The value of Enterprise Architecture

The managers' discourse!

Bas Kasteel

Prof.dr. H.A. Proper

109 IK

The Enterprise Transformation Series

The value of Enterprise Architecture

The managers' discourse!

Bas Kasteel

The Architecture Institute

Capgemini
CONSULTING.TECHNOLOGY.OUTSOURCING

The Enterprise Transformation Series

The enterprise transformation series is a series of reports produced by the architecture institute. The architecture institute (http://www.architecture-institute.nl) is a virtual organization chaired by Capgemini Netherlands' architecture service-line.

Capgemini's architecture service-line considers it to be of the utmost importance to collaborate with academic partners to further improve the field of architecture. We strongly believe a close interaction is needed between theory and practice. The enterprise transformation series captures several results produced in the context of this collaboration, where the focus on enterprise transformations signifies a focus on architecture as a means to direct and govern enterprise transformations, both in terms of IT transformation and the actual business/enterprise transformation.

Within the enterprise transformation series, a further refinement is made between:

- *MSc thesis* produced by students working in the context of the architecture institute. Either as an internship within Capgemini, or as part of a joint research project within the institute.
- *PhD thesis* resulting from projects sponsored directly by Capgemini or produced in the context of joint research projects within the institute.
- *Research reports* produced by a collaboration of researchers and practitioners involved in the institute. These usually cover general research results from collaborations with academic partners.
- *Professional reports* by practitioners resulting from innovation/industrialisation projects. These reports typically focus on hands-on experiences with relevant methods and tools.
- *Outlook reports* providing of the current/future state of the field.

The quality of the series is guarded by the following editorial board:

- Prof.dr. Erik Proper, professor at the Radboud University Nijmegen, principal consultant and leader of the architecture service-line of Capgemini Netherlands, vice-chair of The Open Group's ArchiMate forum, as well as board-member of the Netherlands Architecture Forum.
- Ron Tolido, MA, CTO of Capgemini Netherlands and board member of The Open Group
- Anton van Weel, MSc, senior architect and leader of the architecture expert-group of Capgemini Netherlands' public sector.

Preface

This master's thesis is the result of my research as a student of Information Science at the Radboud University Nijmegen. The research was performed at Capgemini Utrecht and the Radboud University Nijmegen. First I would like to thank Capgemini for giving me the opportunity for which I am very grateful. Using this opportunity, I would like to thank several people who gave me full support during my graduation period. I would like to thank my supervisor at the Radboud University Nijmegen and Capgemini Utrecht, Erik Proper, for his support, ideas and feedback. Secondly I would like to thank Paul Teeuwen for his contribution to the interviews. Thirdly I would like to thank Enexis, ASR, DHL, Philips, ING, Cisco and Kadaster for giving insights in their operations and visions.

To the one closest to me, Sanne Brandsma, you gave valuable insights and supported me by accepting the consequences in terms of time and attention.

The last few words I would like to be of a philosophical nature. Considering the iterative nature of this research a lot of sources have been consolidated to construct the theoretical framework. I discovered some very interesting "things" especially with regard to organizational management, change management and model-based instruments facilitating transformations. However, I'm sure there's still a lot of information upon these subjects to consider. Reading and studying every piece of information would be a lifetime's work and perhaps even a lifetime won't be enough. In the words of David t. Freeman based upon Socrates " The more you know, the more you realize how much you don't know. The less you know, the more you think you know." This research is one of a legacy that is to be continued by the many researchers that will address this topic after me.

"Wonder is the beginning of wisdom." -Socrates

Bas Kasteel

November, 2009

Summary

Presently, organizations need the ability to change fast, they need to be agile and transform to keep up or get ahead of the competition. Due to the need to be agile and transform, the complexity increases. In order to decrease or get control of the complexity, the business needs an instrument to transform, while it is necessary that their operations continue.

Considering the previous points, it is wise to take a step back, and take a new and objective look at the domain where transformation processes are being executed. That particular domain is the management domain, where instruments could support the manager and be used as evaluation, deciding, justification and cockpit component. Through this external, objective approach new fundamental insights could be found and conducted. These newly gained insights add fundamental value to the creation of a new model-based instrument. Albert Einstein once said: "We cannot solve our problems with the same thinking we used when we created them".

This research focuses on the managers' viewpoint. More specific, what's the discourse of the managers and how does it correspond to an instrument for managing the transformation process. As known from literature transformation processes can be seen as normal, while non-transformational processes can be seen as abnormal. Therefore, it is reasonable that managers need such an instrument. An instrument that can be used integral and consistently throughout the organization. Based on the concerns conducted from earlier research, a further exploration, on what managers really need to manage their transformation process, is necessary.

This research is divided into three areas:

The first area focuses on the current way of operating, considering the managers' discourse, with regard to the transformation system. This area gives insight in the way managers' currently manage a transformation process.

The second area focuses on the key pain points with regard to the transformation process. This area identifies the key pain points, which managers encounter, during the transformation process. This area thereby contributes to the research by possibly underpinning the need for a model-based instrument. If the need is established, this question provides the foundation for the third area.

The third area focuses on what way a model-based instrument contributes, with regard to the transformation process. This area contributes to the need for a model-based instrument in a descriptive manner. With this area requirements can be conducted, due to the pain points conducted in the earlier area.

In order to gain insight in these areas, interviews were carried out with the managers who are involved in transformation processes. In this way new insights and theories could be conducted upon systematic and analyzed data.

Contents

Problem statement

These days' businesses are changing very fast, they need to be agile and transform to keep up or get ahead of the competition. With the need to be agile and transform, the complexity increases. In order to decrease or get control of the complexity, the business needs an instrument to transform, while it is necessary that their operations continue. Enterprise architecture is positioned as one of the instruments that can support the transformation challenges recognized by the businesses.

Enterprise architecture pretends to be an instrument that provides management with insight and overview to harness complexity and make well-informed decisions about the future direction of an enterprise and their continuous transformation process[1].

The classical approaches, still used these days, handle the transformation process in separate problem areas. The advantage with enterprise architecture is that it, consistently and in a fundamental manner, deals with all these areas at once. Enterprise architecture offers a medium to achieve a shared understanding and conceptualization among all stakeholders involved, and govern enterprise transformations based on this conceptualization[1].

With the previous points in mind, it is wise to take a step back from the current definitions of enterprise architecture (EA) and take a new and objective look at the domain where it is still not operating. That particular domain is the management domain, where EA could be used as a management insight and control instrument. Through this external, objective approach new fundamental insights could be found and conducted. Some simple question as to why and how could be answered for this particular domain. These newly gained insights add fundamental value when reentering the field of EA. Albert Einstein once said: "We cannot solve our problems with the same thinking we used when we created them". For instance, on what judgments do they practically pass through the assess-aim-act cycle?

In addition, with the growing responsibilities that managers have to their stakeholders, risks must be limited. Risk is something that should be controlled as much as possible. [2] The awareness of the managers and the need for such an instrument may increase since it is possible that in the near future, as a response to the recession, managers may be held responsible for their decisions.

However, besides the supposed position of EA, as the instrument to manage the transformation process, what's the discourse of the managers and how does it correspond to an instrument for managing the transformation process. As known from literature [3] transformation processes can be seen as normal, while non-transformational processes can be seen as abnormal. Therefore, it is possible that managers need such an instrument.

This research focuses on the previous discussed subject hence the main research question: "Do managers need a model-based instrument for managing the transformation process and if so, what are the requirements for such an instrument?"

Relevance

As stated earlier, businesses need to be agile and able to transform. Within an enterprise transformation there are complex issues, which need to be overcome. In order to decrease or get control of these issues, the business needs an instrument to manage the transformation. EA is supposed to be an instrument that supports the transformation process.

In spite of this, in earlier EA research the main focus has been on using it as an IT instrument, an instrument that particularly facilitates architects. However EA provides much more. With recent development [1, 4] in the research field of EA, it's becoming clearer how stakeholders expect that EA [4] helps them to achieve their goals. Stakeholders want to make decisions about an enterprise's future directions and understand the risks involved.

Because of the earlier use as an IT instrument, many stakeholders, and especially managers, consider and stigmatize EA as an instrument only used in the IT field. Which results in not using it integral and consistently throughout the organization. Based on the concerns conducted from earlier research [1, 4, 5], a further exploration, on what managers really need to manage their transformation process, is necessary.

This research will reveal how the managers expect such an instrument to function and help them to achieve their goals. With this better understanding of the managers needs is gained. Furthermore it provides the foundation for a better instrument or proof that EA, as the supposed instrument, is suitable to make their decisions.

However, a challenge within this research will also be the awareness of the managers on such an instrument, since managers seem to make irrational choices, as known form literature.

Most decisions do not begin with the careful analysis of a problem, followed by systematic analysis of alternatives, and finally implementation of a solution. On the contrary, decision processes are characterized by conflict, coalition building, trial and error, speed, and mistakes. Managers operate under many constraints that limit rationality; hence, intuition and hunch often are the criteria for choice. [6]

Although EA is supposed to be an instrument for reducing organizational complexity, effectively applying EA is not without problems, due to the ivory tower syndrome [4]. Since there is a need for a successful instrument to manage transformation processes, the successful application, of enterprise architecture, still lies in the role of the architect [7]. Due to this fact the architects will be involved in this research. With this a better understanding of the possibilities within EA to manage transformations is gained.

Theoretical domains

This research is viewed from an information science and organizational science perspective. Information science focuses on the collection, classification, manipulation, retrieval and distribution of information. It is a broad interdisciplinary field, among which management and model-based system (in the broad sense) development. Organizational science focuses on interactions between people within the organization and gaining insights of the organization. There are many factors concerning an organization. Organizational science, attempts to understand and model these factors. Like information science, organizational studies seek to control, predict, and explain. Model-based system development is concerned with theoretical foundations of models, modelling languages, as well the processes involved in modelling in the context of systems development [8].

Within model-based system development, theories for enterprise engineering are founded in three main drivers. The first one is the return on modelling effort. This driver describes the different roles, which models may have. The second driver is the quality of modelling. This driver supports the quality of models and the modelling processes leading up to these models. The third driver is the act of modelling. This driver continues on the quality of models and associated modelling processes, which leads to a strong interest into a fundamental understanding of the act of modelling. Similar to organizational science, the following roles, which models may have, can be identified:

- Provide insight

- Provide guidance

- Act as a steering/regulative instrument

- Act as a common frame of reference

- Serve as a base for analysis

- Be executable

The domain enterprise engineering is defined in theories for enterprise engineering. As known form literature two important concepts underpin enterprise engineering: *enterprise ontology* and *enterprise architecture*.

"Briefly stated, they concern the following. Enterprise ontology focuses on the essence of an enterprise, fully independent of its actual or possible implementation. Appreciably, this will greatly reduce the complexity, hence reducing the difficulty of comprehending enterprises. Enterprises must ultimately be designed such that they can be implemented. In view of the enterprise purpose and its objectives, it seems obvious that not just any arrangement of the enterprise will suffice. On the contrary, enterprise design must satisfy specific requirements. Enterprise architecture is a crucial concept in this respect and provides normative guidance for design, in order for the enterprise to operate satisfied." [9]

And as mentioned below, enterprise transformation can be conducted from the conclusion that the design must enable enterprise change and adaptation.

"...enterprise engineering must address not only operational aspects having to do with producing enterprise products and services, but enterprise engineering must also address the ability of the enterprise to address future, yet unknown developments successfully: design must enable enterprise change and adaptation." [9]

Enterprise transformation is a view wherein the change of the enterprise is not seen as the

transformation process between two or more situations, but as essential. Literature prescribes us to see an enterprise as a whole, in the spirit of the system theory.[3] This definition is strongly related to a formal organization. However in practice you can hardly see the enterprise as a whole. Instead one must look at the different communities, which will be described later on in the social interface, or the informal organization.

More specific, a transformation can be seen as an:

"ongoing process that permeates the entire organization, and represents a sharp break with the past. This break is a major difference between transformation and simple reform. While reform is an attempt to go down the same path more efficiently, transformation involves the development or discovery of entirely new paths." [10]

This eventually leads to the following domain with the associated foundations wherein this research will be participating.

- Information science, organizational science & change management
  - Model-based system development
    - Theories for enterprise engineering
      - Enterprise engineering
        - (Planned) Enterprise transformation

Since this thesis regularly mentions model-based instruments, one of the most significant instruments, namely EA will be described in general terms. Although EA comes in many forms, this thesis won't go in any detail about these forms. General definitions of EA, which are all applicable on this research, are:

According to IEEE 1471-2000:

"An architecture is the fundamental organization of a system embodied in its components, their relationships to each other, and to the environment, and the principles guiding its design and evolution."

According to Capgemini:

"An architecture is a set of principles, rules, standards, and guidelines, expressing and visualizing a vision and implementing concepts, containing a mixture of style, engineering, and construction principles."

According to [1]:

"A coherent set of descriptions, covering a regulations-oriented, design-oriented and patterns-oriented perspective on an enterprise, which provides indicators and controls that enable the informed governance of the enterprise's evolution and success."

Method

Main research question

As mentioned in the problem statement, this research is about the discourse of the managers and how it corresponds to an instrument for managing the transformation process. The main research question is formulated as:

Do managers need a model-based instrument for managing the transformation process and if so, what are the requirements for such an instrument?

Sub questions

To reduce the complexity of the main research question, the main research question is divided into several sub questions. The outcome of each sub question will contribute to the answer of the main research question. A quadrant (Figure 1) describes the elements within this research, in order to reduce the complexity of the sub questions. This quadrant can be read as follows: Each element on the left contributes to the concerning system at the bottom. The elements:

- indicators & controls;

- transformation system: assess, aim and act;

- steering activities related to the informed governance, evaluate, decide and justify;

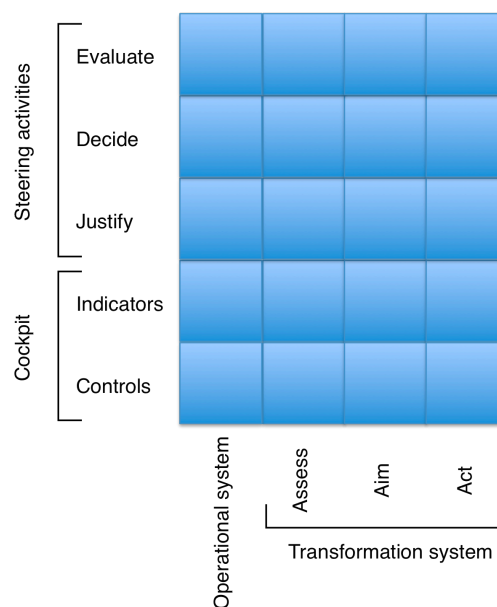are developed and explained by [13], in their article.

Figure 1 quadrant with research elements

The sub questions are formulated as such:

A. What's the current way of operating, with regard to the quadrant?

B. What are the key pain points, with regard to the quadrant?

C. In what way can a model-based instrument contribute, with regard to the quadrant?

With these sub questions the quadrant can be transformed to a cube (Figure 2) with the research elements, per concerning system, related to the sub questions.
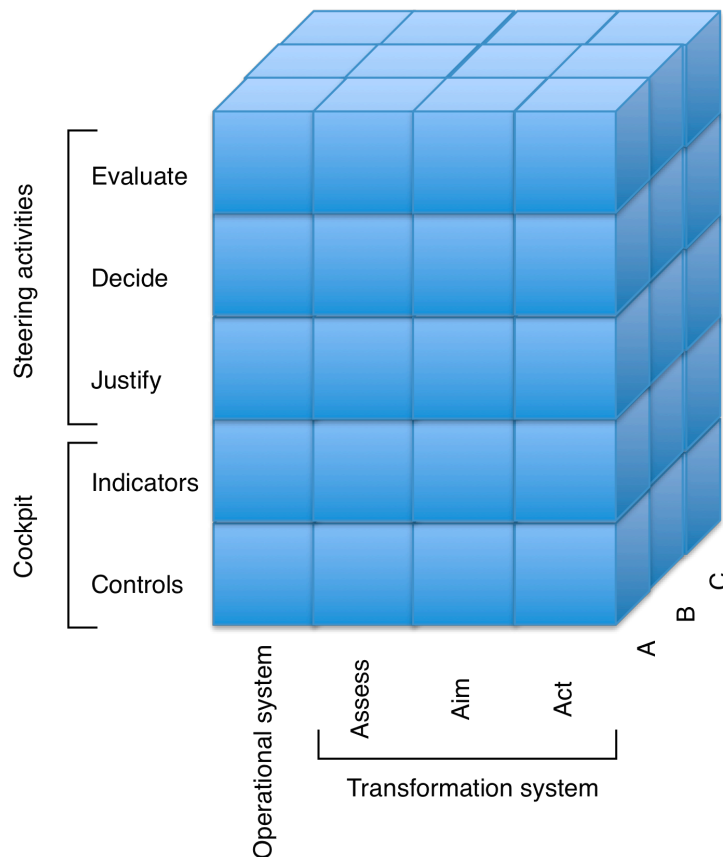
Figure 2 cube with research elements and sub questions

Objectives

In order to answer the main research question, each sub question needs to be properly answered. Below the objectives considering this research in relation to the sub questions:

A. This question gives insight in the way managers' currently manage a transformation process from the operational system to, and within, the transformation system. With these insights, relations to literature and existing theories could be made, in order to lay the theoretical foundation for the sub questions B and C.

B. This question identifies the key pain points, which managers encounter, with regard to a transformation process. This question, thereby contribute to the main question by possibly underpinning the need for a model-based instrument. If the need is established, this question provides the foundation for sub question C.

C. This question contributes to the main question in a descriptive manner. With this question requirements can be conducted, related to the pain points conducted from sub question B.

Eventually by answering the main research question, this research conclusion will be an explanation of the managers' way of managing a transformation process, validated by existing theories. When sub questions B and C provide the conclusion that managers need a model-based instrument for managing the transformation process, than the requirements and the underpinning for such an instrument will be conducted from the answers given to the sub question.

Research approach and execution

This research makes use of the grounded theory of Glaser and Strauss [11]. Glaser and Strauss tried to develop an approach with which researchers could develop a theory upon systematic and analyzed data. That specific theory would fit the explored situation, since it was derived from and supported by the same empirical data, so it is grounded.

"A grounded theory is one that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to the phenomenon. Therefore, data collection, analysis, and theory stand in reciprocal relationship with each other. One does not begin with a theory, than prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge." [12]

Typically for the grounded theory, is the use of interviews as one of its main forms of data collection, which will be used as the main form of data collection for this thesis. Another characteristic of the grounded theory is that research is often performed in phases, where data collection and data analyzing interchange. This research makes use of interchangeability of the grounded theory. The main method for analyzing data is by comparing the different data with each other. The end of data collection is determined by saturation, which means that data collection, and analyzing does not provide any new information.

Since this type of research is qualitative, an open approach is used. This consequently means that the main research question is a preliminary question. Literature is mainly used as a guiding light and facilitates the verification method on the provisional conclusion, throughout this research instead of a foundation. The following model gives a schematic view of the research approach, Figure 3.
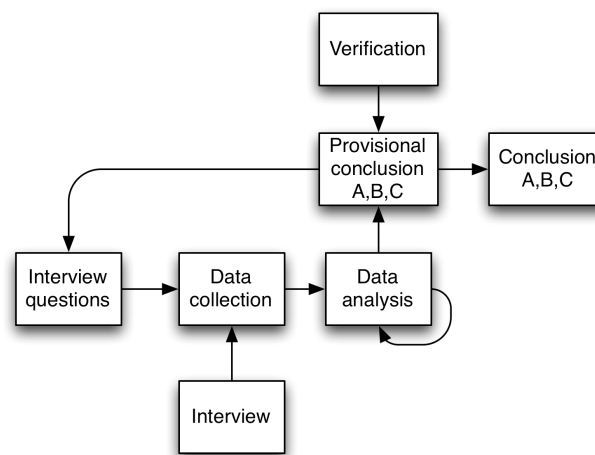
Figure 3 research approach with A,B,C as sub questions

The reason for choosing the grounded theory and this open approach to research is the explorative nature of this research. Only analyzing current literature upon transformation process provides relatively little information about the managers' discourse and the use of EA or model-based instruments in the managing domain.

At the beginning of this research the questions, which the managers should answer, where prepared in correlation to the research cube, as shown in appendix A. After the review of these interview questions for the managers, a questionnaire has also been made in order to gain insights in the view of the architects, as shown in appendix B. This questionnaire had been made accessible on the Internet and spread via the Capgemini architects community and the architects community on Via Nova Architecture. There were many respondents, over 130; unfortunately only 44 were useful for

this research due to the responses given to these questions.

However the main objective for this research was to interview managers at C-level, especially CEO, CFO and COO, because of their attended relation to enterprise transformation. Unfortunately, this was an overambitious objective, which resulted in interviews with C-level managers on an information perspective, or the CIO's of large enterprises who all have dealt and deal with transformation projects in the past and present-days. Happily, the people of Enexis, Philips, ING, ASR, CISCO, Kadaster and DHL contributed and gave insights, which were valuable to the conceptualization of enterprise transformation, and the instruments used in order to steer and support such a transformation. It must be noted that during the interviews the standard defined questions as shown in appendix A, where not structurally used. Instead there was an introduction on the research subject and then the manager gave his or her perspective on the subject. This approach gave a more natural feeling for the manager and gave a clearer view within the current way of operating and the pain points that resulted in the needs they really have. The questioner kept the flow and overview on the interview related to the core aspects of the subject, were the scribe guarded that each subject field remained covered.

The interviews have been recorded, in order to increase the reliability of this research. After each interview the recording was transcribed in order to support the data analysis. The transcriptions of each interview where tagged with the elements as shown in Figure 2, which was hard because of the earlier mentioned deviation of the structural interview question list. During the data analysis of each interview new perceptions, on the managers view, where gained. These newly gained insights were useful in order to construct the foundation and direction of this research. These results contributed to the different theories and activities within a transformation. Based on these insights the enterprise transformation framework of enterprise transformation was formed as shown in Enterprise transformation.

As stated earlier the grounded theory was applied during this research. Figure 4 represents the approach of the interviews and can be read as follows; the first interview was centered on the research cube. However since the interview was open en unstructured several different themes surfaced. These themes were incorporated in the second interview and provided a trigger towards the theoretical framework and results, which eventually contributes to the conclusion. The second interview also provided new insights and themes. These were incorporated into the third interview and triggered new research areas for the theoretical framework etcetera.
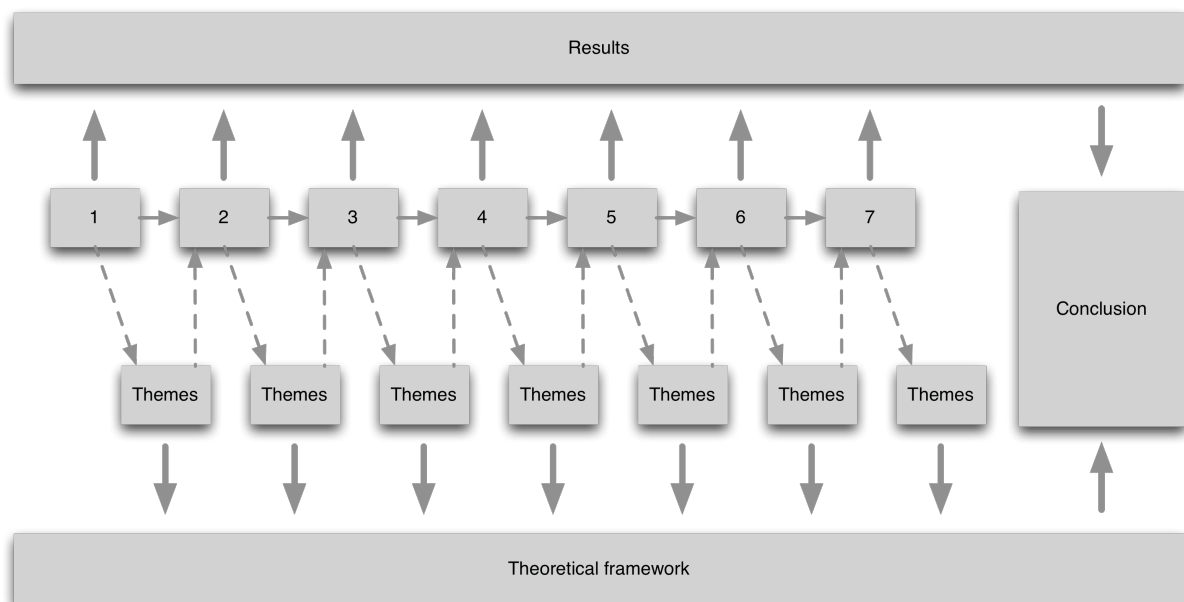

Figure 4 application of grounded theory

The general themes conducted from each interview are:

- Themes from interview 1; Power, interests, control by social communities, supportive instruments, roadmaps, top-down and business vs. IT or better alignment.

- Themes from interview 2; Interests, decision-making based on gut feeling, clarifying strategically to benefit the discussion and business vs. IT or better alignment.

- Themes from interview 3; Decision-making based on gut feeling and upon source of presentation, clear cost analysis and business vs. IT or better alignment.

- Themes from interview 4; Changeability of the organization, culture, decision-making rarely based on models, interests, grasp on the organization, capturing process, people and technique in one.

- Themes from interview 5; Roadmaps, budget, time frames, architecture on three levels, coherence in business and IT communities, collaborative techniques for decision-making.

- Themes from interview 6; Prescriptions from higher authorities, decision-making upon business capabilities, business vs. IT and alignment with authority, Interest in bottom-up, decommissioning as driver for transformation.

- Themes from interview 7; Architects too low in organization, business as driver and decision-makers, instrument providing insights in complexity of landscape, substantive decisions to be taken by business, grasp on projects business vs. IT issue.

With the different theories of enterprise transformation, the insights gained from the questionnaire and the interviews; there were two distinctions between approaches of enterprise transformation, namely top-down and bottom-up. Although the top-down approach is mainly used, bottom-up is gaining popularity. The two approaches will be highlighted in a separate section and will eventually contribute to the main research question, as shown in Figure 5.
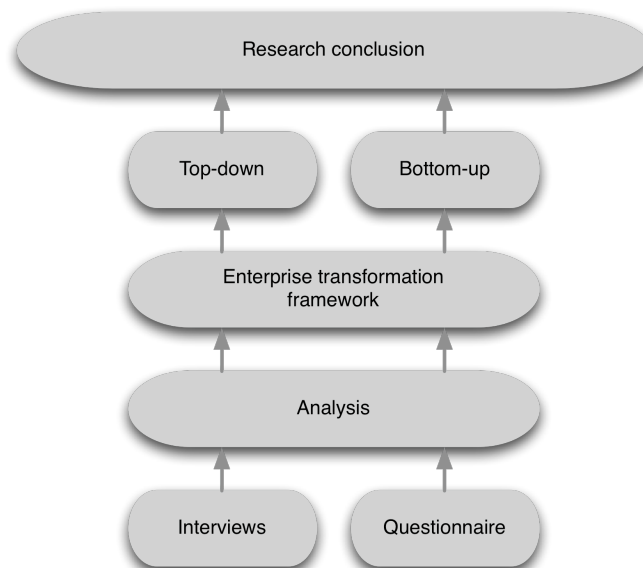
Figure 5 research execution

Enterprise transformation

This chapter will outline several core aspects of enterprise transformation. First the definition of enterprise will be discussed, what an enterprise is and what the elements are within an enterprise will be outlined. Second the definition of transformation will be discussed, what a transformation is and what the elements are within a transformation will be outlined. Third the way of thinking about change will be discussed; several basic concepts will be outlined. Fourth the phases and processes considering a transformation will be discussed. Fifth the drivers for a transformation will be discussed. Sixth the activities within an enterprise transformation will be outlined. Seventh the foundation of judgment and decision-making will be discussed. Eight the focus will change to the local interactions within a transformation therefore the social aspects will be discussed.

Enterprise

From the change management and organizational theory labeled literature, the core aspects of enterprise will be presented. Therefore "organization" will occasionally be used to follow the terminology of change management and organizational theory.

As mentioned earlier in the theoretical framework; one of the definitions of an enterprise is strongly related to the system theory: the view of an enterprise as a coherent whole [3]. According to [13] an enterprise can be seen as an open and active system comprising a collection of actors, processes and technology which jointly engage in some purposeful activity. They [13] state that being a system in the general systems theory sense of the word, an enterprise can be divided into component systems (such as business units) as well as aspect systems (such as IT, business processes, et cetera). This definition corresponds to the formal organization in Figure 6, or the visible part of the organization or in this case enterprise.

Another definition of an enterprise focuses more on the informal organization and its invisible part, with the formal organization or visible part as infrastructure of the enterprise as seen in Figure 6. Homan [14] states that management can not be seen as a separate party governing the enterprise. He states that it's the physical science vision of enterprises, where the aspects of the organizational reality react in a mindless manner to each other, with the management as operator of the system. Organization can't be seen as noun but must be seen as a verb, a dynamical process: "organizing". From this angle enterprises and all their characteristic aspects can't be seen as loosely coupled from the people linked to, and within, the enterprise. Everything that happens around the organization, how the organization looks like and how it functions, is the result of organizational processes. These are interaction processes whereby actors give meaning to what, according to their idea, is happening and whereby this meaning is converted into concrete behavior. Once this behavior is observed, it can be a driver for the arising of new meanings, etcetera. How these different aspects of the organization (structure, culture, etcetera) look like, is not a mindless process of abstract entities reacting to each other, but it's the meaning that people give to these aspects.

And Caluwé [15] states that: *"An organization can be viewed for some purposes as collection of choices looking for problems, issues and feelings looking for decision situation in which they might be aired, solutions looking for issues to which they might be an answer, and decision makers looking for work. Garbage cans full of unresolved issues, unrealized solutions, and potential decisions are to be found everywhere and instead of being emptied, they are transferred into new, larger garbage containers."*

Figure 6 organizational iceberg

Morgan describes many forms and views of organizations in "images of organization" [16]. Hoogervorst argues in [9] what an enterprise is, and takes the mechanistic and organismic way of organizing from Morgan. He also argues and defends his statement that there is no general theory possible about the definition of enterprise. In [17] the authors state that two key paradigms underpin enterprise engineering, where enterprise engineering is the domain of this thesis, as established in the theoretical framework. Their first paradigm states that:

"enterprises are purposefully designed and implemented systems. Consequently, they can be re-designed and re-implemented if there is a need for change. All kinds of changes are accommodated: strategic, tactical, operational, and technological."

Their first paradigm corresponds to the mechanistic way of organizing, what was stated before and the formal and visible part of an organization in Figure 6.

"The second paradigm of enterprise engineering is that enterprises are social systems. This means that the system elements are social individuals, and that the essence of an enterprise's operation lies in the entering into and complying with commitments between these social individuals."

Their second paradigm corresponds to Homan and Caluwé, and additional on the informal and invisible part of an organization in Figure 6.

As known from literature, and as stated before, the different conceptions of enterprise reflects with the conducted information from the interviews, many enterprises that have a formal way of working within their organization and governance, also contain the informal organization and implicitly control, or at least try to, these aspects within the enterprise. This implies that the use of one definition, within this thesis, of enterprise would be ignorant and naïve. Instead, the two paradigms, corresponding to informal and formal, will be used separately within the corresponding approach of enterprise transformations.

Transformation

From the change management and organizational theory labeled literature, the core aspects of transformation will be presented. Therefore "change" will occasionally be used to follow the terminology of change management and organizational theory.

According to [13] an enterprise may evolve over the course of time. Such an evolution could be the result of a gradual change of the behavior of individual elements in the enterprise, or it could be the result of a deliberate and conscious action. Considering this, a transformation could be a planned transformation or a spontaneously arisen transformation of an enterprise.

The first definition of an enterprise transformation or change is based on the definition given by Caluwé and Vermaak [15], who adopt planned change. Their definition is based on different definitions they encountered in literature. They found that the similarities were just as striking as the differences. They expressed these similarities as the presence of the following elements (elements of planned change) as shown in Figure 7:

- Outcome/destination (a.k.a. goals, results, direction, improvement, renewal);

- Context/history (also referred to as cause, need, motive);

- Roles/actors (also referred to as parties, the social dimension);

- Phases/processes (also referred to as steps, sequence, order, activities, technical aspects);

- Communication/meaning (also referred to as interaction, cultural aspects, sense-making);

- Steering/reflection (also referred to as monitoring, directing, orchestrating, guiding, managing, keeping in one's awareness).
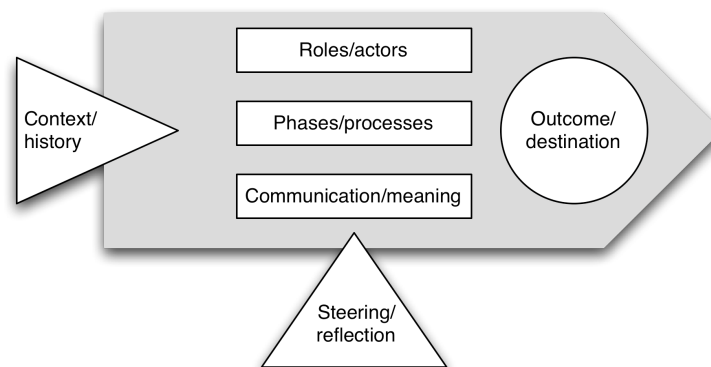
Figure 7 elements of change (based on [18])

Caluwé and Vermaak [15] state that the six elements of planned change complement each other, that together they form a comprehensive definition of planned change. Eventually they state that the small definition of a transformation or change is:

- Realizing intended outcomes;

- With clear rules and role partitioning;

- By going through a sequence of phases or steps;

- By communication and sense-making;

- While recognizing and building on the historical context;

- While the entire process is monitored and guided by the change agents.

Contradicting to what Caluwé and Vermaak state, is the definition of Homan [14]. Homan states that planned change is only possible if the complexity and uncertainty is reduced to nil, though he admits that many enterprises use planned change in order to transform their enterprise. In literature change management is often described as a planned process. Homan states that change management, as planned change, show lots of similarities with classical project management. Although in practice he observed that 75 to 80 percent of change in organizations are spontaneously arisen.

Images that people have according the organizational reality, as well change projects, will be constructed and summarized as "the real and the good". Homan states that there is a sort of perception process between the assignment of the management and the actual change of behavior. Whereby the employees give meaning to the plans, and change ambition, of the management as shown in Figure 8.
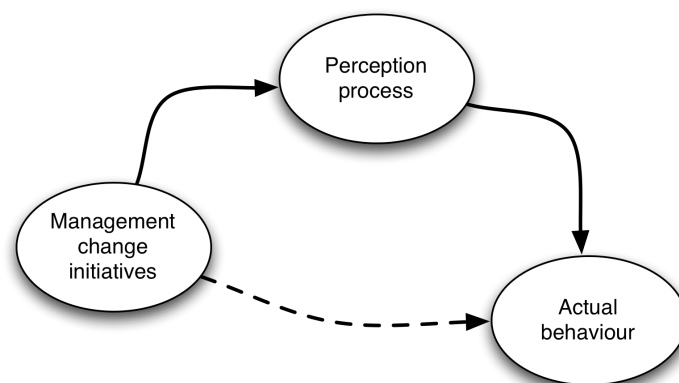
Figure 8 perception process as intervening factor for change (Homan)

A fundamental feature of these "meaning given perception processes" is that they are spontaneous processes. Homan states that these processes may be triggered by the assignments and plans from the management, but eventually it's the individual who decides what he or she thinks of these plans. Looking at what's really happening within organizations one can conclude that the behavior of employees and managers is therefore spontaneous.

The dimension of planned versus spontaneous refers to the level wherein change within an organization is centrally governed or a spontaneous or emergent action of change. These two dimensions refer to the two aspects discussed earlier, and shown in Figure 6, namely the formal and the informal organization. Homan states that many transformations are planned and change interventions are executed within organizations. However he states that simultaneously the actual change process is a spontaneous process that connects to the planned transformation as well as an independently operation of change.

Homan and Caluwé's definitions complement each other. As conducted from the interviews one can state that the actual transformation can be a spontaneous as well as a planned transformation connecting to the formal and informal enterprise.

Way of thinking about change

From the change management and organizational theory labeled literature, the core aspects of way of approaching and thinking about change will be presented. According to Caluwé and Vermaak [15] there are five ways of approaching and thinking about change. Since 1997 color thinking has been introduced, and from then it has been applied on many change projects within different organizations and all kinds of issues. Every color is a world on it's own and has it's own features as such: assumptions, interventions, instruments, communication and assurance. Color thinking and the features per color are shown in Table 1.

Considering Caluwé and Vermaak's color approach, Homan [14] described that this approach is also applicable on his definition of change (planned versus spontaneous), stated earlier. He states that change can be defined in two characteristic dimensions of change activities, namely the polarity mono vocal versus poly vocal. He states that since a lot of spontaneous things happen in organizations implicate that apparently more reality images, or meanings, simultaneously exist. This implies that people within the organization construct their own reality, and this reality does not have to be a perfect reflection of reality. All these 'local' reality constructions have an influence on the variety of the behavior that people in organizations exhibit. This actual palette of behavior and meaning constructions hang loosely together with the formal organization. Homan gives an interesting example that roads and bridges shouldn't be there if they where all build according to the specifications and blueprints. Precisely by diverging from this specifications and blueprints, and improvising and react on what one encounters during the construction, it's possible to construct qualitative good roads and bridges.

Mono vocal means that there is one dominant set of reality constructions in an organization or part of the organization. There is only one voice, one all-determining vision. Whose voice expresses could vary. It could be the management team or a member of that team that's in charge. However the voice can also come from a certain coalition, of persons or departments, who apparently have so much power that their reality construction is the dominant factor in the organization.

Poly vocal is the opposite of mono vocal. Apparently there are more voices than only one dominant voice. Many more reality constructions and many more images reflecting what's wrong and important in the organizations. Homan states that not all the voices are equally loud. However, these voices are there and influence the behavior of the people who interpret these voices. Homan states that if we consider organizations as these polyphonic systems, it's interesting to study the interactions between al these voices.

Assuming mono vocal versus poly vocal, Homan created an axis where the two dimension, and planned versus spontaneous are positioned to each other. The earlier stated five colors of the change process can also be found within this axis as shown in Figure 9.
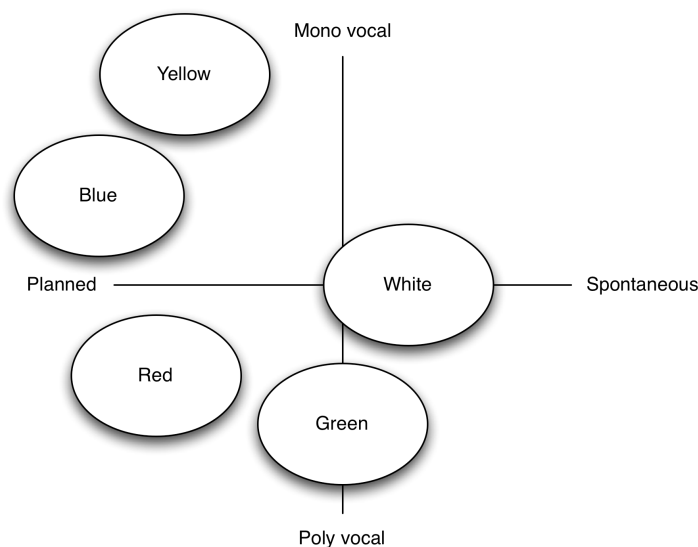

Figure 9 four different approaches and the corresponding colors (Homan)

	Yellow print	Blue print	Red print	Green print	White print
Something changes if…	interests get paired	the result is determent before hand	people get enticed to join the effort	people gain insights	there is room for spontaneous evolution
in a…	game of power politics	rational process	exchange exercise	Development process	dynamical process
to…	a feasible outcome, win-win situation	the best solution, a creatable world	a motivational solution, the best 'fit'	a solution created together by people	a solution that creates energy
Interventions such as…	coalition, top structuring	working in projects, strategic analysis	assess and reward, social gatherings	gaming and coaching, open systems planning	open space meetings, self-managing teams
by a…	process manager who uses power	expert, project manager	HRM expert, a coaching manager	process supervisor who supports people	pattern interpreter who puts himself in jeopardy
aimed at…	positions and context	knowledge and results	procedures, inspiration and atmosphere	setting and communication	complexity and meaning
The result is…	unkown and shifting	defined and guaranteed	conceived, not guaranteed	outlined, not guaranteed	unpredictable
Assurance lies in…	policy and balance of power, loyalty	measuring is knowing, redirection	HRM-systems, good relationships, communication	learning organization	self-organization, quality of dialogue
The pitfall lies in…	daydreams, loose-loose situations	ignoring external and irrational aspects	oppressive systems, mild healers	exclude anyone, inaction	surface concept, laisser faire
Typical actors are…	alongside the process manager: -people with the most formal and informal power -representatives of interests -constituencies, bystanders and environment	alongside the project manager/expert: -sponsors -project staff -target groups / users -outside world	alongside the HRM-expert/manager: -staff assistants -team builders -role models -actors	alongside the process manager: -pullers -coaches -teachers / instructors -participants / experimenters -resources / guardians	alongside the pattern interpreter: -intrapreneur / entrepreneur -promoters -sponsors and innovators -networks

Table 1 the five colors and aspects of the change process (Caluwé)

Drivers for enterprise transformation

Planned change does not start automatically, there has to be a certain source that contributes to the need or desirability to make a transformation visible. This corresponds to Homan's [14] definition, earlier stated, of transformation. Van de Ven and Poole [19] were the founders of four theories, which describe what the drivers for enterprise transformation are. Caluwé and Vermaak [15] expanded these theories.

The first theory is the evolution theory, which searches for the source of change in 'survival of the fittest'. There is a certain scarcity and the organization that adapts better to her environment is able to pull more of the scarcity of customers, money, raw materials, staff, or whatsoever. In this way she survives, while the less adaptable organization languishes.

The second theory is the life cycle theory, which sees organizations as organisms that move through a type of 'natural course of development'. An organization gets born, grows, harvest and dies. An organization develops by her roots, identity and knowing her own course of development and making her own intrinsic ability possible.

The third theory is the teleological theory, which regards organizing as self created process. The source of the transformation lies in the discontent or desires of the stakeholders. Therefore they set goals en put their energy in achieving these goals. The organization creates her future by focus, from inside out.

The fourth theory is the dialectical theory, which sees transformation as the result of the introduction of new views, which questions existing views. The struggle between both brings renewal. From thesis and antithesis arises a synthesis that makes a new future possible for the organization.

Caluwé and Vermaak [15] state that the four theories do not exclude each other. They give a good view on the different 'drivers behind, for instance, one and the same transformation. They state that there are three factors that have impact on the drivers for enterprise transformation: environment, occasion and philosophies as shown in Figure 10.

The environment can be considered as the physical characteristics, which forms the basis for the transformation idea, both, on the inside and the outside of the system, which is changing, as well as in the present and the past. These are characteristics that particularly belong to the evolution and life cycle theory:

- characteristics and changes in the social environment;

- characteristics and changes in the competition;

- characteristics and changes in the organization;

- earlier experiences with changes in the organization.

The occasion can be considered as the emotional characteristics, which forms the basis for the transformation idea. These characteristics are derived from the teleological theory. All the facts that belong to the context are by definition not enough to prioritize the transformation, at least that's the idea. It's necessary that there are initiators, who perceive and explain undesirable characteristics within the given context of the organization or realize that they require something different or better. Such a realization could be a gut feeling and the occasion could lie both inside and outside of the organization and could be of a reactive or creative nature. Caluwé and Vermaak [15] state that reactive factors could be:

- dissatisfaction, complaints, conflicts and problems;

- uncontrollability, imbalance and threats;

- external pressure and force majeure.

And creative factors could be:

- ambition, desires and goals;

- invitations, possibilities and opportunities;

- examples and heroes.

The philosophies of the stakeholders are to be considered as the semantic characteristics, which underlie the transformation idea. These characteristics are partly traceable to the dialectical theory. The idea is that the context or occasion will only yield a change idea if the initiators give meaning to them. For instance relevant characteristics are:

- the vision on people, organizations and the world;

- the vision of change (five colors, Table 1);

- social, political and religious beliefs;

- values;

- language, metaphors and symbols.

As know from literature [14, 15] and as conducted from the interviews the context or history has major impact on the transformation idea: the possible start of a new transformation. There is a connection between the start and the predicted outcome, where actors communicate with each other. And where actors give meaning to the transformation, as discussed earlier.
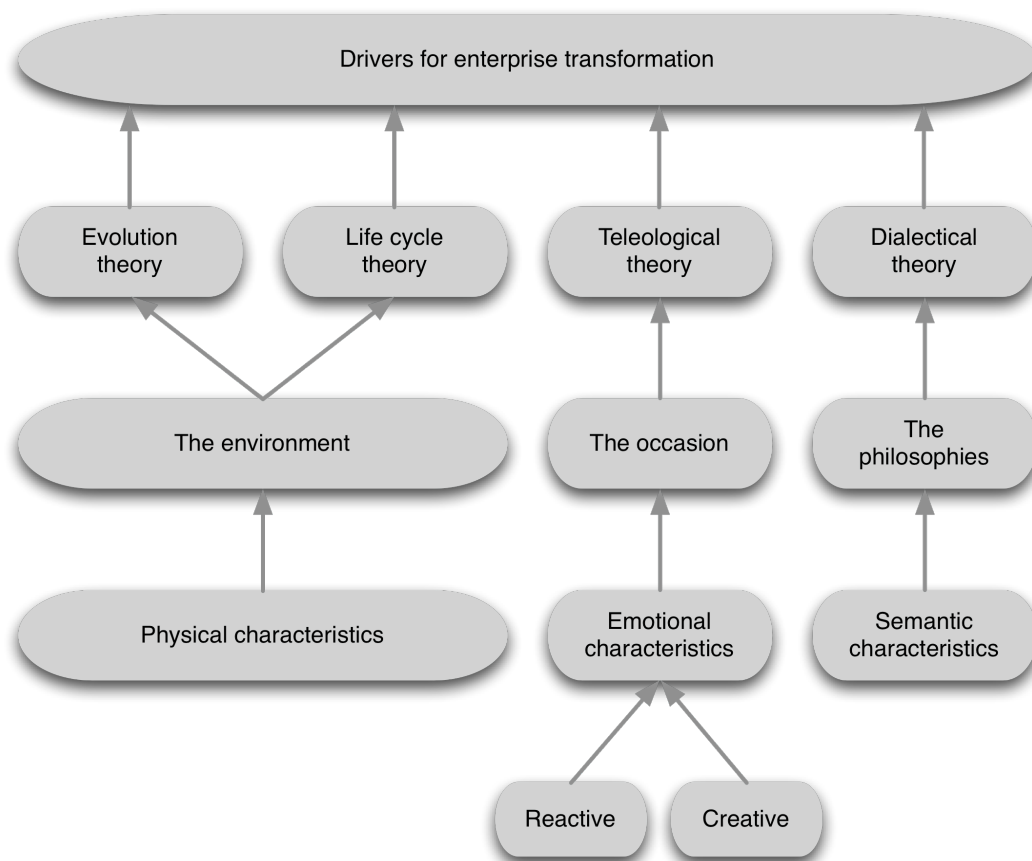

Figure 10 drivers for enterprise transformation

Activities of transformation

Since the core aspects of a transformation are discussed, it's time to discuss the different activities from past to outcome within a transformation. These activities do not follow a homogeneous flow. In a descriptive manner there are always different parts to distinguish. But according to Caluwé and Vermaak [15] the success rate of a transformation will increase if the different processes are distinguished in advance, or in a prescriptive manner. Caluwé and Vermaak have chosen for a classification in five phases, which are independent of the different colors for change. They classified diagnosis, the core of the issue, change strategy, intervention plan and interventions. These five phases could be performed in a recursive manner.

Caluwé and Vermaak give two reasons for such a classification:

The first reason is that it will increase the focus and structuring of change projects by splitting these activities. Every step stands for a justification for the next step. Whereby the amount of failures will decrease. Within every phase, there is focus on the next phase; in this manner consistency is monitored.

The second reason they give is, that it aims at increasing the effectiveness of the transformation by investing in the reflection: apart from doing also thinking, apart from planning also reflecting. Change management is not a trick but a science. Where the five processes help to increase the efficacy and coherency of the change project. They focus on the balance and continuity between the five processes. The most important function of every phase/process is:

1. The diagnosis helps to get clear what's really going on.
2. The core of the issue helps to organize the diagnostic information; map the information between relationships and relations, to express the essence about what's the real problem.
3. Change strategy helps to clarify the leverage of the transformation.
4. The intervention plan contributes to a successful implementation. Define the approach whereby the change strategy is translated in an operational intervention.
5. Interventions will be executed according to the intervention plan, at least when it's a predictable change. In other cases it's possible that after a few interventions, reflection and steering is necessary.

Caluwé and Vermaak state that within every color of change a different classification is possible, however they need to be based on comparable considerations.

Senior [20] divides the world in two halves: 'hard systems model of change' and 'soft systems model of change'. The first model is applicable on simple systems, with clear power structures and organized relations. The second model is applicable on complex systems with multiple power centers en network structures.

Hard systems model of change are founded in the world of systems engineering, operational research and project management. They consist of three main phases. In the description phase the goals will be set, on a systematic manner, for the transformation based upon the diagnosis. In the option phase the alternative scenarios will be devised and one will be selected. In the implementation phase the plans will be executed and monitored. Therefore there is a certain method of diagnose, strategizing and planning. Hard systems model of change is related to blueprint thinking. Though it's also applicable to not so complicated red print project.

Soft systems model of change are founded in the world of organization developers. Senior refers to the three phases model from Lewin [21] whereby change is preceded by 'unfreezing' and followed by 'refreezing'. Over a period of time many more models based upon Lewin's where developed. What all the 'soft models' have in common is the orientation on the psychological side of change processes, mainly red printed thinking. Cummings and Worley [22] handle a more detailed classification in five phases according the same tradition: motivating change, creating a vision, developing political support, managing the transition and sustaining momentum. They state that it's necessary to first indicate where change is needed, before the vision is formulated. Nevertheless a vision gains commitment from people and could be used as an instrument in order to increase the strength and power in the political power field. Due to this political support, in their construction, yellow print thinking is also involved.
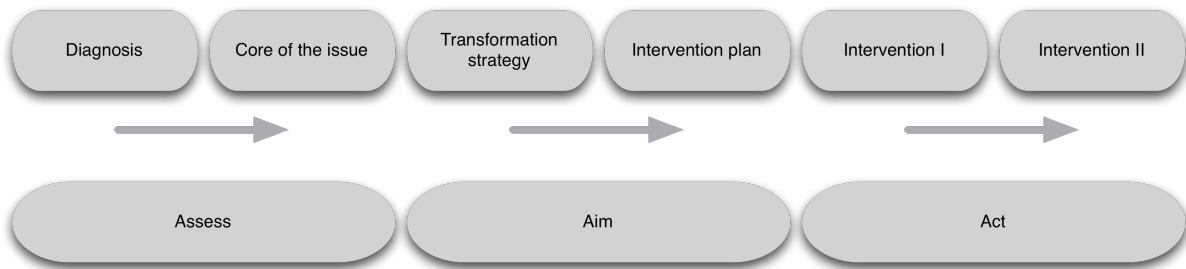
Figure 11 assess, aim and act

Boonstra et al. [23] state that transformation processes are an essential part of their change approach. Their phasing describes the stages through transformation processes. They state that many approaches are based upon Lewin's model of change. Boonstra et al. also handle five phases of change, based upon Lewin's. Their first phase is the orientation phase, where the awareness of the problem, and an image of the possibilities for change, arises. Their second phase is the diagnosis phase, during the diagnosis the state of play will be outlined before the start of the transformation. The current functioning of the organization is identified and loosening of the existing form is started ('unfreeze'). Their third phase is the target acquisition, where the future situation is plotted and where a movement towards the new form ('move') arises. The fourth phase is the actual change, during the transformation strategies and activities will be defined and the change will be anchored ('freeze'). The fifth phase is the evaluation where the transformation is reflected and improvements and learning opportunities will be analyzed.

Corresponding to the five phases described by Caluwé and Boonstra et al. and the phases described by Senior, Lewin and Cummings, the theoretical framework as shown in Figure 2, features the assess, aim and act phases within a transformation system. As known from literature and conducted from the interviews, these phases are not based upon a pure hard systems model of change, but can also be seen as a soft systems model of change. Assess, aim and act could be mapped upon the phases Caluwé described as necessities of an effective transformation. Noted that it's a highly iterative process within the operational and transformation system. However, before an enterprise begins with assess, aim, act processes the operational system is continuously polled if they just need to improve or transform. Although, as described earlier that enterprises are continuously changing, mostly enterprises try to avoid a big scale transformation and try to improve their basic operations before going over to the transformation system. In Figure 12 the operational system and evaluate, decide and justify elements.
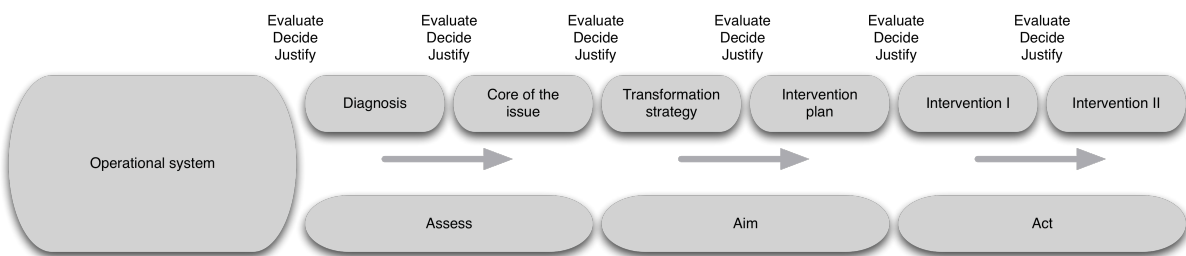

Figure 12 evaluate, decide and justify in transformation

Judgment and decision-making

An important aspect of the transformation process is the decision. As Kevin Morell put it *"as scholars and teachers, it is important for business ethicist to be aware of some of the most commonly used frameworks for understanding choice in business and management. This is because these frameworks are used at different stages of decision-making: initial consideration of the problem, choice of a course of action, justification for that choice. They may be conceptual tools for evaluating or generating options, or used to select or reject options."* [24] This part will consider several theories how people come to a decision and why.

The first theory is recognition primed decision making, a theory by Klein [25], considers decision making in high-stakes, time-pressured situations. The core of this theory is recognition, as shown in Figure 13. When faced with a certain event, decision makers tend to look for cues that they recognize. A manager could be faced with a situation where profits have drastically decreased in a short amount of time. The facts surrounding this decrease could function as a cue to determine the situation and whether or not this situation is recognized. If the situation is recognized and resembles a prototypical situation, a typical approach and course of action will be adopted. The decision-maker won't consider any other options or alternatives, but instead mentally simulate the course of action. In several studies conducted by Klein, this first approach was found to work quite well. However this theory general works best for experienced decision-maker, so in this case, experienced managers, since novice have less experience and will recognize less cues. This theory has also been adopted as one of the most beneficial way of making decision in military organizations regarding strategy.
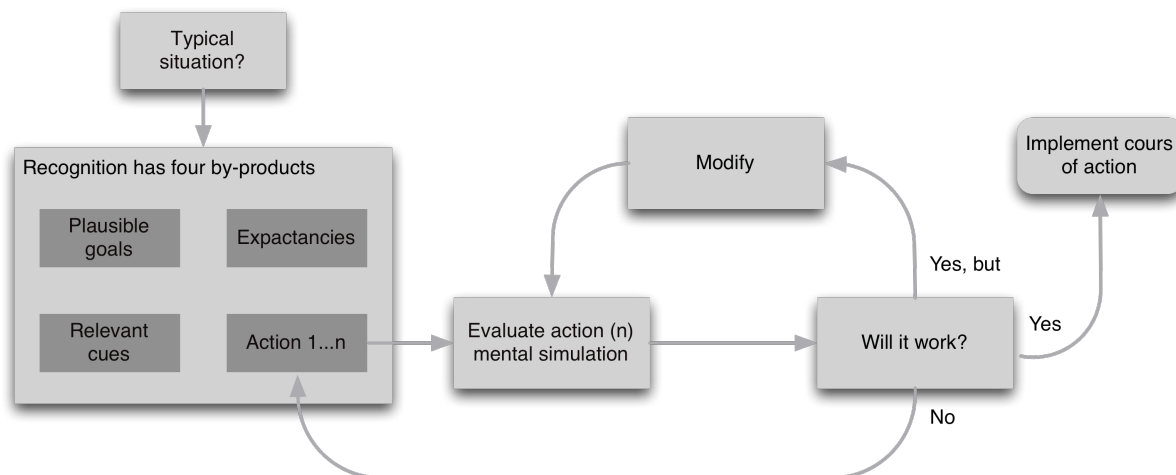

Figure 13 Recognition primed decision model (based on [25])

Related to recognition primed theory is perception of control [25, 26]. Nodgren, Van der Pligt & Van Harreveld researched the two aspects of decision making; risk en perceived control. Previous research has shown that decision makers tend to underestimate risk when they perceive a high amount of control. When low in control, the risk is overestimated. Nodgren, Van der Pligt & van Harreveld investigated this relation but added the additional factor of volition. They confirmed the conclusions of previous research but found that high volition increased perceived risk. This relation was strongly mediated by anticipated regret. When a manager finds himself in a situation where there is no other option but to change, for example during a take-over, volition is low and subsequent perceived risk is low. However when transformation isn't necessary but preferred, anticipated regret will be high with regard to an undesirable outcome. In this case volition is high, so the risk will be perceived as high.

Another theory is the Rational Choice Theory (RCT) [24]; this theory considers decision as a calculation of utility. According to the rational choice theory a decision-maker makes a dispassionate calculation of the net gain of several alternatives, which doesn't necessarily mean justifying a choice. In a way RCT is a form of cost-benefit analysis.

However logically RCT may seem, it has received some criticism especially concerning the practical implications of the cost-benefit analysis. First, calculating the utility of every option isn't very efficient. It takes a huge amount of time to gather all the information, there is no specific rule when to stop gathering information and nearly impossible to gather all the information. When faced

with an overwhelming amount of alternatives, it is simply undoable to weigh al the pros and cons of every one. But more importantly it ignores emotional and psychological aspect. We do not make decisions in a purely rational manner, but in the light of earlier choice, emotions and the social interface, which will be mentioned later on in this thesis. For example we may persist in pursuing an irrational course of action, since we have already invested in it. This phenomenon is known as escalation. It is accurate to state, that RCT won't work effectively when faced with a choice regarding ethical aspect. A more suitable theory, which does consider these aspects, is the image theory.

The image theory [24, 25] is a theory about how people's knowledge guides their decision as shown in Figure 14. Knowledge is divided into three different images, which constitute a person's decision frame. The first image is called value or for organizations culture, which refers to a person's or organization's basic beliefs, principles, values, morals and ethics. The second image is the trajectory image or for organizations vision, which represents a person or organization's agenda or goals. The final image is the strategic image, which refers to the plans for achieving the specific goals. Every alternative is tested against these images to see whether it is compatible. First the alternatives are screened, that is to determine if they are good options by looking at the violation of a person or organization's standards. If the amount of violation exceeds a certain rejection threshold the alternative is rejected. In fact the first decisions that are made are decisions not to do something. Screening leads to either adoption/rejection or a profitability test. When just one alternative survives screening, this alternative is either adopted or rejected on the grounds of a compatibility test. That is, the alternative is tested for compatibility with the three different images, when compatible it is adopted and if not it is rejected. On the rare occasion that more than one alternative survives, a profitability test is executed. The most appealing alternative is then tested against the images and if it is compatible adopted. Besides making decisions about changing, the compatibility test is also used during the transformation to assess the progress of a chosen alternative, which can lead to staying with the status quo or changing of the plan or goal.
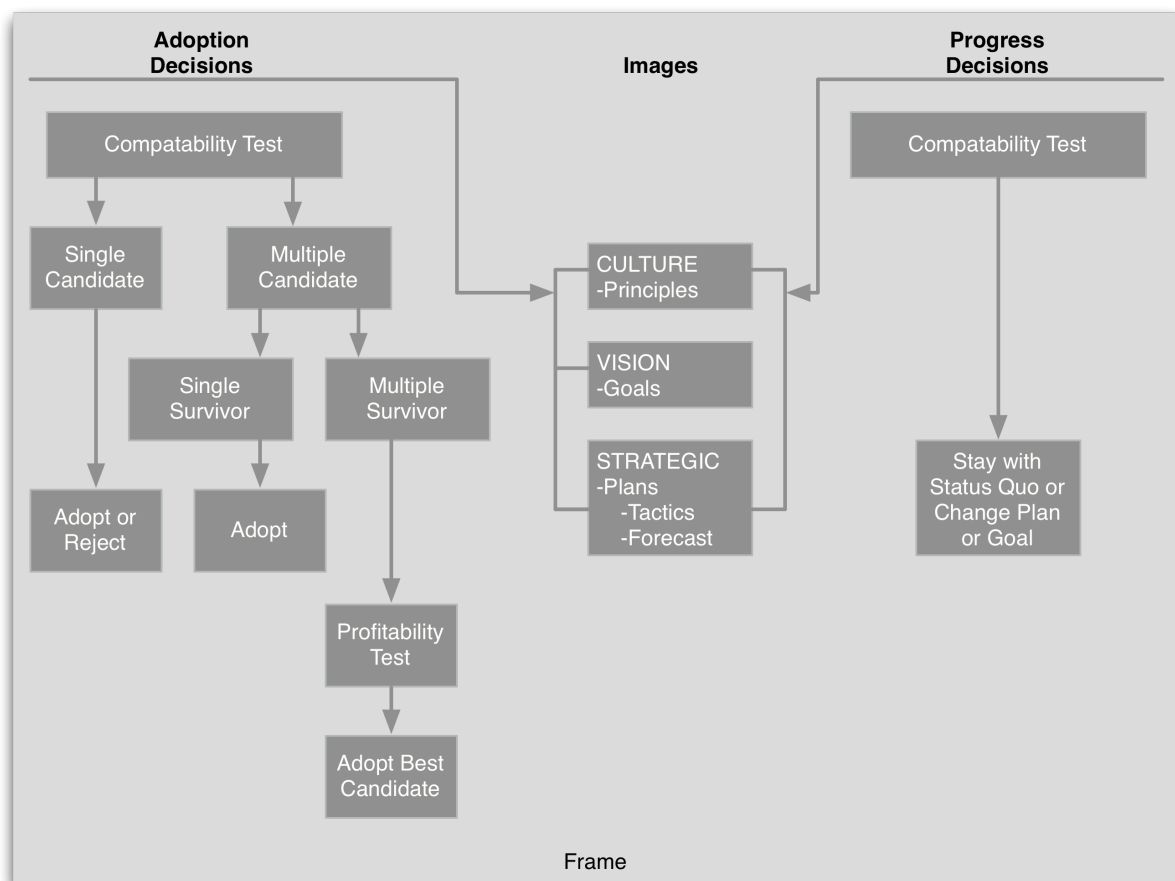

Figure 14 Image theory

People and interaction

A fresh new look means new perspectives. During the data analysis of the interviews the notion of social interaction was a recurring phenomenon. Homan [14] states that "realities" are constructed locally, and that they are the results of social interaction processes. Not the messages that come down to a group of people are relevant (sending perspective), but the meanings they give to it (receiver perspective). Homan describes these "social groups of people" as communities. A community is a group with the same meaning and perception. Communities can also be described as certain "trust groups" and can be discovered by someone's birthday treat, often people give birthday treats to the people within the same community.

In some communities people believe they know how the world works and what is observed will be pressed in the perceptual mold. These communities often have a relatively high stability. However there is often a premature convergence, whereby a "reality perception" of variety and depth not matches the variety and dynamism of the "real reality". People do not see what's really going on and disinterest increases, because people actually take their self-constructed reality as a standard. This means that every organization problem that needs to be resolved by a transformation project, in fact doesn't exists. Since every community has it's own view of reality, will do certain things well and experiencing unique problems that other communities do not see as problematic.

Homan states that behavioral change only arises when the input to certain communities are assimilated in the meaning structure of local communities. Only when input gets locally produced and incorporated in the local meaning structure, then input can lead to production of new perceptions and new behavior, as shown in Figure 15, where [27] distinguished three layers. The first layer is rather easy to change; however the behavior layer is more difficult and the most difficult one is the meaning layer.

Formal organization layer

Behavior layer
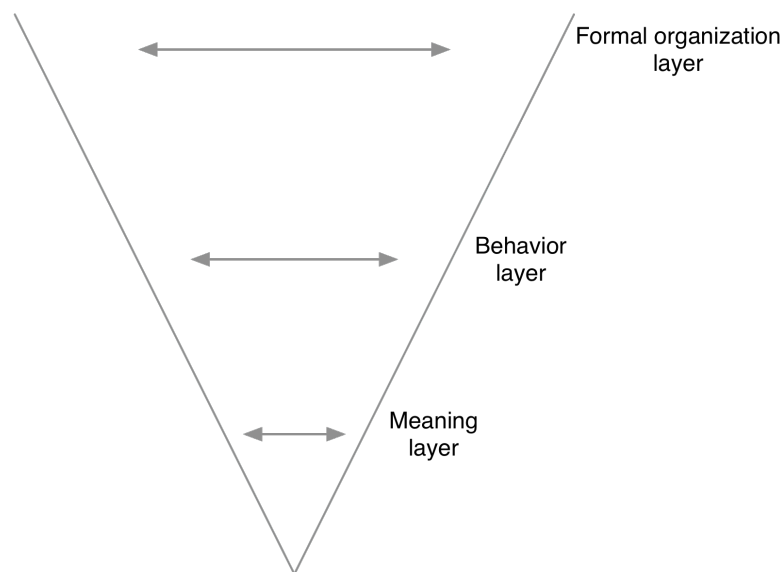
Meaning layer

Figure 15 three different layers (based on [27])

There are two different interaction approaches to distinguish. The first one is the birthplace within the management community, whereby a local interaction and "meaning making process" flows in a number of global, for the entire organization, current theme's and statements on what to do. As stated earlier, and as shown in Figure 8, management assumes that their action directly leads to the desired behavior change. The second one is when organizations are regarded as constellations of communities. In what way a change project, as a global (organization wide) theme, is affecting the behavior of local communities depends on whether or not the community actually expresses the global themes in their local themes.

Homan states that these two interaction approaches, or operationalizations, have two interesting implications. The first implication is that change (selecting new "realities" and recognize the full implications of them) can be seen as a self-organized process. Although transformation initiatives or impulses are to be recognized, change is something that people within a community achieve

themselves. The second implication is that change does not always evolve from explicit external initiatives, for instance from the management.

As stated earlier, these social aspects within a transformation have already been identified, though they have not bean treated as a social interface. According to Long [28], the definition of a social interface is:

"A social interface is a critical point of intersection between life worlds, social fields or levels of social organization where social discontinuities, based upon discrepancies in values, interests, knowledge and power, are most likely to be located."

Long states that there are implications considering social interface:

• Such discontinuities characterize social situations in which the interactions between actors become oriented around the problem of devising ways of bridging, accommodating to, or struggling against each other's different social and cognitive worlds.

• Interface analysis aims to clarify the types of social discontinuities present in such situations, and to characterize the different kinds of organizational and cultural forms that reproduce or transform them.

• Although the word 'interface' tends to convey the image of some kind of two-sided articulation or confrontation, interface situations are complex and multiple in nature.

• Interfaces must be analyzed as part of ongoing processes of negotiation, adaptation and transformation of meaning.

Within social interface there is also something Long describes as knowledge interface, where knowledge interface:

• Involves discontinuity rather than linkage.

• Considers transformation rather than transfer or meaning.

• Considers knowledge as a product of dialogue and negotiation.

• Is multi-layered and often fragmentary and diffuse, not unitary and systematized.

An interesting part of this social interface, which is also applicable on this research, is that Long states that knowledge is founded within certain communities, called epistemic communities, which are:

• Composed of those sharing roughly the same sources and models of knowledge.

• Differentiated internally in terms of knowledge repertoires and application.

• Engineering the creation of a single knowledge system within an epistemic community is unwise and unattainable.

• Innovativeness and adaptability to change depends upon the diversity and fluidity of knowledge rather than on integration and systematization.

Hanson [29] states that mangers and professionals have their own domain based upon decisions that are made. When they try to interfere in each other's domain, dysfunctional phenomena will occur. However Hanson also states that there is a certain grey area, which he calls the "contested zone", where the managers and professionals need each other and where they need to decide. Hanson describes this in his interacting spheres model, as shown in Figure 16.
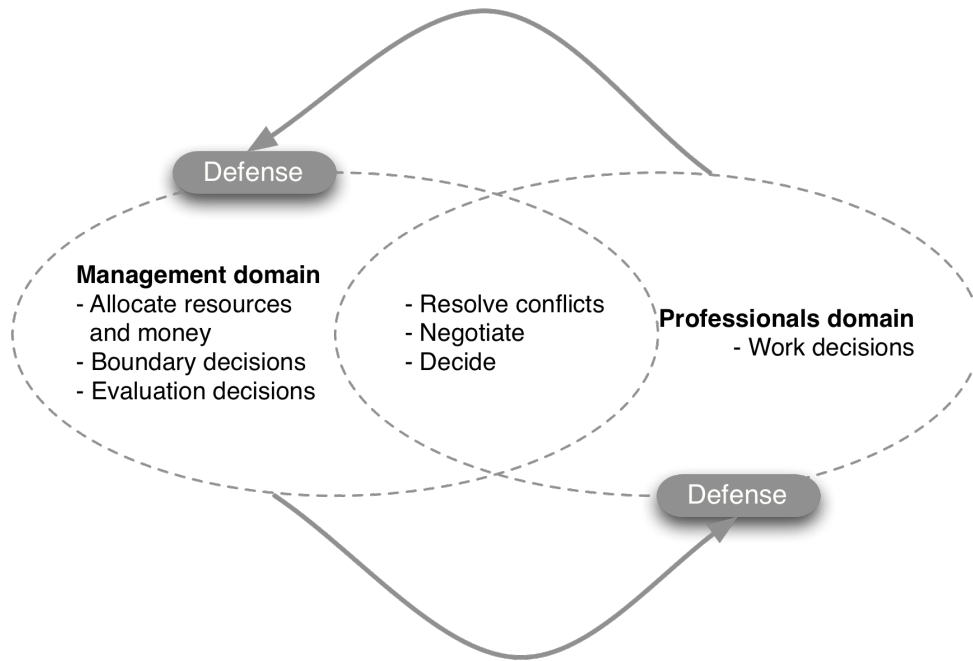
Figure 16 Interacting Spheres Model (Hanson)

Considering these interactions between communities, or domains, it's important not to restrict and not to systemize them. Similar to what Long states innovativeness and adaptability to change depends upon the diversity and fluidity of knowledge rather than on integration and systematization. As stated earlier transformation of meaning is an important ingredient for a successful community transformation and with this an enterprise transformation. Within enterprises there is not such a thing as a single knowledge system. Therefore transformations within enterprises always have to deal with different communities, meanings, and the social interface aspects: interests, values, power and knowledge. These aspects will always be transformed by interaction between different communities inside as well as outside the enterprise, as shown in Figure 17.
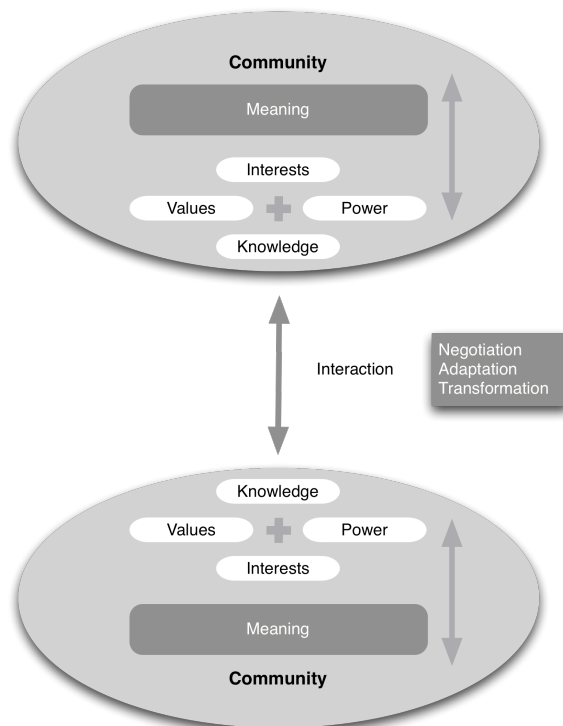
Figure 17 Transformation of meaning by social interface

Top-down

Formal approach

The Top-down approach is the approach that can be seen as the formal approach of the transformation of the enterprise. The top-down approach is, as conducted from the interviews and as known from literature, still an approach that's broadly used within enterprises these days. According to Homan [14], the top-down approach, which he describes as the design approach, focuses on the visible part of the organization, within the organizational iceberg as shown in Figure 6.

The design approach is characterized when the organization is seen as the source of shortcomings and these shortcomings need to be repaired. It's rational, a new design or blue print with the accent on structures, systems and procedures is used. Typical for the top-down structure is that the managers judge and decide what's best for the organization. The managers often already aim at a solution and pretend to know what the outcome of the transformation will be. In this way a transformation is carried out as a linear process. As a result of this linear process, the transformation is well planned, with the assumption that a transformation can be planned and controlled. Separation of design and implementation is typical for this approach. By the design approach transformations are seen as disruptions of the organizations' stability and a plateau needs to be reached as soon as possible.

Governance paradigm

According to the description of the top-down or design approach earlier, governance plays a major role in order to manage and direct the operations, as well as the transformation, of the organization. In [1], the writers state that governance is the supervision of the compliance of rules. They are consequently applied to an enterprise transformation context. Figure 18 shows the basic governance paradigm they based on the governance paradigm from de Leeuw. According to de Leeuw and the interpretation of [1], the governance paradigm involves three important assumptions:

1. there is some system, the target system, which interacts with its environment;

2. this target system needs to be governed;

3. there is another system, the governing system which does the actual governing.

In [1] the writers state that the essence of the governance paradigm is that during the realization of a process there is some kind of interaction with the environment (input and output), and that this process is controlled by some (internal) authority which monitors, and if necessary adjusts, the process to make sure the intended objectives are reached. They state that this authority is called the governing system. The system governed by the governing system is referred to as the target system. Since an organization is part of a larger system, the governing system also interacts with the environment to determine which services of products to deliver, to determine new opportunities and to determine changes in the environment.
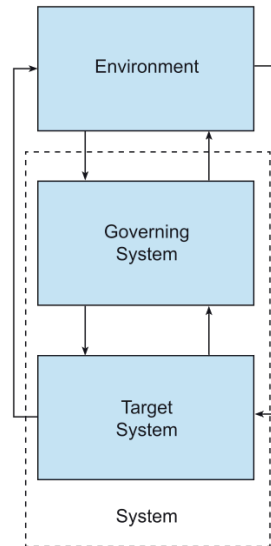
Figure 18 governance paradigm [1]

Approaching transformations

Strongly related to the top-down approach, as shown in Figure 19, are the blue and yellow colors of Caluwé and Vermaak [15] as stated earlier.

Blue print thinking describes that something changes if the result is determined before hand in a rational process to the best solution. Interventions such as working in projects and strategic analysis are implemented by experts or project managers aimed at knowledge and results. The result is defined and guaranteed. Assurance lies in measuring is knowing. The pitfall lies in ignoring external and irrational aspects.

The other dominant color, yellow, describes that something changes when interests get paired, in a game of power politics to a feasible outcome. Interventions such as, coalition and top structuring, are implemented by a process manager who uses power aimed at positions and context. The result is unknown and shifting. Assurance lies in policy, balance of power and loyalty. The pitfall lies in daydreaming and loose-loose situations.

Figure 19 Top-down polarity

Bottom-up

Informal approach

The Bottom-up approach is the approach that can be seen as the informal approach of the transformation of the enterprise. The bottom-up approach is, as conducted from the interviews and as known from literature, not broadly used, but upcoming, within enterprises these days. According to Homan [14], the bottom-up approach, which he describes as the develop approach but also the sustained continuous and spontaneous change, focuses on the invisible part of the organization, within the organizational iceberg as shown in Figure 6.

The develop approach is characterized when the organization is seen as the source of experience. There is not one single perspective of what goes well or wrong, but there are many different perspectives. Improvements arise from the existing organization. In pragmatics of everyday life, one experiences what's wrong and one is able to self improve the current way of working. To improve the organization, insights and knowledge of all is used in a poly vocal way. Every single member, or community, of the organization has a piece of the complex puzzle. By putting all these pieces together a new and extended image arises, from what's wrong and what needs to change in the organization. This contributes to the leverage of the transformation capacity. Emphasis lies on creating a good learning environment where freedom to experiment and reflection on the results of the experiments is encouraged. It's an iterative process where change has to grow in a creative process, by only handling global planning. It's not possible to plan such processes in advance and the organization needs to anticipate on the developments. The develop approach goes from concrete ideas and insights to a new coherent abstraction level addressing social, political and affective processes.

Complexity and chaos theory

Strongly related to the bottom-up approach is the complexity theory. According to Homan [14] the term "complex systems" refers to systems that exist out of a large number of parts or agents who are all connected with each other. Distinctive for complex systems is that collective system-features can originate but aren't traceable to the individual parts. The complexity theory is mainly applicable to processes between communities, or in other words inter-locally, whilst chaos theory is more applicable to processes within the communities or locally.
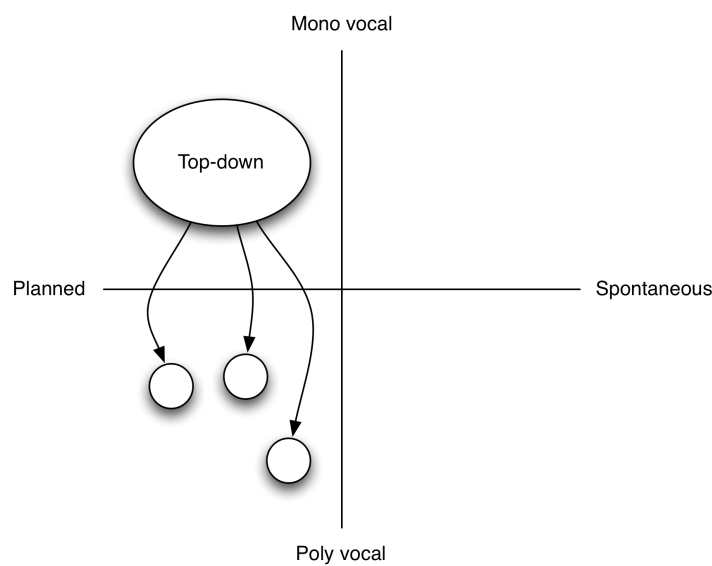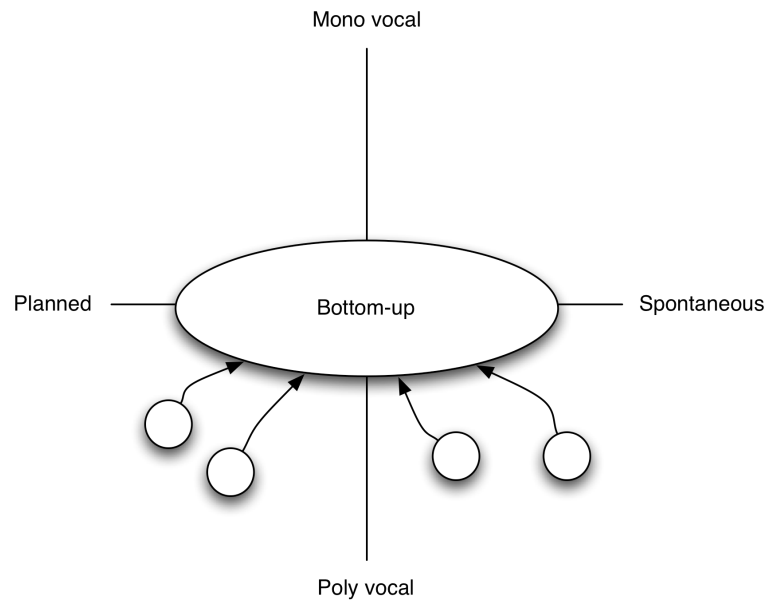
Figure 20 Bottom-up polarity

Approaching transformations

Strongly related to the bottom-up approach, as shown in Figure 20, are the colors red, green and white of Caluwé and Vermaak [15] as stated earlier.

Red print thinking describes that something changes if people get enticed to join the effort in an exchange exercise to motivational solution and the best fit. Interventions such as assess, reward and social gatherings are implemented by an HRM expert or coaching manager aimed at procedures, inspiration and atmosphere. The result is conceived and not guaranteed. Assurance lies in HRM systems, good relations and communication. The pitfall lies in oppressive system and mild healers.

Green print thinking describes that something changes if people gain insights in a development process to a solution created together by people. Interventions such as gaming, coaching and open system planning, are implemented by a process supervisor who support people aimed at setting and communication. The result is outlined and not guaranteed. Assurance lies in a learning organization. The pitfall lies in exclude anyone inaction.

White print thinking describes that something changes if there is room for spontaneous solution in a dynamical process to a solution that creates energy. Interventions such as open space meetings and self managing teams are implemented by a pattern interpreter who puts himself in jeopardy aimed at complexity and meaning. The result is unpredictable. The assurance lies in self-organization and the quality of dialogue. The pitfall lies in service concept and laissez-faire.

Results

This chapter will outline the most significant results gained during this research.

Several interviews with managers of large Dutch and international enterprises have been conducted. These enterprises were: Enexis, Philips, ING, DHL, Cisco, Kadaster and ASR. Through this way information from the managers was obtained and contributed to the manager's discourse. Before hand a questionnaire meant for the managers, Appendix A, was constructed upon the previous mentioned research cube. This questionnaire wasn't used during the interviews with the managers; however general themes within the questionnaire were used as guidelines throughout the interview. The interviews themselves could be characterized as open and unstructured. The unstructured approach had several benefits. First, in this way managers could speak open and freely, without being tired or bombarded with questions. Second, this approach contributed to the iterative working method during this study. Subsequently several new themes, that weren't incorporated in the research cube, surfaced. However, this new themes are integrated in the theoretical framework discussed earlier.

Since the interviews were open and unstructured, general themes that surfaced will be discussed. Some of these themes are general and were mentioned by the majority of the managers, others are very specific but not less important. Since the research focuses on the managers discourse these results are considered to be most significant.

Early on during this research, it became obvious that making appointment with executive mangers could be somewhat of a challenge. Since this could mean a limited amount of results, another source of information, namely the architect, was integrated into the research. Besides practical reason it also provided a new perspective upon transformation, instruments used during transformation and the prospects of Enterprise Architecture as a transformation instrument. The most efficient way of gathering information from the architects proved to be a questionnaire, Appendix B, since there didn't seem to be any valid reason to interview them. A questionnaire was placed on thesistools.com and spread via the Capgemini architects community and the architects community on "Via Nova Architecture". The questionnaire was answered by 130 respondents. Out of these responses only 44 seemed resourceful.

The information gathered through the questionnaire is best presented point-by-point correlating to the research cube Figure 2. The response to the first questions was large, however the last few question provided little information. Subsequent no valid statements could be generated.

Current situation

The current way of operating could (often) be described as an irrational process of transformations without strictly following assess, aim and act phases. As conducted from the interviews and as stated in the theoretical framework there are many aspects which all play an important role during a transformation. One of the most difficult modeling aspects is that of the communities and meaning of these types of communities constructed before and during a transformation of the enterprise. Considering these informal aspects, managers often make decisions on irrational (gut-feeling) basis, without any formal evaluation and justification of the transformation.

The interviews have shown that often managers have to deal with the informal aspect in particular, which play a significant role during enterprise transformation, compared to the formal aspects.

A typical transformation approach for enterprises, which is still used, is the top-down approach as is shown by the interviews. As is normal with a top-down approach, the executive managers often initiate the evaluation of the operational system and define the pain-points within this system. When enterprises handle a sound assess-action the real pain-points are discovered and form a justification for different alternatives in the aim phase available in order to transform the enterprise. However managers state that they regularly act before the real pain-points are even defined. Considering this way of working, the phasing within the transformation could be described as irrational. As conducted from the interviews, the drivers for such a transformation are often based on cost-reduction, but this could be a temporary recession-based driver.

Multinationals frequently have to deal with three levels of control: local, regional and global. Within these levels of control a differentiation is possible on executive-level, middle-management-level and operational-level. Stick to the agreed rules, established at higher-level, and the rest is free to fill in. Currently, the higher the level, the less they make use of roadmaps and architecture. Higher-level control is more interested in the type of functionalities, when these functionalities are available, what are the consequences and how will it work in practice. The steering mechanisms used, mainly centers practical aspects; where will we end, what will we do with it, and what are the consequences concerning timing. In other words: costs, effort and functionality concerning feasibility and the consequences of the business or Return on Investment (ROI). Sector wide benchmarks are often used as indicators, which could be translated to internal Key Performance Indicators (KPI). Architecture becomes visible when the targets are compared with the agreements by constantly benchmarking. Continuously transforming is a fact.

Pain-points

Executive managers often believe more in pragmatics and less in capturing in models. Decisions are regularly based on short-term objectives and budget driven. The predefined "business cases" are not always followed that well. Consequently some managers state that there is a certain lack of insights in the current situation, which results in difficulties on making well-defined evaluation, decision and justification within each state of the transformation process.

When speaking about EA as an instrument, managers frequently relate this to an IT aspect of their organization; consequently in most enterprises there is still lack of awareness of what EA really is.

Architects focus too much on the details and suffer from the ivory tower syndrome, which results in an inability to communicate the real execution message. Business and IT have to align, but it is very difficult since business requirements are dysfunctional. EA is dysfunctional as a gathering and communication model; consequently managers want an instrument that provides uniform gathering and communication between business and IT, based on the same language and conventions.

During the interview architects as a community were also discussed. With regard to the social interface, explained in the theoretical framework, there is still a large imbalance between the architect and managing community. Managers and architects tend to differ largely in their interest, power, knowledge and values, which result in friction between these two communities.

There are few executive managers who need support by a model-based instrument. Consequently the complexity of a transformation is often underestimated. A transformation is regularly translated into new functionalities or executions. In the minds of some managers a model based transformation approach is still very far away from a modeling approach and developing scenarios. The as-is state is often mapped on the to-be state and migration paths are conducted from the gap between these two states. Consequently a transformation is translated in a long-term program without strictly monitoring the status of the transformation and controlling the alignment with vision strategy and execution during the transformation.

Transformations are often difficult in the level movement from top to bottom especially concerning the translation of mission, vision and strategy to functionality or execution.

Potential role of a model-based instrument

Model-based instruments are very important to provide insights in the current and the future situation of the enterprise, however executive managers do not use these types of instruments on a regular and consistent basis. Standardization, within enterprises, of these types of instruments is still not sufficient, and as stated in Judgment and decision-making there are several aspects or images, which provide the foundation upon which managers make their decisions. These "images": culture, vision and strategy could be captured in models but this means that enterprises must be able to explicit these type of images in an instrument.

By defining a sound vision, strategy and execution and using architecture as a form of lifecycle management where the architecture process becomes a process part of every business function which is virtually aligned with IT, better indicators and controls on transformations are given. In this way architecture will help the enterprise to find the right point on the horizon and give insights in the Time to Capability (TTC) by alignment between proper growth, experience and productivity at the right cost.

When looking at different aspects within the enterprise, with regard to the budget, there are three domains to identify: "run the business", "change the business" and "innovate the business". By proper partitioning between these three, the enterprise is able to add capabilities for the enterprise system. Architecture as an instrument plays a major role by reducing and controlling costs the domain of "run the business".

Supporting instruments for architectural thinking will improve the cooperation and alignment between business and IT architecture. Storytelling is a suitable form of communication for the business and executive management, by showing the business impact versus the ease of implementation. The business requirements will be translated with EA to scenarios, which will be communicated to the business, by keeping a continuous dialogue between business and IT.

Assess Evaluate A

The architects within enterprises perceive that insights to what's wrong in the current situation are gained in the following way: by problem, bottleneck and market analysis, more specific gap analysis between the current situation, or as-is, and the future situation, to-be. Some state that when the as-is is constructed the requirements from the stakeholder which are gained by interviews and sometimes by workshops, are mapped on the as-is and the shortcomings are identified. Mostly this is done in a reactive manner on the basis of complaints or operational issues, service level management, operational costs, sector developments and change management. Rarely, insights are gained by audits, however scans on existing processes, procedures and applications do occur. Few enterprises work on a proactive manner, which goes from business strategy to business main architecture, where the to-be is mapped on the as-is.

Issues: TCO, lack of structure, many different standards, lack of synopsis.

Aim Evaluate A

The architects within enterprises perceive that insights to what alternatives are available to improve the current situation, are gained in the following way: by information analysis based on copafijth, impact analysis, project start architecture and definition of solutions based on business and architecture principles. Business cases, with a primary financial plug mapped on architecture, also have a position in finding the best alternative. Enterprises currently define important change parameters from different views, with assigning priorities and values on scenarios to the to-be situation. Although some state that it strongly depends on the problem and urgency, it's also possible to gain insights by anchoring architecture on all levels within the enterprise: strategic, tactical and operational, although not many suggested this way of working. The alternatives are often derived from the business goals, during an interactive process in workshops with stakeholders. Within these workshops the inventory and evaluation of the alternatives will also be assessed.

Issues: Often based on incomplete inventories of two or three scenarios. Not a fixed method. External parties deliver solutions without doing analysis on the real problem. When there are good analyses, there is still the possibility of a weak decision. Often lack of consistency between business units. Too much ad-hoc, therefore not a formal method for decision-making.

Act Evaluate A

The architects within enterprises perceive that insights in the progress of the transformation are gained in the following way: project and program management based on architecture blueprints and project start architecture, with goals and milestones or sequential stages of feasible situations. When using Prince as project management method, business cases and decision-making, escalation-plans and steering within program board are used, but often poorly defined. Progress can be controlled by reviews on the business and architecture principles. Implicit knowledge of progress determines, to a large extent, the insights in the as-is as well as the to-be situation.

Issues: Some state that not many insights are gained during the transformation, due to the lack of resources and structure. They also state that KPI's are not well defined.

Assess Evaluate B

The architects within enterprises state to which extent they're satisfied with the way of gaining insights in what's wrong in the current situation. The level of satisfaction differs quite a lot among architects. Most architects are rather satisfied; some are not satisfied at all. Most architects that are satisfied already use architecture to gain insights in the current situation. The architects that are unsatisfied indicate that the question: "Do we fix the right problem?" is always insufficiently addressed. Consequently, solutions are already put forward. Although architecture is sufficient for the governance discussion, it is insufficient for the substantive discussion. The issue is how these insights can be added to a complete picture of achievable benefits and consequences (based on numbers). And put on the agenda of those who should decide.

Issues: Some state that more support from architecture information is needed. This corresponds with the lack of resources available. Blueprinting new parts is very time consuming. Some architects state that enough tooling is available, but the lack of governance and structure is still an issue.

Aim Evaluate B

The architects within enterprises state to which extent they're satisfied about the alternatives that are available to improve the current situation. With regard to this issue, the level of satisfaction among architects also differs largely. Most architects are rather satisfied; some are not satisfied at all. Most architects that are satisfied already use architecture to formulate the alternatives. Business and IT alignment improves the quality of offered alternatives; an ideal situation is when a small team of professionals indicates the short-term and long-term solutions and alignment between these two, and eventually provide a preference for an alternative.

Issues: The architects that are less satisfied state that architecture is all about thinking above domains, not in domains. The lack of governance and structure is still an issue. Scenarios are often embedded at project level, not at portfolio level. Which results in lack of knowledge about the impact on the organization. Principles need to align the alternatives. Often the business has a short-term problem, which needs to be fixed. Consequently IT is too far behind the wishes of the business.

Act Evaluate B

The architects within enterprises state to which extent they're satisfied with the insights gained in the progress of the transformation. Again, satisfaction differs across architects. Most architects are rather satisfied; some are not satisfied at all. Most architects that are satisfied state that there are good insights in costs and commitment, but lack of pay-off on results. Insights in the progress of a transformation are often part of project management. However changes in the landscape need to be consistently registered.

Issues: Lack of explicit adjustments, of the ambitions, during the transformation. The lack of governance and structure is still an issue; problems are solved out of sight of architecture. Ideal is portfolio management based on plateau planning, however this is often based on politics. Reviews and audits are often snapshots, and take a lot of energy.

Assess Evaluate C

The architects within enterprises state to which extent they think enterprise architecture contributes to gaining insights in the current situation. Almost every architect thinks that enterprise architecture can seriously contribute to gaining insights in the current situation. However this can be explained by the frame of reference. EA provides overview of current relations between strategy, business and IT, through this way better understanding of the current situation is gained. But it should meet some basic conditions: it should be approached from a business perspective; the interest should be secured on a strategic level; principles need to be controlled; deviations must be described and managed; and consistency between principles need to be transparent and should be managed.

When these conditions are met, the total impact of strategy change could be better identified, Mission, vision and goals will be translated to principles. Those principles will be used within projects and therefore contribute to the mission, vision and goals of the enterprise.

Issues: Gaining insights are an inter-disciplinary matter therefore comprehensive understanding is needed. If EA is totally accepted and implemented within the enterprise, it will succeed to fulfill the function of conceptual description of reality. EA models must remain limited to the main values. The devil is in the detail. If the Total Cost of Ownership (TCO) could be mapped on different aspects of EA, one also could predict the future state TCO.

Aim Evaluate C

The architects within enterprises state to which extent they think enterprise architecture contributes to gaining insights to what alternatives are available to improve the current situation. Almost every architect thinks that enterprise architecture seriously contributes to gaining insights in finding the best alternative. However, as earlier stated, this can be explained by the frame of reference. EA provides faster insights in feasibility and side effects, or impact, considering an alternative. It contributes by providing alternatives defined by different target architectures or GAP analysis. EA supports scenario thinking and puts criteria on   selection by steering on principles and strategic guidelines. The real pain of the enterprise can be identified, which results in better-considered decisions. Without EA it's very hard to relate solutions to business context. With the use of EA it's possible to migrate in an iterative manner with a clear understanding of the ultimate situation and long-term goals.

Issues: Some state that the lack of governance and structure is still an issue; solutions are found out of sight of architecture.

Act Evaluate C

The architects within enterprises state to which extent they think enterprise architecture contributes to gaining insights in the progress of the transformation. In contrast to the earlier role of EA of gaining insights in the current situation and alternatives, opinions differ with regard to the role of EA to provide insights in the progress. Some state that the business or managers needs to steer the transformation, consequently a substantial translation is needed. Others state that change management can do this. However some state that with EA better insights of the current and future state contribute to the progress of the transformation, which can be done by roadmaps and by defining transition architectures or certain plateaus. By translation of the business architecture to Project Start Architecture, a firm guarantee is built on achieving the goals for the defined solution; this is supported by a good planning and control cycle. In advance, determine which insights are important and where to focus.

Issues: Translation of EA to let the business steer the transformation. Progress and results of projects need to be monitored and related to EA. Some state that plateaus only apply to program management, and not to portfolio and project management. Arrange a change process on architecture level.

Assess Decide A

The architects perceive how, within their enterprise, one reaches a decision where a certain change must be carried out. Most architects state that there is not a certain recipe and that the requesting parties mostly do it on ad-hoc basis. This also depends on the type of transformation. Some state that it's based on the business priorities, which are described by EA. Based upon business analysis, business case, with financial aspects, and coincidences the business direction board often decides where a certain change must be carried out. Only one stated that principles and goals and the added value of a project must be determined and that they play a major role in decision-making. Consequently program management and architecture makes it clear for managers, why and where a certain transformation is needed.

Issues: Some state that it has to do with politics within the enterprise. Decisions are often not made from a shared vision.

Aim Decide A

The architects perceive how, within their enterprise, one reaches a decision about the best alternative for the transformation. Most architects, as seen earlier, state that there is not a certain recipe and that the requesting parties mostly do it on ad-hoc basis. Some state that it's based on the business priorities related to the alternatives, which are described by EA. Based on business cases, gut feeling, technical arguments by the architecture board, and coincidences the business direction board

often decides which alternative is the best fit. Some architects state that this is done from a stakeholder perspective, which is a positive result where EA contributes. On short-terms not all the interests of the stakeholders can be served, although on long-terms this is flattened.

Issues: Some state that this also has to do with politics, and personal thoughts, within the enterprise. Decisions are often not made from a shared vision, although this is done more and more.

Act Decide A
The architects perceive how, within their enterprise, one reaches a decision on a satisfying progress of the transformation. Some state that there is not a certain recipe, although most architects state that direction boards, with the appropriate representatives, control this. Within these boards the progress of the transformation is discussed considering issues and adjustments or interventions that are needed in order to meet the goals of the transformation, on different levels such as program management and project management. Also with each phase transition, or plateau, the progress is monitored; consequently transition phases need to be determined at the beginning of the transformation. The program/project manager measures progress in people, budget and planning where the architect measures quality and compliance by reviewing the principles.

Issues: Some state that the lack of governance and structure is still an issue, it's currently done on a reactive basis or gut feeling.

Assess Decide B
The architects within enterprises state to which extent they're satisfied how one reaches a decision where a certain change must be carried out. The amount of respondents who were satisfied, were the same as those who were dissatisfied. The ones who were dissatisfied stated that the urgency of architecture on decision-making was not yet visible, therefore other considerations, like time to market play a larger role. The lack of transparency in the decision process was also stated as an issue. Decisions are often made on gut feeling, not based on the rational architecture. The most important thing is that knowledge should be a key aspect, so that sound decisions can be made. Models and principles just support the decision.

Issue: Urgency of architecture is not visible. TCO is not yet available or visible. Decisions are often made on gut feeling, not based on the rational architecture, which involves lack of transparency.

Aim Decide B
The architects within enterprises state to which extent they're satisfied how one reaches a decision upon the best alternative for the transformation. As stated by decisions on assess, the amount of respondents who were satisfied were the same as the amount that were dissatisfied. The architects that were dissatisfied stated that there was too much gut feeling and too little rational considerations. The lack of project start architecture and preliminary analysis contributes to this. Time to market often influences the way decisions were made. Rational arguments, pro and contra, should be documented in order to make a well-considered and transparent decision. The decision for change is a complex dialogue or activity. The ones that were satisfied stated that architecture contributes to the justification and argumentation for the decision, apart from the advice from the architectural viewpoint, which depends on the maturity of the organization.

Issues: Too much gut feeling, too little rational considerations.

Act Decide B
The architects within enterprises state to which extent they're satisfied how one gains insights on the progress of the transformation. As stated earlier, the amount of respondents who were satisfied were the same as the amount that were dissatisfied. The respondents that were dissatisfied stated that it's often not used as an instrument for steering a transformation, since there are too many stakeholders with different meanings and too little governance and structure. Working with plateaus could add structure and may simplify governance. Complications during the transformation are often not communicated and internally solved without alignment with the architecture.

Issues: Governance by using architecture as steering instrument.

Assess Decide C
The architects within enterprises state to which extent they believe enterprise architecture contributes to a decision where a transformation is needed. Almost every architect states that enterprise architecture can seriously contribute to a decision where a transformation is needed. EA will contribute by providing the managers with better insight in the advantages and disadvantages

and therefore better decision-making. However, they do state that EA cannot operate as an independent factor, but need to be understand and supported by the business. When it's supported by the business, it offers a common framework from where it contributes to a consistent decision based on the most efficient transformation by predefined chronological target architectures, which support the transformation.

Issues: EA need to be understood and supported by the business.

Aim Decide C
The architects within enterprises state to which extent they believe enterprise architecture contributes to a decision in what's the best alternative to improve the current situation. Almost every architect states that enterprise architecture can seriously contribute to a decision for the best alternative. It contributes by considering all the relevant alternatives. A decision can be supported because the transformation could be executed somewhere else than the location of the problem. EA could be used as a selection instrument to describe the conditions or principles for the decision and show the long-term and short-term consequences, which involves the decision and thereby contributes to an efficient change portfolio.

Issues: EA fixed on only models can't improve the current situation without domain knowledge.

Act Decide C
The architects within enterprises state to which extent they believe enterprise architecture contributes to the insights gained in the progress of the transformation. Many architects state that enterprise architecture can seriously contribute to insights in the progress of the transformation due to better overview and therefore better decision-making based on the criteria arising from principles and guidelines. By defining uniform plateaus and transition components, better governance is achieved in the progress of what goes well and what needs to be adjusted. Some state that this is more program and project management and not particular EA, but EA needs to be embedded in program and project management.

Issues: EA needs to be continuously updated and reviewed in relation to the principles and guidelines.

Assess Justify A
The architects perceive how one justifies a decision where a certain change must be carried out. Many architects state that it's necessary and desirable but often not explicitly done, but on gut feeling and on an oral basis. However there are many architects that state that it's done by a business case, in particular the Project Initiation Document (PID) or by a Request For Change (RFC), which need to be approved by the board. The extent and depth of a transformation often stipulates by which specialists', in collaboration with an architect, decision needs to be justified on a financial and functional/technical basis.

Issues: Justification is not sufficiently done in an explicit manner.

Aim Justify A
The architects perceive how one justifies the choice for an alternative where a certain change must be carried out. Many architects state that it's necessary and desirable but often not explicitly done, more frequently it is based on a gut feeling and very objective, much like the justification of the decision where a certain change is needed. Advantages and disadvantages need to be weighted and the choice often lies with the contractor. It also needs to be clear what happens if the change is not implemented. Some state that the alternatives are justified by the business case. Financial aspects and risk could be included in the justification. The proposed change is often reviewed for feasibility using the target situation whereby the architect often plays a role in defining the depth and context on the justification.

Issues: Happens frequently objective on gut feeling and by oral justification. Not a justification for the lower levels of the transformation impact, due to the depth and context.

Act Justify A
The architects perceive how one justifies an intervention in the transformation process. Some architects state that a justification of an intervention depends on the impact on the transformation process. A justification could be based upon a comparison of the results and the goals defined by the program and project manager, during the progress and milestone evaluations. Interventions from portfolio and program management are often well justified but higher-level interventions are poorly

justified and are often communicated too late. Some state that small interventions are often difficult, which results in large differences in pressure from higher level. Communication and justification of interventions could be achieved by issue and change management on program and project management level.

Issues: Often poor justification from higher-level, due to ad-hoc intervention with the lack of architecture. The result is lack of governance from higher and middle-level management.

Assess Justify B
The architects within enterprises state to which extent they're satisfied with the way of justifying a decision where a certain change must be carried out. The amount of respondents who were satisfied, were the same as those that were dissatisfied. The ones that were rather satisfied stated that justification is often based on the Return Of Investment (ROI), however there are more aspects that need to be considered as justification. Architecture needs to be part of the business case in order to improve the justification for long-term decisions. Justification is strongly driven by the presence of vision and business requirements. Integration processes between decision-making and portfolio management will support the justification of a decision.

Issues: Justification is often a result of an ad-hoc discussion without documentation.

Aim Justify B
The architects within enterprises state to which extent they're satisfied with the way of justifying a decision on the best alternative for the transformation. As stated by justification on assess, the amount of respondents who were satisfied, were the same as those that were dissatisfied. The ones that were dissatisfied state that there is a lack of formal assessment and justification, which results in justification of decisions purely based on interests from certain communities. Integration processes between decision-making and portfolio management will support the justification of a decision concerning an alternative.

Issues: Same issue, as with justification of decision, justification is often a result of an ad-hoc discussion without documentation.

Act Justify B
The architects within enterprises state to which extent they're satisfied with the justification of an intervention within a transformation. As stated earlier, the amount of respondents who were satisfied, were the same as the amount that were dissatisfied. Some state that interventions are not at all, or insufficient, documented and remain unregistered. Unplanned interventions often are time consuming especially when deviation from principles has occurred. Communication between different levels is very important in order to control interventions. Drivers for interventions are often deadlines that need to be obtained. There is tendency to denial/lack of acceptance of justifications, which leads to postponement of interventions.

Issues: Ad-hoc interventions, which lead to miscommunication and dissatisfaction between communities.

Assess Justify C
The architects within enterprises state to which extent they believe enterprise architecture contributes to a justification of a decision where a transformation is needed. Almost every architect states that enterprise architecture can seriously contribute to the justification of a transformation decision. it gives clear arguments for the transformation and implicitly the impact of the change from an overall context view with an exceeding domain view. By handling a fixed pattern decision-making becomes fathomable and contributes to transparency. EA gives better support for preparing an adequate business case that shows how the planned transformation contributes to the business interest and the financial impact of the transformation.

Issues: EA can contribute if it not suffers from an ivory tower syndrome.

Aim Justify C
The architects within enterprises state to which extent they believe enterprise architecture contributes to a justification of a decision in what's the best alternative to improve the current situation. As stated earlier, almost every architect states that enterprise architecture can seriously contribute to a decision for the best alternative. EA gives a comprehensive understanding of the essence and impact of the alternatives and therefore contributes to a sound and objective decision. EA also contributes to decisions on new transformations by looking at the motivations/justification of the

earlier rejected alternatives. Such considerations are predetermined through the use of a fixed pattern since EA gives steering principles that are linked to the business strategy. Better agility in the future could be reached by minimizing the number of dependencies.

Issues: EA can contribute if it not suffers from an ivory tower syndrome.

Act Justify C

The architects within enterprises state to which extent they believe enterprise architecture contributes to the justification of gained insights in the progress of the transformation. Many architects state that enterprise architecture can seriously contribute to justification of insights in the progress of the transformation due to communication of actual progress and deviations with all the stakeholders. EA governance provides project/process methodology, which is related to project portfolio management. Resulting in controls and indicators for the transformation by providing a framework that provides justification for the risk and financial impact when deviation takes place.

Issues: EA could contribute, considering the conditions that active (substantive) monitoring takes place and implementation level should be involved.

Assess Indicator A

The architects state which indicators are needed to evaluate, decide and justify during the assess phase. There are general indicators with regard to status, results and requirements such as: cost-benefits (ROI, TCO), time, quality, feasibility, risk, manageability, agility, relevant stakeholders and architectural fit. These indicators need to be identified at the beginning of a transformation and related to the objectives that are involved in the transformation and should be included in the business case. The indicators should be compliant to the business and architectural principles and during the assess phase they are targeted on the "why" question.

Aim Indicator A

The architects state which indicators are needed to evaluate, decide and justify during the aim phase. There are general indicators with regard to status, results and requirements, as stated earlier during the assess phase, but now the indicators are more targeted on the policies, validation and knowledge of the offered alternatives. The indicators should be compliant to the business and architectural principles and during the aim phase they are oriented on the "what" question.

Act Indicator A

The architects state which indicators are needed to evaluate, decide and justify during the act phase. There are general indicators as earlier stated, but now the indicators are more oriented on the "soft-side" of the enterprise such as: people, culture, adaptability and the "hard-side" divided into "so far" and "to go". Both the soft and hard indicators should be compliant to the business and architectural principles and during the aim phase they are oriented on the "how" question. Governance can be performed based on the indicators if the target situation is well defined.

Assess Indicator B

The architects state to which extent they're satisfied with the provided indicators during the assess phase. The results were very diverse. Many architects state that they are dissatisfied with the indicators currently used for the assess phase. Budget often plays a dominant role. Business cases still need to improve concerning the indicators. One respondent states that they have too many indicators and they are currently looking for a level where the indicators contribute to the interest of the manager.

Aim Indicator B

The architects state to which extent they're satisfied with the provided indicators during the aim phase. The results were very diverse. Many architects state that they are dissatisfied with the indicators currently used for the aim phase. Some state that it's hard to assess, due to the uncertainty, therefore it's often aimed at cost/benefits and the weight of the indicators are not well defined.

Act Indicator B

The architects state to which extent they're satisfied with the provided indicators during the act phase. Many architects state that they are dissatisfied with the indicators currently used for the aim phase, most were referring to the answers given to the earlier questions considering the indicator topic.

Assess Indicator C

The architects state to which extent they believe enterprise architecture with the indicators contributes during the assess phase. Almost every architect states that this could contribute to better insights in ROI and therefore better decision-making, but there is also a "soft-side". It must be noted that some state that this does not contribute. Any exceptions must be known on the basis of which indicators should be evaluated so that management can verify the progress. EA needs to be well positioned in all the phases to give substantive understanding.

Issues: Lack of TCO. EA should provide a set of tools to convince the management of solutions and alternatives. These tools could be indicators but also risk analyses and financial models.

Aim Indicator C

The architects state to which extent they believe enterprise architecture with the indicators contributes during the aim phase. Same as with the assess phase, almost every architect states that this could contribute to better insights in ROI and therefore better decision-making, but there is also a "soft-side". It must be noted that some state that this does not contribute. Better insights provide more precautions, therefore quicker clarity. In the aim phase EA plays a crucial role by putting constraints on the lower level solutions.

Issues: EA is particularly broad; much more than providing the right principles and guidelines is not possible.

Act Indicator C

The architects state to which extent they believe enterprise architecture with the indicators contributes during the act phase. More architects, than in assess and aim phase, state that EA could not or only moderately contribute, due to the "soft-side" of change, though it's better communicable when using EA. EA provides evaluation of the costs and benefits realized.

Issues: The change process has often to deal with cultural changes in the organization; this goes beyond EA.

Assess Control A

The architects state which controls are needed to evaluate, decide and justify during the assess phase. Some architects stated that this was a difficult question to answer. There are three general controls to distinguish: governance for decision-making, enterprise architecture for defining the right solution and program management guiding the transformation process. Resulting in the following lower-level controls such as: process-steering, financial-steering, time-planning and architectural-steering. Realization of the transformation also involves a non-rational process, namely the learning process of the people. In advance one needs to clearly define the "why", during the assess phase, not only on policies but also specifically what you want to achieve and when you're satisfied.

Aim Control A

The architects state which controls are needed to evaluate, decide and justify during the aim phase. In advance one needs to clearly define the "what", during the aim phase, and embed it at strategic level so that everyone knows which directions the transformation goes, only than is evaluation possible. As stated earlier this can be done by enterprise architecture for defining the right solution with parameters as such: time, scope, budget and quality, where a Project Start Architecture (PSA) supports this.

Act Control A

The architects state which controls are needed to evaluate, decide and justify during the act phase. In advance one needs to do a "zero" measurement containing the considered relevant KPI's that are defined. As stated earlier letting program management guide the transformation process can do this.

Issues: Discipline the one that's responsible for gained results.

Assess Control B

The architects state to which extent they're satisfied with the provided controls during the assess phase. The results were very diverse and limited. A statement cannot be done due to the lack of comments of the respondents. Some stated that the scope is mostly self-determined; organizations are still undergoing a maturity process on governance of EA.

Aim Control B

The architects state to which extent they're satisfied with the provided controls during the aim phase. The results were very diverse and limited. A statement cannot be done due to the lack of comments of the respondents. The "why" is often not clearly defined due to the discussions, which results in that the "what" depends on the interpretation of the program management. Organizations are still undergoing a maturity process on governance of EA.

Act Control B

The architects state to which extent they're satisfied with the provided controls during the act phase. The results were very diverse and limited. A statement cannot be done due to the lack of comments of the respondents. Organizations are still undergoing a maturity process on governance of EA. Steering the transformation is frequently done afterwards.

Assess Control C

The architects state to which extent they believe enterprise architecture with the controls contributes during the assess phase. Almost every architect states that EA could contribute to better governance during the assess phase. A statement cannot be done due to the lack of comments of the respondents. Some state that EA itself is a steering instrument. One respondent stated that it sounds very instrumental.

Aim Control C

The architects state to which extent they believe enterprise architecture with the controls contributes during the aim phase. Almost every architect states that EA could contribute to better governance during the aim phase. A statement cannot be done due to the lack of comments of the respondents. Some state that EA should monitor during the change and not pass a judgment afterwards.

Act Control C

The architects state to which extent they believe enterprise architecture with the controls contributes during the act phase. Almost every architect states that EA could contribute to better governance during the act phase. A statement cannot be done due to the lack of comments of the respondents. Transformation process lies mainly in the areas of change management, but EA could provide a review of the solution to the previously captured frames.

Conclusion

In this section the main research question and the sub-questions will be answered. The main research question was; "Do managers need a model-based instrument for managing the transformation process, and if so what are the requirements for such an instrument?" From this question the following sub-questions were conducted;

A. What's the current way of operating, with regard to the quadrant (Figure 1)?

B. What are the key pain points, with regard to the quadrant?

C. In what way can a model-based instrument contribute, with regard to the quadrant?

It is important to note that an unambiguous answer to either of the sub-questions is difficult since it depends on several features with regard to the enterprise. Three of these features are; the characteristics of an enterprise, the maturity of an enterprise and the awareness within an enterprise of a model-based instrument for managing the transformation process.

A. What's the current way of operating, with regard to the quadrant?

There are several forms of an enterprise to be considered when looking at the current way of operating. The formal enterprises focus more on the visible elements of the enterprise and employ a top down approach by ignoring the informal organization during transformation process. These enterprises operate from a mono vocal perspective. Considering the colors from Caluwé and Vermaak [15] blue and yellow print thinking is applied. The informal organization focuses more on the invisible elements of the enterprise and employs a bottom-up approach but neglect to predict the outcome. These enterprises operate from a poly vocal perspective. Considering the colors from Caluwé and Vermaak [15] red, green and white print thinking is applied.

Many enterprises use a top-down approach. Evaluations are often triggered by management and executed by professionals through many different means. Evaluations consist out of analysis of the current situation and future state. Decisions are made by the managers and communicated to the different communities or levels within the enterprise. Decisions are executed by professionals in different communities or levels.

Indicators and controls depend strongly upon the color of thinking and situational factors. Blue print thinking focuses on measurable elements, which are only visible in the formal organization and thereby not contextually linked to the informal elements. Yellow print thinking focuses on policy, balance of power and loyalty, which again are visible elements. The entire transformation process focuses on practicalities and functionalities.

B. What are the key pain points, with regard to the quadrant?

Many enterprises use a top-down approach; however their transformation process often seems irrational since they ignore their informal organization. Decisions by managers are often made on the basis of a gut-feeling. The complexity of a transformation is regularly underestimated. With regard to theories about decision making, recognition primed decision making is often employed whereby the manager tends to look at one option and doesn't consider any other alternatives. According to the image theory managers often make decisions based especially upon culture, vision and strategy,

though culture often seems to be the values of the manager himself. These decision seemed to be rational for the managers themselves, however justification isn't made explicit and poorly communicated. Many architects mention that the lack of structure and transparency is one of the major pain-points.

With regard to the social interface there is big difference in interest between managers and architects. Managers tend to focus on the short-term goals and are very budget driven, whilst architects strive for perfection and coherency.

C. In what way can a model-based instrument contribute, with regard to the quadrant?

Whether a model-based instrument can contribute to the transformation process depends strongly upon the maturity of the enterprise and awareness of model- based instruments which provide insights in the current elements which are part of the enterprise and future state.

A more mature enterprise often has a clear perspective upon the enterprise as a coherent whole by the use of different model-based instruments. There should also be awareness about the employment of different model-based instruments since it wouldn't be wise to construct a single knowledge system with regard to the different communities and the knowledge within the social interface. Communities use roughly the same sources of models and knowledge. Long stated that the knowledge interface is multi-layered and often fragmentary and diffuse, not unitary and systematized. In short, this means that a model-based instrument could contribute, but not unitary between and within the communities as a source for the phases within a transformation process. According to the managers and architects, a model-based instrument could especially contribute to evaluation, in other word contribution to efficiently running the business at the right cost.

Do managers need a model-based instrument for managing the transformation process, and if so what are the requirements for such an instrument?

As stated before an unambiguous answer isn't possible. First it depends on the characteristics of the enterprise. A model based instrument like EA could be implemented in top-down enterprises with blue print thinking to contribute to running the business and transformation process. Second, only on the condition that the enterprise is mature enough and is aware of the employment of different model-based instruments with regard to the different communities. However managers state that they don't need such a model since they focus on practicalities and functionalities. These functionalities are the indicators upon which a manager grounds his decision; like cost, effort and functionalities concerning feasibility and consequence. Nevertheless a model-based instrument could provide that type of information, if the practicalities and functionalities are filtered out of the foundations of a scenario composed from the underlying conceptualizations of reality. In short, they don't need a model, but could benefit from a model. According to the image theory, managers make decision based upon culture concerning principles, vision concerning goals and strategy concerning plans with tactics and forecast. Subsequent, by the use of a model-based instrument that incorporates these images, adoption of decisions could be made more transparent through a better justification and a formal structured evaluation, throughout the entire enterprise and its communities.

Discussion

This research tried to take a step back and create a new and fresh perspective upon enterprises, transformation processes and model-based instruments. It is one of the first steps towards a better understanding of the enterprise transformation and how it is managed. Some interesting themes surfaced which will be addresses further in the discussion and could provide information for further research.

During the conclusion awareness was discussed as one of the conditions for the implementation of a model-based instrument. But how do managers become aware? In general there are two approaches; the positive approach and the negative approach. The positive approach implies that the managers themselves come to the understanding that they want more transparency in aspects such as; time to capabilities, total cost of ownership and time to market. The negative approach implies that external factors demand that managers provide more insight and transparency in whether or not they perform in a sound and ethical manner. Future research should focus on the creation of awareness of managers and enterprises.

Another important theme that repeatedly surfaced was the distinction in formal and informal organization, also known as the organizational iceberg. During transformation the real pain-point aren't those of the decision-making process within the formal and visible part of the organization but those of the executions in the informal and invisible part of the organization. Or in other words, the construction of meaning within the different communities and the social interface related to these communities. A model-based instrument might aid the pain-points in the formal organization; the pain-points in the informal organization remain unaddressed. It remains the question if managers actually benefit from the model-based instruments if the pain-points in the informal organization aren't recognized and resolved.

Research organization

University

Name:	Radboud University Nijmegen
Address:	Heyendaalseweg 135
Postal code/City:	6525 AJ Nijmegen
Country:	The Netherlands

Company

Name:	Capgemini Nederland B.V.
Address:	Papendorpseweg 100
Postal code/City:	3528 BJ Utrecht
Country:	The Netherlands

Student

Name:	Bas Kasteel
Study:	Information Science
Student number:	0733539
Phone:	+31 (0)6 456 040 94
E-mail:	b.kasteel@gmail.com

Supervisor

Name:	Prof.dr. H.A. Proper
Phone:	+31 (0)6 549 748 52
Room:	HG02.078
E-mail:	erikproper@gmail.com

Referent

Name:	dr. S.J.B.A. Hoppenbrouwers
Phone:	+31 (0)24 365 26 45
Room:	HG02.611
E-mail:	stijnh@niii.ru.nl

Master Thesis lab coordinator

Name:	dr. P. van Bommel
Phone:	+31 (0)24 365 26 45
Room:	HG02.611
E-mail:	P.vanBommel@cs.ru.nl

References

1.   Op't Land, M.: Enterprise architecture : creating value by informed governance. Springer, New York (2008)
2.   Engle, P.: Enterprise risk management time. Industrial Engineer (2009) 20
3.   De Leeuw, A.: Bedrijfskundig management: primair proces, strategie en organisatie. Uitgeverij Van Gorcum (2000)
4.   Raadt, B., Schouten, S., Vliet, H.: Stakeholder Perception of Enterprise Architecture. Proceedings of the 2nd European conference on Software Architecture. Springer-Verlag, Paphos, Cyprus (2008)
5.   Lindström, Å., Johnson, P., Johansson, E., Ekstedt, M., Simonsson, M.: A survey on CIO concerns-do enterprise architecture frameworks support them? Information Systems Frontiers **8** (2006) 81-90
6.   Daft, R.L.: Organization theory and design. South-Western College Publishing, Cincinnati, Ohio (2001)
7.   Lankhorst, M.: Enterprise architecture at work : modelling, communication, and analysis. Springer, Berlin ; New York (2005)
8.   http://tee.cs.ru.nl/. Vol. 2009, Nijmegen Theories for Enterprise Engineering
9.   Hoogervorst, A.P.: Enterprise governance and enterprise engineering. Springer, New York (2009)
10.   Garfield, C.A.: Second to none : how our smartest companies put people first. Business One Irwin, Homewood, Ill. (1992)
11.   Glaser, B.G., Strauss, A.L.: The discovery of grounded theory; strategies for qualitative research. Aldine Pub. Co., Chicago, (1967)
12.   Strauss, A.L., Corbin, J.M.: Basics of qualitative research : grounded theory procedures and techniques. Sage Publications, Newbury Park, Calif. (1990)
13.   Harmsen, F., Proper, H., Kok, N.: Informed Governance of Enterprise Transformations. Springer (2009) 155
14.   Homan, T.: Organisatiedynamica. Theorie en praktijk van organisatieverandering. Den Haag: SDU Uitgevers bv (2005)
15.   de Caluwé, L., Vermaak, H.: Leren veranderen: een handboek voor de veranderkundige. Kluwer (2006)
16.   Morgan, G.: Images of organization. Sage Publications, Thousand Oaks (2006)
17.   Aalst, W., Dietz, J., Harmsen, F., Mylopoulos, J., Proper, E., Sadeh, N., Shaw, M., Szyperski, C.: Advances in Enterprise Engineering II. (2009)
18.   Vermaak, H.: Veranderkunde in zeven vragen. Holland Management Review (2002)
19.   Van de Ven, A., Poole, M.: Explaining development and change in organizations. The Academy of Management Review **20** (1995) 510-540
20.   Senior, B., Swailes, S.: Organizational change. Financial Times/Prentice Hall, New York (1997)
21.   Lewin, K.: Frontiers in group dynamics. Human relations **1** (1947) 5-41
22.   Cummings, T., Worley, C.: Organization development & change. South-Western Pub (2008)
23.   Boonstra, J., Steensma, H., Demenint, M.: Ontwerpen en ontwikkelen van organisaties. Theorie en praktijk van complexe veranderingsprocessen. Elsevier/de Tijdstroom, Maarssen (1998)
24.   Morrell, K.: Decision making and business ethics: the implications of using image theory in preference to rational choice. Journal of Business Ethics **50** (2004) 239-252
25.   Hardman, D.: Judgment and decision making. Wiley-Blackwell, Malden, MA (2009)
26.   Nordgren, L., van der Pligt, J., van Harreveld, F.: Unpacking perceived control in risk perception: the mediating role of anticipated regret. Journal of Behavioral Decision Making **20** (2007) 533-544
27.   Gagliardi, P.: The creation and change of organizational cultures: a conceptual framework. Organization studies **7** (1986) 117

28.   Long, N.: Development sociology : actor perspectives. Routledge, London ; New York (2001)
29.   Hanson, E.M.: Educational administration and organizational behavior. Allyn and Bacon, Boston (1996)

Appendix A Interview questions for managers (Dutch)

		Assess
Evaluate	A	In hoeverre en op welke manier verwerft u inzicht in wat er mankeert aan de huidige situatie?
	B	In welke mate bent u tevreden met de manier van inzicht verwerven in wat er mankeert aan de huidige situatie?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen inzicht te verwerven in wat er mankeert aan de huidige situatie?
Decide	A	Hoe komt u tot een besluit waar een bepaalde verandering moet worden uitgevoerd?
	B	In welke mate bent u tevreden met het komen tot een besluit waar een verandering moet worden uitgevoerd?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij uw besluit waar een verandering moet worden uitgevoerd?
Justify	A	Is een onderbouwing van een veranderbeslissing noodzakelijk en hoe vindt deze plaats?
	B	In welke mate bent u tevreden met de huidige vorm van onderbouwing van een veranderbeslissing?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij de onderbouwing van een veranderbeslissing?

		Assess
Indicators	A	Welke indicatoren zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen?
	B	In hoeverre bent u tevreden met de huidige vorm van ondersteuning die geboden wordt door de indicatoren?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument met de indicatoren die u genoemd heeft u helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing?
Controls	A	Welke stuurelementen zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens de beoordelende fase?
	B	In hoeverre bent u tevreden met de huidige vorm van ondersteuning die geboden wordt door de stuurelementen?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument met de stuurelementen die u genoemd heeft u kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing?

		Aim
Evaluate	A	In hoeverre en op welke manier bepaalt u welke alternatieven er zijn om de huidige situatie te verbeteren?
	B	In welke mate bent u tevreden met de manier van bepalen welke alternatieven er beschikbaar zijn om de huidige situatie te verbeteren?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij het bepalen welke alternatieven er zijn om de huidige situatie te verbeteren?
Decide	A	Hoe komt u tot een besluit over het best passende alternatief om de huidige situatie te verbeteren?
	B	In welke mate bent u tevreden met het komen tot een besluit voor het best passende alternatief om de huidige situatie te verbeteren?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij uw keuze voor het best passende alternatief om de huidige situatie te verbeteren?

		Aim
Justify	A	Is een onderbouwing van de keuze voor een alternatief noodzakelijk en hoe vindt deze plaats?
	B	In hoeverre bent u in staat de keuze voor een alternatief te onderbouwen?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij uw onderbouwing van de beslissing voor het gekozen alternatief?
Indicators	A	Welke indicatoren zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens de gerichte fase?
	B	In hoeverre bent u tevreden met de huidige vorm van ondersteuning die geboden wordt door de indicatoren?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument met de indicatoren die u genoemd heeft u kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing?
Controls	A	Welke stuurelementen zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens de gerichte fase?
	B	In hoeverre bent u tevreden met de huidige vorm van ondersteuning die geboden wordt door de stuurelementen?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument met de stuurelementen die u genoemd heeft u kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing?

		Act
Evaluate	A	In hoeverre en op welke manier verwerft u inzicht in de voortgang van een verandering?
	B	In welke mate bent u tevreden met het huidige inzicht in de voortgang van een verandering?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij het inzichtelijk maken van de voortgang van een verandering?
Decide	A	Hoe komt u tot een beslissing of een bepaalde verandering naar tevredenheid verloopt of dat er moet worden bijgestuurd?
	B	In hoeverre bent u tevreden met de vorm van bewaking en bijstelling van de verandering?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij uw beslissing of een bepaalde verandering naar tevredenheid verloopt of dat er moet worden bijgestuurd?
Justify	A	Is een onderbouwing van een beslissing over een eventuele interventie noodzakelijk en hoe vindt deze plaats?
	B	In welke mate bent u tevreden met de huidige vorm van onderbouwing van een beslissing van het veranderingproces of een eventuele interventie?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument u kan helpen bij de onderbouwing of een veranderingsproces naar tevredenheid verloopt?
Indicators	A	Welke indicatoren zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens het veranderingsproces?
	B	In hoeverre bent u tevreden met de huidige vorm van ondersteuning die geboden wordt door de indicatoren?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument met de indicatoren die u genoemd heeft u kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing?

		Act
Controls	**A**	Welke stuurelementen zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens het veranderingsproces?
	B	In hoeverre bent u tevreden met de huidige vorm van ondersteuning die geboden wordt door de stuurelementen tijdens het veranderingsproces?
	C	In hoeverre en op welke manier denkt u dat een modelgebaseerd instrument met de stuurelementen die u genoemd heeft u kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing?

Appendix B Questionnaire for architects (Dutch)

		Assess(1), aim(2), act(3)
Evaluate	**A**	In hoeverre en op welke manier wordt er: 1. inzicht verworven in wat er mankeert aan de huidige situatie? 2. bepaald welke alternatieven er zijn om de huidige situatie te verbeteren? 3. inzicht verworven in de voortgang van een verandering?
	B	In welke mate bent u tevreden met de manier van: 1. inzicht verwerven in wat er mankeert aan de huidige situatie? 2. bepalen welke alternatieven er beschikbaar zijn om de huidige situatie te verbeteren? 3. inzicht verwerven in de voortgang van een verandering?
	C	In hoeverre en op welke manier denkt u dat Enterprise Architectuur kan helpen bij het: 1. inzicht verwerven in de huidige situatie? 2. bepalen welke alternatieven er zijn om de huidige situatie te verbeteren? 3. inzichtelijk maken van de voortgang van een verandering?
Decide	**A**	Hoe komt men tot een besluit: 1. waar een bepaalde verandering moet worden uitgevoerd? 2. over het best passende alternatief om de huidige situatie te verbeteren? 3. of een bepaalde verandering naar tevredenheid verloopt of dat er moet worden bijgestuurd?
	B	In welke mate bent u tevreden met: 1. deze manier van besluitvorming waar een bepaalde verandering moet worden uitgevoerd? 2. deze manier van besluitvorming over het best passende alternatief om de huidige situatie te verbeteren? 3. de vorm van bewaking en bijstelling van de verandering?
	C	In hoeverre en op welke manier denkt u dat Enterprise Architectuur kan helpen bij: 1. een besluit waar een verandering moet worden uitgevoerd? 2. de keuze voor het best passende alternatief om de huidige situatie te verbeteren? 3. de beslissing of een bepaalde verandering naar tevredenheid verloopt of dat er moet worden bijgestuurd?

		Assess(1), aim(2), act(3)
Justify	**A**	Is een onderbouwing van: 1. een veranderbeslissing noodzakelijk en hoe vindt deze plaats? 2. de keuze voor een alternatief noodzakelijk en hoe vindt deze plaats? 3. een beslissing over een eventuele interventie in de transformatie noodzakelijk en hoe vindt deze plaats?
	B	In welke mate bent u tevreden met de huidige vorm van onderbouwing van een: 1. veranderbeslissing? 2. gekozen alternatief? 3. beslissing binnen het veranderingproces of een eventuele interventie?
	C	In hoeverre en op welke manier denkt u dat Enterprise Architectuur kan helpen bij de onderbouwing: 1. van een veranderbeslissing? 2. van de beslissing voor het gekozen alternatief? 3. of een veranderingsproces naar tevredenheid verloopt?
Indicators	**A**	Welke indicatoren zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens: 1. de beoordelende fase? 2. de gerichte fase? 3. het veranderingsproces?
	B	In hoeverre bent u tevreden met de huidige indicatoren en de ondersteuning die zij bieden tijdens: 1. de beoordelende fase? 2. de gerichte fase? 3. het veranderingsproces?
	C	In hoeverre en op welke manier denkt u dat Enterprise Architectuur, met de indicatoren die u genoemd heeft, kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing tijdens: 1. de beoordelende fase? 2. de gerichte fase? 3. het veranderingsproces?
Controls	**A**	Welke stuurelementen zijn benodigd om de evaluatie, beslissing en onderbouwing te ondersteunen tijdens: 1. de beoordelende fase? 2. de gerichte fase? 3. het veranderingsproces?
	B	In hoeverre bent u tevreden met de huidige stuurelementen en de ondersteuning die zij bieden tijdens: 1. de beoordelende fase? 2. de gerichte fase? 3. het veranderingsproces?
	C	In hoeverre en op welke manier denkt u dat Enterprise Architectuur, met de stuurelementen die u genoemd heeft, kan helpen bij de ondersteuning van de evaluatie, de beslissing en onderbouwing tijdens: 1. de beoordelende fase? 2. de gerichte fase? 3. het veranderingsproces?