemeente is ‘identity’ en ‘acces’ management belangrijk. Een burger logt in, in zijn besloten omgeving, en wat mag hij doen, dus afhankelijk van de rol die je vervult krijg je rechten toebedeeld. Mag je applicaties benaderen of gegevens. Je krijgt enkelvoudige inloggen, single sign on, dit wordt steeds belangrijker en is lastig om te managen.

Een risico is dat er meerdere oplossingen zijn voor één probleem, en locok keuze is bepalend voor de oplossing, dus eigenlijk sorteren we te snel voor. Je moet meer aan vraag geleiding doen en dan oplossingen bieden en dat kan alleen bij een enkelvoudig georganiseerd loket.

54.40 Verander mentaliteit: je kan medewerkers in categorieën categoriseren, sommige zijn proces gericht vragen zich niet af waarom, maar werken enkel het stapeltje weg, andere zijn product gerichter en vragen zich af wat het bijdraagt aan het welzijn van de stad, zo heeft iedereen z’n rol, en als je in een proces werkt, en vraag je je af: “doe ik het wel goed?” Maar veel moeilijker is het dan om over het proces heen te kijken en je af te vragen wat het bijdraagt en wat doet het voor de burger. En nog moeilijker is je afvragen wat je doet en wat de gevolgen zijn voor aanpalende processen, je moet dus op een steeds hoger abstractie niveau komen, je moet een steeds bredere blik hebben. En dit is best lastig, dit betekend samenwerken, afstand doen van je eigen domein, dat is best een lastig traject. Dit ligt bij het hoogste gemeentelijke management team, die gaan kijken ‘moeten we veranderen’? We beleggen het ook wel eens bij projectleiders, die willen een expliciete opdracht toegeven. Er zijn ook autonome ontwikkelingen bijvoorbeeld het project Red tape, die keek naar: ‘zijn alle producten die we leveren wel optimaal georganiseerd, vragen we niet naar de bekende weg, verlangen we dingen die we allang weten, of stellen we geen nutteloze vragen’. Kritisch zijn op je eigen functioneren dat is best lastig. Maar binnen een proces is het lastig tot verandering te komen kijken omdat we toch snel geneigd zijn te kijken naar ons eigen proces. Problemen zoals die met de Wabo wet dwingen ons verder te kijken. Wij, IT’ers doen dat ook wel hoor, we zijn ‘innovators’. We maken van elke mogelijk gebruik om de mogelijkheden van IT te laten zien. Het begint echter met proces beschrijvingen, dit is voor IT misschien niet direct interessant, dit is meer iets voor proces analisten, die zitten bij de diensten. De business/IT alignement is wel iets wat bij ons hoort, het geen wat wij doen moet wel maximaal de bedrijfsvoering ondersteunen, en wij zijn daar niet van. Om dit te bewerkstelligen praten we met projectleiders en we participeren in projecten en daar zitten we vooral in een bewakingsrol. In deze rol zie je wel welke oplossingen bedacht worden.

12.11.7 Head department of permission and assertions

Wat doen jullie met BPM en BPR

Waterschappen zijn een soort gemeente. Onder ons waterschap vallen 22 gemeente. We zijn een lagere overheid. Droge voeten, schoon water en veilige dijken, dat is onze missie. Dit komt neer op dat we de wereld in 3 hoofd entiteiten kunnen benoemen. 1 er is een watersysteem, hieronder vallen alle waters, sloten, gemaltsjes. Dit moet op het goede pijgehouden worden. 2) waterkeringen beheer. Hier vallen dijken onder. 3) zijn de zuiveringsfabrieken.

Toen heeft onze directeur bedacht dat er 3 ‘ hoofden’ zijn. Iedereen is verantwoordelijk voor het functioneel opereren van zijn ‘taak’ voor nu en in het oneindige. Regel het maar. Daarnaast zijn er andere afdelingen, waaronder die van mij. Deze drie hoofd afdelingen zijn opdracht gevers voor de andere afdelingen. Waarbij
A Business Process & Rule Management Maturity Model for the Dutch Governmental Sector

Sommige afdelingen (waaronder deze) erg taakgericht zijn, wij verlenen vergunningen en wij zijn erg zelfstandig. Andere zijn capaciteit gedreven, maar deze moeten meer aangestuurd worden.

We hebben geen actieve BPM of BPR. Maar er is een afdeling Kwaliteit Arbo en Milieu en er is een directie, die willen allemaal overzicht. Er is een afdeling automatisering, informatizeringen en werking unie van waterschappen. Al deze afdelingen zijn op zoek gegaan naar WIA (.waterschapsinformatie architectuur). Dus die hebben de hoofdprocessen en de samenhang hiertussen bedacht. Hoe hangen deze samen en waar vind je deze. Daarnaast wordt tijdens automatiseren ook BPM gedacht en hier horen ook tools bij. Voor ‘mijn’ proces wil ik de samen hang zien tussen de processen.

Als je begint te modelleren en processen in kaart gaat brengen zijn keuzes heel relevant en heel concreet. Eenvoudige hoofdprocessen: watersysteem beheer, keringen en waterzuiveringen, met eventueel nog een planning-, en control-cyclus daaromheen. Maar van oudsher is dit heel anders. Dus keuzes gemaakt op het hoogste niveau zijn al heel belangrijk. Verschillende perspectieven worden binnen de organisatie gezien. Voor kosten verdeling is er namelijk weer een ander perspectief. Er is dus niet 1 centrale sturing bij ons.

Hoe gaat sturing van een project. Hoofdwatersysteem beheer is verantwoordelijk voor het water. Deze start een groot project om zeker te weten dat over 10 jaar zijn gebied weer goed is. Dus die laat een project uitvoeren. Hij is hier de opdrachtgever voor . goede project rapportages zijn van belang.

We hebben een Oracle systeem die alles bijhoud en dit gebeurt ook in Excel spreadsheet. We moeten krediet krijgen voor een project.

Wij hebben 15 pagina’s aan wetten waar we aan moeten voldoen. Hier gaan we heel slim mee om. We kennen ze, we hebben ze, en we organiseren ons hierop.

Twee jaar geleden ging de waterwet op zijn kop. Er zijn verschillende soorten wetsveranderingen als je kijkt naar de impact van de verandering. Twee jaar geleden is de waterwet van kracht gegaan, toen ging de wereld op z’n kop. Waterschap was bevoegd gezag, en nu zijn de gemeenten dat. Dus deze wet zorgde voor een taakverschuiving van overheden. We hebben er twee jaar over gedaan om op papier te krijgen dat er met die waterwet 3 soorten processen zijn ontstaan. Meldingen, reguliere vergunning en uitgebreide procedure. En daar zitten wettelijke termijnen aan. Voordat je zoiets hebt ingevoerd ben je een jaar verder. Hier moet je op anticiperen en op D-day is het zover, of niet. Een andere soort business rule is dat de wetgeving bepaald dat zodra het Omgeving Loket online (OLO) er is dat organisaties via OLO vergunningen moeten indienen. We doen nu alles op papier, vanaf dan moet alles elektronisch. Deze rule heeft een enorme verandering, maar we zijn er klaar voor. Hoe werkt dit? Weten dat het gebeurt, alert zijn met elkaar, en erop sturen als afdeling, dat het gebeurd. Maar niet mechanistisch. Dit is een verandering die een heel proces op zijn kop zet. OLO is nationaal geregeld en gemodelleerd dus dat hebben we niet zelf gedaan. Aan de achterkant hebben wij onze business rules ingeleverd. Er is geen rule engine, dit is veel te ver weg. We hebben nu software voor vergunningverlening en handhaving daar zitten een aantal proces stappen en types in, maar rule engines is pas waar we over 10 jaar aankunnen beginnen. Regels veranderen vaak, maar kan je dit managen. Hoe kan je dit doen. Stel dat de wet veranderd, hoe kan een rule engine dan flexibel zijn. We staan aan de vooravond van zakgericht werken. Zodra er een e-aanvraag binnenkomt worden er dingen gevraagd en die zijn voor-gemodelleerd. Als je bij een aanvraag aan bepaalde voorwaarde voldoet mag je plaatsen. Dus deze criteria zitten op allerlei plaatsen verstop. Dit willen we automatiseren. Hiervoor gebruiken we verschillende standaarden en systemen, Oracle-based maar ook veel in het hoofd. Elke aanvraag wordt bijvoorbeeld nog persoonlijk bekeken. Maar is dit makkelijk te automatiseren? Simpele meldingen worden in een flow schema gezet. Want er zijn kwantiteitscriteria. Water onttrekking mag, maar lozing is maar beperkt. De criteria zijn logisch, maar de samenhang is ingewikkeld. Hierop zijn we nu aan het kauwen. Ook het bredere verband (de unie van waterschappen is hier mee bezig)
Hoe zit het met Business en IT. hoe worden automatiseringsprojecten aangepakt. Er is een E-ambitie, dit is een groot plan voor de komende 5 jaar, dit is strategisch door de directie samengesteld. Per afdeling wordt gekeken naar wat er op onze weg komt en welke investering is hiervoor nodig en welke informatie analyse behoefte hebben we. Dus wat dat betreft is de alignement tussen die afdelingen er. Onze afdeling heeft geen IT afdeling, we hebben functioneel applicatie beheer of super users maar dit is een aparte IT afdeling. Ik vind er wel wat van en ik stuur er wel op, maar ik hoef geen aparte IT afdeling. Ondersteuning van het in kaart brengen van die processen wordt gedaan door Powerpoint. We krijgen zowel elektronische als papieren aanvragen. Dit wordt verwerkt in systemen, vergunningen worden opgeslagen in document management systeem en de proces verbanden brengen we wel aan. Maar soms verhuist papier van bureau naar bureau. Communicatie gaat via het hoofd van de afdeling, maar ook via functioneel applicatie beheerder, en ad-hoc via de medewerkers.

We zijn nog niet zo gemechaniseerd en ge-orchestreerd. Alle afdelingen ondergaan risk control. Wat is het risico dat je niet iets buiten toezicht houd waar een ramp gebeurd, of dat je foutief vergunningen afgeeft. Onze criteria zijn niet zo hard. Voor vergunningen worden beleidsregelingen opgesteld. Vergunningen worden afgewogen, het is vaak een belangen afwegingen. Het zijn geen zwarte wit criteria. Daaronder zit een laag met harde criteria en dat zijn de algemene regels. Daar zou de harde business rule kunnen worden toegepast. Er is wel overzicht van statistieken. Dus hoeveel aanvragen komen binnen, en hoeveel hiervan worden afgewezen op basis van onvoldoende documentatie. Wij zijn geen massa productie fabriek.

12.11.8 Concern Architect
Ik werk nu zo’n 20 jaar voor de belastingdienst. Nu bij CI Office. Als je de belastingdienst ziet heb je een aantal bedrijfsaspecten die rapporteren allemaal aan de directoraat generaal belastingdienst, de belastingdienst is dus niet zoals de UWV en IND, die meer zijn meer een op afstand geplaatst uitvoeringsorgaan, maar wij hangen nog wel heel direct onder het ministerie. De afdeling waaraan gerapporteerd wordt en van waaruit sturing plaatsvindt heet Degibel en een onderdeel daarvan is een cluster die zich op informatie voorziening richt en daar sturen we hoe de informatie voorziening zich in de organisatie ontwikkeld en krijgen we dat ook terug gerapporteerd, dus dat is heel beleidsmakend. En ik ben daar verantwoordelijk voor de architectuur en heb afgelopen jaren in de praktijk nogal wat experimenten gedaan met het vernieuwde bedrijfsconcept voor de belastingdienst. Met alles wat we weten over digitalisatie van informatie, hoe zouden we de belastingdienst dan kunnen inrichten. Dat hebben we ook concreet gemaakt in een nieuwe dienst naar buiten toe voor een aantal maanden. We hebben een dienst en een concept opgeleverd. FBTO heeft dan DITZO, zoets hadden wij voor ondernemers gemaakt, en veel van geleerd, en de ideeën ben ik aan het inbedden voor het beleid hoe de organisatie zich verder ontwikkeld. Hier kijk je dus naar hoe gaan we met beleidsprocessen en bedrijfsregels.

Wat verstaan jullie onder bedrijfsregels? Je hebt heel veel regels in de bedrijfsontwerpend functies, personeelsbeleid, en dat soort zaken, daar heb ik het niet direct over. Ik heb het over regels die eigenlijk direct een manifestatie zijn van wat in de wet staat. En die zijn leuk. Beslis regels, reken regels, fiscaliteit. Hoe kom je nou tot een uitvoeringsorganisatie met een informatie voorziening die voldoet aan de regels die in de wet staan? Dat is een belangrijk spanningsveld in ons werk. En je moet je realiseren, dat je bedrijfsregels en bedrijfsprocessen uit elkaar worden gehaald alsof dat vanzelfsprekend is, als je daar 10 jaar geleden over sprak waren er toch heel veel mensen die keken alsof ze water zagen branden. Toen werden processen en regels gezien als 1 ding. Dus in die zin is er wel heel veel gebeurd in die wereld. Nou heb je ook nog bij ons stukken organisatie waarvan mensen zeggen die daar gewerkt hebben ‘ik ben 10 jaar weggeweest en er is niks veranderd’. Met name registratie en successie is zo’n stuk, dat is nu wel in beweging aan het komen, maar 3 jaar geleden was dat nog precies zo als 20 jaar geleden. Die wet is wel veranderd, maar hoe ze ermee werken is niet veranderd. Dat het allemaal nog bij elkaar hoort en dat het hangt aan personen wie wat weet en wie het dus ook moet uitvoeren, dat soort zaken. De regels zijn zelfs niet gëxpliciteerd zijn want die heeft de wet
goed gelezen en dus snapt het goed. Het is dus in het kader van de digitalisering is de mensheid zich bewust aan het worden dat het uit elkaar trekken van die twee voordeel heeft.

Iedere afdeling heeft zijn eigen informatie voorziening hier, het is helemaal doorgetrokken. In totaal hebben we 30 000 FTE en 5000 FTE is werkzaam in de informatievoorziening en proces ontwerp.

De belastingdienst is een grote organisatie waar heel veel werk situaties voorkomen. Dus we moeten naar het model kijken waar je naar wil kijken om dan te kijken waar jij op wil richten. Drie jaar is hier helemaal niks, wil je een ontwikkeling gaan bekijken dan moet je toch aan zo’n 3 tot 5 jaar denken voor je resultaat ziet.

Model erbij [uitleg opbouw van het model]. Het interessant om hem toe te passen op de aanslagbelastingen. Hier spelen ook bedrijfsregels een belangrijke rol. Beslisregels, maar ook risico regels zijn belangrijk. Welk aangifte profiel willen we op kantoor zien en welke aangifte accepteren we direct. Eind jaren 90 heeft hier een grote verandering plaatsgevonden. Nu is de belastingdienst voor het model gegaan wat we massale processen noemen, zodat niet elke aangifte door een medewerker wordt nagekeken. Er zijn genoeg contra gegevens om te kijken of er afwijkingen zijn en op basis van die kennis kunnen we de aanslag opleggen. Hier moet je letten op de regels die door de wet toegestaan moeten worden, en de risico regels. Dat contrast moeten we bekijken. De situatie hiervoor, en nu. Sommige ontwikkelingen zijn gestagneerd. Door herinrichting van dit proces ontstond capaciteit, en dit verklaard ook waarom de toeslagen en loonheffing keten bij de belastingdienst gekomen zijn.

Je staat als overheid mindere mate in concurrentie. Dus je bent daar meer volgend dan leidend.

Is er sprake van ‘op lijstjes scoren’? factoren onderling spelen hier een rol, en internationaal. Dit is een streven, maar ik kan geen activiteiten aanwijzen waar dat echt gebeurd. We reageren op de omgeving, en dan zijn we volgend. Passief dus vind ik.

Nu: het gedrag is veranderd met het oog op de fiscaliteit. Eerst werd alles stuk voor stuk bekeken zonder ‘aanzien des persoons’ maar er is via risico gericht toezicht, toegegroeid naar doelgroep gericht toezicht. En dan komen toezicht en dienstverlening in de organisatie heel dicht bij elkaar te liggen. Die verandering zie je dus, dat we voor het oog herhaalbare processen hadden en iedereen krijgt de zelfde smaak, dat we nu toegroeien naar een zelf bedieningsmodel en er is een toezichthoudende organisatie, dat is dus uit elkaar gehaald, en die gaat kijken naar doelgroepen in die klanten groep, en zoekt ook actief die doelgroepen op, past daar diensten op toe dat het uiteinde doel van de belastingdienst, compliancy (je doe de aangifte die je moet doen) bereikt wordt. We helpen dus mensen door aan te geven, je hebt een lease auto, vergeet je niet aan te geven, tot je hebt je auto niet aangegeven, wil je dit corrigeren, je hebt het niet gecorrigeerd, maar je hebt die auto toch, dus we leggen je een boete op, tot strafrechtelijke vervolging. We beginnen met een wortel voor te houden en als het dan niet werkt gaan we slaan. Zo zit onze marketing in elkaar. Bij toeslagen speelt dit nog iets minder. We zijn dus heel doelgroep gericht gezien, zodat je daar je toegevoegde waarde levert. Dat is het contrast dat de organisatie doormaakt. Vroeger elke aanvraag hetzelfde proces, en nu continue kijken wat je doelgroep aan het doen is, en je daar op afstemt.

De Belastingdienst is eigenlijk al heel lang een proces organisatie. Eind jaren 60 werden die aangifte al heel rustig en geordend gecontroleerd. Er werd op kantoren wel verdeeld van: jij doet die posten, en jij doet die posten. Er is al heel gauw op ingericht, die kantoren. Sterke administratieve voorbereiding. Er werd integraal gekeken, maar wel in de scope van 1 regeling, dus de inkomstenheffing. Met name bij ondernemers en bij burgers hebben de inkomstenheffing en toeslagen verstrekking hebben wat met elkaar te maken en ga je dat bundelen of niet? En de afhandeling daarvan. Dus wat noem je een proces. Eind jaren 90 is de omslag van kantoor proces naar mechanische proces. Dat zijn dingen die zijn zo groot die gebeuren niet op een dag. In die hele aangifte behandeling is daar naar gekeken en toen kwam men erachter, er komt nog maar 20% op kantoor, en het duurde lang voordat men wist, hoe gaan we met die 20% om, en dat wordt nu pas
gestandaardiseerd, 10 jaar later.

Was: veranderingen doorvoeren op losse elementen.

Nu deze doelgroepgerichte aanpak wordt voor verschillende regelingen uitgevoerd. Dus jij bent ondernemer dus je hebt inkomstenbelasting, loonbelasting en je bent vennootschapsbelasting verplicht, die branche, dus je collega’s deden dit en dit in het verleden fout dus hou hier rekening mee. Dus eerst was het per belastingregeling en tegenwoordig proberen we processen die van belang zijn voor meerdere regelingen ook op al deze regelingen toe te passen.

Van proces tot proces worden veranderingen doorgevoerd. En dat zijn we nu aan het uitdragen, wat betreft digitalisering van vraagstukken.

Ik denk dat die hele mechanisatie slag is gegeven is door kosten efficiëntie maar ook consistentie van uitvoering. Dit is een hele belangrijke driver geweest om te automatiseren. Nu vooral ook om kosten te verlagen. Maar het heeft erg te maken met het weer buiten. In de jaren 90 stond bij de overheid rechtsgelijkheid boven aan en nu moet de overheid niet duur zijn. Strategie van de belastingdienst wordt door de overheid bepaald.

Als je kijkt naar IT bij de belastingdienst dan kom je op de bietenbrug. De formele methoden beschrijven namelijk alleen die processen waar volgorde essentieel is. Wat voor informatie verwerkende organisaties veel gebeurd is, dat werk met een mechanistisch karakter ondergebracht is in een automaat. En daar is het ons niet gelukt om vanuit het model te genereren naar code. Maar het neven effect is, het proces die van dat type, zijn van de kantoren verdwenen. Dus het werk wat nu op de kantoren plaatsvindt daar is men wel met dit soort gereedschap aan het werk gegaan, maar dat liep vast. Het is namelijk gewoon kennis werk. Er zijn een paar organisaties succesvol geweest om hun legacy integratie in zulke systemen te doen, maar dat speelde hier niet dus daar zijn we niet op in gegaan.

Wat betreft de echte tooling: We gebruiken geen tooling of BPM systeem. We hebben wel voortgang en volledigheidsmetingen in het massale proces, maar dat is niet je informatie technologie als hier bedoeld.

punt 6 Veel systemen zijn silo gericht. We zitten nu in de fase dat data uitwisseling onderdeel uitmaakt van die systemen. Daar gaan we nu heen.

GOVERNANCE: vanwege de accountability die er bij een overheidsorganisatie aanwezig is, is dit altijd wel duidelijk geweest, als je het hebt over het primaire proces in ieder geval. De rol van een inspecteur staat in de wet. Alle inspecteurs in het land hadden hun eigen tentje in de lucht in de jaren 50. Tot die omslag kwam, toen die processen in de kelder in Apeldoorn gingen lopen. En dat heeft zich toen geëvolueerd en dat is de situatie waar we nu in zitten. Er is iemand in Apeldoorn verantwoordelijk voor het massale werk, en dat marktgerichte toezicht, daar worden regionaal mensen voor aangesteld en daar is men nu aan het standaardiseren. Sommige activiteiten worden landelijk geconcentreerd die kan je gewoon vanuit 1 kantoor doen.

Beslissingen die in het proces plaatsvinden zijn nooit ad-hoc geweest want de wet is niet ad-hoc. Daar was wel de rechtsongelijkheid die zorgende voor het gevoel dat men zich niet hetzelfde voelde. Dit was niet omdat het niet goed opgeschreven werd, maar omdat het verkeerd gelezen werd. Want dat heb je nou eenmaal bij 5000 mensen. Bestuurlijk kan ik zeggen dat er soms dingen besproken werden en gezegd werd, we zijn hier gekomen en als je ging kijken waarom dan kwam je erachter dat die man over 30 jaar belastingdienst aan kon geven in welke fase hij gezeten had dus waarom de beslissingen zo genomen waren. Dus dat was altijd op basis van ervaringen uit het verleden. Lager zijn ze nooit geweest hier, soms waren bestuurders wel slecht. Op dit niveau worden er goede notulen geschreven, maar als je dieper in de organisatie komt krijg je veel meer het adhoc gevoel, en dat heb je in alle organisaties omdat de beslissingen kleiner zijn.

De belastingdienst is van nature slecht in KPI’s. maar een getalsmatige kwaliteitsverbetering heeft er nooit sterk ingezeten. Men is wel sterk bezig met fiscale monitors, welk beeld wekken we op in de maatschappij en
dat doelgroep gericht toezicht, daar zit dat wel heel erg in. Dat is dus meten en weten. Daar zit plan - do - check - ack in. We verwachten dit en dat, kijken dat na en reageren hierop om dit geheel op een hoger niveau te krijgen. Fouten krijg je terug in externe signalen. Er is wel ‘damage control’ voor als er echt iets heel erg mis gaat. Dit is vanaf jaren 90 ingesteld.

People & culture: Ik denk dat in de oude opzet van de organisatie mensen gewoon hun taak kregen uitgelegd, stapeltjes wegwerken. Er waren wel mensen met overzicht, maar enkel die laatste zijn overgebleven. Hersenloos werk is geautomatiseerd en het werk dat enkel gedaan kan worden met oog op het gewenste effect is overgebleven. De coachende vorm van leiding geven is inmiddels in de organisatie geland. Als ik denk aan mentaliteit tijdens het veranderen zie ik twee soorten. Verandering om de inspectie minder macht te geven dat was een hele pijnlijke met veel weerstand. Er kwam capaciteit vrij, maar omdat hun baan niet in gevaar kwam was er weinig weerstand want de tendens is dat het interessante werk op kantoor blijft. Ik heb vanuit de technologie wel delen van de voorlichting gedaan, maar heb nooit grote weerstand vernomen. Bestuurlijk : de directie vanuit het beleidsministerie zette een automatisering uit wat op de kantoren werd uitgezet, en dat levert natuurlijk altijd weerstand op omdat je het niet zelf bedacht hebt. En ook omdat ik heb meegemaakt dat weken werk kwijtgeraakt was omdat het nog niet goed liep. De strategie werd niet goed gevolgd dus men wist niet wat de essentie van de verandering was. Dit zou verander kundig nu wat anders aangepakt worden. Nu gaan de directeur de bühne op en zegt: ‘dit wil ik veranderen’. Eerst werden veranderingen bedacht en uitgelegd en uitgewerkt naar beneden toe, heel kunstmatig, maar nu wordt moeten medewerkers de verandering zelf meedragen. Draagvlak is heel belangrijk aan het worden.

Kennisdeling: vroeger was er kennis binnen een kantoor. Maar nu is er een intensief netwerk van kennis deling. Hoe gaan we het landelijk doen. Keten partners worden hier steeds meer bij betrokken, maar het ligt er wel aan waar het over gaat. De toeslagen is bijvoorbeeld helemaal afgestemd met de ketenpartners.

Decisional rules: change handeling: een wijziging binnen een bestaande wet kunnen we redelijk snel afhandelen. Maar het is niet zo dat alles netjes in een BRMS zit. En vroeger zaten de regels veel meer verborgen in de processen en in de hoofden. We weten nu veel beter waar de regels zijn werk hebben. Maar dat we dat allemaal met versie beheer en traceerbaarheid als een BRMS systeem hebben ingericht, zover zijn we nog niet.

Het initiatief van aanpassen zit in de bedrijfsorganisatie en die geeft het door aan de IT afdeling en zij implementeren het. De tijd dat de IT’ers met het wetboekje ook nodig had is voorbij. Maar na 3 snelle veranderingen achter elkaar kom je er achter dat dit niet handig is en wordt je al snel deze richting in gedrukt. De IT afdeling heeft toen wel de structuur van de code aangepast maar hierbij is niet het initiatief en de leiding bij de business komen te liggen om hier optimaal gebruik van te maken. Het is meer een IT groepje geworden met heel veel business kennis.

Architectuur: architectuur denken op bedrijfsniveau is nog maar 4 jaar oud, of misschien iets ouder. Dus in de tijd voor die grote verandering was er wel een verandering in het bedrijfsconcept gaande maar vooral was men in de techniek er bekend mee. Ze namen waar dat sommige delen vaak veranderde dus dat het handig was dat te scheiden. Dus dit was erg informeel, en we zijn nu bezig dit te formaliseren. We zijn bezig met de afleiding van de wet steeds helderder te maken.

Er is een Babylonië geconstateerd en dat maakt het nut van zo’n model wel heel duidelijk.
## 12.12 Governmental BP&RM Maturity Model

<table>
<thead>
<tr>
<th>MATURITY LEVEL</th>
<th>Siloed activity awareness</th>
<th>Repeated</th>
<th>Managed</th>
<th>Valuation control</th>
<th>Fully agile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scope</td>
<td>• Niet reageren op de omgeving</td>
<td>• Reageren op de omgevingsdynamiek (passief)</td>
<td>• Anticiperen op resultaten uit het verleden (er wordt geleerd van het verleden)</td>
<td>• Continue verbetering/vooruitgang (PDCA-cyclus, pro-actief)</td>
<td>• Mogelijkheid om de omgeving te voorspellen.</td>
</tr>
<tr>
<td>Scope</td>
<td>• Losstaande activiteiten vinden plaats. (nog geen processen)</td>
<td>• Een proces wordt gezien als een los elementen in de organisatie.</td>
<td>• Processen zijn in samenhang met elkaar en houden rekening met andere processen</td>
<td>• Processen zijn in samenhang met elkaar en houden rekening met andere processen binnen de waarde keten</td>
<td>• Processen zijn gekoppeld aan de strategie van de organisatie.</td>
</tr>
<tr>
<td>Gebruik van formele methoden</td>
<td>• Methoden zijn in concept – methoden voor proces en rule ontwerp &amp; modellen voor as is en to be situatie worden in overweging genomen. (plan)</td>
<td>• Methoden voor vertaling van proces en rule modellen naar uitvoerbare business proces specificaties. (DO)</td>
<td>• Methoden die storing geven voor de verzameling en samenvoeging van proces en rule control- en performance measurement- data (Check)</td>
<td>• Methoden die de ontwikkeling van proces en rule verbetering faciliteren. (Act)</td>
<td>• Evaluatie van de methoden die organisatie breed worden ingezet, is mogelijk. (elaborate act)</td>
</tr>
<tr>
<td>Systeem integratie.</td>
<td>• Organisatie kenmerkt zich door veel losstaande systemen</td>
<td>• Point-to-point integratie tussen systemen (lokale systemen met interfaces ertussen)</td>
<td>• Meerdere systemen binnen het proces zijn aan elkaar gekoppeld en wisselen data uit. Hoewel de integratie nog steeds point to point is, is er wel sprake van integratie denken.</td>
<td>• Meerdere systemen binnen de enterprise zijn aan elkaar gekoppeld en wisselen data uit. Hoewel de integratie nog steeds point to point is, is er wel sprake van integratie denken.</td>
<td>• De ondersteuning van een proces worden beheerd door één overkoepelend systeem.</td>
</tr>
<tr>
<td>Governance structuur.</td>
<td>• Rollen van autoriteit en verantwoordelijkheden zijn niet formeel beschreven.</td>
<td>• Individuele verantwoordelijkheden beschreven binnen het proces</td>
<td>• Verantwoordelijkheden en rollen zijn op elkaar afgestemd binnen de betreffende afdeling. (proces eigenaar)</td>
<td>• Leidinggevende wordt verantwoordelijk gehouden voor de resultaten</td>
<td>• Manager wordt verantwoordelijk gehouden voor de gehele service, deze is proces overstijgend.</td>
</tr>
<tr>
<td>Decision making</td>
<td>• Beslissingen worden ad-hoc genomen</td>
<td>• Beslissingen worden genomen op basis van ervaring uit het verleden.</td>
<td>• Beslissingen in het verleden zijn gedocumenteerd en hier wordt lering uit getrokken</td>
<td>• Beslissingen worden genomen in het belang van het verloop van het gehele proces.</td>
<td>• Beslissingen worden genome in het belang van het verloop van de gehele service, deze is proces overstijgend.</td>
</tr>
<tr>
<td>Monitoring</td>
<td>• Fout afhandeling is ad hoc (Er zijn geen KPI's gedefinieerd)</td>
<td>• Metingen worden gebruikt voor fout controle.</td>
<td>• Metingen worden ingesteld voor analyse van processen. Kwaliteit wordt gemeten</td>
<td>• Metingen worden ingesteld voor proces verbetering. Dit is afgestemd met de scope van de processen</td>
<td>• Sturing op metingen is direct mogelijk (regelkring)</td>
</tr>
</tbody>
</table>

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**Notes:**
- The table outlines the maturity model for the Dutch Governmental Sector focusing on various aspects such as strategy alignment, governance, decision making, monitoring, and information technology.
- Each maturity level describes the level of activity awareness, repetition, management, valuation control, and fully agile perspectives.
- The content highlights the progression from siloed activity awareness to fully agile, detailing the changes in process, method, tooling, and governance structures.
- Special emphasis is given to the integration of processes, decision-making, and monitoring, reflecting the need for continuous improvement and adaptability within the governmental sector.
<table>
<thead>
<tr>
<th>Decision rules</th>
<th>People &amp; culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architectuur</td>
<td>Training (leiderschapstijl)</td>
</tr>
<tr>
<td>Informele business/decisional rule architectuur</td>
<td>De organisatie treint personeel door uitleggens en waarom bepaalde taken uitgevoerd dienen te worden.</td>
</tr>
<tr>
<td>Noodzaak van business beslissingsstandaarden is vastgesteld binnen de bredere architectuur standaarden.</td>
<td>Personeel weet wat en waarom bepaalde taken uitgevoerd dienen te worden.</td>
</tr>
<tr>
<td>Business beslissingsstandaarden zijn opgericht en gemanaged binnen de bredere architectuur standaarden</td>
<td>Coachende benadering en uitdagen dit daadwerkelijk uit te voeren</td>
</tr>
<tr>
<td>Continue verbeteringen van business beslisarchitectuur binnen de bredere architectuur standaarden.</td>
<td>Training op vaardigheden. Middelen worden beschikbaar gesteld om kennis zelf op te doen. Medewerkers worden los gelaten</td>
</tr>
</tbody>
</table>

| Kennis cultuur en mentaliteit | Verander mentaliteit/management betrokkenheid/inzet |
| Specialisten beschikken over veel kennis maar er heerst angst om dit te delen Ik tegen de rest | Organisatie wil niet veranderen, grote weerstand gekenmerkt |
| Kennis wordt gedeeld maar enkel binnen kleine teams. Wij tegen de rest | Team leiders zien noodzaak en zijn bereid te veranderen, ware het niet op puur uitoeverend niveau. |
| Top down wordt ingezien dat er overkoepelend gewerkt dient te worden, echter op de werkvloer is nog enige weerstand merkbaar (geld ook vice versa; dus bottom up. Vanaf de werkvloer wordt samengewerkt maar hogerop is het nog ieder voor zich) | Organisatie breed wordt de theorie van veranderen geaccepteerd maar er is geen kennis over het hoe en wat omtrent veranderen. |
| Communicatie en kennisdeling tussen afdelingen verloopt soepel via afdelingshoofden | Er is algemene bereidheid voor Verandering maar deze is enkel gericht op eigen team/task. |
| Er wordt buiten de grenzen van de organisatie flink geïnvesteerd in kennisdeling. Enerzijds in de selectie van partner organisatie maar ook door middel van kennis deling tijdens congressen met ‘currenten’ | Verandering wordt gezien als een natuurlijk iets binnen de organisatie en dit wordt door management ook uitgestraald. |

| Verander aanpak | kennis cultuur en mentaliteit |
| veranderingen worden ad hoc aangepakt. | veranderingen worden ad hoc aangepakt. |
| veranderingen worden mogelijk gemaakt door middel van automatische analyse | veranderingen worden mogelijk gemaakt door middel van automatische analyse |
| mogelijkheid om de impact van regel veranderingen te voorspellen en testen | Real-time optimalisatie van business beleid aan veranderende externe factoren om de voorspelde veranderingen in business modellen en statistieken te voorkomen. (stabil blijven functioneren ondanks omgevingsveranderingen) |

| Business autonomie / controle | Business autonomie / controle |
| De IT afdeling is de verantwoordelijke eigenaar van de regels een hoog risico op het verliezen van business controle gaat hiermee gepaard. | De IT afdeling is de verantwoordelijke eigenaar van de regels een hoog risico op het verliezen van business controle gaat hiermee gepaard. |
| Business analisten leiden de ontdekking van beslissingsregels voor de locale units, een verbeterde taal consistentie tussen de units gaat hiermee gepaard. | Business analisten leiden de ontdekking van beslissingsregels voor de locale units, een verbeterde taal consistentie tussen de units gaat hiermee gepaard. |
| Business analisten beschrijven de vorm van beslis regels en dit wordt verwerkt door IT | Business analisten beschrijven de vorm van beslis regels en dit wordt verwerkt door IT |
| What-if scenario maken het mogelijk voor business analisten om geautomatiseerde regels te genereren en testen. | What-if scenario maken het mogelijk voor business analisten om geautomatiseerde regels te genereren en testen. |
| Mogelijkheid om regels aan te passen en te veranderen zonder de hulp van de IT-afdeling. | Mogelijkheid om regels aan te passen en te veranderen zonder de hulp van de IT-afdeling. |

| Systeem | Systeem |
| Regels zijn gebonden aan de proces modellen en zitten begraven in code, documenten en hoofden van personeel, enkel handmatige analyse van rules mogelijk. | Regels zijn gebonden aan de proces modellen en zitten begraven in code, documenten en hoofden van personeel, enkel handmatige analyse van rules mogelijk. |
| Regels zijn opgeslagen in spreadsheets | Regels zijn opgeslagen in spreadsheets |
| Integratie van beslissingsregels met use-cases | Integratie van beslissingsregels met use-cases |
| Bronregel repository met traceerbaarheid van de regels en regelsets worden gedeeld als een services over processen en systemen | Bronregel repository met traceerbaarheid van de regels en regelsets worden gedeeld als een services over processen en systemen |
| Potentiële regels worden gesimuleerd | Potentiële regels worden gesimuleerd |
| Versie/tijd management met betrekking tot de beslisregels is mogelijk. | Versie/tijd management met betrekking tot de beslisregels is mogelijk. |
| Regels in een BRMS system. | Regels in een BRMS system. |