Developing a Maturity Matrix for Business Process Outsourcing

Thesis Research Report

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ABSTRACT

Organizations are outsourcing processes to save costs. Most organization do not achieve the anticipated cost savings which is typically the main driver. Research shows that a level of readiness is required to achieve success in BPO projects. The level of readiness is inter alia determined by processes readiness. Process readiness is also described as the formalization of the processes. Organizations find difficulties formalizing their processes. One of the reasons is that the decision steps within the processes are a nexus of governance and regulatory compliance objectives. Business rules are applied to the decision steps within the processes. Since changes occur most often in business rules it is recommend for organization to have their change management focusing on business rules. Maturity in business rules increases a firm-level agility, rapid rule updates, improved multi-channel management, greater control of business rule updates by the business staff, reduced system development, in addition to significant improvements in rule consistency, accuracy and reliability (Morgan, 2002). To become mature in business rules, strict governance is required. The research focuses on the structure of business rule governance to achieve organizational readiness for BPO. A design research is conducted to develop a maturity matrix in business rule governance. The results of the thesis project describe the first steps in implementing a business rule approach to achieve a level of agility which corresponds with a required organizational structure to achieve readiness for BPO projects.

Tags: business rules, business rule governance, business process outsourcing, maturity matrix

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1. INTRODUCTION

Business process management (BPM) is a widely known term and largely presented in scientific literature (Rosemann, 2005). BPM is about discovering the relationships between business process participants, analyzing and redesigning them, defining performance metrics for each participant, and monitoring and optimizing their performance (Korhonen, 2007). Managing processes improves an organizations customers focus and helps organization streamline their processes (Zairi, 1997). One aspect of designing business processes is the formulation of business rules (Von Halle, 2002).

A business rule is also defined as "the set of conditions that govern a business event so that it occurs in a way that is acceptable to the business" (Von Halle, 2002). Business rules can restrict or guide activities within a process. Managing business rules ensure organizations to make consistent decisions, which result in high quality results of the processes (Von Halle, 2002) (Nelson et al., 2010). Managing business rules to avoid duplications or inconsistency between the rules is called business rule management (Von Halle, 2002). Because business needs to respond quickly to changing environments, frequently changes occur in the business processes and rules. Strict governance of the business processes and rules is necessary, which brings us to the factor business process governance. Business process governance is "a set of guidelines focused on organizing all BPM activities and initiatives of an organization in order to manage all of its business processes" (Kirchmer, 2011).

Business process governance is largely represented in scientific literature. However the Business process governance factor is well known in the BPM domain it is not known how business process governance elements correspond to business rule governance. Business rule governance is not widely represented by scientific literature and is considered as a new focus for organizations (Von Halle, 2002). Business rule governance should not be implemented in isolation. Khusidman (2010) sees all categories of governance, such as process governance, IT governance, and business service governance, as parts of an organizations "Ecosystem of governances" with similar approaches. Such integrated viewpoint of all governance initiatives within an organization increases efficiency of new ventures (Khusidman, 2010).

Corporate governance structure increases an organizations transparency, integrity and accountability (Santana et al., 2010). To create such corporate governance structure, one should know what the key elements are of governance (Santana et al., 2010). Indicating the elements of governance enable improvement of an organization initiatives (Santana et al., 2010). Since business rules and business processes are closely related one can assume that the business processes governance elements are also applicable for business rule governance. This leads to the question: "What is the relation between the business process governance elements and business rule governance?". The relation between business process governance elements and business rule governance provides organizations with an overview of elements that influence BRM. Such an overview can be used to determine a business rule governance structure and guidelines can be created how to achieve such structure. Identification of the elements can also clarify the required resources necessary to achieve the governance structure and how this structure can be implemented into their current corporate

governance structure. The guidelines and resources facilitate collaboration and communication during process initiatives. Good governance is necessary for the success of business processes, which in turn, contributes to business success (Markus and Jacobson, 2010).

Business success also includes Business Process Outsourcing (BPO). BPO is, according to Martin et al. (201), one of the most promising instruments of BPM that optimize performance in both core and non-core business processes. Unfortunately BPO received little attention in scientific literature (Rouse and Corbitt, 2004). According to Martin et al. (2010) BPO success is determined by an organizational readiness. Organizational readiness can be divided into three factors, namely process readiness, IT readiness, and business management readiness which in turn are driven by the smooth alignment between business and IT. The process readiness factor only implies the formalization and documentation of the processes. Business rules governance is slightly different from traditional business process governance and requires different governance structures to achieve process readiness. Martin et al. (2010) describes IT readiness as IT infrastructure flexibility and sufficient business knowledge of IT managers. What this means for a business rules management system is not discussed and requires thorough research. This also applies for the factor business management readiness and no scientific literature was founded about rule governance and its relation with BPO.

2. OBJECTIVE AND PROBLEM STATEMENT

Rosemann and de Bruin (2005) state that business success is depended on process success. Process success depends on a numerous amount of independent factors which affect the performance of processes (Rosemann & de Bruin, 2005). One of the independent factors that affects process success is governance. The other factors are; strategic alignment, IT, methods, people, and culture (Rosemann & de Bruin, 2005). If process success is affected by business rules governance, then there should also be a correlation between the organizational readiness and business rules governance because Martin et al. (2008) stated that organizational readiness is dependent on process readiness which correspond to process success. This brings us to the objective of this thesis project to propose a business rules governance framework, which provides interdependencies between the governance elements and relate these to the business rules governance processes to determine organizational readiness for BPO. The formal research question is:

"How should business rules governance be structured to achieve organizational readiness for business process outsourcing?"

The relation between the business process governance elements and the business rules governance processes is the foundation of the designed governance framework and determines the organization business rules governance structure necessary to realize organizational readiness for BPO. One of the elements that determines organizational readiness for BPO, in the model of Martin et al. (2008), is process readiness. The developed framework focuses explicitly on business rule governance to achieve process readiness , which in turn contributes to organizational readiness for BPO. The reason for this is because scientific literature on BPO does not include business rules or rule governance as a

factor. While, according to Eriksson & Penker (1999), business rules and process are closely related to each other, rules governance will in all probability influence the organizational readiness for BPO. The other two elements that determine organizational readiness is IT readiness and Business management readiness (Martin et al., 2008). A maturity matrix is used to determine the required maturity in processes, IT, and business management for BPO. Since this thesis project focuses only on business rule governance an adjusted maturity matrix of Nelson et al. (2010) is used to measure the required maturity matrix. The reason to use an existing maturity matrix is because the deployment maturity matrix of Nelson et al. (2010) illustrated the required steps of BRM deployment which has an overlap with the steps for business rule governance and the model of Nelson et al. has already been proven to be valid by insurance providers in the US. This means that the maturity matrix of Nelson et al. is a fundamental model for the business rule governance maturity matrix.

To clarify the thesis project a bit more we define three sub-research questions, which assist in answering the main research question. The sub-research questions are:

a. How should the governance elements be structured for business rules governance?
b. Can a maturity matrix be created for business rule governance?
c. How does business rule governance relate to business rule maturity levels?
d. How does the proposed business rule governance maturity matrix relate to organizational readiness for BPO?

The last sub-research question is based on the findings of Martin et al. (2010). In his paper he states that organizations should possess a certain level of maturity on the factors process, IT, and business management in order to maximize the change for success in BPO projects. Success in BPO is defined as the achievement of the anticipated costs savings. As stated before business rules are the factors that influence the flow and input and output of a process. Since the formalization of business rules and process formalization are inseparable one can assume that process readiness is among other determines by formalization of business rules. The last sub-research question is the largest of the three and requires an extensive measurement. How this measurement is done is discussed in the next chapter. The measurement is the last step to develop the business rule governance framework. Such business rule governance framework can be used within organization for different purposes. The first goal of the framework is to get organizations familiar with the governance elements. Secondly, the framework can be used as a guidance tool to structure an organizations business rules and to determine the maturity level of an organizations business rules governance. As third; provides the framework a point of intersection between BPO research model of Martin et al. (2008) and the adjusted maturity matrix of Nelson et al. (2010) to determine the readiness in business rules governance of an organization for BPO. This point of intersection provides organizations with an overview of processes that are eligible for business process outsourcing and how to achieve successful process outsourcing.

In order to develop a framework for business rules governance and to give an answer on the (sub)research question, a synthesis of governance elements and business rules governance processes

must be presented. Literature describes different elements that present in a governance structure. Santana et al (2011) combined these different literature sources and presented the following elements: Objectives, Roles and Responsibilities, Standards, Tasks, Organizational Governance Structure, Control Mechanisms, Assessment Mechanisms. Each of these elements will be discussed in more detail later on. The business rule governance processes are not so unambiguous defined. Zoet et al. (2011) presented the following business rules processes that are influenced by the governance elements: design, monitoring, execution, deployment, verification, validation, improvement, mining, cleansed, version, and auditing. While Boyer and Mili (2011) state that there are only 5 rule governance processes, being the rule change process, rule authoring, rule testing, rule deployment, and rule execution monitoring. The relation between the works of different authors on business rule processes is discussed in chapter 5. Before discussing the relation between the elements and processes a formal research method will be presented to illustrate the research approach in use for this research.

3. RESEARCH METHOD

This chapter contains a description of the research approach and the research methods in use. The gathering of suitable date and the creation of sophisticated and evaluated articats requires a formal research approach. The research approach is a mix between behavioral science and design science research. The reason for the combination is because research in the Information science discipline further knowledge that aids in the productive application of information technology to human organizations and their management (ISR 2002, inside front cover) and to develop and communicate knowledge concerning both the management of information technology and the use of information technology for managerial and organizational purposes (Zmud, 1997). Hevner et al. (2004) presented a conceptual framework for understanding, executing, and evaluating research in the information systems discipline by combining behavioral-science with design-science paradigms. Behavioral-science describes that interaction between people, technology, and organization must be managed to achieve improvement effectiveness and efficiency of an organization. Behavioral-science paradigms do this by developing and justifying theories, such as principles and laws, which ultimately inform researchers that explains and predicts organizational needs. Design-science focus on the creation of innovations that define amongst others ideas and products with the use of information systems. The artifacts in this research will be the business rule governance model, business rule governance model for successful BPO project and the business rule governance maturity matrix. The solutions are relevant for the problem statement and apply the seven guidelines described by Hevner et al. (2004). Therefore, it is defined as design science research. The solutions are in form of models and are evaluated through interviews and case studies. These research methods are described latter on. Figure 1 illustrates the information system research framework of Hevner et al. (2004) for this thesis project. The red lines in the model correspond with research objects, which are stated in the next chapter. The thesis project started with an extensive literature review with led to knowledge from the knowledge based side of the figure. Based on the literature is an rule governance framework developed which is validated by domain experts which is illustrated with a b on the red

line from the environment to the IS research. The last is the conducted case study research which functions as a source of feedback but also as the potential end user.

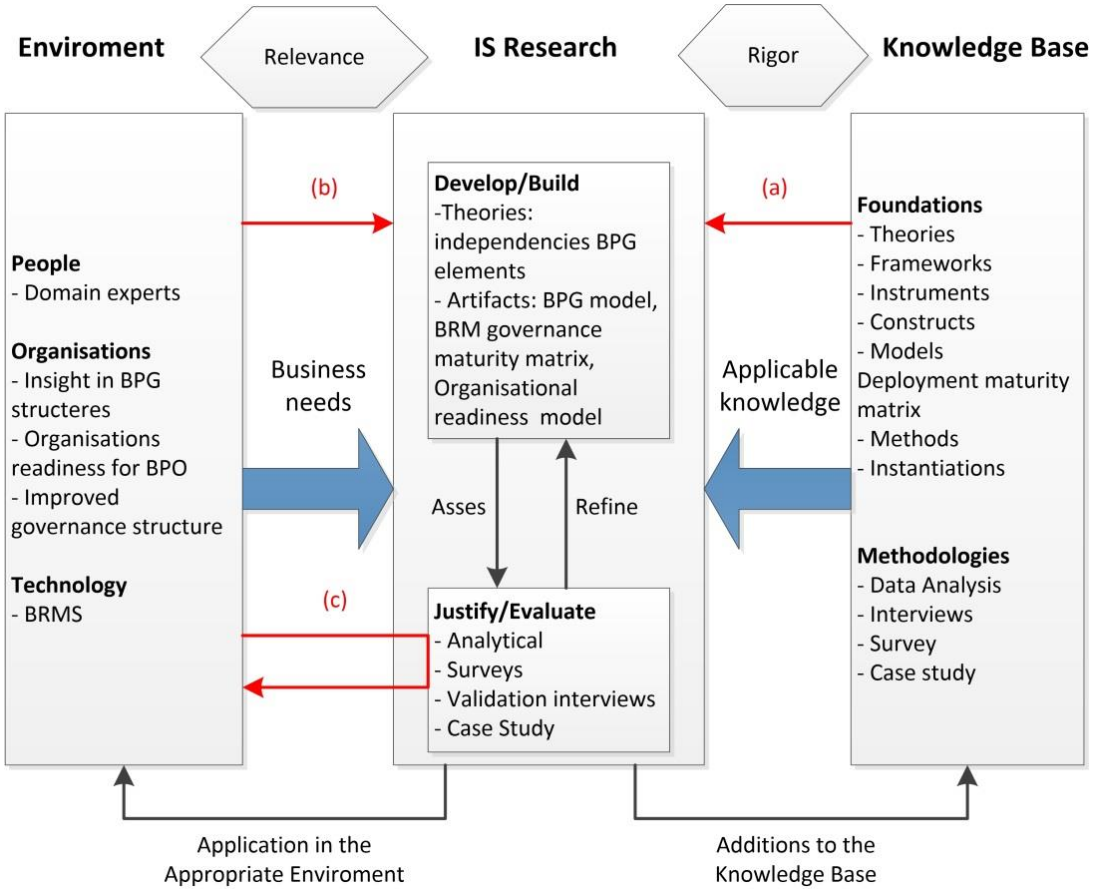


Figure 1: Information System Research Framework (Hevner et al. 2004)

3.1 RESEARCH MODEL

The research model as can be seen in figure 2 is defined using the design method of Verschuren en Doorewaard (2007). As can be seen in figure 1 the thesis project exists of a theoretical part and a practical part. The theoretical part is the foundation of this research and leads to an initial business rule governance framework. The practical part is there to validate the relations in the business rule governance framework that are made based on scientific sources. A rectangle in the figure represents a research object and arrows indicate the conclusion of at least two objects. The main research objects are illustrated with a solid boarder and sub research objects with a stippled boarder. Research question and sub questions, which are described in chapter 2, represent solid rectangles in the figure. The figure can be read from left to right, which represents the sequential order of the research objects. The methods that are used for the research objects are discussed in the next chapter

(a) The first stage of this thesis project is a literature study on the BPM, BRM, business process governance, business rule governance and BPO taxonomies in order to create the initial business rule governance model. The governance model includes process governance elements and rule governance processes and relate these to an adjusted version of the deployment maturity matrix of Nelson et al. (2010). Resulting in a maturity matrix for business rule governance which I call the initial business rule governance framework.

(b) The second stage of the research is to validate the initial governance framework. The decisions made during the development of the initial governance framework require a validation from experts in the field to ensure that the initial model corresponds with the practice. The validation can be split up into two sections. The first section is a validation of the relation between business process governance elements and business rule governance. The second part is a validation of the maturity levels for business rule governance. Both validations make the initial model definitive.

(c) The third and last part of the research is to relate the business rule governance framework to organizational readiness for BPO. In order to find a relation between a maturity level and organizational readiness requires two measurements. One measures the maturity of an organization, the other measures the organizational readiness. The two measurements are then compared to each other to see if there is a relation between them. Measuring the maturity can be done through the use of the developed maturity matrix. Measuring organizational readiness requires an understanding of the three factors that determine organizational readiness. Each of the factors is then measured independently to determine an organizations readiness for BPO. The result of the measurement will lead to an business rule governance framework that visualized a required maturity to achieve organizational readiness for BPO.

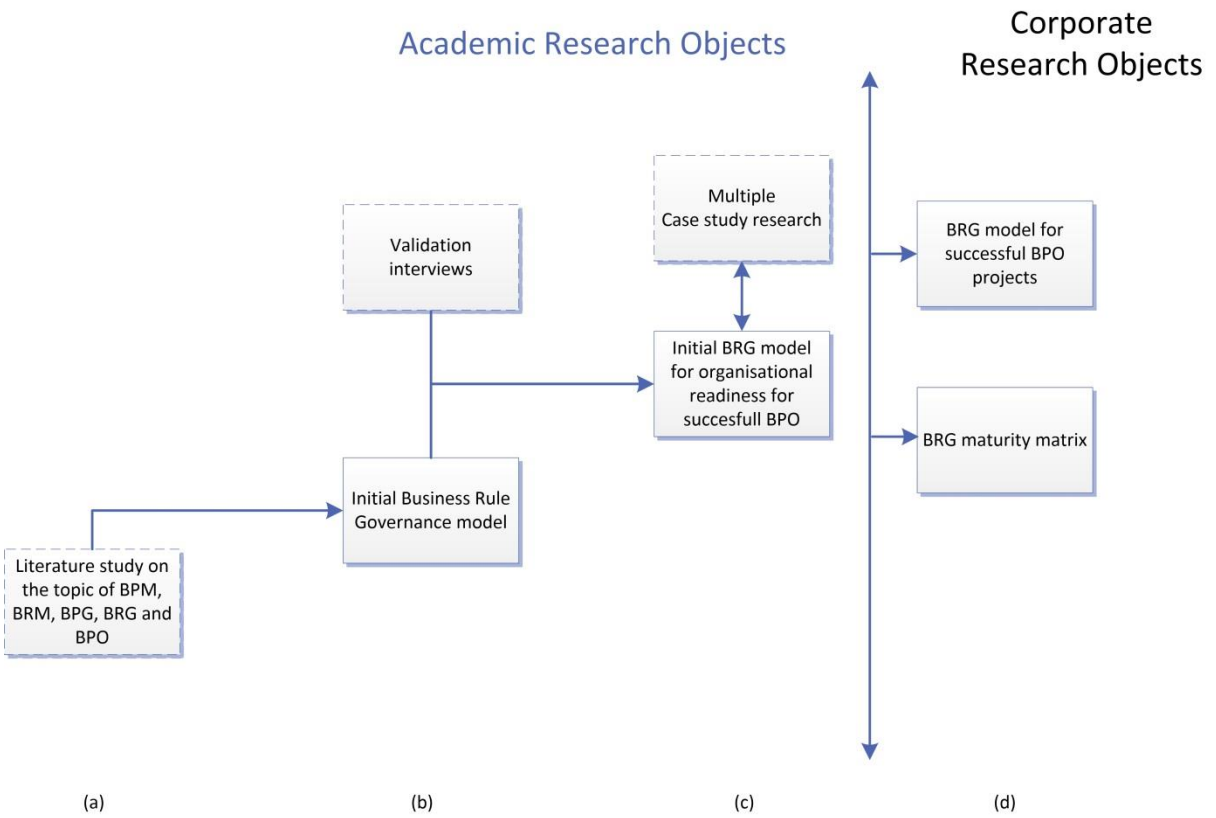


Figure 2: Research model

3.2 RESEARCH STAGES

Previous chapter presented a short list existing of three stages which lead to the final stage; the final business rule governance framework and the business rule governance maturity matrix. This chapter discussed how these three stages are executed and which methods are used.

3.2.1. Stage A: A Literature study

The first stage of the thesis project is the literature study. Literature studies provide theoretical concepts that can support the thesis project and identifies what already is investigated. The selection of the papers during the literature study stage is done with the use of the guidelines of Petersen et al. (2008) for the systematic mapping studies (SMS) methodology. SMS is a methodology that provides a structure of the type of research reports and results that have been published by categorizing them and often gives a visual summary, the map, of its results (Petersen et al. 2008). The first step of SMS is to provide an overview of the research area and identify the quantity and type of research and results available within it. In other words; the first step is to define research

questions for systematic maps. Since the quantity of the papers in the research area is out of the scope of the thesis project, I excluded it from the methodology. The research scope is within the business process domain and focused on business process elements, business rule governance, and business process outsourcing. Hence the following research questions for systematic maps:

RQ1: Which journals and proceedings include papers on business rule governance?
RQ2: Which journals and proceedings include papers on business process governance?
RQ3: Which journals and proceedings include papers on business process outsourcing?

The next step is to define the source and search keywords. According to Kitchenham and Charters (2007) a search key should be structured in terms of population, intervention, comparison, and outcome. It is not hard to define the keywords, since the focus area of the thesis projects is clear. Examples of the keywords that are used are:

business process governance, business process governance elements, governance elements, business rules, business rule governance, rule governance, business processes and business rules, business process outsourcing, maturity in business rules, measurements for business rules.

The sources conducted in the search processes are: ACM portal, IEEE, JSTOR, ScienceDirect, Springer, Google scholar. The main source of literature for this thesis project is Google scholar, because Google scholar also retrieves results from other academic web search engines. The amount of hits on Google scholar was higher than the other academic sources. Not only the academic sources were a source of information for the thesis project but also the online communities on Linked-in and not scientific published articles on the web. The keywords used to search on the not scientific sources, like Linked-in communities and Google web search, were the same as for the academic sources.

The next step described by Petersen et al. (2008) is to define inclusions and exclusions to exclude studies that are not relevant to answer the research questions. See table 1 for the criteria in use for the exclusion of papers. Exclusion of the papers was based on the abstract, introduction and conclusion of the papers that were gathered with the search. The last two steps of the SMS methodology are excluded, since the quantity of the papers on business rule governance is scarce, which means that the remaining papers after the exclusion are included in the thesis project.

Inclusions	Books, papers, and technical reports describing empirical studies regarding business rules, business processes and business process outsourcing. Where several studies were reported in the same paper, each relevant study was treated separately.
Exclusions	Papers that where in the form of abstracts or did not report empirical findings. All papers about BPM that did not report anything about business rules, except for the handbook on BPM.

Table 1: Inclusions and Exclusions

3.2.2. Stage B: Validation of the initial governance model

The validation of the initial governance model is done through two semi- structured interviews and a discussion in an online communitie with business rules experts. The reason to conduct interviews is based on the complexity of the subject. Since business rules is a new focus for organizations (Von Halle, 2002) not all organizations are familiar to the business rule phenomena. Interviews give the interviewer the change to explain the subject and give examples in a context an organization is familiar of. Semi-structured interviews give the interviewer the opportunity to go in-depth on the answers the interviewee gives. Resulting in an interactive conversation which can be guided in a way the interviewer wants. The reason to use online communities is that online communities possess great knowledge of business rules and are used to exchange knowledge about the business rule phenomena. Another benefit of online communities is the possibility to reach more than one people at the same time with my questions.

The interviews were conducted with experts in the field of business rules. The criteria for the selection of experts was that the organization, where the expert is working for, should have at least one year of experience with focusing on business rules. The online communities on linked-in were selected based on the field of interest of the community. The communities that have be selected are the “Business Rules Platform Nederland”, “Business Rules”, Business Process Management Professionals Group”, and “BPM Group”.

All the interviews were recorded and written out within a time stack of twenty-four hours. The reason for the short time stack is because I wanted to write out any interpretations the interviewee gave while they were still fresh in my memory. The short time stack also increases the internal validity of the research because the chance of any misinterpretations is at the minimum. The discussions on the online communities were stored on Linked-in, which give the opportunity to read back any comments whenever they were needed.

As stated in the chapter before, the validation can be seen as two sections; the validation of the relation between the governance elements and the validation of the maturity matrix. The relation between business process governance elements and business rule governance is validated by asking the interviewee which elements or key factors are necessary for business rule governance. During the interviews the business process elements were not mentioned to give the interviewee the chance to come up his\hers own elements. The elements named by the interviewee were afterwards cross checked with the elements from literature to related each with the other. The questions posted on the online communities are the same as the ones from the interviews and can be founded in the appendix. The results of the interviews and online communities are described in chapter 5; named findings.

The validation of the maturity matrix is done by asking the steps of implementing business rules focus within an organization. The steps that are mentioned during the interviews and discussions are compared with each other and also compared to the steps described in literature. Since the steps of Nelson et al. (2010) are already validated, the steps that are discussed within the interviews and

discussion should correspond with eachother. At least the 5 level staged maturity of business rules will most like be acknowledged. However the governance structure at each of the maturity level can differ. The most used governance structure will be used in the definitive business rule governance framework. The results of the validation of the maturity level can be founded in chapter 5 called findings.

3.2.3. Stage C: Case study

The third stage is to relate the business rule governance framework to organizational readiness for BPO. Combining the two elements requires two measurements within the same context. A case study research is a suitable method to examine an individual or a group within a certain context (Yin, 1984). Case studies provide in-depth knowledge on a case and retain a holistic and meaningful characteristics of real-life event (Yin, 1984). In order to measure both elements requires an understanding of the complex phenomena within an organization. The case study protocol of Yin (2009) provides guideline to obtain in-depth knowledge about the complex phenomena. A general overview of the case study protocol van be seen in table 1. According to Yin (2009) a research within multiple organizations and with multiple units of analysis is called a multiple case study research with embedded unit of analysis.

The units of analyze within a case are the maturity of the organization and the organizational readiness of the organization. The research method used to measure the units of analysis are semi-structured interviews. Measuring the maturity is not always so obviously. Organizations may be doing parts of certain maturity levels which makes it hard to assign a level to it. Therefor to hear the organizations vision and reasoning for their current situation gives a understanding of the organization maturity level. The organizational readiness part can be measure with the use of a survey because each of the factors that determine organizational readiness can be ask through a questionnaire. However to measure the organizational readiness also during the interview will reduce time for both the researcher and the expert in practice. Therefore, the organizational readiness is also measured during the interview.

One of the first steps of Yin (2009) in the case study protocol is the selection procedure of the case companies. An overview of the phases defined by Yin (2009) can be seen in table 2. Since a business rules focus is new for organizations, the amount of organizations with a maturity level of 4 a 5 is limited. My supervisor came up with an organization that supports another organization with implementing a business rules approach. This organization has experience with organization with different maturity levels which can function as a case. Another organization was included after a business rule meeting which was organized by a Linked-in community. The director of the organization attended the meeting and showed great interest in the thesis project. The other organizations are randomly selected due to limited resources and time constrains. The criteria in use for selecting the other organizations is that the participating organizations should have at least 200 employees or know a case which is familiar of managing business rules. The other criteria is that the participating organization of the cases described by the organizations must have some experience

with BPO. The reason for the size constrain is because large organizations encounter issues with managing complex processes with lot of dependable and independable variables. The experience in BPO is necessary to measure the organizational readiness of an organization. Each of the companies stays anonymous to keep their results private but will be indicated with a false name.

Phases	
Define and Design	
Conduct literature study	The literature study is conducted based on the SMS method as described in previous chapter.
Select case companies	See table 3 for the selected case companies
Prepare, Collect and Analyze	
Conduct interviews at diverse organizations with different awareness on business rules	Semi-structured interviews are conducted at the diverse set of organizations. The focus lies on the identification of the maturity level of the organization and the readiness of the organization for BPO.
Analyze and Conclude	
Result	The semi-structured interviews provides a source of information for measuring maturity in business rule governance and to measure organizational readiness for BPO. The result can be founded in chapter 5 called findings by the sub-research question; "How does the proposed business rule maturity matrix relate to organizational readiness for BPO?"
Conclusion	Conclusion is a relation with a maturity level that corresponds with the achievement of organizational readiness for BPO
Write multiple case study report	Finalize the report with a discussion and conclusion

Table 2: Overview of the case study phases (Yin, 2009)

Before presenting the case companies, a distinction must be made between the respondents and the unit of analysis. The respondents are the organizations which provided me with a description of the unit of analysis (the cases). The initial contact with the organization is established by e-mail and phone. The interviews itself were semi-structured and were conducted by the respondents organization. All interviews were recorded and written out within a twenty four hour time stack just like the validation interviews. Recurring themes of the interviews are:

- A introduction of the research
- General information about the organization
- Description of at least one case (preferable two cases)

- A case which is mature concerning business rule governance
- A case which is immature concerning business rule governance

In most cases is the respondent takes their own organization as case but two organization described a partner organization. All the respondents mentioned only one case due to time constrains or security issues. An overview of the case companies is presented in table 3:

The first respondent and unit of analysis is a financial organization, one of the largest in the Netherlands and is operating worldwide. The financial organization has more than 6000 employees in the Netherlands with a turnover of 2.112 million euros. This organization is currently implementing a case management system for assisting there business rule governance structure. They will be referred to as the financial organization.

The second respondent is, as they call themselves, a business engineering organization with their focus on the financial and public sector. It has 200 employees and is operating explicitly in the Netherlands. It will be referred in this thesis project as the business engineering organization. The unit of analysis discussed during the interview with the business engineering organization is a financial organization and is also the largest mortgage lender of the Netherlands. The mortgage division of the financial organization is the unit of analysis and is treated as an independent organization. The business engineering organization supported the mortgage division by extracting and structuring their business rules and setting up a business rules approach. The mortgage division of the financial organization is named the mortgage lender.

The third respondent is a small organization and is specialized in business rule management. The organization facilitates other organization with implementing a business rule approach just like the second respondent. Despite the organization does not comply with the prior defined criteria it is still included in the thesis project, because during a business rule meeting, I talked to the CEO of the organization and he described his organization and how they can be of use for my research. The organization is referred as the business rule organization and has just like the business engineering organization experience with different organization with different maturity levels. The case which is discussed during the interview is about a government organization which is one of the customers of the business rule organization. The unit of analysis of is government and the respondent is the business rule organization.

The fourth respondent and unit of analysis is an advisory and engineering organization with their primary focus on the infrastructure of the Netherlands as a country, such as railroad and train stations. The amount of employees is around 1000 and the organization has a turnover of 139.381 thousand euros and will be referred in the thesis project as the engineering organization. The engineering organization is currently reorganizing the IT department which means that the processes need to be restructured as well. The engineering organization hired a consultant to facilitate during the reorganization, which makes the organization a suitable candidate to see if the project remains within the anticipated costs while having a low maturity.

The fifth and last organization is a software vendor and is specialist in business process platforms. The software vendor is the respondent and describes a case of an governmental institution, which determines, imposes and collects the personal contribution for the welfare they receives. But also financing the organizations that provide the welfare to the people. The organizations has around 1100 employees and operates only in the Netherlands. The organization is originated from the law for exceptional medical expenses which is called AWBZ in the Netherlands. The case described by the software vendor is called the welfare organization.

	1	2	3	4	5
Organizational name (Respondent)	Financial organization	Business engineering organization	Business rule organization	Engineering organization	Software vendor
Name of the unit of analysis (If different from the respondent)	-	Mortgage lender	Government	-	Welfare organization
Amount of FTE's of the unit of analysis	59.000	23.059	Unknown	1000	1100
Countries in which the unit of analysis operate	Word wide	Word wide	Netherlands	Netherlands	Netherlands
Type/sector of the unit of analysis in which they operate	Financial institution for any kind of organization	Financial institution for any kind of organization	Public sector	Public sector	Health and welfare
Turnover of the unit of analysis in €	2112 million	1285 million	Unknown	139.381 thousand	58.674 thousand

Table 3: Description case companies

3.3 VALIDITY

A great model is determined by its validity. There are many definitions of the term validity, such as the one of Joppe (2000): “Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are”. In this paper we describe four types of validity; construct validity, internal validity, external validity, and reliability.

3.3.1. Construct validity

Construct validity handles aspects like 'are we measuring what we intend to measure?' (Trochim, 2000). Since I am conducting research into business rule governance structures, it concerns if I am actually measuring and describing an actual governance structure instead of something that is not considered a governance structure. In order to solve this problem, multiple evaluation steps where included in the requirements gathering phase. After the creation of the governance structures an validation interviews were planned to validate the existence of such governance structure. The interviews were with different people from different organizations. The reason for the variation is to avoid the pitfall that the interviewees had the same vision due to mutual education given by the organization. Next to interviews, other validation methods were also conducted, namely consulting of online communities within the business rule domain. For both interviews and the consulting of online communities, use was made of an introduction in business rule and rule governance to align the definitions and context of rule governance.

3.3.2. Internal validity

The interval validity of a research is determined by answering questions like 'do our results really follow from our data?' (Trochim, 2000). For the validation interviews I ensured that each question is related to an aspect of governance structure. By relating every element of an governance structure to a question of the interview ensures a result that is followed form the gathered data. The case study interviews can be split into two sections, one measures and validates the maturity of the organization in business rule governance while the other measures the organizational readiness of the organization that serves as a case. By asking about the governance structure of a specific case will result in an understanding of the maturity level and the validation of the maturity levels. The pitfall here is that a case with the highest maturity level is needed to validate the highest maturity level. Once the data collection is complete, an correlation analysis is executed to related the two section to one and another. All the interviews were recorded and noted so that the aspects matches with each other. It could be that during the interview I misinterpreted some aspects that needed correction. By listening to the recorded interview and correcting the results leads to the findings that are based on true facts and not on misunderstandings or assumptions. At the end of the interview I also mentioned a summary of the most important aspects I noted to be validated by our interviewee, this was also to make sure that I interpreted his answers correctly thus making sure I would not work with false data for the rest of the project.

Another aspect of internal validity are the so called confounding variables. These are variables that cause correlation like in that of the participant(s), re-searcher(s), instrumentation, and environment (Trochim, 2000). The correlation in these variables has to be eliminated. Participant variables are for instance the mood that the interviewee is in or the awareness that he or she has. The same goes for the researcher. Instrumentation is about the way the interview is being performed, if the first interview recorded but the second one is not then this is already considered a correlation. Environment can also be a factor, for instance when the room where the interviews take place changes or the temperature in that room changes. One might be content with the temperature in a room while another is distracted or annoyed by it. From the position of the researcher I can conclude that our participant/interviewee was in a good mood and had more than enough knowledge about business rule governance and process outsourcing. All the interviews were semi-structured, recorded and held in a meeting room by the interviewees organization. I feel like no confounding variables had an effect on our interview and research.

3.3.3. External validity

The external validity is also known as the generalizability of a research. Case studies have often been criticized for being poor research methods concerning the generalizability (Yin, 2009). This is due to it being a research performed within one organizations, and thus is hard to generalize across all other existing organizations. One way of testing the generalizability can be done by replicating the findings over several different cases. If the results are identical, then it can be considered it has a (high) degree of generalizability. Replication logic or multiple experiments must be conducted to make the findings from the multiple case studies generalizable (Yin, 2009). Replication logic means that ever case is conducted the same way. The semi-structured interviews at the cases were identical to each other. All the cases were from different sizes and operate in different fields. The benefit of the diversity is that the findings do not reflect a specific industry, which makes the findings generalizable to all braches. The downside is that I cannot make any conclusion about a specific industry.

3.3.4. Reliability

The reliability of a research concerns the fact that the operations of a (case)study can be repeated with the same results (Trochim ,2000). This means that if another research group would do the same research as we did, they would come to the same results and conclusions. If this is the case, then the reliability can be considered reasonably high. Due to time constraints, the reliability wasn't tested by letting another group perform the same research as we did. The reliability should be proven in further research. But I believe that if another group would use the same tactics as I did like conducting interviews, case study analysis and consulting of online communities, it is likely that another research group will come up with the same results and conclusions.

4. LITERATURE

This chapter explains the taxonomies business process management, business process governance, business rules management, business rules governance, and business process outsourcing. The explanation will clarify what the difference is between the taxonomies and provides an overview of the governance elements and the business rule governance processes, which operate as the foundation of the developed governance framework. To understand business rules and business rule governance one should know what business process management is, because business rules are normally executed within processes (Bajec and Krisper, 2005). Therefore, an introduction to BPM is described first.

4.1 BUSINESS PROCESS MANAGEMENT

Business process management (BPM) is widely seen as the top priority in organizations (Gartner group, 2005). Van der Aalst (2003) defines business process management (BPM) as: Supporting business processes using methods, techniques, and software to design, enact, control, and analyze operational processes involving humans, organizations, applications, documents and other sources of information. Korhonen (2007) complements this definition by including the aspect of defining performance metrics for each participant, and monitoring and optimizing their performance. These processes can be created and monitored by a system. Like Hammer (2010) state: BPM is an integrated system for managing business performance by managing end-to-end business processes.

Doing BPM starts with the formalization of a business process. After an organization has well-defined the end-to-end process it requires management on an on-going basis. The performance of the process; performance in terms of critical metrics that relate to customers need and company requirements, need to be compared to the target for these metrics (Hammer, 2010). Examples of targets are: reduction of the duration of an order life cycle, the implementation of an agile method in order to keep competitive advantage. If an organization fails to reach its target it can be categorized into two reasons: or the design is faulty or the execution is faulty. By examining the pattern of performance adequacy, an organization can determine which one the culprit is. A fault in the execution can be caused by insufficient resources or adequate training. It is hard to determine what the root cause of an execution fail is, because there are many root causes. Root causes requires rethinking of the structure of the process.

Through the use of process management will reduce the change of faults and give organizations the ability to create high performance processes, which operates with much lower cost, faster speeds, greater accuracy, reduce assets, and enhance flexibility (Hammer, 2010). BPM focused on end-to-end processes and gives organizations the ability to drive out the non-value adding processes. The benefits of BPM (lower cost, etc.) improves not only the overall performance of an organization but also customers satisfaction. Because of the continuously monitoring of the processes an organization can respond much quicker on rapid changes. If a change occurs, an organization can recognize this by a decline in the performance metrics, which are noted by process management system. A process

management system is: a generic software system that is driven by explicit process designs to enact and manage operational business processes (van der Aalst, 2003). Process management also provides an umbrella of performance metrics that are either mechanisms for supporting performance processes or goals that can be achieved through them. Linking all the improvement efforts of an organization under BPM leverage a wide range of tools and deploys the right tool to the right moment (Hammer, 2010). BPM helps organization achieve its strategies but requires strict governance to align the organizational strategy with BPM effort (Bandara, 2007).

BUSINESS PROCESS GOVERNANCE

Good business governance is necessary for the success of business process, which in turn contributes to business success (Rosemann & de Bruin, 2005). According to Spany (2010) BPM governance is necessary to create structures, metrics, roles and responsibilities to measure and manage the performance of a firm's end-to-end business processes which are required to optimize and substain improvements to operational performance. Kirchmer (2009) defines business process governance as a set of guidelines and process focused on organizing all BPM activities and initiatives of an organization in order to manage the BPM project. An essential role of BPM governance is to assure that IT investments are closely related to the company's business strategy, and that the payoffs from IT investments is directly derived from the improvements in business process performance. Literature describes governance elements which influence business process management. As stated by Khusidman (2010): the approach defined by the open group in "SOA Government Framework" (2009) can also be applied for business process governance. In fact, he claims that, in order to have all sorts of governances within an enterprise following the same framework, they should follow similar approaches. The benefit of having this ecosystem of governance is it will reduce resistance to establish new governance as well as lower the respective cost and time. Based on Khusidman (2010) findings business rule governance could also follow the same approach as business process governance. Ideally, the elements of business process governance should also be applicable for business rule governance. Before presenting the elements of governance described in literature an introduction of business rules will first be discussed in order to relate the element to business rules governance.

4.2 BUSINESS RULES

The term business rules can be split into two words: "Business" and "rules". According to Wordnet a rule is "a prescribed guide for conduct or action". The term business represents in this case a domain, the business domain. So, a rule of the business means the prescription in the business domain (Boyer & Mili, 2011). Barbara von Halle (2001) describes business rules as: "the set of conditions that govern a business event so that it occurs in a way that is acceptable to the business". Some samples of business rules are: "An on-line store might not accept a next-day delivery order if the order is received after 3:00 p.m." or " If an order exceed €3.000 it need clearance from the account manager" or "If two alarms are issued by the same network node within 30s of each other with the same alarm code, then group them under the same umbrella alarm."

Business processes pathways are directed by decisions outcome. Process decisions are a nexus of governance and regulatory compliance objectives (Debevoise, 2009). Business rules are applied on the decision steps but also on the process outcomes (Debevoise, 2009). Since Business rule changes more often than business processes is it recommended to focus on the business rules (Von Halle, 2002) (Debevoise, 2009). The discipline for the discovery and management of business rules and the methodologies and tools used to manage the rules is called business rule management (BRM) (Kemsley, 2008).

Business rules can be separated into two perspectives, namely business perspective and information system perspective (OMG, 2008). The business rules group defines the two perspectives as follow:

- Business perspective: a business rule is guidance that there is an obligation concerning conduct, action, practice or procedure within a particular activity or sphere. Two important characteristics of a business rule: (1) there ought to be an explicit motivation for it, and (2) it should have an enforcement regime stating what the consequences would be if the rule were broken (BRG, 2008).

- 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" (BRG, 2008).

From an information system perspective, business rules talk about the data in the information systems that is captured by the information system about the real world entities involved in business process, such as customers, products, or transactions (Boyer & Mili, 2011). From a business perspective, business rules talk about the authorization human have and what the actions are that need to be deployed if an event occurs. The rules of the consumer of the information system differ from the information systems rules and from a business perspective the actions divined by the rules do not have to be related with an information system. For every rule is a business motivation. This research will focus on the information system perspective since these rules can be automated in information systems and therefore be outsourced (Dibbern et al, 2004).

Implementing business rules in an organization should be done with cause, because there are pitfalls an organization could make. According to Von Halle (2002) and Boyer and Mili (2011) There are three major issues of implementing business rules, the first issue is that the organization needs to know which business rules they are using and if they are using it consistently. Not knowing could cause organization to use rules that are conflicting with each other. The second issue related to business rules approach, is that organizations have their business rules embodied in their information systems. This is not a problem but mostly only a programmer could understand the program language. This is a risk an organization could have. Therefor organizations should describe the business rules that are embodied in the information systems in a way that all stakeholders can understand. Business rules should also be stored in a way that all the related data can be founded and that the underlying business motivation and the governance and regulatory compliance objectives (Debevoise, 2009) are traceable to reduce the risk. Last issue concerns the rapid change

environment of organizations. Rapid changes requires quick and easy adaptations of the rules, hence the last issue: Organizations need an business rules approach in which they can react to the changing environment in a timely manner (Boyer & Mili, 2011) (Von Halle, 2001). There are formal business rules approaches which can realize a situation without the above described risks. Von Halle and Goldberg (2006) defines business rules approach as: a formal way of managing and automating an organization's business rules so that the business behaves and evolves as its leaders intended. The formal approach means clearly defined processes, tasks, roles and responsibilities, and work products. It manages and automates business rules and ensures that the business behaves as it should (Boyer & Mili, 2011). A business rules approach to systems development allows the business to automate its own intelligent logic better, as well as to introduce change from within itself and learn better and faster how to reach its goals (Von Halle, 2001). In other words the business rules approach makes business rules explicit and separates the business rules from; system requirements (such as functionality etc.) and from the program code. A business rules approach also makes the business motivation of rules traceable and changeable without incurring to change the software code and manages the development, deployment, and the execution of business rules (Boyer and Mili, 2011), (Von Halle 2002).

Boyer and Mili (2011) state that a business rules approach has three components: 1. A methodology for rule management (collecting, recording, validating, assessing, publishing, and evolving the business rules). 2. One or several more or less formal languages for expressing business rules at different stages of their life cycle and for different audiences. 3. A tool set for managing and executing the rules, a Business Rules Management System (BRMS). These components are interrelated to each other. The tool supports the methodology and express the management functionalities in the rule language and translate these to other languages if required. A BRMS also executed the rules in one or several languages so it makes it understandable for different audiences. Examples of business rule languages are "RuleSpeak" by Ross (2003) or the "Object Role Modeling" defined by Halpin (1996).

The method of using a business rules approach differs per organization. An organization can have the business responsible for the discovery of the business rules, which is application independent (Bauer, 2009). Or the discovery can be done during the development of an application (Bauer, 2009). In the former case, a business unit within an organization take the responsibility for collecting, codifying, validating, and publishing of the business rules, which lead to a central stored database containing the business rules. The latter case described the case, which is currently most used in today's organizations (Von Halle, 2002), in which the business rules are discovered during the development of an application and also described in the context of the application (Bauer, 2009). Both methods have their advantages and disadvantages. Boyer and Mili (2011) have illustrated both approach and name the business unit responsible for the discovery of the rules, for the former case, as a rule management organization. The advantages and disadvantages are based on the findings of Boyer and Mili (2011)

The former case, which is illustrated in figure 3, requires significant up-front investment in human resources that are not easily related to operational priorities. One of the challenges the rule management organization will face is the scoping of the rules without any specification of the application projects. The benefit of the former case method is a coherent rule repository (which is stored in a BRMS) and consistency of rules applied in the application projects. The latter case, illustrated in figure 4, does not require an up-front investment, because the rule are collected by the application project team within a specific context. The rules are available for the application project team by the time the project is finished. However if each application project team develops its own rules, then duplication of efforts is inevitable. Managing the rapid growing variations or even conflicting versions of the same rule causes serious problems. A rule administration can store the business rules in a central repository but the business application project team is responsible for managing the rules.

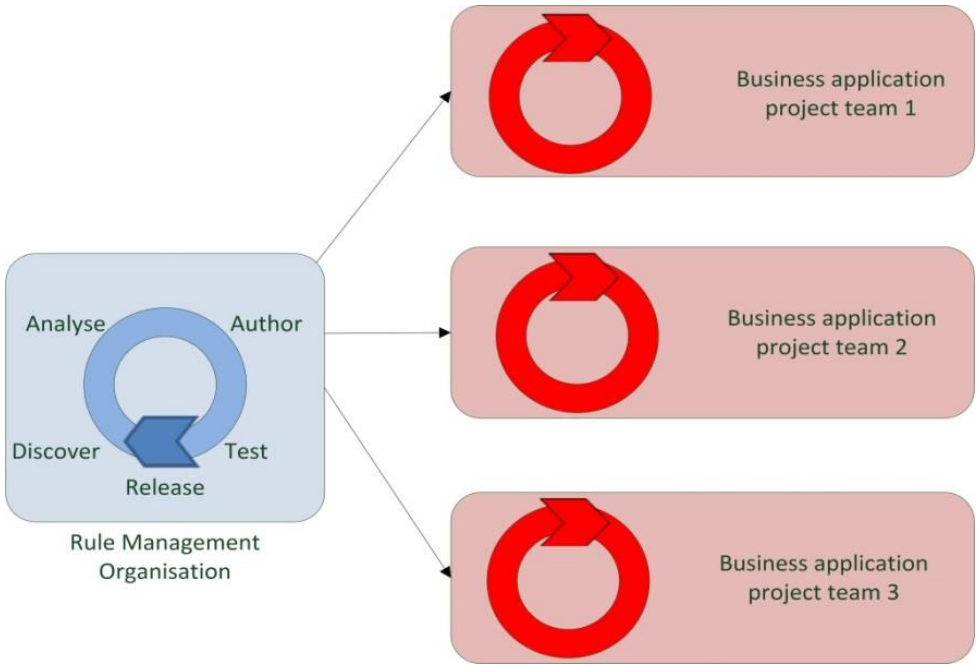


Figure 3: Rule management organizations carries the responsibilities of the business rule development

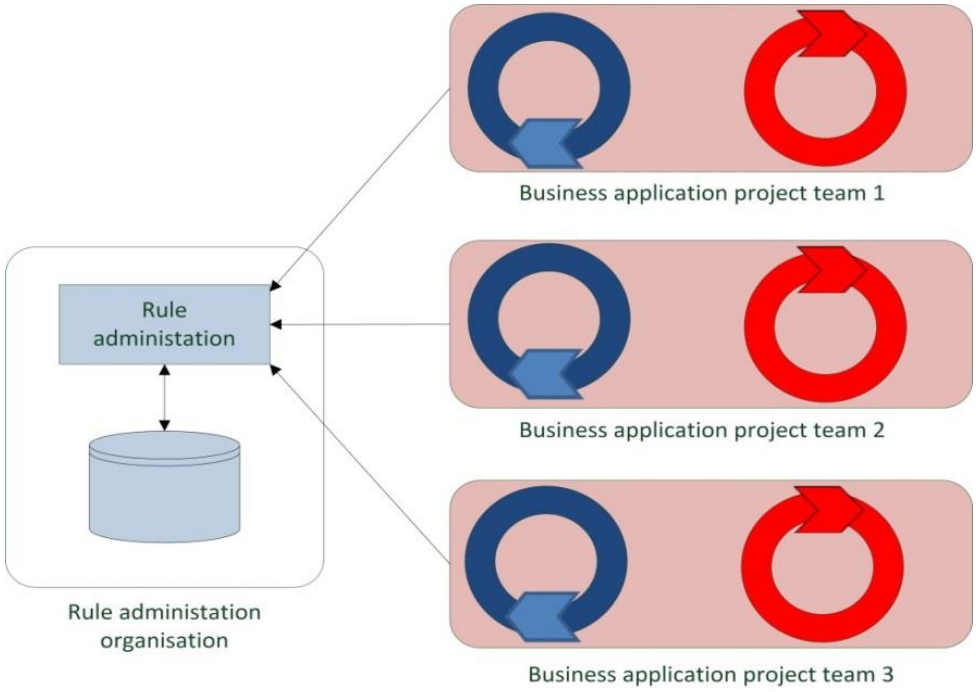


Figure 4: Each business application project team develops his own rules in the context they need and stores the rules in the rule administration

The maturity of the organization determines the method for the organization. The first approach is for the mature organization since they have educated business teams with business analysts responsible for developing and maintaining business rules. The second approach is for the starting organization in business rules, since they need to create a dedicated team. However Boyer and Mili (2011) also describe a hybrid method in which application project teams still develop their own rules but because this team is also involved in the second project, the project team will gain lots of experience developing rules which will evolve in a business rules expertise center (Boyer & Mili, 2011). The group can be split in two groups; members of the team that will focus on corporate wide business rules, and members of the team that will focus on application specific business rules. The hybrid method creates a two way communication between the corporate wide members and project specific members. The business application project teams use the corporate wide rules as the basis for the project specific rules and refines the rules to the context at hand. If the rules of the business application project teams are corporate applicable the team includes, or ask the corporate wide members to include, the business rules in the corporate wide repository. The hybrid method can be seen in figure 5.

The maturity of an organization determines the method and governance required to implement a business rules approach within an organization (Von Halle, 2002). The first step of the each of the approaches starts with the creation of a BRMS. A business rules management system (BRMS) assist with implementing and integrating business rules across information systems (Nelson et al., 2010). A BRMS can be seen as a tool that supports the rule life cycle by a formal business rules approach.

Before going into detail of a BRMS, a description of processes in the business rules life cycle will be discussed.

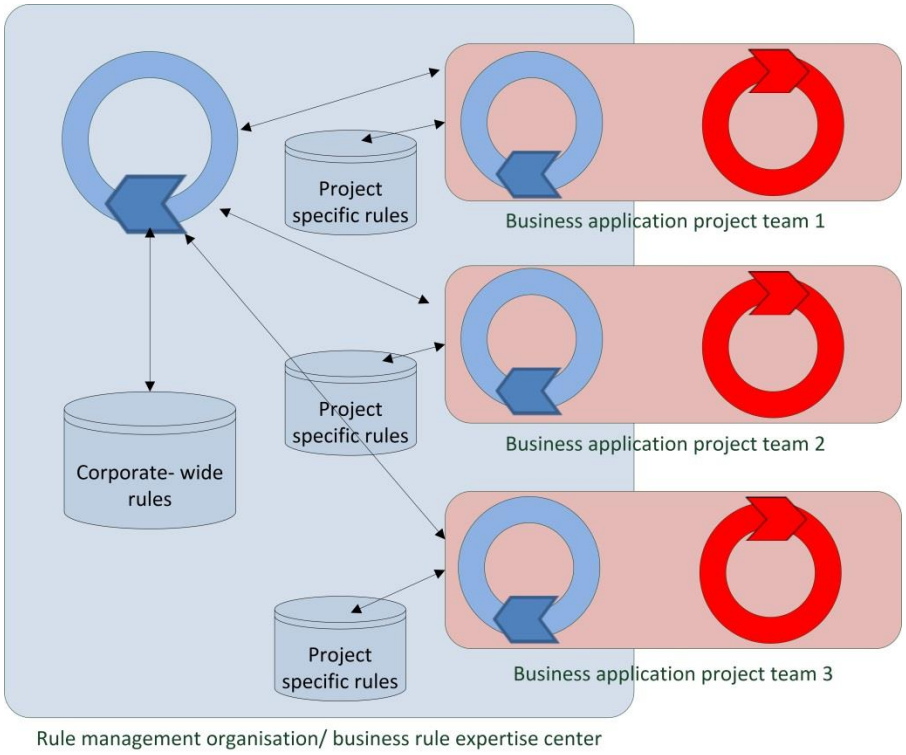


Figure 5: Hybrid method with a business rule expertise center responsible for creating corporate wide and project specific rules

4.2.1. Business rules processes

A business rule approach consist of processes which separate the rules from the software code, make rules traceable to know the reason why they exist and externalize the rules to make them understandable for different audiences and positions rules for change (Von Halle, 2002). Literature describes different processes and this chapter will compare these with each other. Von Halle describes three processes after the determination of the scope namely discovery, analysis, and design. While Boyer and Mili (2011) describes six processes: rule discovery, rule analysis, rule design, rule authoring, rule validation, and rule deployment. The main difference between the two lies in the design phase. Von Halle (2002) describes in the design phase also the implementation of the rule and if associated test. While Boyer and Mili (2011) separate these activities as processes in the business rule approach. Also Boyer and Mili (2011) includes cycles within the processes to make it possible to change the rule during its development. The cycles increases the quality of the rules and therefor the processes in this chapter are described based on the work of Boyer and Mili (2011). Figure 6 illustrates the processes and the associated cycles of Boyer and Mili.

The first cycle is called harvesting, which implies the discovery of potential rules in a process and capturing them by documenting them. Especially the conditions and decision steps in a process are suitable candidates for a rule set. The next cycle is prototyping. Prototyping starts with the implementation of the discovered rules from harvesting. This starts with a design and will eventually be executed with an application. A design provides a structure of the rule set before the actual implementation begins. Authoring tests the design in practice and communicates occurring issues back to the business team. During the prototyping cycle, harvesting activities continue in an on-going basis. With the feedback from the occurring problems during the authoring activity the business team can improve their harvesting cycle.

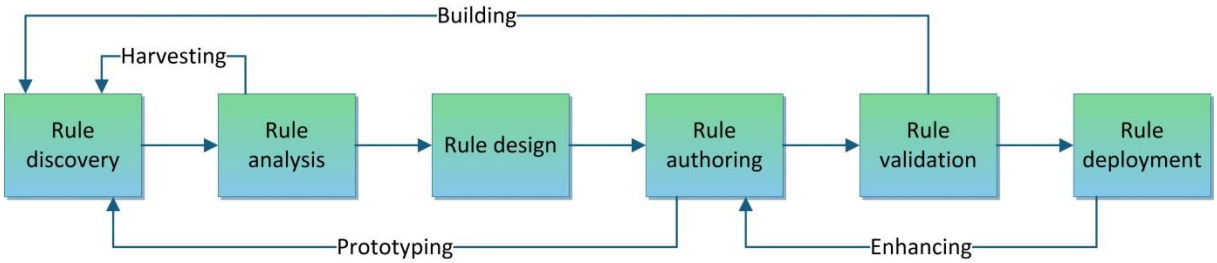


Figure 6: Business rules processes

The building cycle goes a step further then the prototyping. In this cycle the tests will be done with real data and test it in the context where it should be operating. The project of developing rules should be finalized for the data model used by the rules, so the business team can start testing the business application with the decision services. If so, the integration cycle can begin. Data coming from the real data source is sent to the rule engine to fire rules and infer decisions (Boyer & Mili, 2011). Scenarios developed during the building cycle are used for executing during the integration cycle. Enhancing cycle is to ensure completeness and quality of the rule set. Enhancing may be done by other actors then the business team responsible for the previous cycles. The actors responsible for enhancing are the owners of the rule set and business policies and are responsible for the finalizing of the rule set. This means that the business team from previous cycles do not discover and implement all the rules because the scope of a decision evolves over time. However the rule architect must design the rule set so that when no decision can be taken for a given set of data, a default decision is enforced and that data can be identified for future analysis (Boyer & Mili, 2011).

4.2.2. Business rules management system (BRMS)

BRMS is capable of storing, managing, and processing all the business rules collected within a business. Accordingly, the BRMS is the linchpin of the business rule approach (Bauer, 2009). Zoet et al. (2012) describes a BRMS as a system which provides a business service. A business service is coherent piece of functionality that offers added value to the environment, independent of the way this functionality is realized (Zoet et al., 2012). Delivering a business service requires configuration of value-coproduction such as resources, skills, knowledge and competences (Zoet et al., 2012). The

configuration is called a service system. A BRMS is a co-production of service systems (Zoet et al. 2012). Zoet et al. (2012) described eleven service system which are present within a BRMS.

The first service system is about the monitoring of the business rules. This system, which is called a monitoring service system collects information from executed business rules and generates alerts when specific events occur. This information in turn can be used to improve existing or design new rule models. The next system is the execution service system. This system transforms a platform specific rule model into the value proposition it must deliver. A platform specific rule model can be source code, handbooks or procedures. The execution in turn can be automated or performed by humans. To execute a platform specific rule model it needs to be created. Creating a platform specific rule model requires deployment service system. Such system creates a platform specific rule model form a non-platform specific rule model. Before deploying business rule models they have to be checked for two error types, namely semantic/syntax errors and errors in its intended behavior. Semantic/syntax errors are removed from the business model with the use of a verification service system. Intended behavior errors are removed by a validation service system. After removing the errors, the creation can begin within a design service system. In addition an improvement system exists. The improvement system contains among others functionality to execute impact analysis. One of the requirements of designing business rules models, are data sources. Data sources need to be mined with the use of a mining service system. This system contains, processes, techniques and tools to extract information from various data sources, human or automated. Before mining can commence in some cases explicit data sources need to cleansed. The cleansing service system removes all additional information intervening with proper mining or design activities. Each previous mentioned service systems provide output to two management service systems: the version service system and the audit service system. Version service contains the changes made to the data source, the platform specific rule models, the non-platform specific rule models, and other inputs that are registered. Audit service system contains data about realizing changes to specific input, output other service system elements.

To clarify the relation between the service systems of a BRMS and the processes of a business rules approach, a model is created which illustrates the relation between the two. The work of Boyer and Mili (2011) and Zoet et al. (2011) exceeds other sources and are used as the foundation of the two chapters. Because the activities are based on their work, the names of the authors are also mentioned in the model.

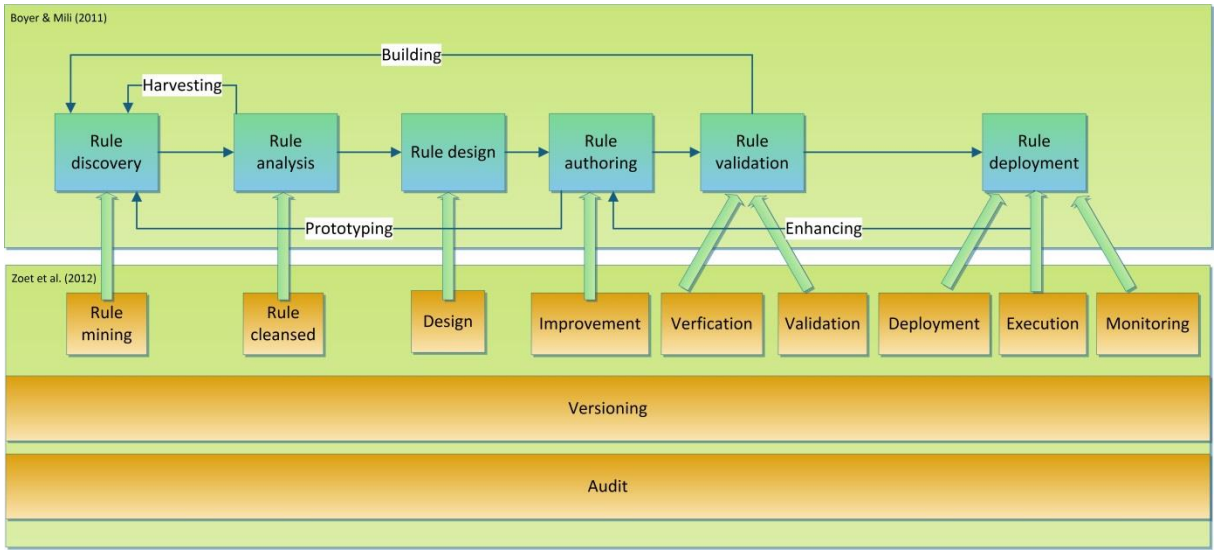


Figure 7: Relation between the business rules processes and the service systems

The arrows in the figure represents similarities between the activities of the different models. The first arrow illustrates the similarity between rule discovery and rule analysis of Boyer and Mili (2011) and rule mining and rule cleansed. Rule mining and rule discovery is about identification of rules and document these. Rules can be extracted from documents, tacit form of working, legacy systems, and business records. Every rule has a meaning and the goal of the analysis activity is to understand this meaning. However some data is irrelevant or could intervene with proper rule discovery and leads to deletion of the data. Zoet et al. (2012) calls this cleansing and Boyer and Mili (2012) see the deletion of the data as part of the analysis processes. Rule discovery and analysis can be supported by the mining and cleansing services. After the harvesting phase starts the prototyping phase. Before development can start a design is required. Both models agree on the term for rule design. When it comes to uncover design issues and improve the design before going into production there term differs from each other. Validation is to ensure that the application can run on real data without any errors. Zoet et al. makes a distinction between the errors as discussed in above. Verification and validation are closely related but the impact differs. Verification errors can be fixed within the process it occurs, while validation errors could make the cycle to start over. If the error prone is fixed then deployment could emerge. Deployment is part of the enhancing cycle according to Boyer and Mili (2011). While Boyer and Mili (2011) describe deployment as the last activity of the rule life cycle, Zoet et al. describe it as the beginning of working with rules. After the deployment of a rule, the business will use the rule in practice. Boyer and Mili (2011) place the execution of the rule under the process deployment. While Zoet et al. (2012) described that the execution of a rule can be supported by the execution service system. In all cases are the service systems of Zoet et al. (2012) supportive to the processes of the business rules approach.

4.2.3. Business rules governance

Managing business rule is to ensure that the business rule approach is maintained and that all stakeholders have access to the organization's rules while ensuring the security and integrity of related rule information (Von Halle, 2002). Ron Ross (1997) defines business rule management as "activities and strategies that aim toward identifying and managing business rules; in order to:

- Understand business practices more completely
- Achieve greater consistency across functions, geographical areas, and systems
- Facilitate rapid change
- Achieve more adaptable business processes
- Move the company towards better Knowledge Management practices
- Improve communication between business users and IT professionals
- Enable easier migration of business functionality."

Achieving the objectives, defined by Ross (1997), requires rule governance to be defined in the context of IT governance, at the same level of focus as the SOA or BPM governance, but with a strong involvement of the business to take rule-set ownership, initiate changes, and drive the changes (Boyer & Mili, 2011). Organizations are subjected by changes in business. A change initiated by the business may impact multiple components in the IT architecture and BPM and business rules governance are allocated to this organization. Since changes occur most frequently in the business rules, strict governance is required to avoid duplications of the business logic (Von Halle, 2002) (Boyer and Mili, 2011).

Literature describe the first activities to start rule governance contains, involve IT and business stakeholders in the process design and define communication strategies to start developing role and responsibilities in order to create a business rules management team (Charpentier, 2009)(Boyer & Mili, 2011)(Von Halle and Goldberg, 2006)(Nelson et al., 2010). The idea it to start small, for example within a project bases and extend it to organizational wide basses (Charpentier, 2009)(Boyer & Mili, 2011)(Von Halle and Goldberg, 2006)(Nelson et al., 2010). The benefit of creating such business rules management team, before implementing business rules in the organization, is that the committee can get top management support and all the available resources they need. If an organization first implements business rules in the organization before defining a governance structure will lead to organizing problems such as: who is responsible for what and how do we do it (Charpentier, 2009). This could lead to errors during the execution of the processes and friction amount the employees (Charpentier, 2009).

The business rules management team contains different roles and responsibilities that need to be created and functions as the fundamental basis for the communication and process progress (Von Halle and Goldberg, 2006). A table of the possible roles can be founded in the appendix. As the team and scope grows the need for governance grows with them. A method to be able to track rules and see their statuses is the rule life cycle (Charpentier, 2009) (Boyer and Mili, 2011).

A rule life cycle is a component of an business rule approach and gives statuses to rules. Keeping track of the rule and its state, ensure the business to manage the rule (Von Halle, 2002). Boyer and Mili (2011) quote: "*the need to drive the design of a rule life cycle are linked to quality control and traceability of the action performed on the rules*." Literature describes different life cycles as a component of the business rule approach. The Eclipse Foundation (2009) described the following statuses as the rule life cycle; new, defined, rejected, validated , promoted, and retired. While Boyer and Mili (2011) described the following statuses in a rule life cycle; new, defined, rejected, validated, deployable. The difference in the life cycle brings confusion which can have a negative effect on the quality and traceability of the rules. Zooming in on the statuses of the life cycle will sort out the differences. The first four statuses are similar to both;

The new status is received when the harvesting is successfully conducted. The rule receives the defined status after a validation round in which the rule is tested within a prototype. If the rule is validated it will be subjected to another validation step in which the rule is tested with real data. It receives the status rejected if the tests are unsuccessful and validated if the test are successful. While the authors have different names for the next stage, promoted by the Eclipse Foundation (2009) and deployable by Boyer and Mili (2011), their definitions are similar to each other. A rule is after the validation part of a rule-set and is deployed on a production platform. A rule or rule-set is only active in a certain period of time. The Eclipse foundation (2009) defines a rule which is no longer active as a retired rule, hence the status retirement. Boyer and Mili (2011) acknowledge that a rule is only active in a certain period in time but sets the rule inactive after deployable. After a rule is set inactive a new iteration of the rule life cycle will be initiated. Figure 8 illustrates the processes with their corresponding statuses.

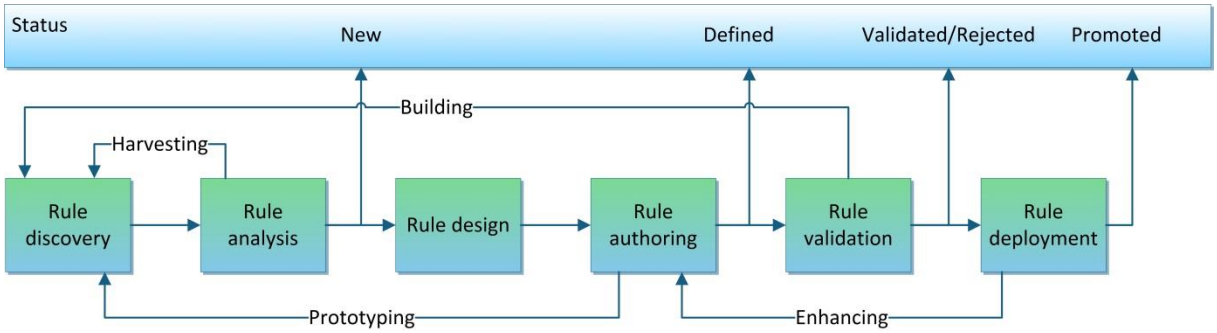


Figure 8: Business rule processes with corresponding statuses

Monitoring of rules goes beyond monitoring the status of a rule. Monitoring is also necessary to define key indicators to measure the process efficiency. Key indicators are factors within the business rule approach, which need successful execution in order to proceed in the life cycle. The key indicators can be monitored during the process execution and after the first implementation a business team can update or change the processes if necessary. It is recommended to first define a process in the scope of one application before being extended at the enterprise level. It is important that rule governance be established, practiced, and refined during the early phases and iterations of

the project so that it will be ready and refined enough for production (Boyer and Mili, 2011). The development of best practice techniques for rule creation and the continuous evolvement of the business processes can be sees as one governance process called rule change process.

The rule change process affect the rule processes in different variants. A change can become very complex and hard to implement if it contains a large scope. Changes can afflict the rules itself but also the data-source behind the rule or the rule structure (Boyer & Mili, 2011). Whatever the impact is of the change, every change needs to be tested to ensure quality and efficiency of the change. Charpentier (2009) and Boyer and Mili (2011) describe rule authoring as a governance process, which deals with the testing area. The process needs to start from the policy people that are creating a new rule, to the analysis of that rule, to the formalization of the rule and finally to the implementation (or authoring) of the rule (Charpentier, 2009). This will be done by test to assess the rule outcome and executions. Only when all the results of the test are positive the rule receives the status as defined (Boyer & Mili, 2011). Otherwise it receives the rejected status and the previous iterations will continue as long as the results are positive. Defined rule-sets are tested in real case scenario's. It is important for the governance of rules that the tests are up to date and takes every change request into consideration. The rule-set has to pass successfully the previous non-regression test suites and the new functional tests added in scope of this change request (Boyer & Mili, 2011). Difference between the authoring governance process and the rule governance testing process is that the testing process ensures that appropriate testing gets performed for the rules that have been developed (Charpentier, 2009) and rule authoring focus on the formalization and creation of the rules. When a rule-set is validated it goes into the deployment process. Rule governance deployment is to control how the rule-set is deployed and put into production. According to Boyer and Mili (2011) deployment from a governance point of view wants to address the traceability and auditability requirements of the deployment phase only for the production platform. After a rule-set has been deployed and executed there is usually a process for monitoring the production environment (Charpentier, 2009). This requires predefined key indicators and maintenance of the these indicators. These issues can be seen as part of the rule execution monitoring process for rule governance. Figure 9 illustrates the business rule processes and overarching governance process.

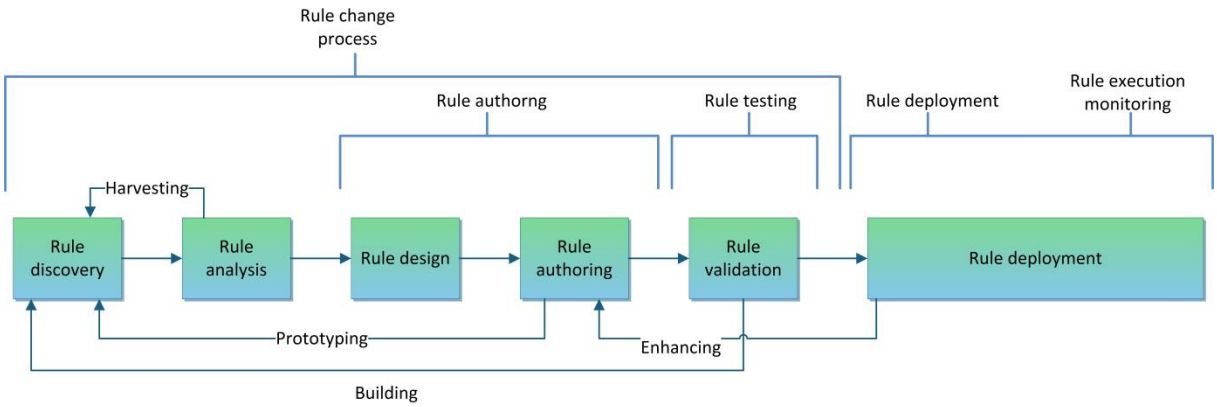


Figure 9: Rule governance processes

4.2.4. Differences between BRG en BPG

The flexible points of a business process or of business services are supported by using the business rule approach; therefore, change management should focus on business rules more than service and process governance. Business process and business rules have different life cycles, so merging authority must be controlled (Boyer & Mili, 2011). A business process life cycle consist out of a design, implementation, and execution phase (Zoet, 2011) while a business rule life cycle consist out of a discovery, analysis, design, authoring, validation, and deployment Boyer and Mili (2011). Business rule governance has to be enforced earlier than business process governance, because a rule-set changes more often than the business process. Therefore, it makes more sense to start defining the rule governance processes earlier. Also, business process governance focuses on monitoring the process and finding some small improvements over time. Process updates may occur every 6 months up to once a year. Business rule changes can happen every day, driven by multiple factors, like competition, regulations, marketing Boyer and Mili (2011). These different impacts on the business may be better supported by having two separate governance groups: one for BPM, one for BRM (Boyer & Mili, 2011).

Business rule governance focus on the implementation of a business rule approach and a BRMS (Bauer, 2009). The advantage of focusing on the rules is the reduction of development processes. Business rule governance makes the rules explicit, which makes is unnecessary to collect or define the rules in the requirements specifications. Business rule governance also gives responsibility and ownership to the business people. While business process governance remains dependent of the IT department since it is not able to configure the rule within the processes itself (Bauer, 2009). Another difference between business rule governance and business process governance is that business rule governance brings agility to the organization since it can change their decision logic quicker because the rules and data behind a decision is externalized from the rest of the data (Bauer, 2009).

Business process governance focusses on the quality of the input and output of the processes (Harmon, 2005) while business rule governance focusses on the quality of the decisions within a process (Von Halle, 2002). Business process governance encourage the creation of business group that focus on the strategic level (Korhonen, 2007) while business rule governance focusses more on the real time bases. However that there are some difference, this thesis project looks for the relation between the business process governance elements and business rules governance. In order to find this relation an introduction in business process governance elements will be discussed next.

4.3 BPG ELEMENTS

Previous chapters described the taxonomies BPM and BRM and what the differences are between them. Based on the work of Santana et al. (2011) corporate governance is the key element to increase transparency, integrity and accountability. According to Khusidman (2010) business rule governance would following similar approaches as process governance. This chapter describes the collection of business process governance elements with their corresponding description. This collection of elements and their corresponding description is based on Santana et al. (2011) and are applicable to every form of governance. Every element will be discussed and relate to business rules governance to describe the interrelationship between the business process governance elements and business rules governance. All the described elements constitute important factors for each of the business rules governance processes. Starting with the element objectives.

4.3.1. Governance element (1/7): Objectives

Each process has its objectives, which need to be achieved. The goal of objectives within BPG and BRG is to unsure the alignment of BPM initiatives to organizational strategic objectives (Santana et al, 2011). However primary goal of BRG is the alignment between business and IT, it is also used for cost saving, maintenance of rule consistency, compatibility, and control in rapid growing businesses. Business rules and a business rules approach becomes focused mental activity aimed at achieving important business objectives (Von Halle, 2001). Business rules not only achieve business objective it also sets objectives. Nelson et al. (2010) created a maturity matrix for business rules in which the objectives of business rules are defined for every stage. Maturity in business rules increases firm-level agility, rapid rule updates, improved multi-channel management, greater control of business rule updates by the business staff, reduced system development, in addition to significant improvements in rule consistency, accuracy and reliability (Morgan, 2002). If an organization starts with business rules it should start small according to Nelson et al. (2010). If the small projects are successful the organization can define more objectives for a larger scale. It is important that the objectives reckon with the lessons learned and capture issues in order to achieve quick progress. Examples of objectives are prioritize and implement processes. According to Von Halle (2001) a business rules approach offers the correlation between rules and business motivations, which include, among others, objectives.

4.3.2. Governance element (2/7): Roles and Responsibilities

Roles and responsibilities constitute the way people can act in a process with some authority, scope of activities and expected results (Santana et al., 2011). Business rules management knows many roles, a total overview of the roles can be founded in the appendix. However to give an insight in the diversity of roles within the business rule domain; a summary of the most described roles in literature is presented. The most described role in literature is the rule steward (Von Halle, 2002)(Boyer and Mili, 2011), (Charpentier, 2009), (The Eclipse Foundation, 2009).

- A rule steward is a manager who is responsible for the development and maintenance of the rule comprehensive plan for the rule management group activities. The rule steward ensures that the rule repository management processes are followed and that a formal language for the capturing of the rule is used. Overall is the rule steward responsible for the quality of the rule management within an organization.
- Rule architect. Ensures that the overall rule management organization makes sense from an application segmentation perspective. He defines the data model for rules and the decision service definition. The rule architect also selects technology needed for rule management.
- Rule analyst is responsible for capturing rules from business conversations, documents, or program code. The rule analyst identifies where rules are needed in processes.
- The rule author writes the captured rule from the rule analyst in detail and identifies events where the rule should fire.
  test the rules by running simulations. When a change of a rule is needed, the rule author will perform an impact analysis
- Rule administrator. Controls the deployment of the rule-set into the different executable servers and environments. He controls the versioning policy.

These are roles and responsibility specific for the business rules management domain. However there are also non-specific roles that are required in business rules management, such as a developer for the creation of a BRMS. Process analyst which defines the overall process context for the business area. Domain experts to make business rule applicable for an project or application. Charpentier (2009) created a visualization of the roles by classifying the roles along two dimension, namely production – management and business – technical. The visualization can be seen in figure 10 and shows how close the roles are to actual operations or to management and how technical a role is. As the business rule focus grows within an organization the roles rule steward, rule analyst, and rule administrator will focus more on the rule governance and the overall quality of the rules and will move to a management dimension (Von Halle, 2002)(Boyer and Mili, 2011), (Charpentier, 2009), (The Eclipse Foundation, 2009). When the maturity in business rules of an organization increases; experts groups will arise. These experts group with rule specific roles in it will be part of the organizational governance structure (Nelson et al. 2010). The governance structure will be described in the governance element organizational governance structure.

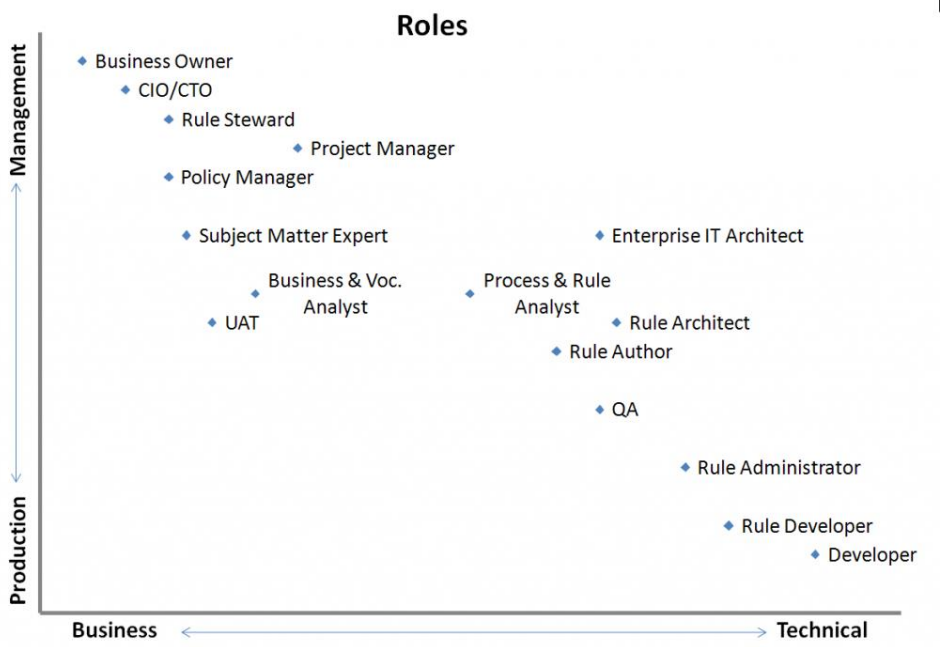


Figure 10: Roles within the business rules domain (Charpentier, 2009)

4.3.3. Governance element (3/7): Standards

Santana et al. (2011) defines standards as: Standardization enables uniformity of business process initiatives. Examples of such standards are methods, tools, metrics, process architecture and document templates. Governance of these standards improves not necessary the quality but it enables guarantees, which result in a common vision and language, an improved communication, to facilitate the sharing of knowledge, and assess return of investment (Santana et al., 2011). In previous chapter is a business rule approach described which can be considered as a standard method for implementing rule management. The business rules group (BRG, 2003) collected and summed up the requirements of business rules, which lead to good business rules. The requirements defined by the BRG are:

1. atomic: can't be broken down any further without losing information
2. business related: only use terms and facts of the fact model
3. consistent: a business rule does not contradict another one
4. declarative: no procedural description
5. unambiguous: have only one, obvious interpretation

Expressing the rules requires a formal language to avoid ambiguities and obscurities. Literature describes different methods which can be used to expresses business rules. Ron Ross developed “RuleSpeak”, the OMG created “Semantics of Business Vocabulary and Business Rules (SVBR)” Von Halle (2002) describes that ambiguity needs to be avoided by using organizational wide standards.

Other methods used for business rules are BPMN (Debevoise, 2009) and case management modeling notation (CMMN) by the OMG. The most used tool for business rules is a business rules management system (BRMS). Such system supports the rules methods and the execution of rules in one or several of the supported rule languages (Boyer & Mili, 2011).

4.3.4. Governance element (4/7):Tasks

A task relates to an action that is necessary to execute a process and is mostly linked to a specific role or responsibility. Examples of tasks are: Design and model processes, monitor and report processes performance, inspect and audit processes execution (Santana et al., 2011). In case of business rules there are six tasks also called processes that need governance. These six processes are discovery, analyzing, design, authoring, validation, deployment.

4.3.5. Governance element (5/7): Organizational Governance Structure

An organization structure exists of teams and roles at strategic, tactical and operation level (Santana et al., 2011). A Steering Process Committee and Process Project Teams are organizational structure elements cited in most process governance models (Santana et al. 2011). Nelson et al. (2010) describes an organizational structure element called a central business rules group (CBRG). This is a group that is responsible for the guidance and direction of business rules management system developments, rule maintenance, system integration and to coordinate implementations (Nelson et al., 2010). According to the business rules service model of Nelson et al. (2010), three areas are identified within the a firms relevance to a business rules approach namely, a CBRG, the IT support unit, and the local business process owners (BPO). The business process owners are responsible for business rules creation, retrieval, updating, and deleting of the rules that are within the scope of the lines of business. The BPO needs standards and direction from the CBRG concerning rule architecture, authoring and maintenance of the rule repository. This rule repository contains all the rules of the organization and keeps track of the updates and maintenance of the rules within the organization. The CBRG provides organizational-wide business rules guidance, liaisons to top management, governance, championing and evangelizing of the business rules approach to the firm (Nelson et al., 2010). IT is a supportive area for both CBRG and BPO, they develop tools, standards, and API interfaces for the CBRG. These areas combined maintain the overall BRMS implementation schedule establish formal mechanisms for knowledge sharing of lessons learned, effective practices and outward liaison to the industry and technology standards setting bodies (Nelson et al., 2010). In the appendix is an overview of the roles and their corresponding organizational structure element described.

4.3.6. Governance element (6/7): Control Mechanisms

Effectiveness of the governance principles are controlled through inspections and audits to determine the BPM level initiatives in compliance with the governance model (Santana et al., 2011). Controls are necessary to correct actions of to adjust actions. This will improve the governance model that is used within the organization (Santana et al, 2011). Control mechanisms can be found on different organizational levels within an organization. There are three organizational levels identified namely: strategic, tactical, and operational. Each of these levels has its own specific control mechanism which monitors and controls the processes and decisions makings. At the strategic level, strategic thinking is required in order to adapt the internal organization to external circumstances (Selznick, 1957). This means that strategy-making process should synthesize an integrated perspective of the enterprise and articulate this not-too-precise vision for the business to pursue (Korhonen, 2007). To do this properly, a control mechanism called: strategic plan is required, which is a contract containing the objectives of the organization; How it should be organize. This contract contains units of works in the core of the business, imposes responsibilities to systemic structures that execute these units of work, and specifies the overall horizontal business processes over these structures (Ould, 2004). Tactical level is about the adaption of the structure of the organization to changes for the organization. The required control mechanism at the tactical level is the capturing of the required targets, the performance measurements, and policies and accountability. Fingar and Bellini (2004) describe the point of control at the tactical level as part of the work plan. Last level, operational level, is about the daily basis. The decisions made at this level should not cross the boundaries of the work plan that is assembled at the tactical level. In other words the work plan is the work process of the operational level and serves as the control mechanism for this level.

Control mechanisms in the business rules domain contains a rule life cycle approach to monitor the progress of the development of the rule (Von Halle, 2002) (Boyer and Mili, 2011). Based on the description of Ould (2004) the business rule life cycle is an element which should be included in the strategic plan and only a rule steward has the possibility to push a rule to the deployment state. The strategic plan contains for every role their responsibility and their boundaries (Charpentier, 2009). The strategic plan should also contain the formal language in use for expressing the rule. A BRMS contains the control mechanisms and can support the governance with monitoring (Charpentier, 2009). The control processes in the rule life cycle can be seen as control mechanisms for the tactical level. Operational level contains control mechanism like: a change for a rule needs to be reviewed by the change management board. The change management board verifies if all rules and code included in a version control repository (Boyer and Mili, 2011).

4.3.7. Governance element (7/7): Assessment Mechanisms

Assessment Mechanisms: BPM teams need a reward for their contribution by achieving objectives. Such reward system increases the motivation and commitment of individuals in order to collaborate and increase the value of clients. Such systems or methods are called assessment mechanisms and contributes to work outside the limits of their functional unities. There are no assessment

mechanisms defined in scientific literature on business rules explicitly. Still, financial rewards are conceivable.

4.4 BUSINESS PROCESS OUTSOURCING

This thesis project evaluates the relationship between business rules governance and organizational readiness for business process outsourcing. In this chapter the business process outsourcing will be discussed. Business process outsourcing, also called BPO, is a component of the term outsourcing. Before discussing business process outsourcing, a short definition of outsourcing in general will be discussed. According to Behara and Bhattacharya (2008), outsourcing has been viewed as a form of external provision of goods and/or services by another enterprise that would previously have been offered in-house. Main objectives of outsourcing initiatives is cost savings mostly done through outsourcing IT departments or parts of it. However current trends in outsourcing include BPO as well. Despite its relative recentness, business process outsourcing (BPO) is emerging to be one of the most promising instruments of BPM that optimizes performance in both core and non-core business processes (Martin et al., 2008). BPO involves transferring certain value contributing activities or processes to another firm to save costs and for the principal to focus on its areas of key competence (Ramachandran & Voleti, 2004). Martin et al. (2008) complements the definition of Ramachandran and Voleti by including mutually beneficial interorganizational alliances among firms based on the level of competence in various business processes. Especially the mutually beneficial alliances is necessary to make BPO successful, because outsourcing IT-intense parts of the firm requires the subsequent implementation of inter-organizational systems to ensure straight-through processing (Martin et al., 2008). Success in BPO is indicated with the achievement of the anticipated cost savings (Lacity et al, 1996). To achieve the anticipated cost savings an organization requires a certain level of readiness. The work of Martin et al. (2008) summarized, compares and gathers measurements of organizational readiness from innovation literature which resulted in a model (figure 5) that describes organizational readiness dependency on three factors, process readiness, IT readiness, business management readiness. Each of these factors requires a smoothly functioning communication routines in the process of IT business alignment. This thesis project will exclusively focus on organizational readiness in business rules governance and relate these to the research model of Martin et al (2008).

According to Martin et al. (2008) project managers need to understand what the impact of outsourcing is on the processes that are kept in-house to make BPO successful. Because it has been shown that process formalization is related to more efficiency, involving the application of rules and standard procedures to reduce ambiguity (Dewett and Jones, 2001). In order to foresee all the side effects of outsourcing processes, or parts of it, requires a certain level of formalization of the processes. We therefor adopt the statement of Martin et al. (2008), namely: Process readiness is indicated with the degree of formalization of the process subject to BPO. The degree of formalization is reflected by the existence of documentation, rules, procedures, and clear management practices (Ein-Dor and Segev, 1978). IT readiness is indicated as the level of flexibility of the outsourcing organization's IT infrastructure and the business knowledge of IT managers (Martin et al. 2008). IT

infrastructure can be dived into two components; technical IT infrastructure and human IT infrastructure. Technical IT infrastructure refers to a set of shared, tangible IT resources forming a foundation for business applications (Byrd and Turner, 2000). Human IT infrastructure refers to the technology management knowledge and skills and technical knowledge and skills of the IT personnel (Lee et al., 1995). By flexible is meant the way an organization can support the design, development and implementation of a heterogeneity of business applications. In other words if an organization has a high degree of IT readiness it can easily adapt changes to their infrastructure. In the context of BPO, a higher degree of IT readiness should require fewer investments in IT systems and IT expertise (Martin et al, 2008). They also claim that a better understanding of the requirements to the IT domain posed by the BPO project leads to a more efficient and effective execution of IT tasks during the project. This can be achieved by creating higher business competence of IT managers. In short IT readiness is dependent of the flexibility of the IT infrastructure and the business knowledge of the IT managers. business management readiness refers, according to Martin et al. (2008), to the experience of the business managers with outsourcing projects and to the active support of top management. Active support is in this context; helping to achieve cost savings from the BPO project within the time and budget (Martin et al, 2008). Experience of business managers is not only learning from previous project but also to have an extensive knowledge of IT to understand the challenges and issues IT is facing and how to deal with those challenges and making the right decisions. It is therefore important that the business managers have an extensive knowledge of IT to avoid unexpected costs and to achieve anticipated savings (Martin et al., 2008). The model of Martin et al. (2008) with the factors that influence organizational readiness can be seen in figure 11.

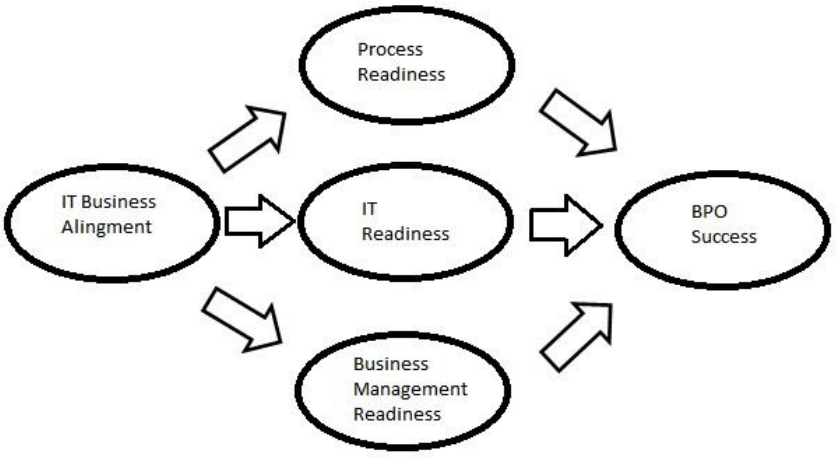


Figure 11: BPO success factors (Martin et al., 2008)

4.5 BRM MATURITY MATRIX

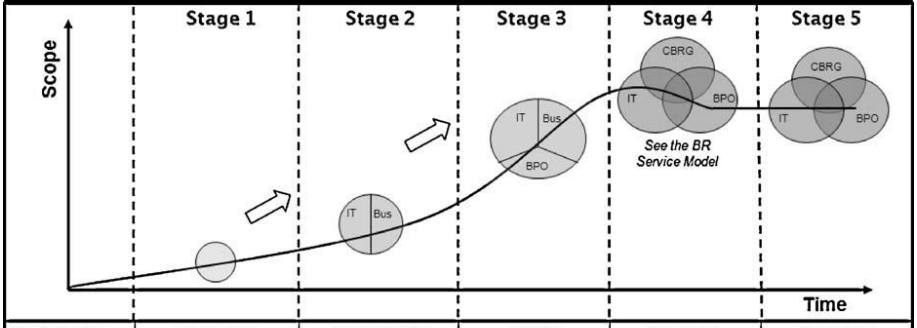
As stated in the chapter research method the measurement tool for business rule governance is a maturity matrix. Maturity matrixes guide organizations to there to be situation. It also allows benchmarking between organizations, division, and departments. Von Halle (2002) claims that rule management has five levels of maturity: initial, repeatable, defined, managed, and optimizing. However Von Halle (2002) only defines the objectives of each level, which not presents the entire picture for this thesis project. Nelson et al. (2010) created a maturity matrix for business rule deployment. The focus areas described by Nelson et al. (2010) correspond with the organizational structure element and part of the roles and responsibilities. The focus area of nelson only describes; which governance structure is responsible for what but leaves out the associated roles within the governance structures. However the maturity matrix of Nelson et al. (2010) is closest related to the to be developed maturity matrix and serves as the foundation of the business rule governance maturity matrix. The maturity matrix of Nelson et al. (2010) can be founded in figure 12.

Van Steenbergen et al. (2007) recognized three types of maturity matrixes, 1: Staged 5-level models. These models distinguish five levels of maturity. For each level a number of focus areas are defined specific to that level. 2: Continuous 5-level models. Is almost the same as the staged 5 level models but with the continuous 5 level models the focused area are not attributed to a level. So the 5 maturity levels are distributed per focus area. 3: Focus area oriented models. These models do not have 5 maturity levels but each focus area has its own amount of maturity levels. The combination of the different maturity levels of the focus area express the organizational maturity levels. Since the existing maturity matrixes consist out of a 5 staged level model, the to be developed business rule governance maturity matrix will also be a 5 stage level model. Also because of the time constrain for this thesis project. The focus areas for the maturity matrix will be the governance elements as described by Santana et al. (2011). The maturity levels for the governance element objective are based on the work of Von Halle (2002). Roles and responsibilities and organizational governance structure are based on the work of Nelson et al. (2010). The remaining governance elements (standards, tasks, and control mechanisms) are based on the work of Boyer and Mili (2011) Von Halle and Goldberg (2006) and Bauer (2009).

The first stage of rule governance is to start creating a loosely coupled group of stakeholders which emphasizes the use of rules in a consistent and reusable way. The loosely coupled group exist out of IT as well as business people and works and the creation of a BRMS solution for certain applications (Nelson et al., 2011). The important thing for stage one is that the scope remains small since the loosely coupled group still needs to grow and define all related factors for rule governance. Von Halle (2002) defines the first stage of rule management as chaotic while business rule management need to be established. Concluding form the statement of Von Halle (2002) is the objective for the first stage is to start developing a BRMS to support the loosely coupled team. The loosely coupled team is considered the organizational governance structure, since the loosely coupled team will in a mature stage evolve to the CBRG (Nelson et al. 2010). Boyer and Mili (2011) describe that the governance processes are very immature and there are no guidelines for rule change processes, rule authoring,

rule testing, rule deployment or rule execution monitoring. In fact the implementation of a rule life cycle has not taking place yet. Role and responsibilities are not defined and standards need to be created or invented. In stage one, the first KPI for rule management will be defined with their corresponding control mechanisms.

Figure #2 – Business Rules Deployment Maturity Model



	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Organization Scope	Application	Application(s)	LOB(s)	Enterprise	Enterprise
Ownership	IT	IT to Business	Business	Business	Business
Structure	Project Team (Informal)	Virtual Group (Dotted Line)	Formal CBRG structure emerges	BR Service Model (See Figure 2)	BR Service Model (See Figure 2)
Development – Responsibility	CBRG	CBRG	CBRG	CBRG, BPO, IT	CBRG, BPO, IT
Implementation – Responsibility	CBRG	CBRG	CBRG "Coordinated" with LOBs	Delegated to LOB and BPO	Delegated to LOB and BPO

Figure 12: Business rule deployment maturity matrix of Nelson et al. (2010)

The second stage acknowledge the existence of a rule life cycle and a rule management approach (Von Halle and Goldberg, 2006). The loosely couple team has more involved employees and even the project leader(s) will be full time dedicated to rule management project. The project leader(s) mostly exist of one from IT and one from business start to from a central business rules group (Von Halle, 2002). The objective of stage two is to achieve traceability from changing rules to other business and system artifacts (Von Halle and Goldberg, 2006). The first roles are also described. Namely a rule repository administrator, a rule analyst, and a rule steward (Von Halle, 2002). The two project leaders will be the rule steward which introduce the first rule processes, namely authoring rules analyzing rules, testing rules, and deploy rules (Von Halle and Goldberg, 2006). Which started with a loosely coupled team has now grown to an informal central business rules group (Nelson et al. 2010). Because the rule life cycle is introduced by the informal central business rules group, control mechanisms can be placed within the business rule processes. Rule stewards will monitor the statuses of the rules and will also introduce a formal language for expressing business rules to achieve high quality rules (Von Halle, 2002). The scope of the informal business rules group will also expand in stage two. Nelson et al. (2011) describes that the business rule repository now focus on a couple of applications.

Stage three grows in scope and will encompassing and line of business (such as marketing, sales etc.) (Nelson et al., 2010). The central business rules group is at stage three formally established with dedicated full time leadership, staff and ownership of the team moves to the business process owners (Nelson et al., 2010). Von Halle and Goldberg (2006) describe that an organization seeks

consistency among its rules and alignment of the rules to current and changing objectives. In other words an organization seeks a business rule governance across projects and systems. Meaning the objective of stage three is the establishment of a business rule governance group. Boyer and Mili (2011) described that the roles: rule steward, rule analyst, rule writer, rule tester, rule administrator, change board member are required for proper business rule governance. Which means that these roles are in stage three bought to life. A detailed description of the roles and their responsibilities can be founded in the appendix.

Consistency is achieved by working the same way. Nelson et al. (2010) and Von Halle and Goldberg (2006) describe that in stage three the CBRG start working through a more coordinated way which implies the use of a standard business rule methodology. A standard business rule methodology can be the agile business rule development method of Boyer and Mili (2011). Establishing business rule governance brings tasks as documenting lessons learned, capturing issues, tracking implementations, establish communication to business rule activities. Von Halle (2002) calls stage three the repeatable stage, because of the structured approaches and the documenting, teaching and mentoring of business rules processes and procedures. These tasks are executed by the formal central business rules group but the actual implementation of rules lies now at the responsibility of the business process owners. Which means that IT focus begins to shift to technical enablement and infrastructure and the business staff focus begins to shifts to interpretation of the business rules for implementation (Nelson et al., 2010). The benefit of having the business process owners responsible for the implementation of the business rules if that the business has easier access to funding and improves the visibility and forces the CBRG to focus on the business value of the business rules approach instead of technological considerations (Nelson et al. 2010). Since business rule governance will be established in stage three so are the business rule governance processes. The business rule governance processes monitor the business rule processes with the use of a rule life cycle and changes to rule need permission of the rule steward (Boyer and Mili, 2011).

Stage four is according to Nelson et al. (2010) known for its “factory model”. The factory model refers to applications that are adapted to make them interoperable for an online repository that centrally stores the organizations business rules. This is done by the three areas; business process owners, CBRG, and IT working according a business rules approach. The factory model can also be seen as the start of the construction of a business rules service model in which each of the three areas deliver its own services in a collaborating way. The service model of Nelson et al (2010 is illustrated in figure 13. The objective for stage four is to actively capturing and analyzing of success metrics. These success metrics predict -schedules, -deliverables, -and savings (Von Halle, 2002). Roles and responsibilities are at this stage fully defined (Boyer and Mili, 2011) and every role is part of the business rule service model (Nelson et la., 2011). The business process owners are responsible for creating, maintaining, updating and deleting of business rules and requires support of the CBRG through architecture rules and differs guidelines (Nelson et al., 2011). The CBRG is responsible for coordination and governance of business rules. At this stage is the business rule governance committee formed within the CBRG. The governance committee is responsible for the meta modeling and alignment, guards deadlines, provides top management support for rule processes,

and makes sure that the business rules are aligned with the overall strategy of the organization. IT provides services for the CBRG such as creating API's, business rules tool support and data access support. Standards in stage four are that organizational wide the online rule repository is used and that the change processes is universal within the organization. The change processes, which is illustrated in figure 14, is described by Boyer and Mili (2011) and is fully managed by the business process owners. Meaning that the business process owners implement and updates the business rules themselves.

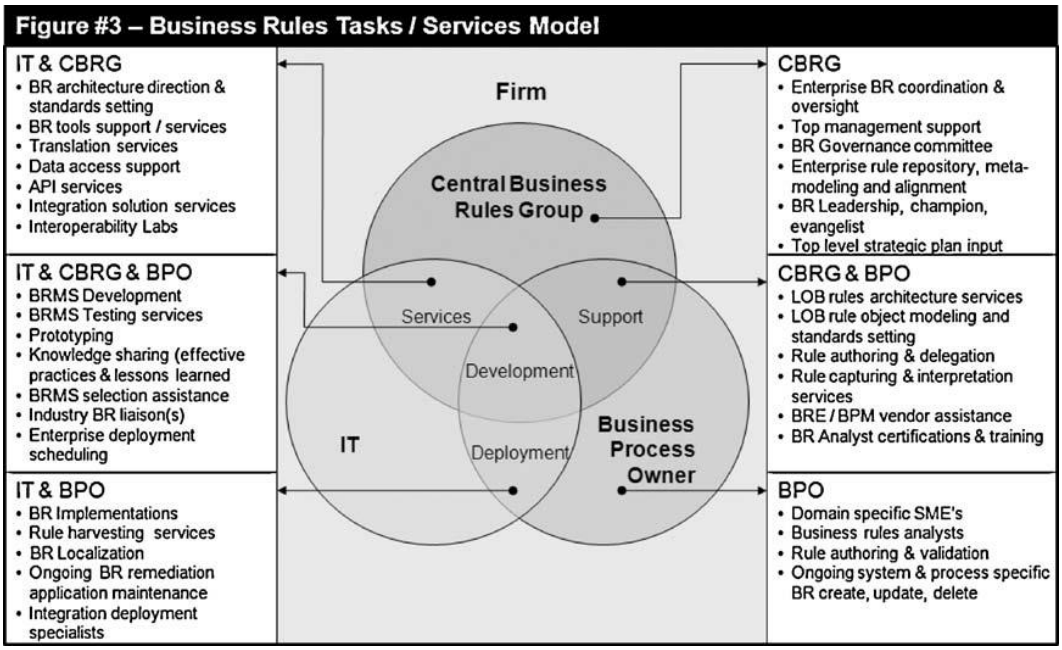


Figure 13: Business rule service model (Nelson et al., 2010)

A change request will be stored in a database and the reviewers will be notified. A rule analyst will scope the change and performs an impact analysis. According to Boyer and Mili (2011) there are three types of outcomes possible, namely simple, not feasible, and possible but costly. In case of the latter a deeper review is required by the governance committee. The committee will accept or reject the change. If it is accepted the rule will continue its regularly life cycle and will be subjected to the governance processes; rule authoring, rule testing, and rule deployment. If it is rejected the governance committee will make up a document in which substantiate there decision. It is the task of the governance committee to review the change request and the implementation to ensure traceability and quality mechanisms. The authoring process and rule testing, which is illustrated in figure 15, is mostly done by a rule writer and an QA tester. The rule writer ensures that the new business rule reflect the business intent and de QA tester have to ensure that the rule change satisfy the change request and do not negatively impact the rest of the system (Boyer and Mili, 2011). After the validation of the rule, a rule is deployed. The deployment process can be seen in figure 16. The rule execution monitoring process performed by the rule steward supports the rule authoring and rule testing process and ensures that the costs not exceed the precede agreed budget.

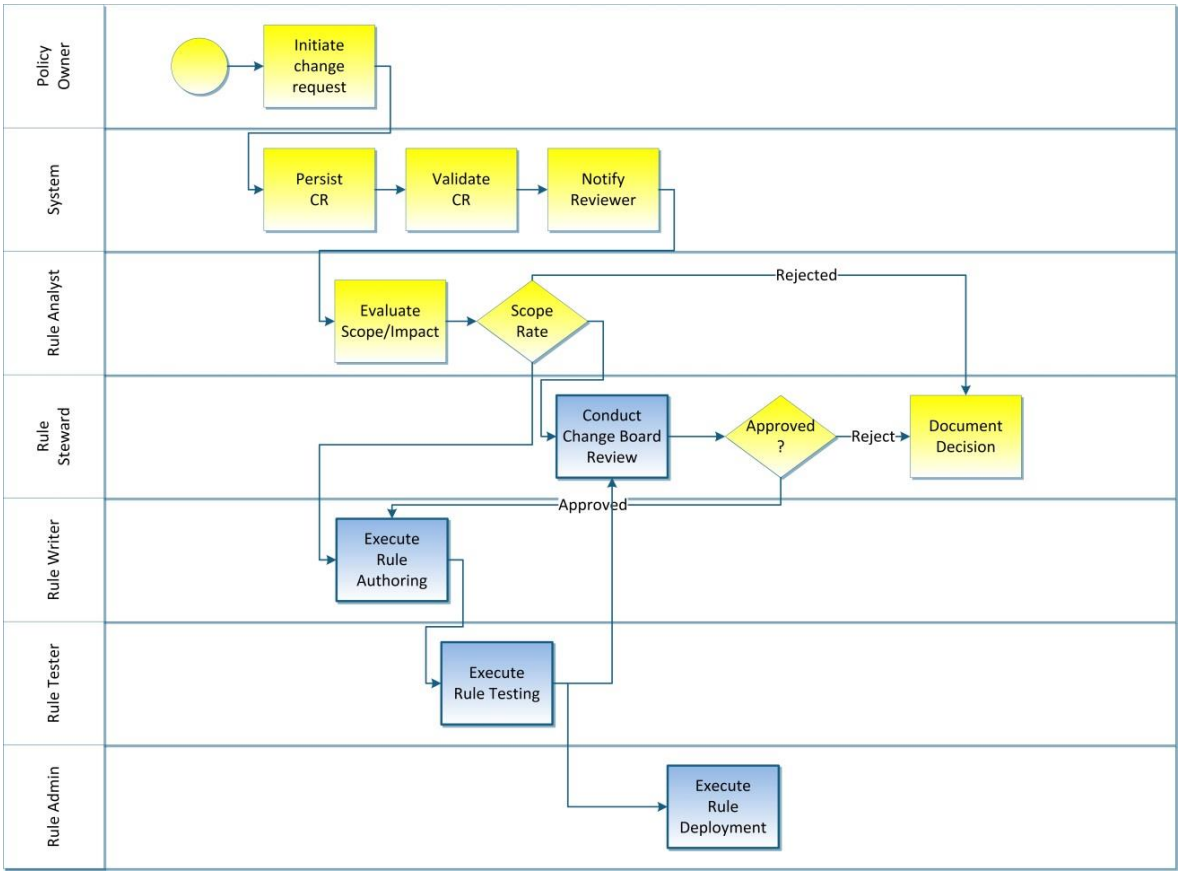


Figure 14: Rule Change Process (Boyer& Mili, 2011)

In brief the tasks of stage 4 contains the following activities: maintain the BRMS implementation schedule, establish formal mechanisms for knowledge sharing of lessons learned, effective practices and outward liaison to the industry and technology standards setting bodies (Nelson et al., 2011). The control mechanism is the implementation of a organizational wide approach for change management which focusses on the business rules.

Stage five is the institutionalizing and integration of an on-going business rule mind set. The difference with stage four is that level four focus on short-terms futures whereas level five looks to a variety for long term futures (Von Halle and Goldberg, 2006). The roles and responsibilities as like the standards do not differ from level four. The tasks of stage five are operationalize the ongoing aspects of the BR approach, including identifying and delegating responsibilities, establishing the new ongoing services of the CBRG and in the IT support units and institutionalizing business rules management across the firm (Nelson et al., 2011). It is the task of the governance committee to structure the CBRG in a way that the business rules approach and its aspects is operationalized. This means that an continually search is started to develop best practices for the business rule approach, identifying and delegating roles and responsibilities, establishing new on-going services of the CBRG and in the IT support units, and institutionalizing business rule management across the firm.

The institutionalizing of the business rule mind set has large impact on the organizational governance structure. The governance committee with the CBRG has greater influence as before. Every project will be managed with a set of related business rules. Such responsibility requires much of the rule repository and lot of maintenance. It is therefore important to structure organizational wide control mechanisms to monitor business rule execution.

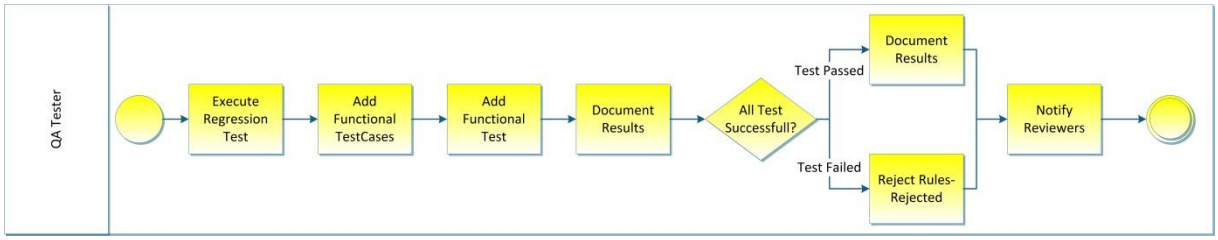


Figure 15: Rule Authoring and Rule Testing Process (Boyer and Mili, 2011)

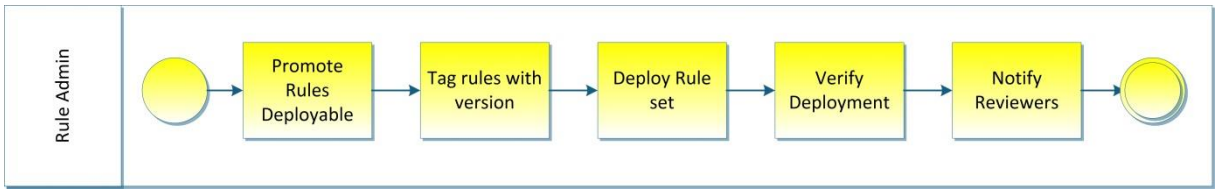


Figure 16: Rule Deployment Process (Boyer and Mili, 2011)

5. FINDINGS

In this chapter are the findings presented which are originated from the conducted research methods. The findings are structured as follows: Each chapter provides the answer on one of the sub-research questions. Starting with the relationship between the business process governance elements and business rule governance. Followed by the relation between business rule governance and the business rules maturity matrix. Then the developed business rule maturity matrix will be discussed and related to the organizational readiness for BPO. Last chapter summarized the findings of the sub-research in order to answer the main research question.

5.1 BUSINESS PROCESS GOVERNANCE ELEMENTS AND BUSINESS RULE GOVERNANCE

The first sub-research question is: “How should the governance elements be structured for business rules governance?”. In chapter 4.3 is a list of the governance elements for business process management introduced. Based on literature is a description composed for each of the governance elements. An evaluation of the governance elements with their new description is needed, because the description is composed from different literature sources which describe different scopes of rule management. Therefore, they need to be evaluated on the extent to which they represent a business rule governance element. As descripted in chapter 3.1 use is made of semi structured interviews to validate the business rule governance elements. Multiple semi-structured interviews are conducted online as well as by different organizations. The participating organizations are presented in chapter 3.2.2. and 3.2.3. including the reason of selecting the organization. The interviews started with an introduction and explaining the goal of the research, the creation of a business rule governance framework to achieve organizational readiness for BPO. Then, the prepared question were asked, which can be founded in the appendix. First, general open questions like name, function, general information about the organization are asked. Thereafter, the interviewee is asked to name governance elements which he/she thinks affects business rule governance.

5.1.1. Identifying governance elements

During the interviews I deliberately did not mentioned the governance elements by name to give the interviewee the change to come up with its own elements. Each elements the interviewee mentioned is written down with its corresponding description. The mentioned elements, which are illustrated in table 4, are cross checked with the elements from literature to find a correlation. If an element is not mentioned during the interview or the respondents does not acknowledge the existence of the element, then the element can be omitted from the business rule governance framework. The elements mentioned by the organization but not described in literature is in consultation of an expert included in the business rule governance framework. After letting the interviewee describing the governance elements which are applicable for rule governance, a list of governance elements from literature is provided to the interviewee. The list of governance elements brings insight to the interviewee and helps the interviewee validating the descriptions of the business rule governance elements. It could be the case that the interviewee forgot to mention a governance

element or does not know the proper name for the element. The list from literature solve this problem.

5.1.2. Findings

The mentioned elements of the organizations are illustrated in table 4. The table illustrated the elements and the organizations that mentioned that specific element. It is by coincidence that the names of the elements correspond with the names as described in literature. The exact description the organizations gave on the governance elements are description in the follow-up tables. After each element is a conclusion made if the governance is included in the business rule governance framework or not.

Mentioned element	Mentioned by
Objectives	The financial organization, business rules organization, business engineering organization, online community, the engineering organization, the software vendor
Roles and responsibilities	The financial organization, business rules organization, business engineering organization, online community, the engineering organization, the software vendor
Tasks	The financial organization, business rules organization, business engineering organization, online community, the software vendor, the engineering organization
Control mechanisms	The financial organization, business rules organization, business engineering organization, online community, the software vendor, the engineering organization
Standards	Business rules organization, business rules organization, business engineering, the software vendor organization, online community, the engineering organization

Table 4: Mentioned Governance Elements

As stated in table 4 the elements organizational governance structure and assessment mechanisms were not mentioned by the interviewees. However after providing a list of governance elements described in literature, all the organizations acknowledge the existence of the organizational governance structure and assessment mechanisms. The reason the organizations gave for not mentioning organizational governance structure is that they forget to mentioned it (financial organization, business rules organization and business engineering organization, software vendor) or they never heard about an organizational governance structure (engineering organization, online community). The description of organizational governance structure provided by the organizations will be discussed later on.

The reason for not mentioning assessment mechanisms is because there are not any in the business rules domain. All the organizations agreed that assessment mechanisms are not commonly used in

the business rule domain. One of the quotes that illustrated the answer of all organizations is the answer from the business rule organization and they said: *"Assessment mechanisms are not commonly used in the business rule domain. If they are used they take form in a financial reward but I have not seen it so far."* For the other elements were the answers more or less on the same line between the case companies.

The first governance element which is described is objectives. Santana et al. (2011) defines objectives as in business process management as the alignment between BPM initiatives and strategic objectives. For business rules is that different as we can see in the table of the descriptions the organizations gave on the governance element; Objectives.

Governance element: Objectives	
Name organization:	Description of the element:
The financial organization	*The objective of rule governance is to ensure traceability of the business rules. Not only for the rule itself but also the customers arguments and decisions that are made in a specific situations.*
Business rules organization	*Traceability of the business rules but also of the underlying information of the rule. That is the objective of working with business rules.*
Business engineering organization	*Extracting of business rules from the rest of the data.*
The engineering organization	*Documenting of the business rules that exist in the processes, which makes it*
The software vendor	*Objectives play certainly a role in rule governance but not in the form of achieving a higher maturity level in rule governance but more in a way of setting goals for the entire business.*
Online community (LinkedIn)	*A business rule focus is all about the extraction of the data en the rules out of the process.*

Table 5: Descriptions of the organizations on objectives

As we compare the descriptions of the different organizations is one term which is mentioned frequently; traceability. "*Traceability is one of the most if not the most important objective of business rule governance"* (online community). By traceability is meant that organizations need to store their business rules in a way that they can easily and within an certain time manner change the rules. The business engineering organizations said that most organizations, who are at an immature phase of business rules, need more than a month to change a rule. "*With the current technology takes a trip to mars 32 days, while a change in the business rule in an immature organization more than 40 days."* (The business rule organization). The long duration is an issue, not because a trip to mars is quicker but because a business rules can change daily. The business rules organization defines a method to achieve traceability: *By defining the terms in a process, like for example customer or account, and the conditions the term operate. For example: an person has an account. The terms are customer and account and the condition is that a person has an account. The business rule could be that a person cannot have more than one account. By storing the terms and conditions separately from the source code, makes it easier to change the business rule. That should be the objective of business rule management: Traceability of the business rules but*

also of the underlying information of the rule (Business rules organization). Based on these findings I conclude that the governance elements objectives is also applicable for business rule governance and contains the description of achieve traceability in the business rules.

The second governance elements which is also mentioned by the organizations is roles and responsibilities. According to the financial institution are roles and responsibilities; *"an element which is needed in every governance structure."* The description of the organizations is illustrated in table 6.

Governance element: Roles and responsibility	
Name organization:	Description of the element:
The financial organization	*It is import to strictly define who can adjust rules to avoid any errors. In our organization is a change in a rule set part of a project.*
Business rules organization	*Specific roles need to be defined which have the responsibility to change the rules. Defining the roles and responsibilities prevent redundancy in the business rules and makes maintenance of rule repository easier.*
Business engineering organization	*Business rule management brings specific roles to an organization like a rule steward which is responsible for the rule life cycle.*
The engineering organization	*It is import that the people know what they need to do and who responsible for what.*
The software vendor	*The existing roles need a change so that some roles also have the responsibility for changing the rules. Mostly is first IT responsible for changing the rule. The responsibility moves to the business side during the increase in maturity in business rules. Increases.*
Online community (LinkedIn)	*Most common rules are a rule steward, rule analyst, a rule architect and a rule writer.*

Table 6: Description of the organizations on roles and responsibilities

As can be seen in the table above are roles and responsibilities an indispensable element in business rule governance. As quotes by the software vendor: *"It is important that not everybody has access to the business rules and can changes whether they want.".* Not all the organization acknowledge that business rule management needs a rule steward or a rule specific role. The reason for this could be that not all organizations know the benefit of the existence of business rule management specific roles. As can be seen in the descriptions of the governance element roles and responsibilities is the need to assign the responsibility of creating and maintenance business rules a must have element. According to the financial organization and the engineering organization business rules can also be created and maintained by BPM experts. The financial organization state: "*Roles in the business rule domain are incorporated in the existing roles in the BPM domain. People can have multiple roles and responsibilities. In our organization is the business process owner responsible for the development of the associated business rules."* Just as the engineering organization said: "The person that is allowed to adjust a process is also allowed to adjust is associated business rules.". Concluding from these statement I can say that roles and responsibilities are an important element of business rule governance. Because the focus on business rules is new for most organization (the business engineering organization, 2013), the responsibility of

creating rules currently lies by the existing BPM roles. *"90% of the organizations are at the begin stage of business rule and start to realize that they should focus more on the business rules instead of the processes. This is also the beginning for organizations to start creating rule specific roles and responsibilities."*. The concluding from the statement is that roles and responsibilities need to be defined to have peoples in the organization which are aware of the rules that exist within the organization.

The third governance element are tasks. A task is an action that is necessary to execute a process and is mostly linked to a specific role or responsibility (Santana et al., 2010).

Governance element: Tasks	
Name organization:	Description of the element:
The financial organization	*Business rule management specific tasks are creating rule, analyzing rules and implementing rules.*
Business rules organization	*Defining tasks is crucial and need to be assigned to the roles and responsibilities.*
Business engineering organization	*The roles need to know what tasks they need to be executing so tasks is also applicable for business rule management.*
The engineering organization	*A business rules approach requires a think thought an rule specific tasks. Like for example Who will extract the rules out of the current processes and data.*
The software vendor	*A rule specific task is the identification of the business rules. This is also the first tasks organizations do when they start with a business rule approach.*
Online community (LinkedIn)	*The people that are responsible for business rule governance are also responsible for the creation and formalization of the tasks for creating business rules and make them traceable.*

Table 7: Description of the organizations on tasks

Tasks are related to roles and responsibilities according to the organizations. Just like the formalization of roles and responsibilities is the need to formalize the tasks also necessary to keep control of the business. Like the business rules organization said: *"Roles and responsibilities and tasks are related to each other. They should not exist without each other."*. As said by the software vendor is the first step of business rule management the identification of the business rules. Literature describes that the first process of business rule approach is rule discovery with correspond to the citation of the software vendor. Concluding, tasks as a governance element occurs also in business rule governance.

The next governance element are standards. Santana et al. (2010) takes a wide definition for standards. A standard can be methods, tools, metrics, process architecture and document templates. All description for the governance element standards that can be categorized in one of the described elements from Santana et al. (2010) are written down. Leading to the following results:

Governance element: Standards	
Name organization:	Description of the element:
The financial organization	*There is no overall standard for working with business rules but the open group is developing a standard for case management called CMMN. This method can be used as a standard for formalizing business rules.*
Business rules organization	*The use of a BRMS can be considered as a standard for business rule management. The use of a standard is very important to be consistent and efficient.*
Business engineering organization	*We do not see one method as a standard for the formalization of business rules, however there are some method such as 'People' and 'RuleSpeak' that can be used by organizations for their business rule formalization. The use of a standard is highly recommended to ensure that everybody works the same.*
The engineering organization	*I don't know any standard for business rule management. But we have policies defined for changing rules to avoid any errors in our systems and to have maximum consistency.*
The software vendor	*There is not a standards which is used by all organizations. However it is highly recommended to use one method of defining rules for organizational wide purposes. Examples of such methods are 'Rulespeak' of 'SVBR'*
Online communities (LinkedIn)	*There are formal languages which can be used for formalizing business rules. The most known languages is rule speak. Using a formal language ensures that the business rules do not contradict each other and to avoid unambiguous.*

Table 8: Description of the organizations on standards

As claimed by all organizations that standards are highly recommended. The reason why standards are highly recommended is because; *"Consistency in the work process is required and the governance team is responsible for achieving this. Achieving the consistency can be done by formalizing a standard."* (Business engineering organization). The business rules organization said after seeing the definition of a standard that the use of a BRMS is something which can be considered a standard. *"Rule management requires a database where all the rules are stored and their underling data. A system where the rules are stored is called a business rule management system (BRMS). Such system is a standard tool used for business rule management. If an organization set up policies for the usage of the BRMS ensures structure in the business rules repository and has maintainability advantages".* Based on the statement of the business rules organization I can say that business rule governance requires the formalization of standards to obtain maintainability advantages. Based on these results is concluded that the governance element 'standards' is also applicable for business rules but that there is not method considered as a

standard. However the organizations did not acknowledge a formal method for business rules management as 'The standard' there are languages which are widely known to express business rules.

Organizational governance structure is not mentioned by the organizations but after providing the list of governance elements as described in literature the financial organization, business rules organization, business engineering organization, and the software vendor acknowledge the importance of having a governance structure for the organization.

Governance element: Organizational governance structure	
Name organization:	Description of the element:
The financial organization	*Organizational governance structures ensure quality in organizational wide processes. Business rules can affect multiple division within an organizational. A central group specialized in business rules can create best practices or policies for the creation, implementation and maintenance of business rules. The specialized group can be part of the Center of Excellence.*
Business rules organization	*A central business rules group needs to be created as part of the organizational governance structure. This group is responsible for the guidance of business rule management developments.*
Business engineering organization	*Most organization do not have a specialized group, only in a very mature stage they start to create a centralized group in business rules. This is an import factor for the evolvement of an organization in business rules.*
The software vendor	*Especially in the large organization is an organizational governance structure beneficial. It is an important element of governance to have a continuous search in improvement of the business rules discovery, authoring, development, and implementation.*

Table 9: Description of the organizations on organizational governance structure

As can be seen in table 9 are not all organizations mentioned. The engineering organization and the online community did not acknowledge the importance of having an organizational governance structure. The reason for they gave is that they never heard of an organizational governance structure. They claim that top management is responsible for the quality of the corporate governance structure. *"Good management result is quality and unambiguity. We expect from everybody to think along policies and regulations. I don't see why a special group needs to be created for this task."* (Online community). The reason that the online community and the engineering organization do not acknowledge the presence of the governance element organizational governance structure could be because they do not know the benefit of having an organizational governance structure. Still the other organizations see organizational governance structure as an indispensable element of business rule governance. Concluding organizational governance structure is also an element in business rule governance.

The last element discussed element is control mechanisms.

Effectiveness of the governance principles are controlled through inspections and audits to determine the BPM level initiatives in compliance with the governance model

Governance element: Control mechanisms	
Name organization:	Description of the element:
The financial organization	*Governance controls the progress and quality of the processes. Also for business rule governance is it important to place control mechanisms to monitor the progress and quality of the business rules.*
Business rules organization	*Organizations should always monitor the data and knowledge behind a rule set to see if the data is up to date. This requires traceability of the data behind the rule, because a change in the data has more impact than a change of the rule itself. Therefor is it important for organization to have multiple checkpoint which need 24/7 monitoring.*
Business engineering organization	*Control mechanisms in business rules are very important to see if the underlying data of a business rule is consistent, declarative, unambiguous and business related*
The engineering organization	*Business rules needs to be authored and tested before implementation. These control steps are needed to avoid contradiction between the business rules and that the progress still runs smooth.*
The software vendor	*A control mechanism for business rules management is a rule life cycle. The lifecycle allows the manager to track the progress of the business rules.*
Online communities (LinkedIn)	*Testing of the rules before implementation is a control mechanism which should be monitored by the people of the business rule governance.*

Table 10: Description of the organizations on control mechanisms

Control mechanisms is as can be seen in table 10 an element which affects business rule governance. Like the engineering organization said *"Good governance has control over the unit it should govern. In this case is that business rules and all its related aspects".* The software vendor sees control mechanisms in business rule management as the testing of rules before implementation. It could be the case that rule contradict each other and can therefore not be implemented in the same process. The software vendor gave the following example: *"The safety department wants you to have rough tiles to avoid slipping while the health department wants you to have slick titles because that is more hygienic. These two rule contradict each other. It is therefore necessary to have the control mechanisms, like authoring and testing of rules, in place."*. Meaning that control mechanism in business rule governance take the form of tests to avoid contradiction between the rules. Control mechanisms is according to the financial organization related with roles and responsibilities. The organization makes a distinction between authority controls and execution controls. The authority controls checks if a person cannot change whatever he want. Execution controls check if the processes is executed according to business standards. The execution control should ensure traceability of the business rules. One form of control mechanism mentioned by the business engineering organization is versioning. It is important

to keep record of different versions of a business rule to understand the reason of the change. *"Versioning of business rules is essential to follow the reasoning of change in a rule set." (The business engineering organization).* The statements of the organizations brings me to the conclusion that the control mechanisms are also applicable in business rule governance and take the form of testing, authoring, and versioning of business rules.

5.1.3. Conclusion

Based on these finding I can conclude that the business process governance elements are also applicable for business rule governance. However the form of the elements are different for business rule governance. Like literature and the case companies described assessment mechanism is not applicable for business rule management and can therefore be discarded. The case companies explained that the governance elements are interrelated with each other. Like an organization defines roles and responsibilities for business rules and tasks are assigned to the roles. For each task or work assignment are standards used to ensure quality standards. The roles and responsibilities are part of an organizational governance structure for continuous improvement and knowledge sharing of business rules related factors. The organizational governance structure also defines the objectives and determines the control mechanisms necessary to achieve the objectives.

5.2 THE BUSINESS RULE GOVERNANCE MATURITY MATRIX

The second and third research question can be placed under the same overarching phenomena, namely the development of the business rule governance maturity matrix. The criteria to develop a maturity matrix is the initial state of the business rule governance maturity matrix and is discussed in the first chapter. The findings describe how business rule governance relate to the maturity levels and presents the business rule governance maturity matrix.

5.2.1. Identifying maturity matrix criteria

The second sub-research question is: “Can a maturity matrix be created for business rule governance?”. To answer this question, use is made of the paper of Weerd et al. (2009). Weerd described the development of a software product management maturity matrix which has been proven to be valid among 45 software product management professionals. Since the creation of the maturity matrix for software product management has resulted in such accepted maturity matrix within the software product management environment; the development steps are used to create a maturity matrix for business rule governance. As described in chapter 4.5 is chosen for a 5 staged maturity matrix because of limited time and resources. Developing a maturity matrix for business rule governance will take the same steps as in the paper of Weerd et al. (2009). Van de Weerd et al. (2009) developed a model which illustrated the development of a maturity matrix and can be founded in the appendix. However the model of Weerd et al. (2009) included a reference framework and is focused on the development of a capabilities maturity matrix which is not applicable for the development of a business rules governance maturity matrix. Meaning that the model of Weerd et al. (2009) needs adjustments to make the approach applicable for the development of business rule governance maturity matrix. The first adjustment is the exclusion of the reference framework in the model. Only the right part of the model illustrates the development of a maturity matrix, which is the focus of this chapter. In other words only the right part of the model is applicable for the development of a business rule governance maturity matrix. Weerd et al. (2009) describes capabilities that indicate a maturity level and are part of the maturity matrix. In case of business rule governance are the governance elements the capabilities that indicate a maturity level. Resulting in a new model, which is based on the model of Weerd et al. (2009), and is presented in figure 17.

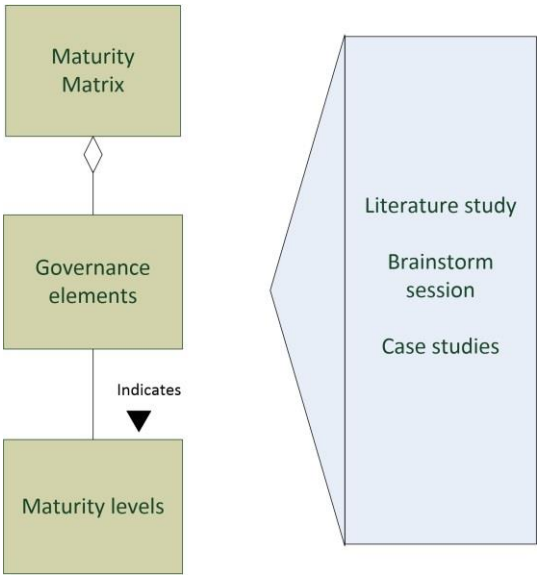


Figure 17: Maturity matrix development model

Just like Weerd et al. (2009) is the maturity matrix for business rule governance be created with the following main steps. 1. Identification and description of governance elements. 2. Positioning the governance elements in the maturity matrix. 3. Validating the maturity matrix. The first steps is described in sub paragraph 5.1. Positioning of the governance elements is presented in subchapter 4.5. The next subchapter (5.2.2.) will validate the created maturity matrix based on literature.

5.2.2. Findings

"How does business rule governance relate to the business rule maturity levels?". In previous chapter are the governance elements related to business rule governance, which provides a list of elements that are applicable for business rule governance. Based on literature, described in chapter 4.5, a maturity matrix is created with the maturity matrix of Nelson et al. (2011) as foundation. During the validation interviews five levels of rule management is asked for each element and compared to the literature based maturity matrix. Another validation method of the maturity matrix is done through asking the case companies to described the business rule structure of at least one case. The described structures are used to validate the coherency between the elements within a maturity level. A remark of the business engineering organization is that a maturity matrix in business rules should contain a level 0. Level 0 means that the organization is unaware of business rules being special and business rules are not managed rigorously as strategic levers for achieving business objectives. However the other organizations agreed with the maturity matrix as how it is. Therefor is the level 0 not included in the maturity matrix and discarded. Below are the maturity levels defined by the organization for the first element; Objectives.

Maturity matrix / Case Company	Level 1	Level 2	Level 3	Level 4	Level 5
The financial institution	Extract decision steps within the processes	Document the rules within the decision steps and store the rules separately	Create a team that has the responsible for organizational wide rules and store all customers arguments by the rules.	Create performance measurement which can facilitate in predicting schedules and savings.	Develop performance measurements to continually improve prediction for the long term future.
Business rules organization	Give a select group of people the responsibility to use the rules in a consistent way	Define the objects (e.g. People) and the context of the object as rules and document these as a separate entity.	Create a business rules group which is responsible for the rules in current and changing objectives	Start with analyzing the success metrics of the business rules approach.	Actively measure performance of the business rules approach
Business engineering organization	Start forming a group of stakeholders which will be responsible for identifying and creating rules	The group start extracting the rules out of the processes and stores them separately from the process.	Involve business people to the group and involve other business entities as well.	Define monitoring methods to analyze the impact of the business rules approach	Create best practice model and have regularly monitoring review in place.
Engineering organization	Identify with a select group the rules within the processes	Store these rules in a way the can be traced.	Expand the approach to other departments and applications	Have a business rules group measuring and directing the business rules approach.	Creating and capturing of business rules is standard process of the organization and is monitored by a business rules group.
Software vendor	Create a team who emphasizes the use of rules in a consistent and reusable way	Ensure traceability of the rules across businesses and systems.	Have a central group within the organization which is responsible for the business rules approach.	The central group will capture success metrics to predict schedules and deliverables	The central group creates best practice models for capturing business rules and to measure the performance.

Table 11: Maturity levels defined for the governance element: Objectives

Scientific literature (see chapter 4.5) describes the first objective of business rule governance as the creation of a team which emphasizes the use of rules in a consistent and reusable way. As can be seen in table 11 have four out of five organizations described a similar objective. Based on these findings is concluded that the description, as described in literature, of the first level for the governance element; Objectives is accepted. The second level described by literature is ensuring traceability from changing rules. Again have the organizations defined a similar answer, which result in the acceptance of level two. The objective in level three, described by literature, is the establishment of a business rule group which is responsible for organizational wide business rules. The interviewees acknowledge the movement to organizational wide approach as the next step. Result ; level three is also accepted in practice. Level four and five are in literature very close to each other.

Level four defines the objective as the creation of success metric to predict the short term future, while level five predicts the long term future. Monitoring, capturing and analyzing are the keywords of the interviewees for level four which corresponds with the description as in literature. Level five as defined by the interviewees is that monitoring is regularly performed and best practices are created to make predictions for the long term future. These findings has resulted in the following structure for the governance element objective.

	Level 1	Level 2	Level 3	Level 4	Level 5
Objectives	Creation of a loosely coupled team group of stakeholders which emphasizes the use of rules in a consistent and reusable way	Traceability from changing rules to other business and system artifacts	Establish a business rule governance group for consistency among its rules and alignment of the rules to current and changing objectives	Actively capturing and analyzing of success metrics for the short term future. These success metrics predict - schedules, - deliverables, - and savings	Actively capturing and analyzing of success metrics for the long term future.

Table 12: Overview maturity levels for the governance element: Objectives

Maturity matrix / Case Company	Level 1	Level 2	Level 3	Level 4	Level 5
The financial institution	IT starts with defining business rules but no formal roles are defined	A person gains the role of rule steward and will guide a group so ensure consistency within the business rules	The entire group will get rule specific roles and each has its own responsibility, like one for rule discovery, another for rule testing etc.	Rule approach is divided in multiple roles and divided amongst people within a business rules group	Segregation of duties within the business rules domain is formally structured.
Business rules organization	IT starts to realize that a business rules focus improves agility.	Rule specific roles start to be defined. These roles have the responsibility over the rule life cycle and the repository.	Since the scope of the rules approach is enlarged and the group has also increased. So are the roles as well	The eclipse foundation has created a list or roles and responsibilities, which are applicable in level 4.	No changes with level 4.
Business engineering organization	IT personnel begins extracting rules from the processes	Individuals are appointed and gain rule specific roles	Segregation of duties is beginning to formalized. So can a person who developed the rule not be the tester as well.	No conflicting roles and responsibilities are applicable.	No new roles and responsibilities are created.
Engineering organization	The existing roles within the BPM domain start with extracting business rules. Meaning that the responsibility first lies by the process owners.	People from BPM will get rule specific roles like a rule steward and rule analyst.	The groups grows and so are the roles. But I don't know any rule specific roles.	All rule specific roles and the coherent responsibility are defined	The roles and responsibilities are organizational wide known.
Software vendor	The first step is awareness of the benefits of a business rule focus. No formal rules are yet defined. But the awareness start within the IT department	A rule steward is brought to life and has a full time duty with business rules.	Rule analysts, rule testers, rule developers are assigned to people and a rule change management procedure is created.	Change managed now knows are formal procedure for the change in business rules and segregation of duties among the personnel are in place.	Change managed now knows are formal procedure for the change in business rules and segregation of duties among the roles are in place.

Table 13: Maturity levels defined for the governance element: Roles and Responsibilities

Level one in roles and responsibilities is according to scientific literature as described in chapter 4.5 not defined. As noted from the interviewees are the roles not formally defined by is IT starting with the set-up of a business rules approach. Since the interviewees acknowledge that roles and responsibilities are not defined in the primary phase of business rule governance is concluded to describe level one of roles and responsibilities as not defined. The interviewee agreed that at level two the first roles are defined. The financial institution, engineering organization and the software vendor even said explicitly that a rule steward is created. The engineering organization also mentioned a rule analyst, which is also described in literature. Since the description as stated in scientific literature is more complete, it is used to describe level two of roles and responsibilities in the business rule governance maturity matrix.

At level three are more roles and responsibilities defined, which is also acknowledge by the interviewees. The business engineering organization mentioned also the segregation of duties. Not only rule specific roles are brought to life, also a policy is documented, which describes the segregation of duties to ensure quality within the rules. The software vendor mentioned rule change management procedures. Concluding from the statement of the software vendor as well as the statement of the business engineering organization is level three also the level in which change management starts to be formalized which includes the segregation of duties. Literature is more specific in the roles but does not contain the change management formalization with the segregation of duties. By combing the two descriptions results is: Rule steward, rule analyst, rule writer, rule tester, rule administrator, change board member are created and a policy is created for rule changes and segregation of duties is in place.

Level four is described in literature as well as by the interviewees as the level where all rule specific roles are known within the organization. However the software vendor as well as the business engineering organization mentioned again the segregation of duties but this time that no conflicting roles can occur. In other words every stage of the rule life cycle is performed by the appropriate person. The difference with level three is that now all roles are created and that conflicting roles cannot occur. Result is: All business rules roles as described by the Eclipse Foundation (2009) are created and conflicting roles cannot occur. Level five is according to the scientific literature not different then level four. Based on the findings from the interviewee is that true. The descriptions that are mentioned for level five are included in the other levels. Therefor is level five no different from level four. The result of the descriptions is noted in table 14.

	Level 1	Level 2	Level 3	Level 4	Level 5
Roles and responsibilities	Not defined	The first roles are defined: rule repository administrator, a rule analyst, and a rule steward	Rule steward, rule analyst, rule writer, rule tester, rule administrator, change board member are created and a policy is created for rule changes and segregation of duties is in place.	All business rules roles as described by the Eclipse Foundation (2009) are created and conflicting roles cannot occur	All business rules roles as described by the Eclipse Foundation (2009) are created and conflicting roles cannot occur

Table 14: Overview maturity levels for the governance element: Roles and Responsibilities

Maturity matrix / Case Company	Level 1	Level 2	Level 3	Level 4	Level 5
The financial institution	No standard is used	An informal method is used to discover business rules	A formal method is documented and widely used. The method includes rule discover, analysis, testing and implementation	Change management focuses more on business rules and has a structured way of changing rules, which are stored separately from the processes.	A business language is chosen to formalize business rules and formal procedure is used to tender rule changes
Business rules organization	No standard is used or known	A business rules approach is used for one or a couple of application.	The business rules approach is adapted by the organization and best practices are created. The approach becomes a standard	A language is selected to be used as a standard for describing business rules and an organizational wide repository is introduced	Change management procedure with the focus on business rules is implemented in the organization.
Business engineering organization	No standard is used	Formal steps are documented to identify and capture business rules	A coordinated business rule approach is implemented with the use of a business rule language, such as 'Peoplesoft' or 'RuleSpeak'.	A BRMS is used organizational wide	Business rules change process is formalized, documented and makes uses of a business rule language.
Engineering organization	-	-	-	-	-
Software vendor	No standard is used	A business rules management approach is introduced	The business rules approach is coordinated	Business rules approach is universal for the entire organization including change processes for business rules. Eg. SBVR	Business rules approach is universal for the entire organization including change processes for business rules. Eg. SBVR

Table 15: Maturity levels defined for the governance element: Standards

The reason that the engineering organization is left black in table 15 is because the interviewee did not know any standards for business rules or the maturity steps for standards in business rule governance. As can be seen in table 15 is level one universal to all. Which makes the conclusion that at the first stage no use is made of standards in business rule governance. The second level is also not different among the interviewees and describes the introduction of a business rules approach. Literature describes level three as the adaption of one method that is used as standard for rule management. The method includes lessons learned, issues captured, tracking of implementations, and communications to the business rules activities is established. The Business engineering organization specifies the communication to the business rules activities by mentioning a business rules language. Examples of business rules languages are; Rule Speak, Peoplesoft, SBVR.

Level four is as described in literature the level in which business rule change process becomes universal organizational wide. The business rules organization stated that the business rules language is determined in level four. However scientific literature and the business engineering organization claims that a business rule language is part of the coordinated business rules approach. After a discussion with the interviewee from the business rules organization he acknowledge that a business rules language is part of the business rules approach. Validated by all the organizations is the following description for standards level four: Universal business rule change process and the use of an organizational wide online repository. Literature does not describe a description for level 5. The descriptions of the organizations are inherent in the description of level four. A business rules language, and change management procedures are part of a business rules approach. Concluding level 5 does not differ from level 4. An overview of the level for the governance element standards can be seen in table 16.

	Level 1	Level 2	Level 3	Level 4	Level 5
Standards	Needs to be created or invented	The first steps of a rule management approach is introduced	Coordinated business rules approach (lessons learned, issues are captured, implementations are tracked, communications to the business rules activities is established	Universal business rule change process and the use of an organizational wide online repository	Universal business rule change process and the use of an organizational wide online repository

Table 16: Overview maturity levels for the governance element: Standards

Maturity matrix / Case Company	Level 1	Level 2	Level 3	Level 4	Level 5
The financial institution	First tasks is creating a team for rule management	Defining rule specific processes	Improve the rule specific processes by creating best practices and actively monitor business rule processes	Establish knowledge sharing within the organization but also outward liaisons to the industry	Have business rule management embedded within the organization and make business rule governance part of the corporate governance structure
Business rules organization	The first task is creating a system to store and structure business rules	Formalizing business rules processes, like rule discovery, rule analyzing, rule testing, rule implementing	Become expert in the business rule processes. Issues noted, implementation guidelines, best practices etc.	Set up a continuous search for knowledge sharing and improvement of the business rule processes.	Set up a continuous search for knowledge sharing and improvement of the business rule processes.
Business engineering organization	IT needs to build a tool for managing and structuring business rules	Business rules processes needs to be defined	Procedures of the processes need to be created for organizational wide purposes	Efficiency and knowledge become priority one to optimize the business rules processes	Create a feedback loop controlled by the business to measure performance of business rules initiatives
Engineering organization	Policies need to be created how to discover and formalize business rules	Create system that support rule specific processes	Document business rule management practices. Such as projects, changes, and issues.	Create a business rules approach for the specific industry your operating.	Define the approach in such way that an ongoing business rules approach is established
Software vendor	A tool is required to extract and store business rules. The first tasks concern the creation of a business rules management system.	Processes needs to be defined and formalized to identify business rules	Start with monitoring the business rules approach and document all business rules related aspects. E.g. projects,	Starts with creating communities where knowledge is shared concerning business rules management	Create new services for the central business rules group.

Table 17: Maturity levels defined for the governance element: Tasks

Maturity level one of the governance elements tasks is described in scientific literature as the level were the BRMS system is created. The engineering organization does not agree and claims that first a policy must be created before developing a system. The reason for first developing a policy is because an organization needs to define first what they want to do with the business rules and how they intend to achieve it. The software vendor, business engineering organization, and business rules organization agrees with the statement of the engineering organization but sees that task as part of the developing process of a BRMS. The majority agrees the with the descriptions as stated in scientific literature and therefor is decided to have the description of the first level the same as in scientific literature. Questions relating the second level did not result is a discussion with the interviewee. The description of the organization correspond with the description as stated in scientific literature. Concluding level two is defining the first processes of business rules.

Coming up to level three is also unambiguous described. When an organization has taken the first steps in business rule management the business rules activities must be monitored to improve the business rules approach. Monitoring result in lessons learned, issues captured and tracking the progress of business rules activities, which is acknowledge by the interviewees. However scientific literature also described the establishment of communication to business rules activities, which we consider required for monitoring of business rules activities. The establishment of communications is also included in the description which result in: “Documenting lessons learned, capturing issues, tracking implementations, establish communication to business rule activities” as the description of level three. If an organization has accomplished level three it can continue improving their business approach by setting the priority of their tasks to knowledge sharing of lessons learned. Knowledge sharing creates a broader perspective and can improve the business rules activities (Nelson et al., 2010).

Level four is also were the focus is based on the liaisons of the industry and not just the organization. We see the knowledge sharing back in the answer of the interviewees which result in the description “Maintain the BRMS implementation schedule, establish formal mechanisms for knowledge sharing of lessons learned, effective practices and outward liaison to the industry and technology standards setting bodies”. Level five is when business rules approach is operationalize according to scientific literature as described in chapter 4.5. However the description the interviewees gave differs among each other they are all included in the description which is stated in literature. An overview of the description per level for the governance element tasks can be founded in table 18.

	Level 1	Level 2	Level 3	Level 4	Level 5
Tasks	Creation of a BRMS	The first rule processes are defined, namely authoring rules analyzing rules, testing rules, and deploy rules	Documenting lessons learned, capturing issues, tracking implementations, establish communication to business rule activities.	Maintain the BRMS implementation schedule, establish formal mechanisms for knowledge sharing of lessons learned, effective practices and outward liaison to the industry and technology standards setting bodies	Operationalize the ongoing aspects of the BR approach, including identifying and delegating responsibilities, establishing the new ongoing services of the CBRG and in the IT support units and institutionalizing business rules management across the firm

Table 18: Overview maturity levels for the governance element: Tasks

Maturity matrix / Case Company	Level 1	Level 2	Level 3	Level 4	Level 5
The financial institution	Starts from IT. A couple of IT personnel which is responsible for the changes in the processes	Business people are involved in the extraction of business rules. They are the initiators of changes	The business people and IT personnel which are responsible for the changes to business rules become a central business rules group. All changes or implementation of business rules become their priority	Other organizational departments starts to collaborate with the central business rules group. Policies with procedures are created for the business rules group.	The business rules group is part of the Center of Excellence and form a service model to the organization.
Business rules organization	IT starts by seeing the benefit of focusing on business rules	Responsibility moves from IT to the business. A couple of business managers with a group of IT'ers will take the responsibility for the business rules. A formal business rules group is established	A central business rules group within the center of excellence is created. The central business rules group consist out of full time employees and business owner gain the ownership of the rules within the processes	The central business rules group is formally established and provide an additional service to the organization.	The central business rules group is formally established and provide an additional service to the organization.
Business engineering organization	-	-	A central business rules group is established containing people from IT as well as from the business.	The central business rules group consist out of expert which are responsible for all business rules related activities	The central business rules group works together with the process owners and the IT to established an agile business rules approach.
Engineering organization	-	-	-	-	-
Software vendor	The first people, which will eventually be in a business rules team, are from IT.	IT convince business manager to be part of a rule based focus	The business and IT are full time dedicated to the business rules approach and from a business rules team	The business rules team is a formally establish group with expert and have close relation with other business units.	The business rules team is a formally establish group with expert and have close relation with other business units.

Table 19: Maturity levels defined for the governance element: Organizational governance structure

Organizational governance structure brought some confusion among the engineering organization. The engineering organization did not know any specific organizational governance structure in the rule domain and see the governance structure as an element for organizational wide purposes instead of rule specific. Meaning every form of governance should include the business process owners and IT from the start. IT is always the supportive function in any case. The business engineering organization stated that an organizational governance structure is started to be formalized when a maturity level three is accomplished. The other organizations stated that an organizational governance structure start with an group from IT who is responsible for extracting the business rules out of the processes. At level two are business people involved. The IT personnel with a couple of business managers form an informal central business rules group according to scientific literature. The interviewees had the same description as can be seen in table 19.

Level three is as well as described in literature as by the interviewees the level in which a central business rules group is established in an organization. The group contains personnel which is full time dedicated to business rule management. Level four is when the central business rules group becomes an extra service to the organization. The group forms a bridge between process owners and the IT and ensures rule reuse en consistency and traceability of the business rules. As literature described level four is where the three areas; business process owners, CBRG, and IT are working in a collaborating way and form a business rule service model with all its required resources. Only the financial organization formalized a level five for organizational governance structure. They describe that in level five the central business rules group becomes part of the center of excellence. However the business rules organization stated that the central business rules group can be considered as a center of excellence when is provides an additional service to the organization. Since level four is described as the level in which the central business rules group can be seen as an additional service to the organization. Therefor is decided to has level five the same as level four. An overview of the descriptions per level for the governance element: “Organizational governance structure” can be seen in table 20.

	Level 1	Level 2	Level 3	Level 4	Level 5
Organizational governance structure	Starting to form a team out of IT people, which will be the loosely couple team	Informal CBRG with mainly people from IT	Central business rules group is formally established with dedicated full time leadership, staff and ownership of the team moves to the business process owners	Three areas; business process owners, CBRG, and IT are working in a collaborating way and form a business rule service model with all its required resources	Three areas; business process owners, CBRG, and IT are working in a collaborating way and form a business rule service model with all its required resources

Table 20: Overview maturity levels for the governance element: Organizational governance structure

Maturity matrix / Case Company	Level 1	Level 2	Level 3	Level 4	Level 5
The financial institution	The people need to know what they doing and why but we don't know any rule specific control mechanisms	The people need to know what they doing and why but we don't know any rule specific control mechanisms	The people need to know what they doing and why but we don't know any rule specific control mechanisms	The people need to know what they doing and why but we don't know any rule specific control mechanisms	The people need to know what they doing and why but we don't know any rule specific control mechanisms
Business rules organization	At the beginning are no formal control mechanisms defined	Monitoring is done by define development steps. In other words a life cycle is created which is monitored.	The scope changes and formal change request are establish and progress is monitored trough a business rules life cycle.	An internal audit team controls the quality of the rule change process and progress is monitored trough a business rules life cycle	An internal audit team controls the quality of the rule change process and progress is monitored trough a business rules life cycle
Business engineering organization	A IT manager is directing a group of IT'ers during the development of a BRMS. The IT manager is the control mechanism.	Rules processes are introduced and progress is monitored by the Manager with the use of a BRMS	The rules follow a life cycle with at each level progress can be measured by the business rules group	The rules follow a life cycle with at each level progress can be measured by the business rules group	The rules follow a life cycle with at each level progress can be measured by the business rules group
Engineering organization	First step is to extract the rules and store them separately. No control are in place here.	Business rules needs to be authored and tested before implementation. These control steps are needed to avoid contradiction between the business rules and that the progress still runs smooth	Progress steps are stored and monitored by a manager. Formal approval is needed by different people before implementing a business rule	A formal method is used for business rules activities and quality assurance people and controlling the regularly the quality	A formal method is used for business rules activities and quality assurance people and controlling the regularly the quality
Software vendor	Business rules focus is new so controls are not in place yet	Regularly monitoring of the business rules are consistent with the law and regulations	Have a rule life cycle in place to control the development and changes of rules	Formal procedures are defined and regularly controls take place to see if the controls are compliance	Formal procedures are defined and regularly controls take place to see if the controls are compliance

Table 21: Maturity levels defined for the governance element: Control mechanisms

The last governance element to describe is are the control mechanisms. Control mechanisms level one is described as not defined. The description is also acknowledge by the interviewees. Not defined control mechanisms does not mean that there are no control mechanisms. The business rules organization explained that informal control mechanisms can exist and that agreements are made for extracting business rules. An example is that each rule must contain a term (such as customer) and a fact (such as a customer has a least one account) (Bauer, 2009). The financial organization stated that they do not know any rule specific control mechanisms but that the people need to know what they are doing and why. If the people know what they are doing and why the overall quality is ensured. Still control mechanisms can support complex situation to ensure traceability and maintainability (Boyer and Mili, 2011). The second level is when the first business rules processes are formalized. Working according a prescribed procedure is seen as a control mechanism by the business rules organization, business engineering organization, engineering organization, and the software vendor. Von Halle (2002) describes a prescribed procedure and tracking the status after each step as a life cycle. Meaning that the first control mechanism is the implementation of a business rule life cycle.

Level three is as described in literature (Chapter 4.5) as the level in which monitoring of the life cycle takes place. The interviewees agreed with the description. The engineering organization added the control mechanism: segregations of duties, which means that formal approval need to be given after each stage of the business rule life cycle. The business rules organization has a similar description for level three. The interviewee described that a formal change request is established for business rules management. A formal change request is according to the interviewee of the business rules organization a process in which the steps are documented and followed according to the procedure. In the procedure use is made of the segregation of duties. Each status of the rule life cycle is done by another authorized personnel. Level four and five are the same according to the organizations as well as the scientific literature as described in chapter 4.5. In level four and five are the control mechanisms applied on an organizational wide basis and contain a formal change management process as well as a rule life cycle and a method for each activity in the life cycle. The interviewee of the business rules organization also mentioned an internal audit team to measure the quality of the business rules management activities. However the other organizations did not mentioned an internal audit team and if procedures are executed according to the procedures and management monitors regularly the quality of the business rules activities we do not consider an internal audit team as an un-missing item for level four and five control mechanisms.

	Level 1	Level 2	Level 3	Level 4	Level 5
Control mechanisms	Not defined but informal controls can exist	The business rule life cycle is implemented and the statuses are monitored by the informal CBRG	Maintaining the rule life cycle approach with imbedded control mechanisms	the implementation of a organizational wide approach for change management which focusses on the business rules	the implementation of a organizational wide approach for change management which focusses on the business rules

5.2.3. Conclusion

The findings from the interviews and description of the case companies have led to the validation of the maturity matrix. The case companies agreed with the steps of each elements however two elements was not unambiguous among the case companies. Organizational governance structure and standards are not validated by all the case companies. However it is still possible to make a maturity matrix with the findings are presented in 5.2.2. The result, as presented in table 22, is based on the findings per governance element.

Maturity levels / Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Objectives	Creation of a loosely coupled team group of stakeholders which emphasizes the use of rules in a consistent and reusable way	Traceability from changing rules to other business and system artifacts	Establish a business rule governance group for consistency among its rules and alignment of the rules to current and changing objectives	Actively capturing and analyzing of success metrics for the short term future. These success metrics predict -schedules, -deliverables, -and savings	Actively capturing and analyzing of success metrics for the long term future.
Roles and responsibilities	Not defined	The first roles are defined: rule repository administrator, a rule analyst, and a rule steward	Rule steward, rule analyst, rule writer, rule tester, rule administrator, change board member are created and a policy is created for rule changes and segregation of duties is in place.	All business rules roles as described by the Eclipse Foundation (2009) are created and conflicting roles cannot occur	All business rules roles as described by the Eclipse Foundation (2009) are created and conflicting roles cannot occur
Standards	Needs to be created or invented	The first steps of a rule management approach is introduced	Coordinated business rules approach (lessons learned, issues are captured, implementations are tracked, communications to the business rules activities is established	Universal business rule change process and the use of an organizational wide online repository	Universal business rule change process and the use of an organizational wide online repository
Tasks	Creation of a BRMS	The first rule processes are defined, namely authoring rules analyzing rules, testing rules, and deploy rules	Documenting lessons learned, capturing issues, tracking implementations, establish communication to business rule activities.	Maintain the BRMS implementation schedule, establish formal mechanisms for knowledge sharing of lessons learned, effective practices and outward liaison to the industry and technology standards setting bodies	Operationalize the ongoing aspects of the BR approach, including identifying and delegating responsibilities, establishing the new ongoing services of the CBRG and in the IT support units and institutionalizing

					business rules management across the firm
Organizational governance structure	Starting to form a team out of IT people, which will be the loosely couple team	Informal CBRG with mainly people from IT	Central business rules group is formally established with dedicated full time leadership, staff and ownership of the team moves to the business process owners	Three areas; business process owners, CBRG, and IT are working in a collaborating way and form a business rule service model with all its required resources	Three areas; business process owners, CBRG, and IT are working in a collaborating way and form a business rule service model with all its required resources
Control mechanisms	Not defined but informal controls can exist	The business rule life cycle is implemented and the statuses are monitored by the informal CBRG	Maintaining the rule life cycle approach with imbedded control mechanisms	the implementation of a organizational wide approach for change management which focusses on the business rules	the implementation of a organizational wide approach for change management which focusses on the business rules

Table 22: Business rule governance maturity matrix

5.3 ORGANIZATIONAL READINESS FOR BPO

The third sub-research is: "How does the proposed governance model relate to the organizational readiness for BPO?". Answering the question is done through a case study research as described in chapter 3. During the interviews at the case companies or respondents company is first an analysis made of the maturity of the business rule governance. The questions asked to measure the maturity can be founded in the appendix.

5.3.1. Identifying Maturity Levels

Based on the results of the interview are the maturity levels of the governance elements determined and visualized with a dark blue color in a table. Each case has its own table and can be founded in the appendix. The elements that scores as lowest in the maturity matrix defines the overall maturity level of the organization. The overall maturity level of the case companies are structured in one table for clear visualization of the diversity of the case companies. Table 5 presents the overall maturity level of the case companies.

Maturity levels / Case Companies	Level 1	Level 2	Level 3	Level 4	Level 5
The financial organization	■	■			
The mortgage lender	■	■	■	■	
The government	■				
The engineering organization	■				
The welfare organization	■	■	■		

Table 23: Overall maturity level per case company

The second part of the sub-research question is the level of organizational readiness for BPO. As described in chapter 4.4 organizational readiness depends on process readiness, IT readiness and business management readiness. The organizational readiness was also measured during the interview and will be discussed next. The questions related to organizational readiness can be founded in the appendix. The result of the interview will be discussed per case company and will be directly related to the maturity level of the organization. Since the answer is qualitative forced me to bring my own value judgment to make the results comparable. Process readiness also described as the degree of formalization of the processes. Is considered achieved when business rules are documented and procedures exist within the organization about rule capturing and changes to rules. IT readiness is considered as achieved when a change to the technical infrastructure is executed with an month. The reason why is chosen for a month is because the business engineering organization stated: changes that have an impact on multiple business units within an organization requires

approval from top management and thorough research and completion of such project within a month is considered acceptable in contemporary times. IT readiness is also determined by technological knowledge and skills of the IT personnel, which is measured by asking the interviewee if the level of knowledge is sufficient. Other factors which also determines IT readiness is the business knowledge of the IT managers. If the business knowledge is considered sufficient is also determined by the interviewee. Business management readiness is determined by the experience of the business managers with outsourcings projects. A business manager who has lead three or more process outsourcings project is considered experienced, since the financial organizations stated: *"A business manager who has led one process outsourcings project makes a lot of mistakes and do thinks mostly ad hoc. The second time are the mistakes from the first time avoided and a work procedure is created. The third time becomes routine for the business manager in which he can use his best practices from previous times."* As stated in chapter 4.4 is business management readiness also determined by top management support. If top management support was present during the process outsourcing project is determine by the interviewee. The first organization which will be discussed is the financial organization.

5.3.2. Findings

Per inquiry with the financial organization is determined that the organization has its processes documented but not all of its rules. It is currently busy with extracting the business rule for an entire line of business and stores the rules in a case management system. The case management system can be seen as the BRMS for the organization. The organization has a large IT department with all the available resources they need to develop any kind of business application. The organization works by an agile development method to stay flexible. Although an agile method is in use, a change to the business rules can only be done within a project. The change is then executed by the next release and not sooner than that. A release is released per quarter which is not considered in a timely manner. The business managers of the organization have lot of experienced with outsourcing project and have at minimal five years of experience as manager. The business managers achieve active support of top management for the BPO projects. The impact of an outsourcing project on the processes that are kept in-house are predefined. Like a business analyst said: *"The entire design and automation processes needs to be done in-house to avoid any complication afterwards."* The organization knows lots of success stories in BPO as het business manager of the organization said: "*You need to know what the process does in order to outsource the process successful".* Concluding from their statements has the financial organizations achieved process readiness and business management readiness. IT readiness is not achieved since the organizations lacks easily adaptations to the IT infrastructure.

Going to the next case companies, namely the mortgage lender which is described by the business rule organization. Two consultants described the organizational readiness of mortgage lender as an example for other organizations. The processes and rules are documented and stored in a BRMS. A specialized team of business people has the authority to change rules whenever is needed. Concluding from that statement is that the IT infrastructure is very flexible since it can change their

business rules within a couple of days. The organization has established a business rules approach which requires IT personnel to have sufficient knowledge of the business. Because as the business engineering organization describes: *"It should be possible to release a business rule-set separately from a release of the business application which contains the rules. Building such system requires an extensive knowledge of the IT personnel, not only in programming skills but also the reason behind the project should be known by them."*. The mortgage lender has accomplished a strong relation between IT and the business people in which I conclude that the IT knowledge of the business managers must be at sufficient to exert IT leadership. The business engineering organization is an outsourcing partner of the mortgage lender since it supported by the development of a business rules approach within the organization. The business engineering organization claims that the mortgage lender is enthusiastic about the end result and the collaboration towards the end result. Based on the results of the interview achieved the mortgage lender on all three aspects (process, IT, business management) readiness for BPO. And as discussed during the interview the mortgage lender also achieved successful BPO projects.

Third organization is a governmental organization referred to as the government. The business rule organization described the government as a chaotic organization. The processes where not completely documented and the roles and responsibilities neither. It has no own IT department and is dependent on third parties to deliver IT resources. The business managers have little knowledge about IT, which lead to misconceptions and higher cost of the government to achieve its goal. Their IT systems are solid and requires specialism for any changes to their systems. *"A rule change within the organization need assent from the business manager who sends the change request after approval to IT, who need to search for the rule. Such process cost at minimal 2 a 3 months in that time the rule change is no longer applicable for that time"* Based on the findings can I conclude that the government lacks process as well as IT and business management readiness.

The engineering organization is currently organizing their organization after a reorganization. Their IT department is separated in innovation, maintenance, and customer relationship. The processes are defined and documented but the business rules are not separately managed. The organization starts by with being aware of business rules being special. *"The reorganization required new processes and new roles and responsibilities to be defined. One of the issues we faced is to determine what the rules are which can be seen as the boundaries of the roles and their associated responsibilities."* said the IT manager of the new department of innovation. Concluding from the interview I would say that the process readiness lack formalization of the business rules. The IT is improved since the reorganization according to the IT manager. Roles and responsibilities within the IT department are known and responsibilities are clear for the rest of the personnel. However since the organization does not have a rule based focus a rule change will probably cost lots of time. The IT manager acknowledge that the business rules are not stored or managed separately. According to the IT manager lacks the IT departs technical as well as business knowledge. The manager said *"The IT knows too little about the underlying business drivers"* and when I asked about the technical knowledge he said: *"the technical knowledge is sufficient but some specialism is missing."* Based on these two statements is the conclusion that the organization is not IT ready for BPO. However the organization do knows experience

business managers with outsourcing projects. The business managers also possessed technical knowledge to exert IT leadership, cause the manager said: *"Project managers have enough technical experience to support the IT by identifying risks, because some of the managers are originated from the IT department.".* During the reorganization, support was provided by a consultant from a third party. The cost of the project was anticipated and satisfaction from both sides was high. Concluding, process readiness and IT readiness is not achieved but business management readiness is in place.

The welfare organization has documented the processes and also the business rules. The organization has implemented a formal business rule approach and has the responsibility of changing or creating rules by the business process owners. The organization knows 6 domain experts which validate new rule and changes request. The roles and responsibilities are defined and the processes are clear to the managers. The IT department works by an agile development method with experienced people from a third party. The organization was also mentioned in the news claiming that: *"The agile development method should make our IT infrastructure flexible and makes the organization able to quickly respond to law and legacy changes."* The experts from the third party also understand the business domain, because the business knowledge is required to establish a business rule approach. The experience of the business managers in outsourcing project is extensive because *"The organization is depending on third parties to deliver adequate IT software, since they do not have the technical knowledge in-house."* The process applying for a license is done by a third party and is fully automated by the third party. The total cost correspond with the anticipated costs and the BPO project was successful. The reason that the anticipated costs are achieved is, according to the software vendor, because business managers gain support of the top management. Concluding process readiness is achieved. IT readiness is not applicable in this case since the organization does not has its own IT department. Business management readiness is achieved since the managers have sufficient knowledge of IT to identify risks and the managers gain top management support.

5.3.3. Conclusion

To find a correlation between an maturity level in business rule governance and organizational readiness for BPO we have measured the maturity level of each case and the organizational readiness. Organizational readiness is achieved when the three factors process readiness, IT readiness and business management readiness is achieved. Looking at the first case: "The financial organization" has a maturity level 2 in the business rules governance maturity matrix. The organizational did not achieved organizational readiness since it lacks easily adaptations of the IT infrastructure. However despite the organization lack organizational readiness they still know successful process outsourcings projects. The second case is the mortgage lender and has a maturity level 4. The organization has achieved organizational readiness as described in chapter 5.3.2. and know success stories with business process outsourcing projects. The government is in level one of the business rule governance maturity matrix and did not achieve organizational readiness. The case company knows a lot of failed business process outsourcing projects which are also published in the Dutch newspaper last year. The engineering organization is in level one and did not achieve organizational readiness since it lacks of business rules formalization and sufficient business

knowledge of the IT personnel. However the engineering organization knows a successful business process outsourcing project despite of its low maturity and lack of organizational readiness. The last case is the one of the welfare organization which is described by the software vendor. The welfare organization has a maturity level 3 and has achieved organizational readiness. According to the software vendor knows the welfare organization lots of successful business process outsourcings projects. An overview of the case companies and their maturity level and if they have achieved organizational readiness can be seen in table 24.

Case Company	Maturity level	Organizational readiness
Financial organization	2	No
Mortgage lender	4	Yes
Government	1	No
Engineering organization	1	No
Welfare organization	3	Yes

Table 24: Relation between a maturity level and organizational readiness

As can be seen in table 24 are the mortage lender and the welfare organization the only case companies which have achieved organizational readiness. Coming back to the sub research question: "How does the proposed governance model relate to the organizational readiness for BPO?". A relation is founded that organizational readiness is achieved when an organization has achieved level 3 in business rule governance or higher. Meaning that an organization is ready for successful outsourcing project when the organization has:

- Establish a business rule governance group for consistency among its rules and alignment of the rules to current and changing objectives
- Creation of the following roles and responsibilities: Rule steward, rule analyst, rule writer, rule tester, rule administrator, change board member are created and a policy is created for rule changes and segregation of duties is in place.
- The use of a coordinated business rules approach (lessons learned, issues are captured, implementations are tracked, communications to the business rules activities is established
- Have the following tasks in place: documenting lessons learned, capturing issues, tracking implementations, establish communication to business rule activities.
- Have a central business rules group established with dedicated full time leadership, staff and ownership of the team moves to the business process owners
- Control business rules activities with the use of a business rule life cycle approach.

6. DISCUSSION AND CONCLUSION

This section describes a reflection of the thesis project. As described in chapter 5.3 a relation is founded between level three of the business rule governance maturity matrix and organizational readiness for BPO. However there is no relation founded between successful BPO projects and organizational readiness. The reason for not finding a relation between organizational readiness and successful BPO project are discussed here.

6.1 LIMITATIONS

Every research has its limitations and this research is no exception. One of the limitations is that the number of interviewees is limited to one and several times two per organization. Also the amount of case companies is limited due to the limited time and resources. Readers should take into account that the organizations with knowledge about) business rules management is limited. Like the interviewee of the business engineering organization said; “Most organizations in the Netherlands are not aware of business rules being special”. The amount of participating organizations limits the validity of the results. Still, in qualitative studies the amount of participants can be quite low with impeding on the validity. Nevertheless, more participants would certainly have been a welcome addition to this study.

The selection of the case companies was a great risk for this thesis project, because the case companies were selected before knowing the maturity in business rules. Selecting the case companies beforehand could lead to having all case companies with the same maturity level, which would have limited the generalizability of the research. Luckily, the case companies carried different maturity levels in business rules, which makes it possible to relate the different levels to the level of readiness of the organization. Another risk is that the interview questions for measuring organizational readiness was not validated beforehand, which could lead to incorrect questions that measure the wrong elements. Based on the result, it can be said that the questions did measure what they were intended to measure.

Other limitation is associated with the different industries of the participating organizations. The interviewees of the organizations had different roles and looked from different perspectives to business rules. However this increases the generalizability of the research it makes it hard to compare the answers since not all interviewees had the same name for the governance elements. To compare the answers given by the interviewees, the description of the mentioned elements are compared to each other. The descriptions of the governance elements are based on my personal judgment which limits the validation of the research. However, since all different keywords mentioned by the interviewees are used to form a descrption, my personal judgement is limited. Business rule management is not widely known in the Netherlands and has emerged as a topic in 2002 in scientific literature. Scientific literature on business rule governance could not be founded. Only few not-scientific literature sources describe business rule governance in general. Limited literature has not only its implications on the available literature in scientific sources but also in practice. Since business rules management has quite a significant overlap with business rule

governance when it comes to scientific literature, I was able to use business rules management literature to define business rules governance. However, the gap between the academic world and the practical use of business rule governance is still a significant one.

Another limitation is that a value judgment is used to determine an organizations readiness for BPO. Measuring the sufficiency of the technical knowledge as well as knowledge in underlying business thoughts of the IT personnel is based on the valuation of the interviewee. Since none of the interviewees is a BPO-expert or has ever led a BPO project, it could occur that the interviewee has a wrong idea about the readiness of the organization. To avoid the miss valuation of the interviewee, a BPO-expert could determine the readiness of the organization in BPO. Due to limited time and resources, the valuation of the interviewee is used. Other issue is that it could be the case that the researcher misinterpreted an answer given by the interviewee or that the researcher has a stereotype image of the organization which would lead to a false overview. The quality of the data collection through interviews could be improved by more practice in interviewing skills and to conduct more interviews within each organization.

A limitation described by the business engineering organization is that the focus of BPO projects is too wide. The interviewee could come up with any kind of case for BPO which would not be directly related to formalization of business rule governance. The business engineering organization also said: “The processes that are eligible for BPO are what we call dead portfolio processes. These are the processes that do not change anymore and only cost money for the organizations. These processes do not contain much business rules and are therefore not the primary focus for successful outsourcing” A distinction of process types with the corresponding degree of business rules intensity would solve this case. The processes with ‘organizations most important rules’ contain business secret which are not eligible for outsourcing. The financial institution acknowledge the fact that business rule distinguish your organization from the rest, which you do not want to give away. Based on the vision of the financial organization and the business engineering organization one can conclude that the processes that are outsourced will probably contain a few simple rules. The simple business rules do not have a large impact on the success of the BPO project and formalizing these rules is not required.

Another discussion point is the validity of the maturity matrix. Not all organization had the same experience with business rule governance and their judgment on the reliability of the maturity matrix should be of less importance. The creation of the maturity matrix was determined by the existing maturity matrix of Nelson et al. (2010). A staged representation was selected due to the time constrain and the limited resources available. Using the method of Steenbergen et al. (2010) could result in a different maturity matrix. The method contains the following phases: a scoping phase in which purpose and scope of the maturity model are defined, the design of the model, followed by the development of the assessment instrument, and an implementation and exploitation phase in which the model is put to use and consequently exploited (Steenbergen et al., 2010). The scope for the thesis project is business rule governance and directed to business rule practitioners. The focus areas were predefined since Santana et al. (2010) claims that the governance elements are applicable for any governance structure. The focus areas are interrelated with each other according

to the case companies. This means that one can assume that a focus area maturity matrix would suit the business rule governance domain. Developing a focused area maturity matrix is included in the future research chapter. Discussed so far are the limitations and the discussion which can be improved by the researcher. However, external factors can also determine the result of the research. An external factor is that the work of Martin et al. (2010) is not proven for a larger market. Martin et al. searches in his paper for factors which influence the success of BPO projects and validates these within one organization. It could be the case that the one case company of his research does not represent the overall market. Meaning that there are more or less factors determining the organizational readiness for BPO. Since the paper of Martin et al. 2010 is used as a foundation for this research, it could explain the absence of the of the correlation.

6.2 CONCLUSION

The conclusion provides the answer to the question “How should business rules governance be structured to achieve organizational readiness for business process outsourcing”. Answering the main research question is done through defining sub-research questions. The first sub-research question is “How should the governance elements be structured for business rules governance?”. Extensive literature research is conducted to identify governance elements. Scientific literature describes that governance elements of business process management are also applicable for business rule management. By interviewing experts in the business rules domain are the description of the governance elements defined. Results of the interviews are presented in chapter 5.1 and serves as the answer to the first sub-research question.

The second sub-research question is: “Can a maturity matrix be created for business rule governance?”. By conducting a literature review on developing a maturity matrix resulted in two main papers. The two papers are used to determine if a business rule governance maturity matrix can be created. The first paper is from Steenbergen et al. (2010) who described the different maturity matrixes. A 5 staged maturity matrix is chosen due to limited time and resources. Scientific literature on business rule management includes a paper from Nelson et al. (2010) who describes 5 stage of business rule management. The paper of Nelson et al. (2010) is used as a foundation for the business rule governance maturity matrix. Another paper which is used to determine if a maturity matrix can be created for business rule governance is the paper of Weerd et al. (2009). She has developed a model which is used to develop a maturity matrix in software product management with great success. The steps of the model are analyzed in chapter 5.2 to determine if the steps can be also applied for business rule governance. Results show that a maturity matrix of business rule governance can be created and is presented in chapter 5.2.3.

The third sub-research question is “How does the proposed governance model relate to the organizational readiness for BPO?”. First semi-structured interviews are conducted to determine the maturity of the case companies in business rule governance. Second part of the interview is used to determine the organizational readiness of the case companies for BPO. The results are illustrated in

tables which are presented in chapter 5.3. Result shows that the organizations with achieved level 3 or higher also achieve organizational readiness for BPO.

The answers to the three sub-research questions are the foundation of the answer to the question: "How should business rules governance be structured to achieve organizational readiness for business process outsourcing". By comparing the organizational readiness of the case companies with the business rule governance levels does not reveal a univocal level to achieve successful BPO. Organizations from level one can do successful BPO projects even when the factors of successful BPO projects are not formalized, flexible, or experienced enough. However there is a trend visible, namely an organization with a mature level in business rule governance also scores high on the factors process readiness, IT readiness, and business management readiness. All the interviewees from the organizations acknowledge that an organization should have formalized the processes, have dedicated IT personnel with sufficient knowledge of the business and extensive technical knowledge, and have experienced business manager who can identify IT risks to achieve successful BPO project. No univocal level is founded to achieve successful BPO projects does not have to mean that there is no maturity level which correspond to high change of successful BPO projects. In chapter 6 are the research point for improvement discussed which could have led to another result. Based on the statement of the organization that a certain maturity is required leads to the following conclusion: To increase the change of success for BPO project requires a level 3 maturity level in business rule governance is required. Level three of the business rule maturity matrix is chosen because organizational readiness is achieved at this level of maturity. Recap on level three is:

- Establish a business rule governance group for consistency among its rules and alignment of the rules to current and changing objectives
- Creation of the following roles and responsibilities: Rule steward, rule analyst, rule writer, rule tester, rule administrator, change board member are created and a policy is created for rule changes and segregation of duties is in place.
- The use of a coordinated business rules approach (lessons learned, issues are captured, implementations are tracked, communications to the business rules activities is established
- Have the following tasks in place: documenting lessons learned, capturing issues, tracking implementations, establish communication to business rule activities.
- Have a central business rules group established with dedicated full time leadership, staff and ownership of the team moves to the business process owners.

6.3 FUTURE RESEARCH

Future research is needed to construct different business rule governance structures for different process types. Not all processes are eligible for BPO and future research is needed to see if the business rule governance structure differs between them. The future research can, for example, focus explicitly on “dead portfolio” processes to find a significant relation between business rule governance structures and organizational readiness for BPO. Another point for future research is doing the same research with experienced organizations with at least the awareness of business rules being special and create a focus area maturity matrix. The experienced case companies can support the development of a focus area maturity matrix, which entails an overview of the capabilities within each of the focus areas. A focus area maturity matrix provides more details of the independencies between the governance elements which will probably lead to a better match with the organizational readiness of the case companies. Another point for future research is that a measurement method is required for the organizational readiness to eliminate the value judgment in this thesis project. Preferable a quantitative method should be used to support the qualitative findings.

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APPENDIX

VALIDATION INTERVIEWS

Introductie: Onderzoek naar business rules governance
linken aan organisatie gereedheid voor process outsourcing

Business rules definitie: business rules are the ultimate levers with which business management is able to guide and control the business

Governance elementen:
Doelstelling
Rollen en verantwoordelijkheden
Standaarden
Taken
Organisatie bestuur structuur
Controle mechanisme
Beloningsmechanisme

Maturity levels:
Initiële level: chaotisch en nog aan het leren hoe regel management succesvol kan worden
Herhalend: Documenteren en vastleggen van de regels. Cursussen/ lessen in regelmanagement geven en een regeldatabase beschikbaar hebben voor een grote groep.
Gedefinieerd: Regelmanagement wordt beoefend en de beoogde vooruitgang wordt behaald.
Gemanaged: Vastleggen en analyseren van statistieken (d.m.v. matrixen/ meetmethodes/ statistieken)
Geoptimaliseerd: Hoge kwaliteit resultaten en voorspelbare tijdschema's en voorspelbare kosten.

Vragen:

1. Hoe worden regels aangestuurd bij uw organisatie?
2. Wat zijn de belangrijkste factoren voor het aansturen van (process) regels?
3. Is een apart beleid voor bedrijfsregels nodig? Zoja hoe is zo beleid opgebouwd?
4. Hoe onderscheid het beleid voor de regels ten opzichte van het beleid voor processen?
5. Welke rollen zijn er bekend voor het werken met regels?
6. Hoe wordt het werken met regels ondersteund met een systeem?
7. Wordt er een volwassenheidsmatrix gebruikt voor de processen/regels?
8. Welke stappen zijn er voor het opzetten van "regelbewuste organisatie"?
9. Welke elementen worden belangrijk beschouwd voor process outsourcing?
10. Hoe volwassen moet een organisatie zijn voor process outsourcing

11. Hoe draagt een BPM systeem bij aan process outsourcing?
12. Hanteren jullie standaarden voor het ontwerpen van business rules?

CASE STUDY INTERVIEW

The following questions are related to the governance elements and tries to validate the relation between business process governance elements and business rule governance.

1. Wat doet uw bedrijf precies?
2. Kunt u 2 casussen opnoemen waarbij in de ene casus de volwassenheid betreft regelbeheer laag is en in de andere casus de volwassenheid van het regelbeheer hoog is?
3. Waar ligt de verantwoordelijkheid voor het beheren van de regels?
4. Welke rollen heeft de organisatie met betrekking tot het regel management?
5. Volgens de literatuur zijn er 5 processen die bij rule management horen: regelverandering, regels schrijven/aanpassen, regels testen, regels uitvoeren, regels monitoren. Zijn deze processen ook terug te vinden in de praktijk?
6. De volgende governance elementen worden besproken in de literatuur: Doelstelling, Rollen en verantwoordelijkheden, Standaarden, Taken, Organisatie bestuur structuur, Controle mechanisme, Beoordelingsmechanisme/ beloning mechanisme. Hoe zien deze elementen eruit bij het regelbeheer?
7. Wat is een volwassen manier van elk van de bovenstaande processen?
8. Regels veranderen in de loop der tijd, maar hoe wordt de levensloop van regels bijgehouden?
9. Waar ligt de verantwoordelijkheid van het implementeren van nieuwe regels
10. Wat is de beginfase om te starten met regel management?
11. Waar begin je met het definiëren/formaliseren van regels? En waar eindigt het?
12. Hoe groeit dit proces? Met welke rollen eindigen ze?

ORGANIZATIONAL READINESS

De following questions are related to the organizational readiness of the case company.

1. How are the processes formalized?
    a. Are the business rules also formalized?
    b. Are roles and responsibilities formalized?
    c. Do you have any documentation on the processes and business rules?
2. How agile is your IT infrastructure?
3. Can changes be executed in a timely manner?
4. Do you have all necessary IT resources to develop applications?
5. How is the knowledge of the IT personnel in underlying business thoughts? Like mission vision etc.
6. How is the technical knowledge of the IT personnel?
7. How extensive is the knowledge of the business managers?
    a. How many years' experience do the managers have as manager?
    b. Are the manager able to estimate IT complications within a project?
    c. Do the business managers have any experience with outsourcing projects?

The following projects are related to outsourcings project. Examples are project in which processes or part of the process is executed by another organization.

8. Was the impact on the inhouse process beforehand known?
9. How satisfied are you on the fulfillment of agreements of the other organization?
10. How satisfied are you about the end result delivered by the other organization?
11. Do you know how satisfied the other organization is?

ROLES AND RESPONSIBILITIES

Role	*Unit*	*Role-Responsibilities*	*Skill*
Business Owner	Business unit	• Control the execution of a Line Of Business	Management skill Business problem-solve Strong business experience
Policy Manager or Subject Matter Expert (SME)	Business unit	• Support the definition of business processes • Determine and manage the implementation of a business policy, generally by providing the content for the business rules that enforce the policy and the process contexts in which the rules are applied. • Oversee the execution of that policy via business rules applied. Such oversight includes confirming that implemented rules fully and faithfully correspond to the intended policy. • Review rules, rule flow • Review the results of testing and simulation • Manage business vocabulary • Resolve business issues relating to BR • Be accountable for the quality of the BR • Approve major changes to BR	Strong business experience Analytical Management skill Business problem-solver Effective communicator Strong leader Decision maker
Manager Or Rule Steward	Rule management team	• Develop and maintain a comprehensive plan for the rule management group activities • Establish BR policies • Identify business sponsors for issues relating to BR • Develop processes for rule management and standards for rule capture and documentation • Ensure that repository management processes are followed • Ensure that enterprise rule standards are followed • Standard management position	Management skill Business problem-solver Practical business experience Effective communicator Strong leader Comfortable with technology
Rule Architect	Architect team or Rule management team	• Select technology to ensure performance and usability • Design, test, implement rules using appropriate technology (triggers, rule engine) • Ensure the overall deployment organization of the rules makes sense from an application segmentation perspective • Ensure rule execution is optimized • Establish traceability for rules within the technical architecture • Ensure rule reuse • Design the structure of the rule repository (defining what metadata customizations are needed and possibly implementing the structure) • Develop the processes developed around repository management • Assist evaluation of implementations with respect to the rules • Coordinate with application developers on system design, implementation and testing • Act as a liaison between business and IT	Good understanding on how to translate BR to implemented one Competent with structure and models Understanding of rule application infrastructure Detail oriented Diligent about enforcing standards Works well with system designers, developers and testers Enterprise Application Integration Service Oriented Architecture UML tools
Rule Analyst	Analyst team	• Assist business in identifying existing BR • Research the meaning and origin of BR • Create rule templates for rule authors to use • Analyze rules for completeness, correctness, optimization (from a logical, not performance, perspective) • Identify how rules are used in processes that implement business policies	Analytical Good business knowledge Creative thinking Writing Good communication skill Problem-solving ability Proficient in BRMS web interface Knowledge of Rule IDE Proficient in Rule testing environment and

		• Ensure the quality of the BR • Ensure consistent terminology is used in the BRs • Analyze BR to identify conflicts, redundancies • Ensure consistency of BR across function, geographies and systems • Conduct impact analysis for revising or replacing BR • Integrate new or revised rules into existing rule set • Make recommendations for BR changes based on business knowledge • Facilitate resolution of BR issues • Act as consultant for the project team • Act as a liaison between business and IT	framework
Vocabulary Analyst	Analyst team	• Formalize the business terms (and phrases) used in business rules; this formalization may be in a logical data model, fact model, business object model or some other format that standardizes the terms used and their definitions. 'Terms' include nouns, noun phrases and qualified nouns that are referenced in business rules • Create and manage abstract layer of the data model	Object and/or data and/or fact modeling Proficient of Rule IDE Proficient in BRMS web interface
Process Analyst	Analyst team	• Define the overall process context for the business area/ application. • Work with business SMEs to understand the logical business processes and how they fit together in a logical flow (or in an implementation flow for a given application). • Identify where rules are needed in processes • Create and update process flow	Process Modeling Business Process Modeling Notation
Rule Author	Rule management team	• Write detailed rules, following appropriate syntax and using standard vocabulary Validate rules in detail against the object model and data model • Perform impact analysis for potential changes to rules from technical perspective • Identify events where rules should fire • Challenge BR for ambiguity, inconsistency and conflict from a technical perspective • Test Rules • Create and update rule flow • Run simulations • Ensure rule reuse • Debug rule logic • Create and manage test cases to test the rule logic	Knowledge of Rule IDE Proficient in BRMS web interface Proficient in rule life cycle Proficient in rule deployment process Proficient in Rule testing environment and framework Less sophisticated rule authors may be limited to changing parameters or creating new rules based on existing templates; testing likely limited to scenarios and scenario suites More sophisticated rule authors may create rules from scratch and involve rule flow; testing may include simulation
Business Analyst- develop business solution	Business unit	• Understand business goals • Find business solutions to business problems • Ensure business solutions support business goals • Make recommendations for business change based on business knowledge • Conduct impact analysis of proposed business changes • Identify and assess business tactics and associated risks • Facilitate meetings to gather business requirements • Document "as-is" and "to be" workflows • Record terminology, business concepts and fact model • Capture and express business rules • Analyze BR, identifying conflicts, redundancies • Decompose BR to atomic level • Act as business team lead for the project team • Act as a liaison between business and IT • Understand business rules methodology and how to apply it	Analytical Good business knowledge Creative thinking Writing Good communication skill Problem-solving ability Facilitation skills Organize content into structured forms (models and structured documents) that are understandable by the business experts (for approval) and IT (for implementation). Such analysts often bring an ability to incorporate an enterprise perspective on requirements in a specific area of the business, but this is not relevant on all projects.
Developer	IT development	• Develop application business logic, database access layer, GUI	Problem-solving ability Proficient in Java or .Net, application server, Eclipse, Visual Studio

		• Domain object model
		• Meet functional specs
		• Write technical rules in low level ILOG Rules Language
		• Set rule project foundations:
		  ○ Rule project structure
		  ○ rule set parameters
		  ○ rule flow
		  ○ sandbox testing in Rule Studio
		  ○ Develop the BOM to XOM mapping
		• May have rule management requirements if rules are primarily technical rather than business-managed
		•
			Proficient in Rule IDE
			Low-level rule syntax
			API knowledge
			Rule optimization techniques
			Physical object modeling
			Competent with structure and models
			System integration
			Detail oriented
			Diligent about enforcing standards
			Works well with system designers, developers and testers

QA engineer	IT development	• Manage application and rule set quality • Develop Rule Test cases • Define Key Performance Indicator with the Policy manager	Problem-solving ability Good business knowledge Good communication skill Testing and QA methodology Detail oriented Diligent about enforcing standards Works well with system designers, developers and testers Proficient in BRMS web interface and Rule IDE Proficient in Rule Execution Server Proficient in Rule Test Framework
Rule Repository Administrator	IT production	• Manage the different rule repository cross departments • Develop the standards that are required across projects • Manage the rule deployment and rule set quality • Install and configure environment • Deploy the application • Re-deploy rulesets as changes are made • User management (security)	Proficient in Rule Execution Server Proficient in Rule Repository management and database management

The Eclipse foundation (2009)
http://www.eclipse.org/epf/downloads/praclib/praclib_downloads.php

MATURITY MATRIX PER CASE

The maturity matrix applied for every case is illustrated here.

Maturity levels / Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Goal					
Roles and responsibilities					
Standards					
Tasks					
Organizational governance structure					
Control mechanisms					

Table 25: The financial institution maturity matrix

Maturity levels / Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Goal					
Roles and responsibilities					
Standards					
Tasks					
Organizational governance structure					
Control mechanisms					

Table 26: The mortgage lender maturity matrix

Maturity levels / Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Goal					
Roles and responsibilities					
Standards					
Tasks					
Organizational governance structure					
Control mechanisms					

Table 27: The government maturity matrix

Maturity levels / Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Goal					
Roles and responsibilities					
Standards					
Tasks					
Organizational governance structure					
Control mechanisms					

Table 28: The engineering organization maturity matrix

Maturity levels / Elements	Level 1	Level 2	Level 3	Level 4	Level 5
Goal					
Roles and responsibilities					
Standards					
Tasks					
Organizational governance structure					
Control mechanisms					

Table 29: The welfare organization maturity matrix

RESEARCH METHOD WEERD ET AL.

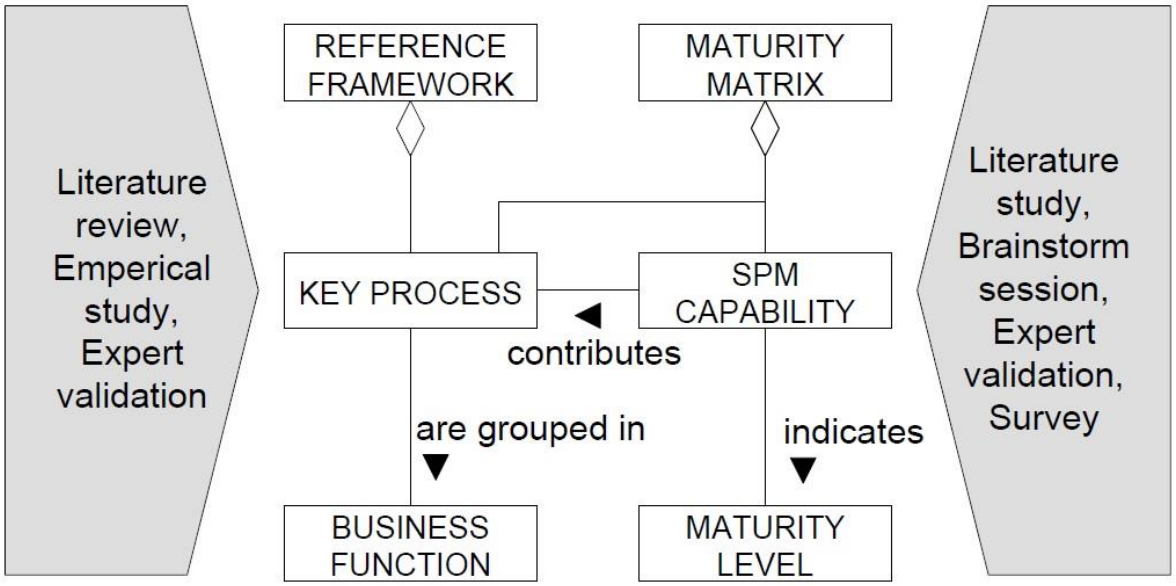

Figure 18: Research Model SPM Maturity Matrix (Weerd et al.)