Facilitating a business transformation in knowledge-intensive organizations

The development of the Business Transformation Method for Knowledge Intensive Organizations (BTMKIO)

Author
Lucas van den Bemd

Supervisors
dr. ir. R.W. Helms (Utrecht University)
dr. M. R. Spruit (Utrecht University)

dhr. W. D. D. M. E. in der Maur, MSc (Deloitte)
dhr. W. van Walbeek, MSc (Deloitte)

Utrecht, November 2012
IKU - 3219542

Abstract

Nowadays, we live in a turbulent environment: increasing globalization, economic recessions, and changing customers' demands require organizations to change their way of conducting business. The success of an organization depends on its ability to change the way it conducts business. Fortunately for organizations, numerous business transformation methods exists which support organizations to change. However, there is almost no support for the business transformation of knowledge-intensive organizations. The majority of currently existing methods focuses on high-level goals of the new organization and not on the identification of knowledge that is required to reach those goals. This is odd given the fact that the success of a knowledge-intensive organization heavily relies on the knowledge possessed by its employees.

This research focuses on the development of a method that can complement current existing business transformation methods in order to facilitate a business transformation in knowledge-intensive organizations. Knowledge is their most important asset required to reach organizational goals. Therefore, it is important that this knowledge is successfully transferred to the newly developed organization. This method, called the Business Transformation Method for Knowledge-Intensive Organizations (BTMKIO), uses an approach consisting of three steps which ensures that the right knowledge transferred:

1. Step 1: The business goals are translated in order to identify the knowledge areas required in the new organization.
2. Step 2: The possession and sharing of the required knowledge areas within the organization are mapped.
3. Step 3: The required knowledge areas are transferred to the new organization, whereby the old organization remains operational during the transformation.

The BTMKIO is composed of existing techniques available in scientific literature: the Knowledge Strategy Process and the Knowledge Network Analysis are used as foundation of the method.

The developed method is evaluated by means of a case study. The method is conducted at a department of a Dutch insurance company. The correctness, completeness, ease of use and practical value of the method are graded. Additionally, the method is also reviewed based on the same criteria by 2 experts in the field of business transformations and 1 expert in the field of network analysis. Main advantage of the method is that it provides useful and meaningful insights in knowledge possession and knowledge sharing within the organization. These insights can actually be used to make decisions on the reassignment of personnel. Main disadvantage is that the method cannot be conducted without the help of an expert, while this was a requirement for the method. Reason for this is that underlying knowledge is required on network analysis to convert the gathered data into meaningful results.

Keywords: business transformation method, knowledge network analysis, knowledge strategy process, knowledge-intensive organizations

Acknowledgements

Table of contents

Chapter 1: Introduction

Nowadays, we live in a turbulent environment: increasing globalization, economic recessions, and changing customers' demands require organizations to change their way of conducting business (Borrás, Chaminade & Edquist, 2009; Lobontiu & Big, 2006; Martin, 2011). According to Ashurst and Hodges (2010) organizational success depends on the ability of the organization to adapt and transform. They claim that only the organizations that have the ability to do so will persist. This is in line with the theory of dynamic capability which is defined as "*the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments*" (Teece, Pisano & Shuen, 1997, p. 516). Fortunately, in the past decades numerous business transformation methods have been developed that can support organizations in transforming their business processes in order to remain competitive (Kettinger, Teng & Guha, 1997).

Although there is a wide range of transformation methods, there is almost no support for the business transformation in knowledge-intensive organizations (Dalmaris, Tsui, Hall & Smith, 2007). Kettinger, Teng, and Guha (1997) investigated and compared 25 business process reengineering methodologies. The majority of these methods focus on high-level goals of the new organization and not on the identification and transfer of the knowledge that is required to reach those goals. This is odd given the fact that the success of a knowledge-intensive organization heavily relies on the knowledge of its employees and the knowledge sharing between those employees (Grant, 1996). In recent years, knowledge was brought some more to the attention in business transformation methods. Several approaches have been developed, e.g. research was conducted to identify the relation between knowledge flows and processes (Kim, Hwang & Suh, 2003), the integration of Business Process Management and knowledge management, and the integration of business processes and knowledge management (Remus & Schub, 2003). However, these approaches are not systematic or are not used on a broad scale in order to generalize their usage for a wide range of business processes (Dalmaris, Tsui, Hall & Smith, 2007).

Additionally, in existing methods the old situation is often neglected during the transformation process (Kettinger, Teng & Guha, 1997). However, it is important that the old organization continues to operate, even after (part of) the workforce is reassigned to the new organization. This is especially important in a transformation that takes a longer period of time.

Therefore, there is need for an approach that complements existing business transformation methods by emphasizing on the knowledge present within the organization and by ensuring that the old organization remains operational during the transformation process.

1.1 Research trigger

The department business insurances of InsuranceCo[1] will create a completely new organization in the upcoming three years. This new organization will be created within the same building as the current organization whereby employees for the new organization will be selected from the current workforce. In order to make this business transformation a success it is important to select the

---

[1] The name of the insurance company is fictitious for privacy reasons.

'suitable employees'. In this case, 'suitable employees' means selecting those employees that have the right knowledge that is required to achieve the goals of the new organization. It is crucial to identify what domain of knowledge is required, which (group of) employees contain this knowledge, and how this knowledge can be transferred. Besides that, it is also important to make sure that the old organization continues to operate after employees are reassigned. The old organization should remain operational despite the fact that employees are leaving.

1.2 Research objective

The objective of this research is to develop a method that can be used in a business transformation in order to identify and transfer knowledge that is required to achieve the goals of an organization. The method complements existing business transformation methods: it can be incorporated in its entirety to existing methods or parts of the method can be added, i.e. method fragments (Hong, van den Goor & Brinkkemper, 1993; Levantakis, Helms & Spruit, 2008). This method only focuses on the identification and transfer of knowledge areas in a transformation: aspects as the transformation of business processes, transition of IS/IT, providing training for employees, are omitted.

This method is based on the approach of Dalmaris, Tsui, Hall and Smith (2007) and consists of three stages. First, this method translates organizational goals into required knowledge, in order to identify the knowledge that is pivotal for conducting business. Secondly, the method provides means to identify who possess the required knowledge and to visualize knowledge sharing within the organization. Thirdly, it transfers the required knowledge to the new organization, thereby preventing knowledge loss in the old one.

1.3 Research questions

Based on the problem statement described in the introduction of this chapter the main research question can be defined:

> *"How can a method be developed that complements existing business transformation methods and that facilitates a business transformation in knowledge-intensive organizations that acknowledge the knowledge dimension?"*

This research question is supported by four sub research questions.

Existing business transformation methods will be investigated to decide whether they are suitable to conduct in a knowledge-intensive organizations and whether the old situation of the organization is taken into account. This results in the first sub question:

1. *Which business transformation methods already exist?*

In knowledge-intensive organizations, knowledge is the most important asset (Grant, 1996; Zack, McKeen & Singh, 2009). To reach organizational goals it is important to have the required

knowledge available within the organization. Therefore, it should be determined what the required knowledge is. This leads to the second sub question:

2. *How can organizational goals be translated into required knowledge (areas)?*

As soon as the required knowledge areas are identified, the next step is to investigate who possess this knowledge and how this knowledge is shared. Different methods are investigated which provide insight in the possession and sharing of knowledge within the organization:

3. *How can the required knowledge areas and knowledge sharing within an organization be mapped?*

Based on the results of the second and third sub research question an approach will be developed to transfer the required knowledge to the new organization, whereby the old organization remains operational despite the loss of knowledge:

4. *How can the required knowledge be transferred from the old organization to the new one, whereby the old organization remains operational?*

1.4 Scientific relevance

The scientific relevance of this research can be found in the creation of a method that facilitates a business transformation in knowledge-intensive organizations. The method (fragments) can be used to extend the functionality of existing business transformation methods, thereby making them suitable for the use in knowledge-intensive organizations.

The effects of an organizational downsizing on the network are already investigated (Kwon, Oh & Jeon, 2007). The stability and efficiency of the network are assessed after a workforce reduction. Kwon, Oh and Jeon (2007) provide a first basis for this research. However, they only focus on downsizing not on transforming, i.e. there is no new organization established. This research will also pay attention to knowledge sharing within this new organization, e.g. how are actors connected in the new network?

Additionally, the gathered data in the case study of this research can be used to evaluate the knowledge network analysis (KNA). Collected data can be used to evaluate the usefulness and effectiveness of the KNA technique.

Finally, the functionality of the KNA will be extended. Heretofore, the KNA technique was used to identify bottlenecks in the knowledge network of an organization. In this research it will be used to gain insight in knowledge domains and knowledge sharing and to facilitate a business transformation.

1.5 Business relevance

The method is suitable for organizations that heavily rely on their knowledge for conducting business. The method provides a solution for knowledge-intensive organizations that have to transform their business as a result of the changing environment, e.g. increasing globalization,

economic recessions, or changing customers' demands. It is a sector independent method so it can basically be used in all types of industries.

Moreover, the method provides valuable information on knowledge sharing within the organization. Management receives an overview of the knowledge network of the organization: the knowledge area(s) that each employee has, and which role an employee plays within the knowledge network. This information is very useful for decision making, e.g. decisions on the reassignment of personnel or the safeguarding of knowledge areas. It also provides insight in the weak spots of the knowledge network.

The majority of existing business transformation methods is developed oriented towards specialists (Grover & Malhotra, 1997; Kettinger, Teng & Guha, 1997; Valirys & Glykas, 1999), i.e. experts are required to conduct the transformation. In practice, this implies that an organization has to hire consultants or experts in order to conduct the transformation, which is a costly investment. Hence, this method consists of a step-by-step approach so it can be used by management of the organization. No expensive experts have to be hired, which saves costs.

1.6 Glossary

This section provides an overview of the most important terminology used in this research. This overview can be used to increase understanding of the topics related to this research. It is high-level: the reader can use the references provided to delve deeper into the subject.

Knowledge

Although knowledge is a widely used term, there is no consensus amongst researchers regarding its definition (Grant, 1996). One widely used definition is that of Nonaka (1994), who defines knowledge as "*justified true belief*". He makes a distinction between two types of knowledge: tacit and explicit knowledge. Tacit knowledge is hard to formalize or communicate. It is "deeply rooted in action, commitment, and involvement in a specific context" (p. 16). Explicit or codified knowledge is knowledge that can be expressed and transferred in words and numbers.

Schreiber et al. (2000) define knowledge as "*whole body of data and information that people bring to bear to practical use in action, in order to carry out tasks and create new information*" (p. 4). Knowledge distinct itself from data and information on two dimensions: it has a sense of purpose and has a generative capability, i.e. it can be used to create new information. The distinctions between data, information, and knowledge are presented in Table 1. Schreiber et al. (2000) do not discuss wisdom.

	Characteristic	Example
Data	Uninterpreted raw	...---...
Information	Meaning attached to data	S O S
Knowledge	Attach purpose and competence to information Potential to generate action	Emergency alert -> start rescue operation

Table 1 Distinctions between data, information, and knowledge (Schreiber et al., 2000)

In this research the definition of Schreiber et al. (2000) will be used when referring to knowledge as it is perceived as most applicable in the current context.

Knowledge sharing

Knowledge sharing can be defined as sending knowledge to other people and receiving knowledge from other people (Davenport & Prusak, 1998). Van den Hooff and van Weenen (2004) make a distinction between two forms of knowledge sharing: knowledge donating and knowledge collecting. The first focuses on the communication of one person to others, while the latter focuses on consulting others to learn what they know. Alavi and Leidner (2001) use the term knowledge transfer when referring to knowledge sharing. They describe knowledge transfer as a process, whereby knowledge is transferred via a knowledge transfer channel. Examples of transfer channels are (in)formal meetings, telephone calls, or coffee break conversations.

In this research the definition of Alavi and Leidner (2001) will be used when referring to knowledge sharing, as it is a complete definition that is widely accepted and often referenced in the scientific community.

Knowledge area

A definition of a knowledge area is uncommon in scientific literature. One of the scarce definitions is that of Schreiber et al. (2000) who define a knowledge area, or knowledge domain, as "*a coherent cluster of insights, experiences, theories, and heuristics*". For example, a knowledge area in an insurance company is knowledge on accepting fire insurance requests. Knowledge areas and knowledge domains refer to the same concept and are used interchangeably in this research.

Knowledge management

A comprehensive definition of knowledge management is provided by Dalkir (2005) and states that it is "*the deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation. This coordination is achieved through creating, sharing and applying knowledge as well as through feeding the valuable lessons learned and best practices into corporate memory in order to foster continues organizational learning*" (p. 3).

Knowledge loss

Knowledge loss, also referred to as knowledge drain, is the loss of valuable expertise as a result of an employee leaving the organization (Kiger, 2005; Zhuge, 2002). This can occur when an employee retires, finds another job, or is reassigned to a new organization. Besides, the loss of knowledge this may also result in disconnectedness of a knowledge network (Helms, 2007). Knowledge loss and disconnectedness of the network both can have a negative influence on the development of skills and expertise within the organization and consequently on its performance.

Knowledge-intensive organization

Although the term knowledge-intensive organization or firm is widely used in literature, consensus on a definition of this concept is lacking (Rylander & Peppard, 2004). The term can be explained from two perspectives: the input and output perspective. Starbuck (1992) draws a comparison between knowledge-intensive and labor-/capital-intensive organizations. These terms describe the

relative importance of labor or capital as the input for a production process. Therefore, calling an organization knowledge-intensive means that knowledge is the most important form of input, i.e. more important than labor or capital. This view on knowledge-intensive organizations is shared by other researchers as well (Ditillo, 2004; Donaldson, 2001). The output perspective describes knowledge-intensive organizations as organizations that produce knowledge. Thus, the most important result of their production is knowledge (Alvesson, 2004).

In this research the input perspective on knowledge-intensive organizations is used. Knowledge-intensive organizations are defined as organizations that use knowledge as their most important asset required to conduct business.

Business transformation

Business transformation can be defined as a structural change of internal and external organizational processes in order to remain competitive (Bosilj-Vuksic, Stemberger, Jaklic & Kovacic, 2002). Similar concepts are Business Process Reengineering, Business Process Redesign, and Business Process Change Management which can all fall under the umbrella term Business Process Improvement (Povey, 1998).

Chapter 2: Research design

This chapter describes the research approach that has been applied. The approach used is Design Science Research (DSR). The artifact resulting from the DSR is evaluated by means of a case study at a Dutch insurance company. Additionally, the method is reviewed by experts in the field of business transformations and network analysis. This chapter is divided in five sections. The first section introduces the DSR approach. The second section discusses the used research approach. The third section describes how the literature study is conducted. The fourth section discusses case study validity. The last section describes how the expert evaluation is conducted.

2.1 Design Science Research

Design Science Research (DSR) can be defined as developing and building new and innovative artifacts with the purpose of generating new scientific knowledge (Simon, 1996; Hevner, March, Park & Ram, 2004). In this research an artifact, i.e. a method, is developed which forms a complement for existing business transformation methods which can be used to facilitate a transformation in knowledge-intensive organizations.

For the development of the method the design research methodology of Peffers, Tuunanen, Rothenberger, and Chatterjee (2007) is used. They developed a Design Science Research Methodology (DSRM) process based on prior research on seven design science methods. This DSRM process is presented in Figure 1. DSRM consists of six activities and is originally constructed for the design and development of Information Systems. However, DSRM can also be used to create other artifacts, like methods or models (Peffers et al., 2007). The output of the DSRM process in this research is a method: a set of steps used to perform a task. The DSRM process has four research entry points: a problem-centered initiation, an objective-centered initiation, a design- and development-centered initiation, and a client-/context-centered initiation. In this research the problem-centered entry point is applicable.
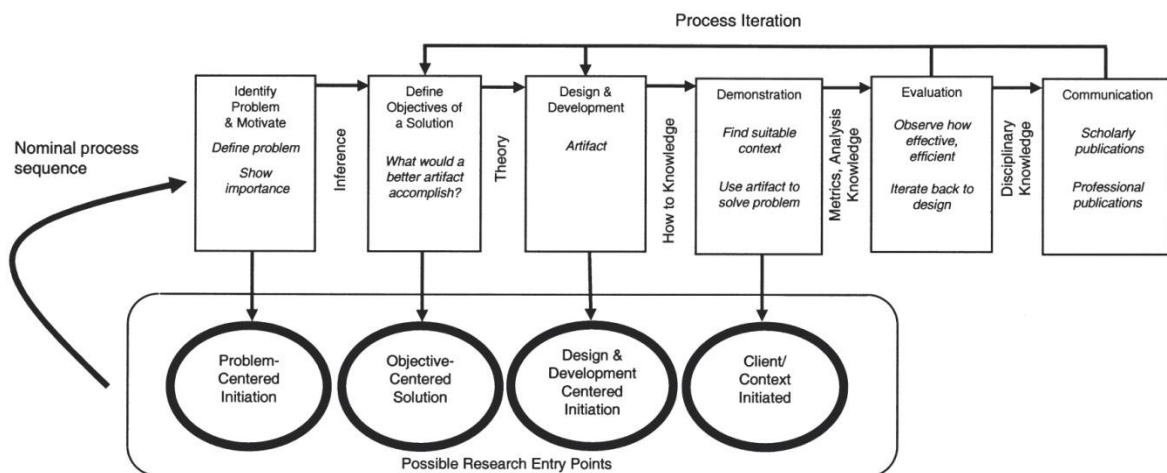
Figure 1 The Design Science Research Methodology Process

2.2 Research approach

During the conduction of the DSRM process other research approaches and methods are used in order to gather data, to construct the method, and to evaluate the created method. These methods and approaches are a literature study, a case study, and an expert evaluation. These approaches and methods are conducted in a specific stage of the DSRM process and can be combined into one final research approach as presented in Figure 2.
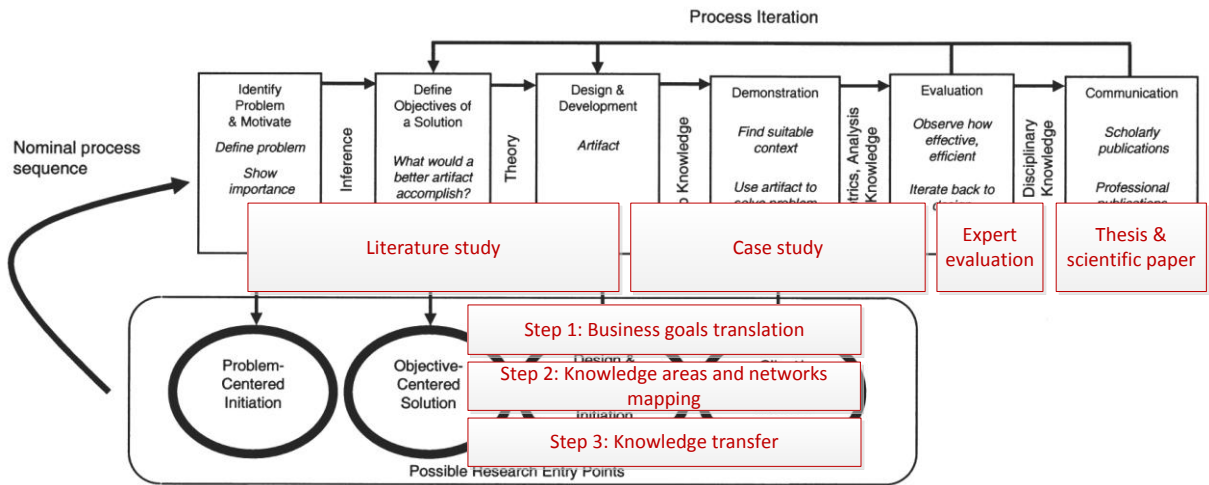
Figure 2 Final research approach

The different activities that are taken while conducting this research are discussed here.

Activity 1: Problem identification and motivation. The problem is identified and the motivation to create a new method is provided. These are described in the first chapter. The problem definition and motivation are partly based on the literature study discussed in the third chapter.

Activity 2: Define the objectives of a solution. The goals of the method are described in the fifth chapter. The third chapter provides an overview of already existing methods and indicates why these methods are not suitable for the current situation. This is done based on the literature available on currently existing methods.

Activity 3: Design and development. The fourth chapter describes different techniques, available in scientific literature, which can be used to construct the method. In this activity the first version of the method is actually developed. During the conduction of the case study the first version of the method is improved by using a trial and error approach, e.g. using different network analysis measurements to identify suitable employees. The fifth chapter provides an overview of all activities of the method.

Activity 4: Demonstration. Besides improving the method, the case study at a Dutch insurance company is also conducted to demonstrate the method. The sixth chapter describes this case study in which the method is used and improved. The reliability and validity of this case study are discussed in section 2.5.

Activity 5: Evaluation. The seventh chapter describes the findings of the case study and compares its results with the objectives of the method. Results are also discussed with management of the case company. This provides insight into the correctness, completeness, ease of use, and practical value for the organization of the developed method. These criteria are adapted from the research of Helms, Bosua and Ignatio (2009). The method is also evaluated by experts in the field of business transformations. Results of these evaluations are also discussed in the seventh chapter.

Activity 6: Communication. All activities performed and all data gathered will be communicated to the academic community by means of this thesis and a scientific paper.

Each activity is executed in a certain phase of the research. This thesis project consists of four main phases. The first phase is the preparation phase. The problem statement, research questions, and research approach are defined in a short proposal and are described in detail in the long proposal. The second phase is the literature study in which the currently existing methods are discussed and on which the method is based. The third phase is the case study and the expert evaluation in which the created method is evaluated. Based on this evaluation the method is improved. The last phase is the finalization of the thesis. In the last phase the different parts are combined into one final document. The planning of this thesis project is presented in Appendix A.

2.3 Literature study

Conducting a literature study is useful and of importance for several reasons. First of all, a literature review creates a broad understanding and overview of research that already is conducted in the research domain of interest. Secondly, it reveals areas where research is still needed (Webster & Watson, 2002). The literature study is also used to determine the methodology of this research and to gain a good understanding of the important aspects in order to conduct this research (Hart, 2001). Thirdly, the studied literature is used for the development of the method. The literature study is conducted in the period from April 2012 until July 2012.

The Ancestry Approach is used as search strategy (Matthews & Matthews, 2008). This strategy starts with investigating the references of a research report of interest to find other interesting reports. This step repeats until no further interesting concepts are identified or the concepts are so old that they can be judged as obsolete. The execution of the literature review is based on the method of Duff (1996), which is a high-level approach suitable for a wide range of research domains. This method consists of five phases which are presented in Figure 3 and discussed in this section. The literature study is an iterative process, which is indicated in Figure 3 by the arrow that runs from the last step back to the first one.
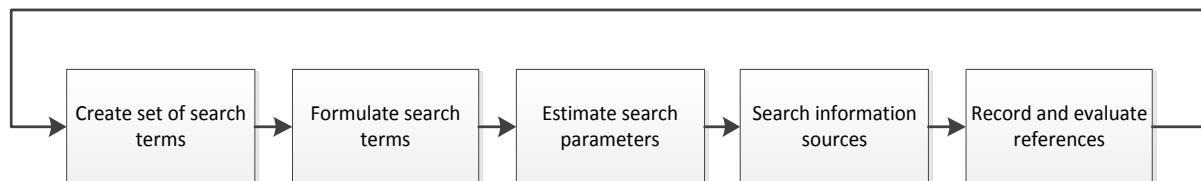
Figure 3 Literature study approach based on Duff (1996)

Create set of search terms. A list of search terms, or key words, is defined which provide means of access into the literature. The following key words are used to create a list of definitions, to create an overview of already conducted research and to develop the method: *knowledge sharing, knowledge domain, knowledge area, knowledge management, knowledge loss, knowledge-intensive organization, business transformation, business reengineering, business process redesign, business process change management, business goals translation, knowledge network analysis, social network analysis, knowledge repository, knowledge base*. These key words are used to find relevant research reports. Once a relevant research report is identified the Ancestry Approach is applied: the references of this report are investigated to find other interesting reports.

Formulate search statement. The key words are used in combination with Boolean operators, e.g. AND and OR, to query different databases to create a list of possible relevant literature. For search terms consisting of multiple key words, e.g. business process reengineering, quotation symbols are used to prevent unrelated literature from dominating the search results. Appendix O provides an indication on the size of the body of knowledge.

Estimate search parameters. Four parameters can be used to determine whether a source is relevant or not. When a particular source fails to meet the criteria set for two or more of these parameters it is considered as irrelevant.

The four parameters are:

- **Spatial**: Research on a subject which is specific to a particular geographical area should focus on literature relating to that subject within the same area. Because this research does not focus on a specific geographical area there are no restrictions to this parameter.
- **Temporal**: The reviewed literature should be as recent as possible. Whether research is considered as still relevant depends on the topic at hand. To understand the rising need for business transformation methods in last decades, literature from the 1990s and 2000s will also be investigated. However, in case of older literature more attention will be paid to decide whether that literature is perceived as still relevant.
- **Disciplinary**: Often, literature cannot be categorized in one domain: multiple research domains should be determined in which the research topic might fall. In this research there are two possible research domains: knowledge management and business transformation methods.
- **Formal**: Literature can be found in multiple sources whereby a distinction can be made in the quality of the source. In this research the following sources are used, as they are perceived as a high quality source (Matthews & Matthews, 2008):
  - Article in an academic journal
  - Dissertation
  - Book section
  - Book
  - Conference proceeding

Search information sources. Numerous search engines exist to find academic literature. Additionally, there are digital libraries of academic journals and conference proceedings which can

be used to find relevant literature. In this research the following sources are used: Google Scholar, Microsoft Academic Search, CiteSeer, Science Direct, and Utrecht University Omega.

Record and evaluate resources. The list of search results of each database or search engine is scanned for interesting titles. The abstract of the sources that seem relevant are read. When the title and abstract indicate that the source is likely to be relevant for this research the whole source is perused. Then, the Ancestry Approach is used to identify relevant related literature (Matthews & Matthews, 2008).

Each relevant source is evaluated with the QRAQ critical thinking tool (Duff, 1996). Based on this evaluation is decided whether a source is used. This tool uses the following criteria to evaluate a source:

- **Quantity**: determine how many times the source is cited by others and the extensiveness of the information source.
- **Relevance**: determine the relatedness to the topic, the publishing date, and the intellectual level of the source.
- **Authority**: determine the qualification of the author, the country of origin, and the author's organizational affiliations.
- **Quality**: determine if the source is primary or secondary, the reputation of the publisher, and the references to other work.

2.4 Case study validity

The methodological guidelines from Yin (2003) are used to address validity and reliability issues of the case study. These guidelines are discussed in this section.

Internal validity

Internal validity is about "*establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships*" (Yin, 2003, p. 35). Internal validity is only applicable to causal/explanatory case studies, whereby the researcher(s) trying to determine whether event x led to event y (Yin, 2003). Because the case study conducted in this research is a descriptive/exploratory study, internal validity is not perceived as a concern.

Construct validity

Construct validity is about "*establishing correct operational measures for the concepts being studied*" (Yin, 2003, p. 34). In this research construct validity is increased by collecting data from multiple sources: interviews, surveys, documents, and from information systems. This data consists of information on employees, knowledge areas, the organizational structure, and the reasons for the transformation.

External validity

External validity is about "*establishing the domain to which a study's findings can be generalized*" (Yin, 2003, p. 34). A case study relies on analytical generalization: the researcher tries to generalize results of the case study to some broader theory (Yin, 2003). Because the new method is only evaluated in one case study the generalization is limited.

Reliability validity

Reliability is about "*demonstrating that the operations of a study – such as the data collection procedures – can be repeated, with the same results*" (Yin, 2003, p. 34). Goal of (increased) reliability is to minimize biases and errors in the research. Reliability can be guaranteed by using a case study protocol and developing a case study database. A case study protocol documents all procedures followed by the researcher(s). It provides an overview of the case study project, the field procedures, the case study questions, and a guide for writing the case study report. The case study protocol of this research can be found in appendix F. A case study database consists of the data collected during the case study and the report of the case study written by the researcher(s) (Yin, 2003).

2.5 Expert evaluation

The expert evaluation consists of 2 semi-structured interviews with experts in the field of business transformations and 1 semi-structured interview with an expert in the field of network analysis. Table 2 introduces the experts. In these interviews the method was discussed. Each step and its deliverable were explained. Besides that, results of the case study were presented to the experts to demonstrate the outcomes of the method. The used interview protocol is presented in Appendix K. A semi-structured approach was used to ensure that all interviews covered the same topics, while providing the experts the opportunity to give their opinion on the method.

Name	Function	Experience
Dhr. P. Hofman	Partner at Deloitte Consulting	15 years in the field of business transformations
Dhr. F. Bovee	Director Insurance at Deloitte Consulting	13 years in the field of business transformations
Dhr. R. Aalbers	Assistant Professor Strategy & Innovation at Radboud University Nijmegen	10 years in the field of network analysis

Table 2 Experts with whom the method was evaluated

The results of the expert evaluations were used to grade the correctness, completeness, ease of use and the practical value for the organization of the constructed method. This evaluation approach is based on the research of Helms, Bosua and Ignatio (2009). Results of the expert interviews are discussed in chapter 7.

Chapter 3: Literature review

This chapter introduces the business transformation concept. Additionally, it discusses a collection of currently existing business transformation methods. These are investigated and compared with each other in order to answer the first sub research question: '*Which business transformation methods already exist?*'.

A definition on business transformation

Business transformation can be defined as a structural change of internal and external organizational processes in order to remain competitive (Bosilj-Vuksic, Stemberger, Jaklic & Kovacic, 2002). Similar concepts are Business Process Reengineering, Business Process Redesign, and Business Process Change Management which can all fall under the umbrella term Business Process Improvement (Povey, 1998). Business Process Reengineering can be defined as "*a form of organizational change characterized by strategic transformation of interrelated organizational subsystems producing varied levels of impact*" (Kettinger, Teng & Guha, 1997, p. 56). Business Process Redesign can be defined as "*analysis and design of work flows and processes within and between organizations*" (Davenport & Short, 1990, p. 11). Business Process Change Management can be defined as "*the process of continually renewing an organization's direction, structure, and capabilities to serve the ever-changing needs of external and internal customers*" (Moran & Brightman, 2001, p. 66).

Based on these definitions it can be concluded that the concepts only differ slightly from each other with respect to the focus of the project. For example, reengineering often entails radical changes while redesign has a more evolutionary approach. Or, redesign often only focuses on small sub processes while reengineering covers the whole organization (Mansar & Reijers, 2007).

Drivers behind a business transformation

What is the main reason for an organization to conduct a business transformation method? Sethi and King (1998) identify three different drivers for conducting a business transformation: a competitive environment, recent internal changes, and IT infrastructure. The competitive environment results from the increasing globalization of markets. This trend forces organizations to be more innovative and efficient and to speed up time-to-market and customer response rates (Lobontiu & Big, 2006). Internal changes, for example personnel and budget cuts, force organizations to the transformation of business processes in order to remain competitive or to survive. A strong IT infrastructure can also act as a driver for a business transformation. Technology can replace people and inefficient organizational processes within the organization while saving time and money. Additionally, it can facilitate and ease a business transformation process. Therefore, IT is often perceived as a critical enabler of a business transformation (Grover & Malholtra, 1997).

Kallio, Saarinen, Salo, Tinnilä and Vepsäläinen (1999) conducted a survey amongst 289 organizations in order to identify the most important reasons for conducting a business transformation. They found the following top three drivers: internal inefficiency, changed customer/supplier requirements, and industry changes. Examples of internal inefficiencies are high costs and low quality output. Changed customer/supplier requirements can be for example the

demand for quick payment of invoices or reduced time-to-market demand. Failing to fulfill these requirements will lead to low customer satisfaction or high pace of losing suppliers. Examples of industry changes are changing economic conditions, globalization, new legislation, and new technologic developments.

These business drivers all lead to the same: the need for a change in current business processes. Several organizations took a pioneering role: they identified this need and (completely) changed their way of conducting business (Hammer, 1990). Success stories of these organizations led to a new trend: organizations in all kind of markets were eager to change their business processes. However, the in-house knowledge to conduct a transformation was lacking. Therefore, organizations hired consultancy companies to help. As a result a wide range of business transformation methods was developed by these companies (Kettinger, Teng & Guha, 1997). Several researchers tried to create a framework that generalizes these different methods with the purpose to develop a generic method that is suitable in (almost) every situation or to improve the business process change practice (Grover & Malhotra, 1997; Kettinger, Teng & Guha, 1997). Two of these frameworks are discussed in the next section.

Business transformation frameworks and methods

Most methodologies that can be used for a business transformation are the intellectual property of consultancy companies (Grover & Malhotra, 1997). All methods differ slightly from each other in their execution phase, depending on the orientation of the company. However, Grover and Malhotra (1997) were able to create a generic reengineering model based on these methods. This model consists of six main phases:

1. **Preparation**: The current situation is evaluated, the goals of the reorganization are set, the reengineering team is established, and the scope and change plan are developed.
2. **Process-think**: Customers, processes and performance measures are defined.
3. **Creation**: Current process elements are identified (e.g. organization, systems, information flows), and process changes that are required in order to achieve desired change in performance are defined.
4. **Technical design**: The envisioned changes in processes are documented. Hardware, software, procedures, systems and controls needed to conduct the new processes are described in detail.
5. **Social design**: The social aspects of the new processes are defined. Plans for recruitment, education, training, redeployment, and morale are produced.
6. **Implementation**: The technical and social plans are realized. The reengineered processes are implemented in the organization.

The model of Grover and Malhotra (1997) corresponds to the framework developed by Kettinger, Teng and Guha (1997). This framework is based on the comparison of 25 business transformation methods and also consists of six main phases:

1. **Envision**: A business process is identified that should be changed in order to improve organizational performance.

2. **Initiate**: A reengineering project team is assigned, performance goals are set, a project planning is made and stakeholders and employees are notified.
3. **Diagnose**: The current process and its sub-processes are documented in terms of process attributes (e.g. activities, resources, communication, IT).
4. **Redesign**: A new process design is developed. This design meets strategic objectives. A prototype of the new process is conducted and the process is documented. The design of new information systems that support the new process is completed.
5. **Reconstruct**: Change management is conducted to migrate successfully to the new situation. The new IT systems are implemented and employees receive training.
6. **Evaluate**: The new process is evaluated in order to identify whether the goals defined in the second phase are met.

Both frameworks are compared to each other in Figure 4 on the next page. The arrows connect corresponding activities.

The discussed frameworks are based on methods that were mainly developed for labor- or capital-intensive organizations. However, in more recent years, researchers started to incorporate knowledge in business transformation methods in order to increase the performance of business processes (Seeley, 2002). Several approaches have been developed, e.g. research was conducted to identify the relation between knowledge flows and processes (Kim, Hwang & Suh, 2003), the integration of Business Process Management and Knowledge Management, and the integration of business processes and Knowledge Management (Remus & Schub, 2003). However, these approaches are not systematic or are not used on a broad scale in order to generalize their usage for a wide range of business processes (Dalmaris, Tsui, Hall & Smith, 2007). For this reason Dalmaris, Tsui, Hall and Smith (2007) provide a framework for the improvement of knowledge-intensive business processes. This framework focuses on business processes that are knowledge-intensive.

Although this framework takes a knowledge perspective, it still has its limitations. First of all, knowledge sharing is only briefly described: knowledge sharing is not visually presented and does not play a pivotal role. This is odd, because research showed that the (health of the) knowledge network directly influences business performance. Therefore, it would be logical to incorporate this in the framework (Dalmaris, Tsui, Hall & Smith, 2007; Tsai, 2001). Secondly, the method was only tested to detect potential improvements areas and to guide the development of recommendations for improvement in those areas. How it can be used to facilitate the actual transformation is not discussed. Despite these limitations, several aspects of the framework can be taken into account when the new method is developed. The method has an approach which can be used in the to-be built method: gain insight into the current and desired situation (audit), analyze the knowledge domains and knowledge sharing within the organization (analyze), and provide recommendations for the desired situation based on the analysis (design).

Activity	Sub activity
Preparation	Develop executive consensus
	Create mandate for change
	Establish reengineering team
	Establish game plan for the conduct of reengineering
Process-think	Building and understanding a customer-based process model of the business
	Identify and evaluate processes that contribute to the core competencies
Creation	Identify current process elements
	Identify a new process 'vision' (what changes are required in order to achieve the desired changes in performance
	Benchmark best practices
Technical design	Document the redesigned processes
	Provide description of hardware, software, procedures, systems and controls
Social design	Produce plans for recruitment, education, training, redeployment and morale
	Develop career paths and incentives
Implementation	Produce pilot version of the reengineered process
	Realize technical and social plans

Framework of Grover and Malhotra (1997)

Activity	Sub activity
Envision	Establish management commitment & vision
	Discover reengineering opportunities
	Identify IT levers
	Select Process
Initiate	Inform stakeholders
	Organize reengineering teams
	Conduct project planning
	Determine external process customer requirements
	Set performance goals
Diagnose	Document existing process
	Analyze existing process
Redesign	Define and analyze new process concepts
	Prototype and detailed design of a new process
	Design human resource structure
	Analyze and design IS
Reconstruct	Reorganize
	Implement IS
	Train users
	Process cut-over
Evaluate	Evaluate process performance
	Link to continuous improvement programs

Framework of Kettinger, Teng and Guha (1997)

Figure 4 Comparison of the two frameworks

The need for a knowledge-focused approach

The previous section described the lack of a business transformation method for knowledge-intensive organizations. But why is such an approach required? To understand this, the importance of knowledge within an organization is investigated.

In knowledge-intensive organizations, knowledge is the most important asset required to reach organizational goals (Grant, 1996; Zack, McKeen & Singh, 2009). Drucker (1998) defines the role of knowledge as "*the key economic resource and the dominant – and perhaps even the only – source of competitive advantage*". In order to become and remain successful, it is important that organizations pay sufficient attention to knowledge that employees possess, i.e. they should assure that this knowledge is up-to-date, correct and of the required level of quality.

If a knowledge-intensive organization wants to be successful and competitive it has to ensure that the required knowledge is at the right place. This can be achieved by implementing knowledge management within the organization. Knowledge management is "*the deliberate and systematic coordination of an organization's people, technology, processes, and organizational structure in order to add value through reuse and innovation. This coordination is achieved through creating, sharing and applying knowledge as well as through feeding the valuable lessons learned and best practices into corporate memory in order to foster continues organizational learning*" (Dalkir, 2005, p. 3). Goals of knowledge management can be, for example, the prevention of knowledge drain, the promotion of knowledge reuse, and one of the most important goals: (the support of) knowledge sharing. Sharing the right knowledge with the right people will improve organizational performance (Van der Spek, Hofer-Alfeis & Kingma, 2002). However, how knowledge management should be conducted is beyond the scope of this research. Numerous frameworks exist which can help organizations to successfully conduct knowledge management (Heisig, 2009).

One important lesson that can be learnt from Knowledge Management is that in order to ensure that the business transformation will be successful, sufficient attention should be paid to getting the right knowledge on the right place in the new organization. Thus, this should be a focus area in a business transformation method.

Limitations of currently existing methods

The description of currently existing frameworks/methods reveals the limitations for their applicability in knowledge-intensive organizations. First of all, the methods pay little or no attention to knowledge domains and knowledge networks in the organization. However, in the current era knowledge is one of the most important assets in service companies, as described in previous section (Grant, 1996; Zack, McKeen & Singh, 2009). The majority of the methods designed in the past twenty-five years are based on accounting, economic or engineering principles. Although these methods achieved success in, for example, manufacturing and construction companies, they showed to be less applicable in organizations with business processes that heavily rely on knowledge (Dalmaris, Tsui, Hall & Smith, 2007). The methods that underpin the importance of knowledge in the transformation process pay too little attention to knowledge networks and the effects of the transformation on these networks.

Secondly, the old situation in the organization is often neglected. A business transformation can have an evolutionary or revolutionary approach (Jarvenpaa & Stoddard, 1998). Evolutionary change is incremental: change in the organization is implemented in (small) steps. Revolutionary change is implemented rapidly and fundamentally changes the way an organization conducts its business. In case of an evolutionary approach, the transformation is a gradual process which can take a long period of time, up to a several years. Therefore, it is important to ensure that the old organization remains operational during this period. However, the majority of currently existing methods focuses on the goals of the new organization and does not pay attention to the old situation (Grover & Malhotra, 1997; Kettinger, Teng & Guha, 1997). In case of an evolutionary approach, the new method will also take the old organization into account. Knowledge networks provide valuable insights into the effects of reassignment of personnel. For instance, key employees on whom the old organization depends should not (directly) be reassigned to the new situation. These employees can be identified by analyzing the knowledge networks. In case of a revolutionary approach, the old situation can be neglected, so this analysis is not required.

Thirdly, the majority of currently existing business transformation methods are oriented towards specialists (Valirys & Glykas, 1999). Therefore, management of an organization is often not able to conduct the transformation and an external party has to be hired to help out. Valirys and Glykas also point out that most existing methodologies fail to recognize the importance of a diagnostic phase at the beginning of the transformation process. In this phase the scope and objectives of the transformation should be identified in order to prevent an unsuccessful transformation.

Conclusion

This section compared a collection of existing business transformation methods and tries to answer the first sub research question: "*Which business transformation methods already exist?*". Two frameworks, which are based on a collection of methods and techniques, are discussed to cover a wide range of different methods. This comparison showed that currently existing methods pay little or no attention to knowledge present in the organization and the transfer of this knowledge to the new organization. Also, the old organization is often neglected while it should remain operational in case of an evolutionary transformation. See Table 3 for the most important findings.

	Grover & Malhotra (1997)	Kettinger, Teng & Guha (1997)
Based on α methods	Exact number unknown	α = 25
Activities	6	6
Number of sub steps	15	21
Focus on knowledge	No	No
Old organization neglected	Yes	Yes
Feasible to conduct without experts	No (expertise required for certain activities)	No (expertise required for certain activities)

Table 3 Comparison of the two frameworks

Chapter 4: Method design

As discussed in the previous chapter, in knowledge-intensive organizations knowledge is the most important asset to reach organizational goals (Grant, 1996; Zack, McKeen & Singh, 2009). Consequently, in order to make a business transformation successful it is important to transfer the required knowledge to the to-be built organization in order to reach its goals. However, it is hard to determine what the required knowledge is, who possesses this knowledge, and how it is shared within the organization. Especially considering the large amount of knowledge areas present in an organization (Zack, 1999). This method incorporates several techniques described in scientific literature to overcome these challenges.

The method design is based on the approach of Dalmaris, Tsui, Hall and Smith (2007) who provide a framework for the improvement of knowledge-intensive business processes. The following aspects of their framework provide a basis for the to-be developed method:

- **Audit**: Gain insight into the current and desired situation. Since this method focuses on knowledge, this entails identifying the knowledge areas that are present in the current organization and identifying those which are required in the new organization.
- **Analyze**: Investigate knowledge areas and knowledge sharing within the organization. Identify who possess what knowledge areas and map how this knowledge is shared with colleagues.
- **Design**: Provide recommendations for the desired situation based on the audit and analysis. This consists of transferring the required knowledge to the new organization and ensuring that the old organization remains operational.

Additionally, based on scientific literature and the current situation in the case company the following design criteria are determined:

- The organization should be able to conduct the method without the help of experts or consultants. The majority of currently existing business transformation methods are oriented towards specialists (Valirys & Glykas, 1999). An (expensive) external party has to be hired to help out. Enabling management to conduct the method itself saves costs.
- The method should ensure that the old organization remains operational during the transformation (in case of an evolutionary approach). The majority of currently existing does not pay attention to the old situation (Grover & Malhotra, 1997; Kettinger, Teng & Guha, 1997). However, if the transformation takes a longer period of time, the organization should remain operational in order to maintain revenues.
- The method should incorporate an activity in which the purpose and scope of the transformation are defined. Valirys and Glykas (1999) point out that most existing methodologies fail to recognize the importance of a diagnostic phase at the beginning of the transformation process. This may result in an unsuccessful transformation.
- The method is suitable to identify knowledge areas within the organization. Existing methods pay little or no attention to knowledge areas and knowledge networks in the organization. However, in the current era knowledge is one of the most important assets in

service companies (Grant, 1996; Zack, McKeen & Singh, 2009). Therefore, more attention should be paid to the knowledge dimension. This also provides input to the following 4 design criteria.

- The method is suitable to identify knowledge areas that are required to reach organizational goals.
- The method is suitable to provide insight in the knowledge possession and knowledge sharing within the organization.
- The method is suitable to transfer the required knowledge to the new organization by reassigning employees.
- The method is suitable to provide recommendations on the reassignment of employees in order to make the transformation a successful one.
- The method should incorporate an evaluation activity to determine whether the business transformation was successful. This criterion is based on existing methods that incorporate an evaluation activity (Kettinger, Teng & Guha, 1997).

This chapter consists of three sections. The first section will describe different approaches to identify knowledge areas that are required in the new organization. This will be done by translating organizational goals into knowledge areas. The second section will describe different techniques to identify knowledge areas and knowledge networks within an organization, i.e. possession and sharing. The third section describes how knowledge should be transferred whereby the old organization remains operational.

The applied research approach is the same as used in the literature study of chapter 3, which is described in section 2.3.

4.1 Organizational goals translation

In order to ensure that the right knowledge is transferred it should be determined what the required knowledge is. This can be done by translating organizational goals into knowledge areas that contribute to organizational success, i.e. are required to reach those goals (Helms & Buijsrogge, 2006). This section describes two different techniques to do so. Additionally, each technique is assessed to decide whether it is suitable as first step of the business transformation method. First of all, the Knowledge Strategy Process is described. The Knowledge Strategy Process is developed with the purpose of aligning knowledge management to business strategies in order to improve business's success (Van der Spek, Hofer-Alfeis & Kingma, 2002). Secondly, the KP^3 method is described. The KP^3 method is developed in order to assess to what extent each entity of knowledge contributes to business performance (Ahn & Chang, 2004).

The Knowledge Strategy Process

Van der Spek, Hofer-Alfeis and Kingma developed the Knowledge Strategy Process (KSP) in 2002. Main purpose of the process was to align knowledge management and business strategies in order to improve business's success. Conducting the process successfully will lead to Knowledge Management initiatives that are aligned with company strategies and relevant business drivers. The KSP consists of six steps which result in a knowledge management action plan.

The different steps are briefly discussed here (Van der Spek, Hofer-Alfeis & Kingma, 2002):

1. **Specify the business case**. A clear description of the characteristics of the business case, its boundaries, and its environment will be made. Data needs to be collected on:
   - Business strategy and perceived challenges to the business
   - Strategic priorities for the next planning period
   - Stakeholders involved in the process
   - Relationships with other parties in the value chain or parts of the company
   - Important trends and developments in the environment
   - Core work processes related to the selected perspective
   - Structure of the workplace (teams, roles, projects)
   - Key people involved in the business case

2. **Identify knowledge areas which are relevant within the context of the case**. Different techniques can be used to identify and cluster knowledge areas (e.g. mind-mapping, thinking-aloud, protocols, and cluster-techniques). Originally, these techniques are developed to provide support for building expert systems. However, they have proven to be useful for knowledge area identification as well.

3. **Identify most important Key Performance Indicators in the context of the business case**. The relevant Key Performance Indicators (KPIs) are identified. To leverage the overall excellence of operations it is advised to focus on a broad range of KPIs (i.e. not only financial KPIs should be selected). When relevant KPIs are identified the current performance on those indicators should be measured. For example, when customer satisfaction index is identified as a relevant KPI, the organization should assign a grade to it.

4. **Analyze the knowledge areas in terms of current impact and future impact on the KPIs**. In this step the relationship between performances and knowledge areas is identified. This is done by assessing the impact of knowledge areas on the current and future value of KPIs. Two questions are central in this assessment: 1. What is the current impact of this knowledge area on the performance of the selected KPI? 2. What is the expected impact of this knowledge area in the future? Before answering this questions consensus should be reached on the meaning of the 'future', e.g. one, two, or three years. The assessment leads to a knowledge portfolio in which different knowledge areas are relatively scored. For example, a five-point Likert scale can be used whereby 1 means no impact and 5 means a (very) high impact. This results in a ranked overview of knowledge areas that contribute to the success of the business case.

5. **Knowledge areas are assessed in terms of proficiency, codification and diffusion.** In order to rank the fitness of knowledge areas they are assessed in terms of three dimensions:
   - Level of proficiency: can the knowledge be applied by the employees within the organization?
   - Level of diffusion to internal and external parties: is the knowledge spread across different departments of the organization?
   - Level of codification: can the implicit knowledge be made explicit?

   The knowledge areas receive a score ranging from one to four on every dimension for the current and the required situation.

6. **Knowledge Management action plan**. A gap analysis is performed on the scores of the current and future situation. Based on this analysis actions can be planned that support the development of the knowledge areas, which will result in successfully achieving the business case.

The creators of KSP evaluated the process in two case studies. These studies showed that it is a tool that can successfully be applied by organizations in order to plan their knowledge management activities (Hofer-Alfeis, 2003; Van der Spek, Hofer-Alfeis & Kingma, 2002). It provides a clear overview of the knowledge areas that have an impact on organizational goals and how big this impact is. Besides that, it assesses the proficiency, codification, and diffusion of each knowledge area and provides an action plan for management to resolve possible deficits in these knowledge areas. Helms and Buijsrogge (2006) successfully applied the KSP in order to identify the knowledge areas that have the highest contribution to business goals.

The KP^3 method

The KP^3 method is an approach used to assess to what extent each entity of knowledge contributes to business performance (Ahn & Chang, 2004). The method can be used to assess the productivity of knowledge entities, to gain information for evaluating and compensating knowledge workers, and for the development of human capital. The KP^3 method is a two-step approach consisting of four main components. The first step is identifying the contribution of product knowledge on developing products and the contribution of process knowledge on conducting processes. The second step is identifying the contribution of products and processes on the financial and organizational performance. The method consists of four components which are discussed here.

Knowledge. In the KP^3 method, knowledge can be classified into two categories: product, and process knowledge. Product knowledge is the knowledge directly related to the products of the organization. Process knowledge is the knowledge directly related to the activities that are performed in each stage of the value chain of the company. Product and process knowledge can be classified as tacit or explicit knowledge. Tacit knowledge is hard to formalize or communicate. It is "*deeply rooted in action, commitment, and involvement in a specific context*" (Nonaka, 1994, p. 16). Explicit or codified knowledge is knowledge that can be expressed and transferred in words and numbers.

Product. Products are the output of the activities of the organization. These activities are linked in a value chain (Porter & Millar, 1985). In case the organization is a service company Product can be replaced by Service.

Process. The process consists of linked activities that deliver the product or service. Each activity adds value for the customer. The value chain is used to analyze the contribution of each activity to the business performance (Porter & Millar, 1985).

Performance. Performance is the measurement of how the product or service performs in the market. This can be measured in two dimensions: financial and organizational performance. Monetary metrics, such as revenue and profit, are used to measure financial performance. Nonmonetary metrics, such as job satisfaction, are used to measure organizational performance.

There are four linkage matrices to combine the four components. These matrices represent the relationships between knowledge and business performance, via Product and Process (Ahn & Chang, 2004). Each linkage matrix is briefly discussed here.

Knowledge-Product matrix. This matrix links product knowledge to products. It shows which product knowledge is needed to create the product. Product knowledge is measured for each employee on an 11-point scale. The knowledge stock of the organization can be calculated by adding the individual knowledge stock of each employee, resulting in a number which represents the knowledge stock of the whole organization.

Product-Performance matrix. This matrix links the product to the financial performance. It measures the financial performance of an organization that is achieved by knowledge activities. Output of the matrix is a value that represents the knowledge productivity of the organization in terms of financial performance.

Knowledge-Process matrix. This matrix links process knowledge to processes. It shows which process knowledge is needed to execute the processes. The process knowledge can be measured for each employee in the same way as it is done in the Knowledge-Product matrix.

Process-Performance matrix. This matrix links processes to organizational performance. It shows how processes within the organization contribute to the organizational performance. This can be done separately for each process, for a department within the organization, or for the whole organization.

The components and linkage matrices can be used by an organization to assess the contribution of product and process knowledge to financial and organizational performance. The KP^3 method is presented in Figure 5.
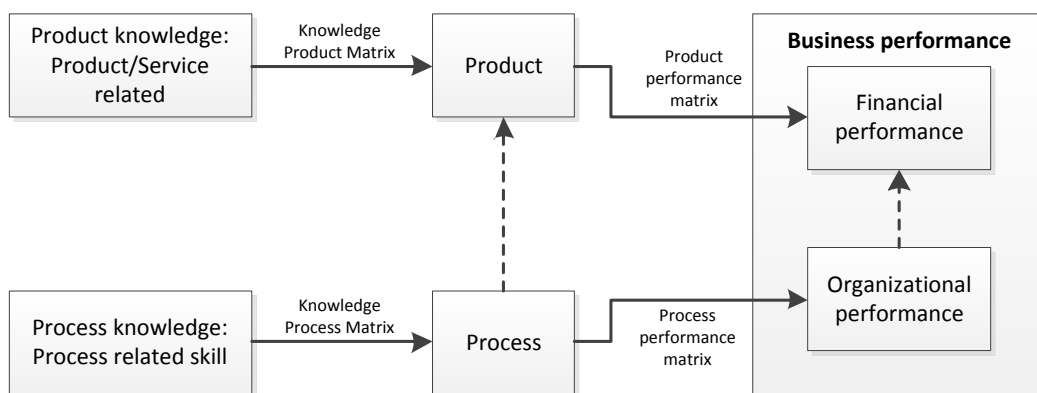
Figure 5 The KP^3 Method (based on Ahn and Chang, 2004)

Conclusion

Organizational goals can be translated into required knowledge (domains) using two different approaches: the Knowledge Strategy Process and the KP^3 method. The KSP can easily be adjusted to make it suitable as the first step of the new method. The first four steps of the KSP can be used unchanged to identify the knowledge areas that play a pivotal role in the situation after the

business transformation. If desired, the last two steps can be used to assess the identified knowledge areas. However, this is beyond the scope of the new method. The KP³ method does not directly translate the business goals into required knowledge but assesses which knowledge contributes to the business performance of the current organization. Additionally, the KP³ does not describe how knowledge areas should be identified within the organization. Therefore, KP³ is not directly usable as first step. The method could be reversed so it can identify which knowledge areas are needed to enhance business performance of the new organization and the focus shifts from assessing the current situation to the desired situation. Besides that, the developers of the KP³ method indicate that there are still several theoretical and practical issues for the real-world application of the method (Ahn & Chang, 2004). Therefore, the KSP approach will be used in the to-be developed method.

4.2 Mapping knowledge possession and knowledge sharing

In this section the knowledge audit method is discussed. Knowledge possession and knowledge sharing can be mapped by conducting a knowledge audit. Three different techniques to conduct the knowledge audit are discussed: interviews, the Knowledge Network Analysis, and the data mining of IS/IT. This section will answer the following sub question: '*How can the required knowledge and knowledge sharing within an organization be mapped?'*.

Knowledge audit

Knowledge audit is based on information auditing and is used to determine what knowledge an organization possesses, what the source of the knowledge is, where the knowledge is stored, and how knowledge is used. Information auditing has a focus on codified/explicit knowledge while knowledge auditing tries to identify, evaluate and manage implicit knowledge as well (Buchanan & Gibb, 1998). Jashapara (2004) defines a knowledge audit as an assessment that "*incorporates all the effective processes associated with the exploration (such as identify, evaluate, manage) of human knowledge (tacit and explicit) within a business unit or an organization*". A knowledge audit is often conducted before implementing a knowledge management initiative in order to make an inventory of knowledge and to identify a possible knowledge gap between the current situation and the desired situation (Levantakis, Helms & Spruit 2008).

There exist numerous methods for conducting a knowledge audit. Levantakis, Helms and Spruit (2008) investigated and compared thirteen knowledge audit methods. Based on this comparison they created a reference method for knowledge auditing. This reference method is also called a super method which can be defined as the smallest common denominator of all activities covering all of the existing methods (Hong, van den Goor & Brinkkemper, 1993). This means that the super method is more complete than each of the individual methods. Main purpose of the super method is to identify knowledge bottlenecks in the organization. The super method was used at a consultancy company. The execution took approximately two months (Levantakis, Helms & Spruit, 2008). Although this two-month period also consisted of activities to evaluate the method, an organization should keep in mind that conducting a knowledge audit can be a time-consuming process.

Interviews

The research of Levantakis, Helms and Spruit (2008) showed that most knowledge audit methods heavily rely on interviews to map knowledge sharing within organizations. The downside of using interviews is that this technique does not provide much structure to analyze knowledge sharing in a consistent way (Helms, Bosua & Ignatio, 2009). This may result in a biased or incomplete knowledge network. Because identifying knowledge networks plays a pivotal role in the to-be developed method this should be done thoroughly and in a consistent way. Therefore, knowledge audit methods that use interviews as data gathering technique are not suitable to use as second step in the method. There are also knowledge audit methods that make use of a social or knowledge network analysis (Choy, Lee & Cheung, 2004). This technique is discussed in the next section.

Knowledge Network Analysis

Knowledge Network Analysis is used to take a snapshot of a community of practice (Helms, 2007). Communities of practice are "*groups of people informally bound together by shared expertise and passion for a joint enterprise*" (Wenger & Snyder, 2000, p. 139). In other words, they are informal groups of people that share knowledge in a particular area or domain. Knowledge networks map the lateral sharing of knowledge between members of the network. The analysis of the network can consist of identifying knowledge management roles, expertise levels, knowledge flow viscosity (the richness of the knowledge exchange), and knowledge flow velocity (the speed of the knowledge exchange) within an organization. Originally, this analysis is used to identify knowledge management bottlenecks in the knowledge network (Helms, 2007) but research showed that Knowledge Network Analysis is also a useful technique to visualize and analyze knowledge sharing within an organization (Ignacio, Helms, Brinkkemper & Zonneveld, 2009).

The Knowledge Network Analysis is based on Social Network Analysis (SNA). SNA can be used for the analysis of structural patterns of social relationships in networks (Scott, 2000). SNA can be defined as the mapping and measuring of relationships and flows between people, groups, organizations, or other entities (Hanneman & Riddle, 2005; Liebowitz, 2005). Each social network consists of two types of data: the nodes/actors in the network and the relations/edges between the nodes. The actors are the people of interest that are investigated by means of the network analysis. The edges represent the interactions between the persons (Wasserman & Faust, 1994).

Hanneman and Riddle (2005) describe three different strategies for conducting a network analysis:

- **Full network method**: the relations that each actor has with other actors are investigated.
- **Snowball method**: the research starts with investigating a set of actors. These actors indicate with whom they interact. Then, the indicated actors are asked the same question. This process repeats until no new actors are identified or when the resources limit is reached.
- **Ego centric method**: an actor is asked to identify the persons with whom he or she has a connection. Additionally, this actor describes what the relations are between the persons he or she identified.

KNA is successfully used in several companies to identify knowledge management bottlenecks in knowledge networks (Helms, 2008; Helms & Buijsrogge, 2006; Ignacio, Helms, Brinkkemper &

Zonneveld, 2009). KNA also helps to visualize and understand a knowledge network and eases decision making (Cross, Parker & Borgatti, 2002). However, the KNA also has a limitation: research showed that the technique focuses on the symptoms of knowledge sharing bottlenecks rather than on the underlying causes (Ignacio, Helms, Brinkkemper & Zonneveld, 2009).

Besides the identification of knowledge sharing bottlenecks, KNA can also be used for other purposes (Helms, 2007; Kwon, Oh & Jeon, 2007):

- Knowledge identification
- Leader identification
- Communities of practice identification
- Analyze consequences of retirement, outsourcing, downsizing, business transformation, and mergers and acquisitions.

Kwon, Oh and Jeon (2007) investigated the effects of downsizing an organization on its networks. When an organization is downsized, i.e. employees have to leave the organization, the networks have to restructure. The connections of the leaving employees must be rerouted to the employees that remain within the organization. They created a fictitious network of 200 nodes and simulated a downsizing in order to analyze the change in stability and efficiency of the network. The results of this analysis can be used to make decisions on the reassignment of employees in case of an evolutionary transformation, i.e. when the old organization has to remain operational.

Data mining of IS/IT

A third way to conduct a knowledge audit in order to gain insight into the knowledge domains and knowledge networks is by investigating IS/IT. This can be done with a data mining approach. Nowadays, numerous knowledge-intensive organizations make use of Information Systems, e.g. intranet, a knowledge base, or enterprise social media, to store and share knowledge amongst coworkers (Brzozowski, 2009; Cook, 2008; DiMicco et al., 2008). The data stored in and the usage of these systems can be mined to gain insight into the different knowledge areas and knowledge sharing within an organization. Data mining can be defined as "*a process of searching and analyzing data in order to find implicit, but potentially useful, information. It involves selecting, exploring and modeling large amounts of data to uncover previously unknown patterns, and ultimately comprehensible information, from large databases*" (Shaw, Subramaniam, Woo Tan & Welge, 2001, p. 128).

Several researchers used the data mining technique for the purpose of knowledge domain and knowledge sharing mapping. For instance, Reijsen, Helms, Jackson, Vleugel, and Sara (2009) used email data as a source for collecting network data. Reijsen et al. (2009) compared several tools that can be used to mine email header and body data and selected two suitable ones. The first tool focuses on the creation of a network based on the header data of emails. The information in the header of an email provides information on the nodes in the network and the interactions between these nodes, i.e. the sender and receiver of an email. The second one focuses on revealing knowledge areas based on the content of an email. The data gathered with both tools can be used to create a knowledge network. Research showed that the separate tools can be used for the creation

of a knowledge network (Reijsen & Helms, 2009). However, the combination of the two tools is not yet evaluated in a real-life setting.

Research showed that knowledge network data gathered with emails can be a substitute to a (time-consuming) survey (Reijsen & Helms, 2009). However, the mining of emails also has its downsides. First of all, emails are domain independent, on multiple topics, and not always syntactically well-formed (Muresan, Tzoukermann & Klavans, 2001). This can lead to an incorrect representation of knowledge areas and knowledge sharing within the organization. Or as Reijsen et al. (2009) state: "*there is no 100% certainty that the uncovered network is in fact a knowledge network compromising of knowledge transfer*" (p. 871). Secondly, the data mining of emails can be seen by employees as a privacy infringement and they can refuse to cooperate. Thirdly, it does not cover other interactions between employees, e.g. by telephone or face to face. Knowledge that is shared, for instance at the coffee machine, is not uncovered.

Conclusion
This section answers the following sub research question: '*How can the required knowledge areas and knowledge sharing within an organization be mapped?'*. This can be done by conducting a knowledge audit.

Three different techniques are discussed which can be used to conduct a knowledge audit: interviews, the Knowledge Network Analysis (KNA) and data mining IS/IT.

It can be concluded that the KNA technique is most suitable for the new method, due to its flexibility. By adjusting the initial survey, knowledge areas and knowledge sharing within the organization can be mapped. Several network analysis measurements can be used to identify the suitable employees for the new organization.

A knowledge audit that uses interviews as data gathering technique can also be used to map knowledge and knowledge sharing within an organization and can therefore be part of the method: it provides an elaborate overview of the knowledge areas present in the organization. However, most knowledge audit methods that use interviews are time-consuming. When the method has to be used in a large organization with numerous employees and a wide range of knowledge areas conducting interviews are too time-consuming, and therefore not suitable.

Finally, based on the discussed research, it can be concluded that a data mining technique best can be used to gather *additional* information on knowledge domains and knowledge sharing instead of using it as a stand-alone approach. By only using the data mining approach there is a substantial chance of overlooking relevant information and interactions, resulting in an incomplete overview of knowledge areas and networks.

The most important findings are summarized in Table 4. The plus and minus are used to rate the data gathering technique with respect to the other techniques. A '+' is used to indicate that the technique scores positive on the criterion and a '-' is used to indicate that the technique scores negative. Flexibility concerns the degree to which a technique can be adapted to a particular situation. Speeds concerns the time required to gather the data. Completeness indicates whether the usage of the technique results in a complete overview of the knowledge within the organization.

Efficiency indicates whether the collected data can be analyzed directly or that additional processing activities have to be conducted (e.g. digitizing data collected on paper). Dependency shows to which degree a technique is dependent on employees to gather data, e.g. the employee has to fill out a form (a '+' represents that there is no dependency, a '-' represents that there is a dependency). Stand-alone indicates whether a technique can be used as the only data gathering technique (+) or another technique should be conducted as well (-) to gain insight in knowledge possession and sharing. Error prone indicates whether it is likely that the data gathering technique delivers erroneous data (-) or not (+).

Criteria	Interviews	KNA	Data mining IS/IT
Flexibility	+	+	-
Speed	-	+	+
Completeness	+	+	-
Efficiency	-	+	+
Dependency	-	-	+
Stand-alone	+	+	-
Error prone	+	-	-

Table 4 Comparison of the techniques to conduct a knowledge audit

4.3 Knowledge transfer

Once the required knowledge areas are identified and the possession and sharing of these knowledge areas is mapped, the knowledge can be transferred to the new organization. This will be done by reassigning employees that possess the required knowledge areas to the new organization.

The techniques discussed in the preceding two sections are used to create a list of employees that are to be reassigned. However, in an evolutionary transformation it is important that the old organization remains operational even after employees leave. Reassigning employees that play an important role in the old organization can lead to knowledge loss and disconnectedness of the network (Helms, 2007), which can ultimately lead to organizational failure.

Prevent knowledge loss and network disconnectedness

Several network analysis measurements can be used to identify the employees whose reassignment will lead to knowledge loss or network disconnectedness. These measurements are summarized in Table 5 and discussed in detail thereafter.

Measurement	Description	Reference
Cutpoint identification	Cut points are actors in the network that, once removed, lead to disconnected (sub) communities in the network.	(Hanneman & Riddle, 2005)
Power	Power measures the influence of an actor on others. This influence depends on the connections of the actors one is connected to: if actor x is connected to actor y that is not well connected, actor y is dependent on actor x in receiving knowledge. However, if actor y is well connected, it is not only dependent on actor x, therefore the power of actor x is lower.	(Bonacich, 1987)
Betweenness centrality	Betweenness centrality indicates the extent to which a node lies between all other pair of nodes on their paths.	(Freeman, 1979)

Knowledge exclusivity	Measures whether an employee possess a knowledge area that no other actor has.	(Carley & Reminga, 2004)

Table 5 Measurements to identify knowledge loss and/or network disconnectedness

Cutpoint identification. A cutpoint can be defined as an actor whose deletion from the knowledge network will lead to unconnected parts in this network. The parts that result from deletion are called bi-components (Hanneman & Riddle, 2005). Employees identified as cutpoints should not be reassigned in the first phase of the transformation, as their reassignment possibly will lead to disconnectedness of the network, knowledge loss and ultimately to failure in the old organization. An employee is either defined as a cutpoint or not.

Power. Bonacich (1987) argued that the influence of an employee on its colleagues depends on the connections of these colleagues. An actor that is connected to others that are not well-connected is perceived as powerful: these other actors are dependent on that particular actor to meet their knowledge demand. Well-connected actors have alternatives to do so. Or as Bonacich (1987) states it: "*power comes from being connected to those who are powerless*" (p. 1171). Thus, the power measurement reveals the actors on which other actors depend. Removing actors with high power will result in knowledge loss and disconnectedness of the network. Here, the interquartile range is used to identify the employees with the highest power. The most influential employees are called outliers: their power lies outside the normal expected range. Outliers are identified by adding (1.5 * interquartile range) to the median. The interquartile range was used as a threshold in recent studies (Eagle, Pentland & Lazer, 2009; Kwak, Lee, Park & Moon, 2010; Safran, Neuman, McGraw & Lovette, 2005).

Betweenness centrality. Where power focuses on the network of a specific knowledge area, betweenness focuses on the entire knowledge network. No distinction is made regarding the subject of the interaction between the actors. Betweenness centrality indicates the extent to which an actor lies between all other pair of actors on their paths. The more times an actor appears on paths, the higher its centrality. A high betweenness centrality means that an actor plays an important role in the organization regarding knowledge sharing. Removing actors with a high betweenness centrality will result in knowledge loss and (possible) network disconnectedness. The interquartile range is used to identify the employees with the highest betweenness centrality.

Knowledge exclusivity. This measurement is used to indicate those actors that have exclusive access to a particular knowledge area (Carley & Reminga, 2004). If this knowledge area is required for conducting business in the old organization, reassignment may lead to failure in the old organization. Knowledge exclusivity can be measured for the whole network, but also for sub communities. An employee possesses either exclusive knowledge or he or she does not.

Management demands
Management can also restrict the selection of employees who will be reassigned to the new organization. It can indicate its demands on the type of employees in the old and new organization. For example, it can decide whether it wants beginners or experts, isolates or well-connected employees. Table 6 provides measurements that can be used to analyze the network in order to meet management's demands.

Measurement	Description	Reference
Cliques	In cliques, every member of a sub-group has a direct tie with each and every other member. It is the maximum number of actors who have all possible ties present among themselves.	(Hanneman & Riddle, 2005)
N-cliques	In n-cliques, an actor is a member of a sub-group if they are connected to every other member of the group at a distance greater than one.	(Hanneman & Riddle, 2005)
Isolates	Isolates are actors within the network that are not connected to others.	(Hanneman & Riddle, 2005)

Table 6 Measurements to identify employees that meet management's demands

Cliques. A clique is a "*sub-set of a network in which the actors are more closely and intensely tied to one another than they are to other members of the network*" (Hanneman & Riddle, 2005, p. 174). Cliques can be seen as Communities of Practices (Li et al., 2009) which are "*groups of people informally bound together by shared expertise and passion for a joint enterprise*" (Wenger & Snyder, 2000, p. 139). Communities of Practice have several advantages over traditional teams: they solve problems quickly, they transfer best practices and they develop professional skills (Wenger & Snyder, 2000)

In order to ensure that these advantages retain in the new organization, it is best to reassign a clique as a whole. However, the reassignment of a clique may be restricted by the role of one of its members. For example, it could be the case that one member is a cutpoint. There is no minimum size of Communities of Practice. However, in small cliques it is hard to sustain regular interactions and to offer multiple perspectives in order to solve problems (Wenger, McDermott & Snyder, 2002). The discussed advantages still apply, albeit to a lesser degree.

N-cliques. Cliques demand that each actor in the sub-set of the network has a direct tie with every other member of this sub-set. However, this demand may be too strict in several situations (Hanneman & Riddle, 2005). N-cliques allow "*an actor to be a member of a clique even if they do not have ties to all other clique members; just so long as they do have ties to some member, and are no further away than n steps*" (Hanneman & Riddle, 2005, p. 179). N-cliques may have the same advantages as cliques. However, because the mutual connectedness is smaller the advantages are likely to be smaller as well. Future research should investigate the extent to which the advantages apply.

Isolates. Isolates are employees within the organization that are not connected to colleagues in the knowledge network (Hanneman & Riddle, 2005). Being an isolate can have both advantages and disadvantages. An advantage is that isolates can be reassigned without leading to disconnectedness in the knowledge network. A disadvantage can be that the isolate will remain an isolate in the new organization, and will not share his or her knowledge.

Conclusion

This section provides an answer to the fourth sub research question: '*How can the required knowledge be transferred from the old organization to the new one, whereby the old organization remains operational*?'.

Knowledge will be transferred by reassigning employees that possess the required knowledge to the new organization. In case of an evolutionary transformation, this selection of employees is restricted by the role they fulfill in the old organization. Additionally, management can restrict the selection based on its demands on the employees in the new organization. Measurements originating from the literature on network analysis will be used to identify the role an employee plays in the knowledge network and whether he or she meets management's demands.

Chapter 5: Construction of the BTMKIO

This chapter describes the construction of the Business Transformation Method for Knowledge-Intensive Organizations (BTMKIO), which is based on the techniques originating from scientific literature and on the defined design criteria, both discussed in previous chapter. The BTMKIO consists of three main steps:

1. Identification of required knowledge by translating business goals into knowledge areas that are required to achieve these goals.
2. Mapping of the required knowledge and knowledge sharing within the organization.
3. Transfer the required knowledge from the old to the new organization and ensure that the old organization remains operational.

The upcoming three sections will discuss for each step which techniques will be used and which sub activities should be conducted. The last section presents the complete method and the integration of the method with an existing business transformation method. The steps of the BTMKIO are modeled in a Process Deliverable Diagram (PDD). A PDD is a modeling technique developed by van de Weerd and Brinkkemper (2008) which consists of two integrated diagrams: on the left-hand side the activities of a method are shown and on the right-hand side the deliverables resulting of these activities are shown. The person or persons responsible for the execution of an activity are presented on the bottom of an activity. The PDD is accompanied by two tables which describe all activities and their deliverables, respectively. The PDD makes use of different types of relations and concepts. A short description of these elements is provided in Appendix B.

5.1 Step 1: Identification of required knowledge

For the translation of business goals into required knowledge part of the Knowledge Strategy Process (KSP) of Van der Spek, Hofer-Alfeis and Kingma (2002) will be used. Of the six steps, the first four steps will be part of the method. Originally, the fifth and sixth step of the KSP are used to assess the knowledge areas and create a knowledge management action plan. However, that is beyond the scope of this method and will therefore not be incorporated. The PDD of the first step of the method is presented in Figure 6. The activities of this first step are discussed in Table 7 and the deliverables of these steps in Table 8. Main deliverable of the first step is the knowledge portfolio which consists of all the knowledge areas within the organization and highlights those that are required to reach the goals in the new organization.
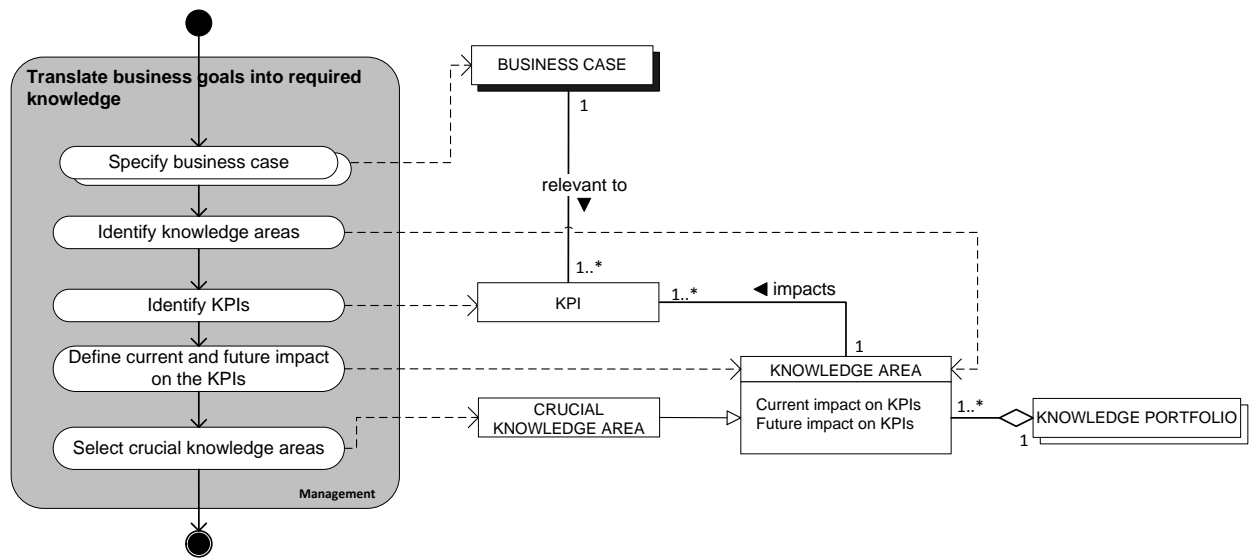
Figure 6 Step 1 of the BTMKIO

Activity	Sub activity	Description
Translate business goals into required knowledge	Specify business case	First of all, the goals of the new organization should be identified in order to determine the purpose of the business transformation. In order to do so a BUSINESS CASE is specified. This is an open complex sub activity: its sub steps are presented in Appendix C.
	Identify knowledge areas	KNOWLEDGE AREAs that are relevant to the BUSINESS CASE are identified. These can be KNOWLEDGE AREAs that are already present in the organization, or new ones. The identification can be done by using several techniques, e.g. mind-mapping, thinking-aloud protocols, or data-mining related documentation. For the translation of the organizational goals a list of 8 to 12 KNOWLEDGE AREAs is perceived as optimal. If the list is too long or too short the related KNOWLEDGE AREAs should be clustered or split up. This step results in a list of relevant KNOWLEDGE AREAs.
	Identify KPIs	The Key Performance Indicators (KPIs) related to the organizational goals are identified. Techniques like the balanced scorecard (Kaplan & Norton, 1992) can be used to identify KPIs that are related to organizational goals. Measuring the current and desired/expected score for the KPIs is not perceived as useful in this context and will therefore not be part of the method.
	Define current and future impact on the KPIs	In this step the current and future impact of KNOWLEDGE AREAs on the KPIs are defined.

33

| | Before this can be done, consensus should be reached on the meaning of future, e.g. two or three years from now. By analyzing this impact the relationship between KNOWLEDGE AREAs and performance becomes clear. Because the current and future impact is analyzed it can be determined whether a knowledge area becomes more important in the future, or not. The result of this step is a KNOWLEDGE PORTFOLIO which visualizes the current and future impact of the knowledge areas on organizational performance. |
| | Select crucial knowledge areas | Based on the KNOWLEDGE PORTFOLIO the CRUCIAL KNOWLEDGE AREAs can be selected. These areas have a future impact of 2.5 or higher. Result of this step is a list of CRUCIAL KNOWLEDGE AREAs. |

Table 7 Activity table Step 1

Deliverable	Description
BUSINESS CASE	The BUSINESS CASE provides information on the goals of the new organization and the goals of the business transformation. It consists the following information (Van der Spek, Hofer-Alfeis & Kingma, 2002): - Scope of the transformation: what will be done during this transformation and what is outside its scope? - Business strategy: what is the strategy of the to-be developed organization? - Strategic priority: what activities should be executed first? - Stakeholders: who are involved in the business transformation? - Core work processes: what are the most important processes involved in the business transformation? - Key people: who are involved in the business case? - Relationships: which relationships are there with other parties (e.g. other departments) that may have influence on the transformation? - Trends: what important developments are there in the (direct) environment that may have impact on the transformation?
KPI	A Key Performance Indicator is a measurement of performance. It can be used by an organization to measure and evaluate the success of its activities (Fitz-Gibbon, 1990).
KNOWLEDGE AREA	A knowledge area or domain is defined by Schreiber et al. (2000) as "*a coherent cluster of insights, experiences, theories, and heuristics*".
KNOWLEDGE PORTFOLIO	A KNOWLEDGE PORTFOLIO visualizes the current and future impact of knowledge areas on KPIs (Van der Spek, Hofer-Alfeis & Kingma, 2002). This portfolio can be used to identify the KNOWLEDGE AREAs that are required to reach the goals of the new

	organization, i.e. CRUCIAL KNOWLEDGE AREAs. A template for the KNOWLEDGE PORTFOLIO is provided in Appendix D.
CRUCIAL KNOWLEDGE AREA	CRUCIAL KNOWLEDGE AREAs are KNOWLEDGE AREAs that have a future impact of 2.5 or higher. They are required to reach the goals of the new organization.

<div align="center">Table 8 Deliverable table Step 1</div>

5.2 Step 2: Mapping of knowledge possession and knowledge sharing

After the crucial knowledge areas are identified in the first step, the employees that possess and share this knowledge should be identified. This will be done based on a knowledge audit with the Knowledge Network Analysis as data-gathering technique (Helms, 2007). This technique is chosen because it is suitable for the mapping of knowledge possession, knowledge sharing and the analysis of knowledge networks. The different activities that are conducted in this second step are visually presented in a PDD in Figure 7. This PDD is accompanied by an activity table (Table 9) and a deliverable table (Table 10). Main deliverable of the second step is a collection of network graphs that map knowledge possession and knowledge sharing within the organization.
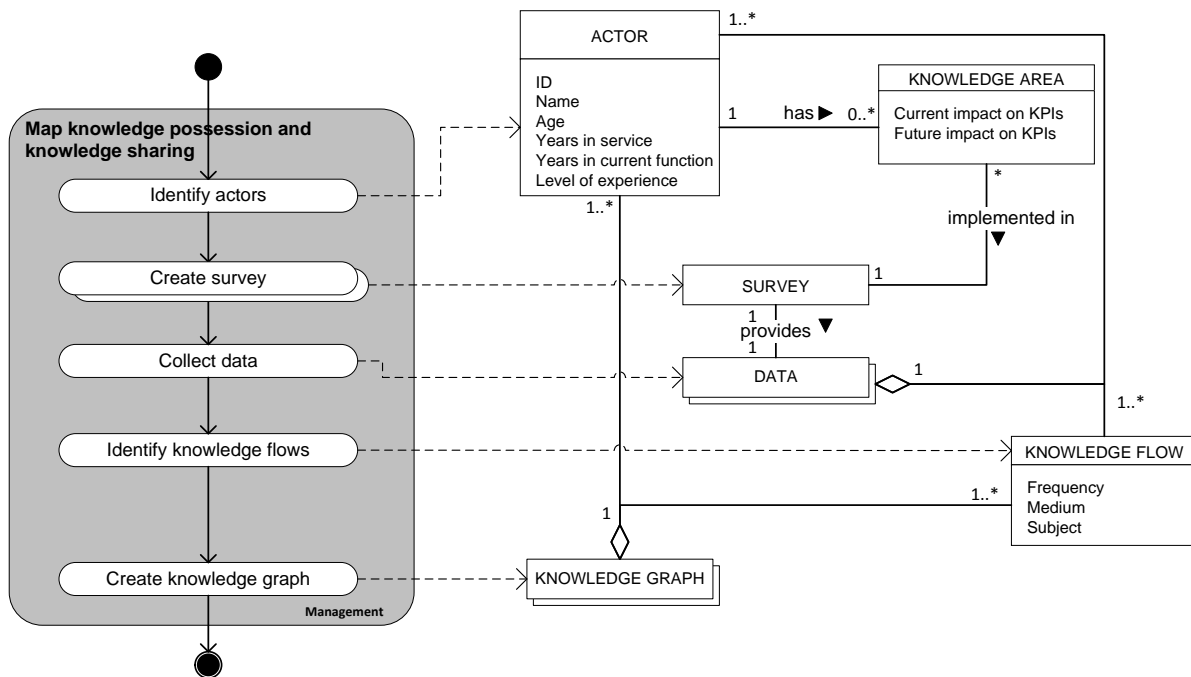
<div align="center">Figure 7 Step 2 of the BTMKIO</div>

Activity	Sub activity	Description
Map knowledge possession and knowledge sharing	Identify actors	The second step starts with identifying the ACTORs that should fill in the survey. ACTORs are the employees of the organization or department that will conduct a business transformation. Besides filling the SURVEY, ACTORs are also part of it: employees have to indicate from which ACTOR they receive knowledge. Therefore they have to be identified before creating the SURVEY. Most logical is that the HRM department will provide this data.

	Create survey	In the subsequent activity the SURVEY is created. This entails implementing the list of KNOWLEDGE AREAs, the lists of ACTORs for knowledge sharing indication and the questions. Conducting a pilot survey to check whether the SURVEY is understandable, correct and complete is highly recommended. The SURVEY can be created with (online) tools like SurveyMonkey[2] or SurveyGizmo[3] or can be handed out on paper. This is a complex open activity. Its sub activities are presented in Appendix C.
	Collect data	After the SURVEY is completed DATA can be collected be sending out the survey to the ACTORs. Because a high response rate is required (>80%, Lesser and Prusak, 2004) it is recommended to gain management support for sending out the survey (Helms, 2007). It is plausible that more employees will fill in the survey when they receive it from their direct supervisor. DATA is collected on personal information of ACTORs (name, age, years in service, which KNOWLEDGE AREAS they possess, and the level of experience for these KNOLWEDGE AREAs), and on knowledge sharing (from whom do ACTORs receive knowledge?). In literature, a technique is described which can be used to complement data based on the already collected data (Huisman, 2000). However, this technique is not applicable here as the complemented data can only be used to make statements on the whole network. In this research, mainly statements on the individual level are made.
	Identify knowledge flows	Based on the DATA collected with the SURVEY KNOWLEDGE FLOWs can be identified. These flows indicate which employee receives knowledge from whom. It provides insight into the frequency, medium and subject of the knowledge transfer.
	Create knowledge graph	After the KNOWLEDGE FLOWs are identified a KNOWLEDGE GRAPH can be created. This graph visually represents the ACTORs and the KNOWLEDGE FLOWs between them. Such a graph can be created with tools like Netminer[4] or Ucinet[5].

Table 9 Activity table Step 2

---

[2] www.surveymonkey.com
[3] www.surveygizmo.com
[4] www.netminer.com
[5] www.analytictech.com/ucinet/

Deliverable	Description
ACTOR	The employees of the organization or department that is subject of the business transformation. They have to fill in the SURVEY and are part of it.
KNOWLEDGE AREA	A knowledge area or domain is defined by Schreiber et al. (2000) as "*a coherent cluster of insights, experiences, theories, and heuristics*".
SURVEY	Collection of questions that map KNOWLEDGE AREAs that employees possess and that map how knowledge is shared within the organization.
DATA	Information on ACTORs, knowledge possession, and how knowledge is shared within the organization. This information is collected with the SURVEY.
KNOWLEDGE FLOW	The transfer of knowledge between ACTORS (Helms & Buijsrogge, 2006).
KNOWLEDGE GRAPH	A snapshot of a knowledge network (Helms, 2007). It visualizes which employee shares what knowledge with whom. Besides that, it provides information on the frequency and medium of this KNOWLEDGE FLOW.

Table 10 Deliverable table Step 2

5.3 Step 3: Transfer of knowledge

Based on the first two steps decisions can be made on the reassignment of personnel. Main deliverable of the third step is a list of suitable employees that can be reassigned. An employee can be categorized as suitable when:

- He or she possesses the knowledge areas required to reach the goals of the new organization, as indicated by the knowledge portfolio.
- He or she fulfills the demands of management regarding characteristics and the role in the knowledge network.
- His or her reassignment will not lead to crucial (or significant) knowledge loss in the old organization or disconnectedness in the knowledge network (only applicable in an evolutionary transformation).

The identification of suitable employees is based on network analysis measurements as discussed in previous chapter. This analysis results in a list of employees who are suitable to reassign to the new organization. From this list a group can be selected that actually will be reassigned. Depending on the demands of management different groups can be defined. Thus, the analysis will not result in one single solution. The different solutions can be summarized in scenarios which describe the characteristics and the advantages and disadvantages of the proposed reassignment. Management should discuss the different scenarios and choose the most suitable one. The employees of the chosen scenario are reassigned to the new organization. After the transformation is completed it should be evaluated in order to determine whether it was successful.

The different activities that are conducted in this third step are visually presented in a PDD in Figure 8. This PDD is accompanied by an activity table (Table 11) and a deliverable table (Table 12).
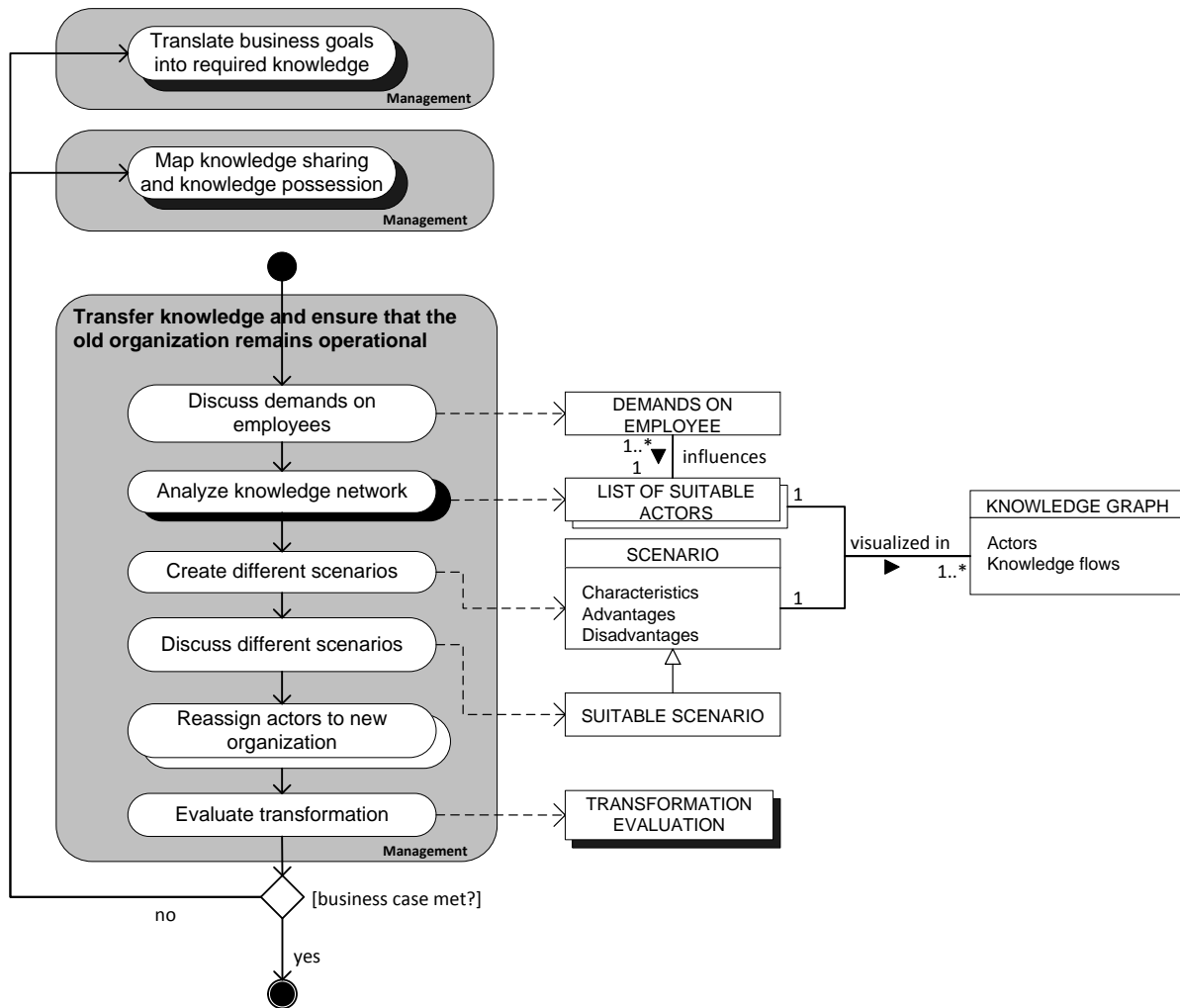
Figure 8 Step 3 of the BTMKIO

Activity	Sub activity	Description
Transfer knowledge	Discuss demands on employees	In a discussion, management should indicate their demands on the type of employees in the old and new organization. These demands form a list of key characteristics which an employee should meet. The key characteristics can be for example age, level of expertise, or position in the knowledge network (isolated or well-connected).
	Analyze knowledge network	The knowledge network is analyzed in order to define a LIST OF SUITABLE ACTORS. Different measurements available in network analysis literature can be used to identify those ACTORs that are suitable, i.e. possess the required knowledge areas, meet management's demands, and whose reassignment will not lead to knowledge loss or disconnectedness of the knowledge network. This is a complex closed activity. Its sub activities consist of

		calculating values for the different measurements in a network analysis tool. How this calculation is performed is beyond the scope of this research and therefore not discussed.
	Create different scenarios	Different SCENARIOs are created in which different SUITABLE ACTORs are reassigned to the new organization. These SCENARIOs are visualized in KNOWLEDGE GRAPHs. The situation in the old and new organization is visualized. For each SCENARIO the characteristic of the network are discussed, and the advantages and disadvantages are provided.
	Discuss different scenarios	The different SCENARIOs created are discussed with management. The characteristics, advantages and disadvantages of each SCENARIO are discussed. Based on this discussion the most SUITABLE SCENARIO is chosen.
	Reassign actors to the new organization	The ACTORs appointed in the most SUITABLE SCENARIO are reassigned to the new organization. This is a complex open activity. Its sub activities are presented in Appendix C. The five sub activities described are guidelines: the exact content of each step is beyond the scope of this research and should be defined by the organization that conducts a business transformation.
	Evaluate transformation	Once the employees are reassigned and are working in the new organization for a considerable amount of time the transformation should be evaluated. Purpose of the evaluation is to determine whether the transformation was conducted successfully, i.e. to decide if the goals of the new organization are met. In case of an evolutionary approach, one should also investigate whether the reassignments did indeed not lead to knowledge loss or disconnectedness of the network in the old organization. If this is the case, the organization should take action to ensure that the old organization remains operational. If the evaluation shows that the transformation was not successful, management should investigate possible causes and solutions.

Table 11 Activity table Step 3

Deliverable	Description
DEMANDS ON EMPLOYEES	These demands describe the type of employees that management would like to put to work in the new organization and who should stay in the old organization. For example, management could decide only to select experts, only a well-connected clique, or only the isolates in the old organization.
LIST OF SUITABLE ACTORS	A collection of SUITABLE ACTORs. A SUITABLE ACTOR is an employee that possesses the knowledge areas that are required to reach the goals of the new organization. In case of an evolutionary transformation an ACTOR is only suitable if the reassignment will not lead to crucial knowledge loss in the old organization or he/she meets the demands of management.
SCENARIO	A SCENARIO provides an overview of the ACTORs that should be reassigned. Additionally, it consists of a KNOWLEDGE GRAPH that visualizes the new organization. For each SCENARIO the characteristics of the networks, and the advantages and disadvantages are discussed.
KNOWLEDGE GRAPH	A KNOWLEDGE GRAPH is a snapshot of a knowledge network (Helms, 2007). It visualizes which employee shares what knowledge with whom. Besides that, it provides information on the frequency and medium of this KNOWLEDGE FLOW.
SUITABLE SCENARIO	Based on the comparison of the SCENARIOs, management chooses the most suitable one. This SCENARIO has the biggest advantages and suits the business case best.
TRANSFORMATION EVALUATION	A document describing the results of the evaluation and possible actions that should be taken based on these results.

Table 12 Deliverable table Step 3

5.4 The complete method

The three different PDDs can be combined into one PDD which represents the complete method. The PDD of the developed method is presented in Figure 9.
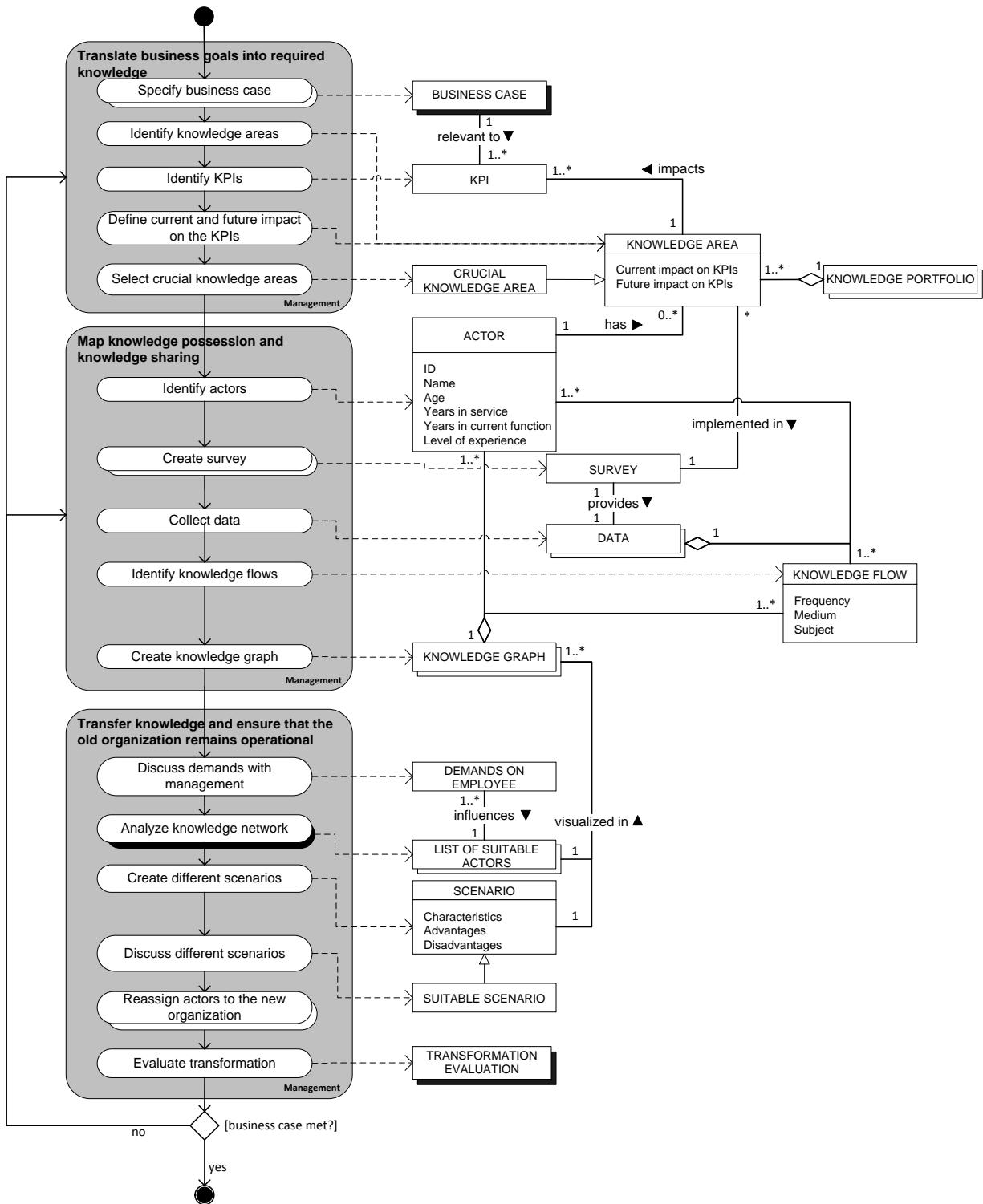

Figure 9 The BTMKIO

Method fragments

As discussed, (part of) the method can be implemented in currently existing business transformation methods in order to overcome their limitations. A method fragment can either be a complete step or just a sub activity with its associated deliverable (Hong, van den Goor & Brinkkemper, 1993; Levantakis, Helms & Spruit, 2008). An example is provided to illustrate this implementation.

The framework of Kettinger, Teng and Guha (1997) will be extended with fragments of the BTMKIO. As discussed, this framework does not pay particular attention to the knowledge in the organization or does not ensure that the old organization remains operational during the transformation.

Most existing methodologies fail to recognize the importance of a diagnostic phase at the beginning of the transformation process (Valirys & Glykas, 1999). In the framework of Kettinger, Teng and Guha (1997) such a phase is only briefly described. The activity 'Specify business case' is implemented to overcome this limitation.

The Diagnose activity of the framework is extended with the audit and analyze step of the developed method to put more focus on the knowledge present within the organization. The activities 'Translate business goals into required knowledge' and 'Map knowledge possession and knowledge sharing' are fully implemented into the framework.

The Redesign activity of the framework is extended with parts of the design activity of the BTMKIO to ensure that the suitable employees are reassigned to the new organization. The method fragments 'Analyze knowledge network', 'Create different scenarios' and 'Discuss different scenarios' are implemented.

In the Reconstruct activity of the framework the actors that are identified as suitable are reassigned to the new organization. This approach is based on the method fragment 'Reassign actors to new organization'.

Finally, the original evaluation activity is replaced with the one of the BTMKIO, as it is more comprehensive.

The result is a complete method that takes all different components of a transformation into account (including training of employees, software applications, IT, buildings, etcetera). The newly compiled method is presented in Figure 10. The red parts are the method fragments that are added. Because both the framework and the method are already discussed, the activity and concept table have been omitted. The evaluation of the use of method fragments in currently existing methods is beyond the scope of this research and is a topic for future research.
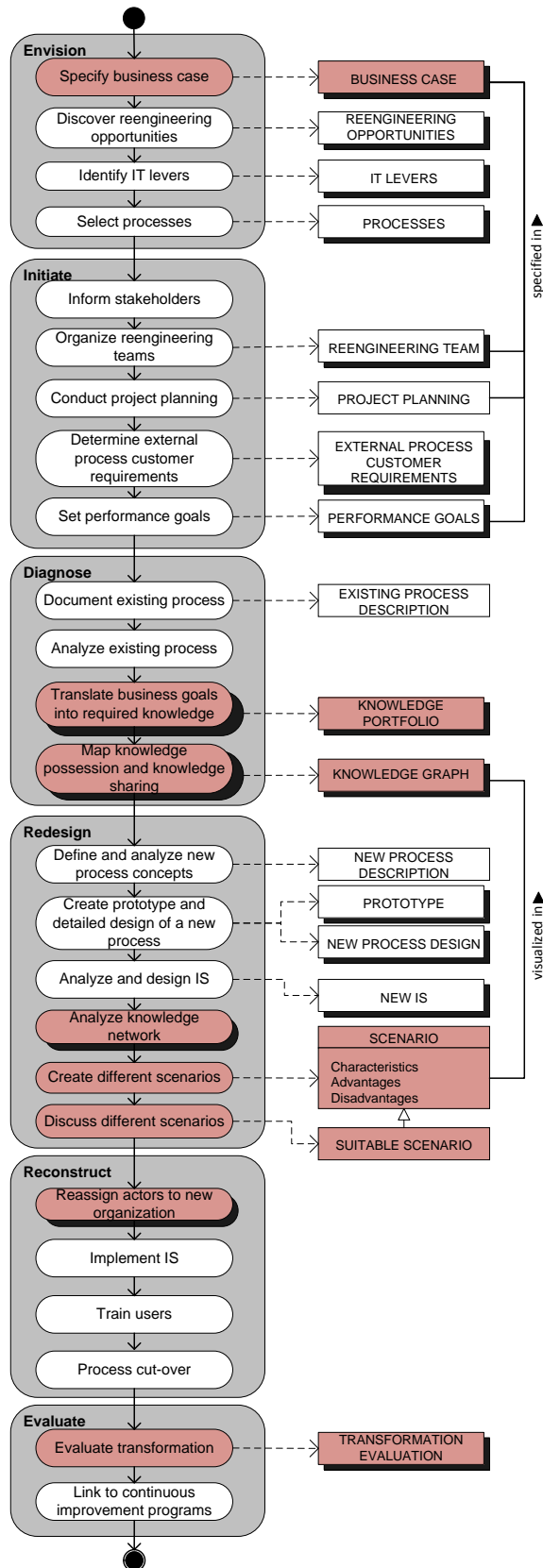
Envision

Specify business case → BUSINESS CASE

Discover reengineering opportunities → REENGINEERING OPPORTUNITIES

Identify IT levers → IT LEVERS

Select processes → PROCESSES

Initiate

Inform stakeholders

Organize reengineering teams → REENGINEERING TEAM

Conduct project planning → PROJECT PLANNING

Determine external process customer requirements → EXTERNAL PROCESS CUSTOMER REQUIREMENTS

Set performance goals → PERFORMANCE GOALS

specified in ▲

Diagnose

Document existing process → EXISTING PROCESS DESCRIPTION

Analyze existing process

Translate business goals into required knowledge → KNOWLEDGE PORTFOLIO

Map knowledge possession and knowledge sharing → KNOWLEDGE GRAPH

Redesign

Define and analyze new process concepts → NEW PROCESS DESCRIPTION

Create prototype and detailed design of a new process → PROTOTYPE / NEW PROCESS DESIGN

Analyze and design IS → NEW IS

Analyze knowledge network

visualized in ▲

SCENARIO
Characteristics
Advantages
Disadvantages

Create different scenarios → SCENARIO

Discuss different scenarios → SUITABLE SCENARIO

Reconstruct

Reassign actors to new organization

Implement IS

Train users

Process cut-over

Evaluate

Evaluate transformation → TRANSFORMATION EVALUATION

Link to continuous improvement programs

Figure 10 The framework of Kettinger, Teng and Guha (1997) complemented with method fragments of the BTMKIO

43

Chapter 6: Case study

A case study is conducted to evaluate the developed method. The method will be evaluated to decide whether it is suitable for its purpose, effective, usable, and valuable for organizations. The case study design and protocol are discussed in Appendix E and F, respectively. The case study was conducted from May till October 2012.

6.1 Case company

InsuranceCo is one of the largest insurance companies in the Netherlands. InsuranceCo relies on independent intermediaries for selling insurances. Besides insurances, InsuranceCo also offers banking products (e.g. mortgages and pensions). Currently, the company has approximately 6000 employees who serve over 5 million of customers. The case study focuses on the department business insurances which employs approximately 460 people. The department has a turnover of approximately 400 million euro. Business insurances consist of 25 different departments which vary in their tasks and amount of employees.

6.2 Case study set-up

In this research a single holistic case study is performed. A single case study means that only one case, e.g. one company, is studied. Reason to conduct only a single case study is that the organization is a representative for other knowledge-intensive organizations. Holistic means that there is only one unit of analysis, i.e. the department business insurances of InsuranceCo.

The developed method is used at the case company to improve the initial version of the method. The results of the case study are used to gain insight into the correctness, completeness, ease of use, and practical value for the organization of the developed method. During this case study the three different steps of the method are evaluated and improved if needed.

Step 1: Business goals translation. A business case was already created in the past by management of the department business insurances. Subsequently, the goals are translated into knowledge required to reach those goals by means of the adjusted version of the Knowledge Strategy Process.

Step 2: Map knowledge domains & knowledge sharing. A survey is conducted in order to gather information on knowledge domains within the organization and how this knowledge is shared amongst employees. Each employee of the department of interest received the survey. The survey consists of two parts. In the first part the employee has to answer some personal questions. The questions are on the knowledge domains they possess, expertise level, and years of service. In the second part the employee has to indicate from whom he or she receives knowledge. This results in a Knowledge Network Graph in which knowledge sharing between employees is depicted.

Step 3: Transfer knowledge. In the third step different scenarios are created based on the results of the first and second step, and on the demands of management. Advantages and disadvantages are provided for each scenario. The different scenarios are discussed with management and the most suitable one is selected. Thereafter, the method is evaluated with management in order to grade its correctness, completeness, ease of use, and practical value for the organization.

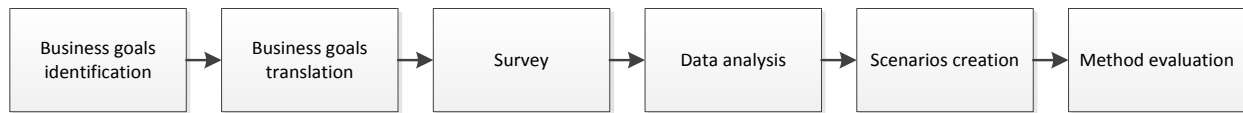The case study procedure is presented in Figure 11 on the next page.

Figure 11 Case study procedure

6.3 Execution of the method

During the case study the method is executed in order to evaluate its correctness, completeness, ease of use, and the practical value for the organization. All steps described in the PDD in Figure 9 are conducted, except for the actual reassignment and evaluation, which were outside the scope of this case study. The gathered data is handed over to the case company which will conduct the last activities itself. How the method is executed is discussed in detail in appendix M. This section describes the most important results of each activity.

Step 1 Translate business goals into required knowledge

Specify business case. In the first step a business case is specified in order to determine the goals of the transformation. The important goals of the organization are discussed here. The complete business case can be found in Appendix G.

The list of most important organizational goals[6]:

- Create a rationalized product portfolio. Focus on selected target audiences and sectors.
- Achieve and maintain faster growth than the market.
- Achieve and maintain a combined ratio improvement.
- Achieve an efficiency improvement, partly based on a high degree of Straight-Through Processing (STP).
- Achieve and maintain a cost ratio improvement.
- Achieve and maintain a positive Net Promoter Score (NPS). NPS is a customer loyalty metric.
- Create an organization with employees that fit in the newly created profile and that are fan of the organization.
- Create a converted portfolio to the target platform, i.e. implement new information systems that fit to the product portfolio.

Identify knowledge areas. Within the department 17 knowledge areas can be defined. The list of knowledge areas that is used in the survey is presented in Appendix H.

Identify KPIs. The case company already defined the Key Performance Indicators which should measure whether the organizational goals are met. Table 13 presents the linkage between the new organizational goals and the KPIs.

---

[6] Exact figures are left out, as this is competitively sensitive information.

Organizational goal	KPI
Create a rationalized product portfolio. Focus on selected target audiences and sectors.	Product portfolio (# of products)
Achieve and maintain faster growth than the market.	Market growth (with respect to the competitors)
Achieve and maintain a combined ratio improvement[7]	Combined ratio
Achieve an efficiency improvement, partly based on a high degree of STP.	Degree of Straight Through Processing (STP)
Achieve and maintain a cost ratio improvement	Cost ratio
Achieve and maintain a positive NPS-score.	Net Promoter Score (NPS)
Create an organization with employees that fit in the newly created profile and that are fan of the organization.	Employee satisfaction: Winning Performance Culture (WPC) score.
Create a converted portfolio to the target platform.	Conversion degree (amount of conversed IT systems)

Table 13 Organizational goals mapped to KPIs

Define current and future impact on the KPIs. A brainstorm session with a senior product manager and an operational manager led to the Knowledge Portfolio Matrix presented in Figure 12 which visualizes the impact of the 17 different knowledge areas on the KPIs. The full knowledge portfolio can be found in Appendix I.

Select crucial knowledge areas. Based on the matrix the crucial knowledge areas could be identified. The crucial knowledge areas are those that have a high future impact on the KPIs (above 2.5). These are pivotal in reaching the new organizational goals.

As can be seen from the matrix in Figure 12 there are 11 crucial knowledge areas, which are presented in Table 14.

---

[7] Combined ratio indicates the amount of several costs factors for each euro of premium. For example, a combined ratio of 95% means that for 1 euro premium, 5 eurocent is yield and 95 eurocent consists of several costs.
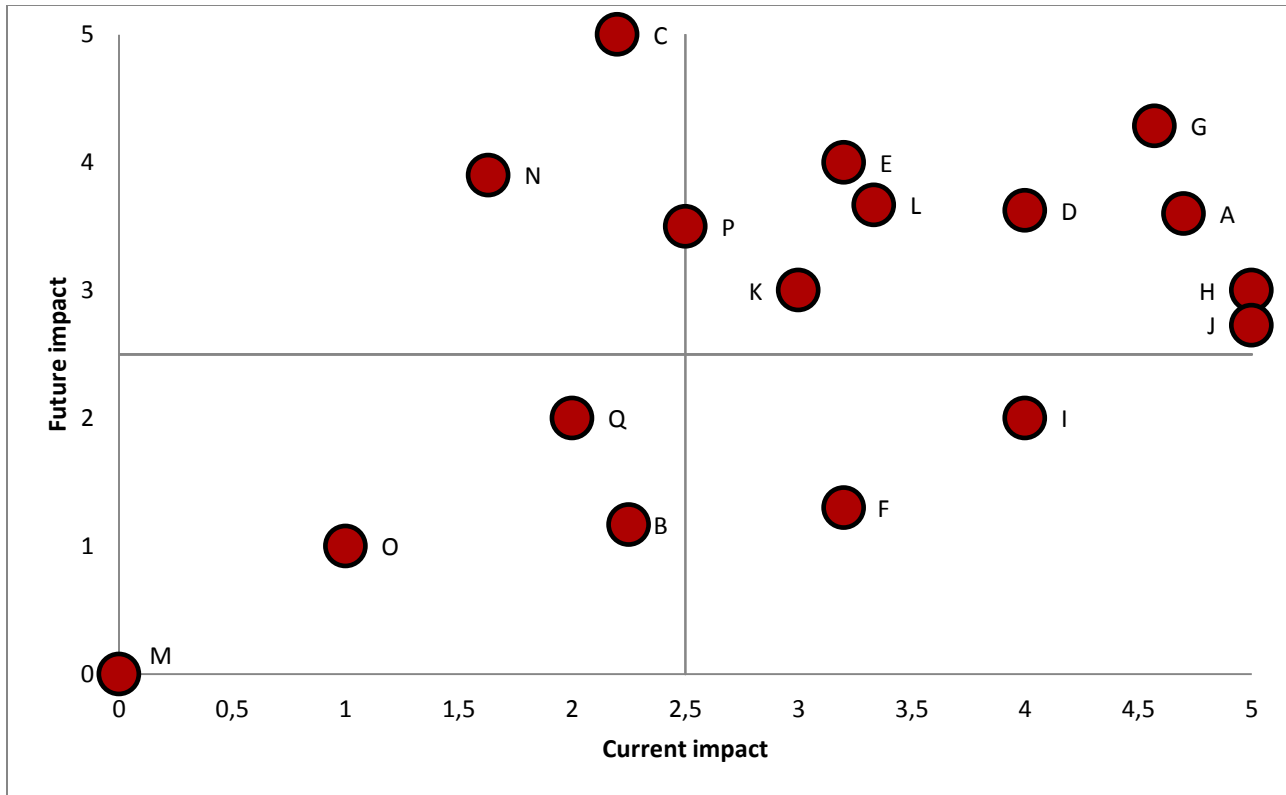
Figure 12 The filled in Knowledge Portfolio Matrix

Knowledge area	Dutch	English
A	Acceptatiebeheer	Acceptance management
C	Klantcontact	Customer contact
D	Klantbehoeften / wensen	Customer requirements / demands
E	Marktontwikkeling	Market development
G	Schadebehandeling	Damage treatment
H	Project- en changemanagement	Project and change management
J	Productmanagement	Product management
K	Productbeleid / Ketenregiebeleid / Beleidsvorming	Product Management / Supply Chain Management Policy / Policymaking
L	Accountmanagement	Account management
N	Business analytics (data analyse)	Business analytics (data analysis)
P	Technische inspectie	Technical inspection

Table 14 Crucial knowledge areas

Step 2 Map knowledge possession and knowledge sharing

Identify actors. Within the department of the case company 454 actors were identified.

Create survey. A survey was created to collect data on knowledge areas possession and knowledge sharing.

Collect data. The final survey was sent out on the 26th of June 2012 by the managers of the different sub departments within the case company. On the 20th of September the data collection phase ended. On that date a response rate of 69.5% was reached and the survey was closed. In order to conduct a meaningful network analysis, a response rate of at least 80% is required (Lesser & Prusak, 2004). However, because the majority of the statements on the reassignment of employees are made on the personal level instead of the network level, this is not perceived as a problem.

Identify knowledge flows. Based on the filled in survey knowledge possession and knowledge sharing between employees could be identified. The knowledge flows tell who receives knowledge from whom, with what frequency, via which medium, and on which topic.

Create knowledge graph. The knowledge graphs provide a graphical insight in the different knowledge flows. The knowledge graphs can be used to identify the suitable employees for the new organization and to transfer knowledge.

Step 3 Transfer knowledge and ensure that the old organization remains operational

Discuss demands on employees. In a discussion with the business executive of the transformation, the demands on the employees for the new organization are defined. This discussion led to the demands presented in Table 15.

Demand of management	Parameter
The case company will conduct an evolutionary transformation: employees will be reassigned in several stages. It is important that the old organization remains operational during this process.	Operability old organization
In the first stage, approximately 50 employees should be reassigned.	Number of employees to be reassigned is 50
The focus in the first stage should be on younger employees. In the case company, the average age is quite high. To ensure flexibility and continuity in the workforce and the organization, younger employees are positively discriminated.	Age of employees should be as low as possible
According the business executive, actors with high power block the usage of the knowledge repository for their colleagues. He states that the repository is up-to-date, meaning that an employee does not need to consult a colleague in order to conduct business: the repository contains the required knowledge. By not reassigning these employees, actors in the new organization are designated to the knowledge repository[8].	Employees with high power

---

[8] This assumption can be dangerous. It could also be the case that these experts possess particular knowledge that is not available in the repository. Not reassigning these employees will lead to a loss of knowledge. This is a topic for future research.

		Well-connected
Identify well-connected group per knowledge area. A well-connected group can be classified as a clique. Cliques are identified for each required knowledge area. In case a knowledge area has no cliques, an attempt is made to identify n-cliques.		Well-connected actors

Table 15 Demands of management on the employees

Analyze knowledge network. The measurements discussed in section 4.3 are used to determine which of the 454 employees can be reassigned to the new organization. Results of this analysis are presented in Table 16.

Measurement	Result	Effect
Cutpoint identification	The analysis pointed out 84 actors that are cutpoints in at least one of the 17 knowledge networks. Several actors are cutpoints in multiple networks.	Do not reassign the 84 actors that act as a cutpoint in the first stage of the transformation.
Power	Power is measured by using the Bonacich's power measure with an attenuation factor of -0.5. Power is calculated separately for each knowledge area. This resulted in a list of 132 outliers, i.e. employees with high power.	Do not reassign the 132 actors that have high-power.
Betweenness centrality	The analysis identified 32 actors with a high betweenness centrality.	Do not reassign the 32 actors that have a high betweenness centrality in the first stage of the transformation.
Knowledge exclusivity	There is no knowledge area which is possessed by only one employee. However, there is a knowledge area possessed by only a few employees: 'Data analytics' is possessed by only 10 employees. Looking at the knowledge portfolio in Figure 12, this knowledge area is not perceived as important in the current organization. Therefore, knowledge exclusivity does not lead to restrictions on the reassignment of employees.	Knowledge exclusivity has no effect on the selection of suitable employees.
Cliques	The analysis showed 6 cliques divided over 2 knowledge areas with a minimum size of 3. Of these 6 cliques 0 can be directly reassigned, because members of the clique fulfill an important role in the old organization.	Do not reassign cliques in the first stage of the transformation
N-cliques	The analysis showed 68 n-cliques divided over the 13 required knowledge areas. The minimum size of an n-clique is 3 with n=2. Of the 68 n-cliques 0 cliques can directly be reassigned.	Do not reassign n-cliques in the first stage of the transformation
Isolates	In the network 9 isolates could be identified.	The business executive preferred well-connected employees over isolates. Therefore, the isolates will not be reassigned.

Table 16 Measurements used to analyze the knowledge network

Based on the network analysis the initial list of 454 employees can be subdivided into 4 categories.

The first category consists of employees who possess the required knowledge areas and can be reassigned directly to the new organization. This entails 141 employees. Of these 141 employees a selection can be made who should be reassigned first, based on the demands of management.

The second category lists employees who should be reassigned in a later stage, as a direct reassignment will lead to knowledge loss and/or network disconnectedness. Category two consists of 167 employees. Employees with high power are also put in the second category, as it could be the case that they possess knowledge that is not present in the repository. Although the business executive does not want employees with high power in the new organization it is advised to reassign these employees in a later stage when their colleagues already are familiar with consulting the knowledge repository. This is a topic for future research.

The third category consists of 26 employees who should not be reassigned at all. These employees do not possess the knowledge that is required in the new organization, or are in the oldest age category while they are a beginner or intermediate in a crucial knowledge area.

The last category consists of 120 employees that did not fill in the survey. Therefore, no useful statements can be made.

This subdivision is done by color coding, as is presented in Figure 13. For each employee is investigated whether he or she possess the required knowledge areas, which level of expertise he or she has, whether he or she meets the demands of management and whether he or she could be reassigned while the old organization remains operational.

Figure 13 Identifying suitable employees with color coding

Create different scenarios. Based on the knowledge network analysis and the demands of management different scenarios can be created. Additionally, the scenarios are visualized in knowledge graphs and the characteristics of the old network and the new one are described.

The first category can be used to identify the 50 most suitable ones. These employees will be reassigned in the first stage. As indicated, the business executive preferred as much young expert as possible. However, the analysis reveals that those actors are scarce: only 8 employees who are suitable to reassign directly fall into the age category of 26 to 33 years. To reach a list of 50 employees two scenarios are possible:

1. Complement the list of suitable employees with older experts. Main advantage: there is more expertise within the new organization.
2. Complement the list with younger employees with less experience, i.e. beginners or intermediates. Main advantage: flexibility and continuity in the workforce and the organization.

Employees are prioritized based on the knowledge they possess. Employees that possess more knowledge areas than their colleagues are preferred.

The two scenarios overlap: 32 employees are part of both scenarios. The two scenarios are compared in Table 17 and presented in Figure 14 and Figure 15. In the knowledge graph the number below the node presents the ID of the employee. The size of the node indicates the age: the bigger the node the older the employee. The arrows indicate knowledge sharing between actors that occurs in the current situation, and which is expected to persist in the new organization.

As can be seen in the knowledge graphs, both scenarios consist of isolated employees. Although these actors meet management's demands and possess the required knowledge areas, the question rises whether the organization will function with such a structure. Future research should investigate this.

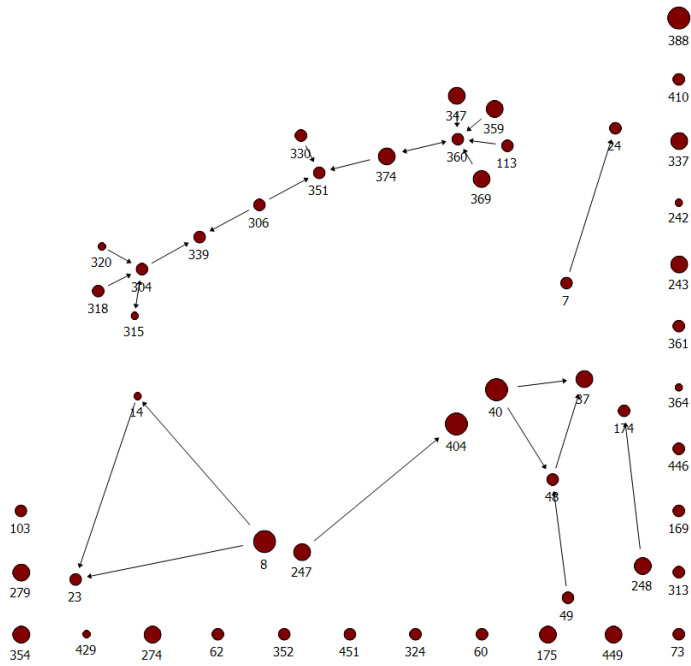|	Scenario 1 (experts)	Scenario 2 (young employees)
Number of knowledge flows	25	20
Number of experts	50	50
Age category distribution	6x 26-33 26x 34-45 14x 46-55 4x 55+	8x 26-33 42x 34-45
Knowledge repository usage distribution	20 daily 9 weekly 5 monthly 3 half yearly 3 never 10 unknown	22 daily 8 weekly 7 monthly 2 half yearly 5 never 6 unknown
Knowledge repository delivery	22 actors	23 actors

Table 17 Scenario comparison
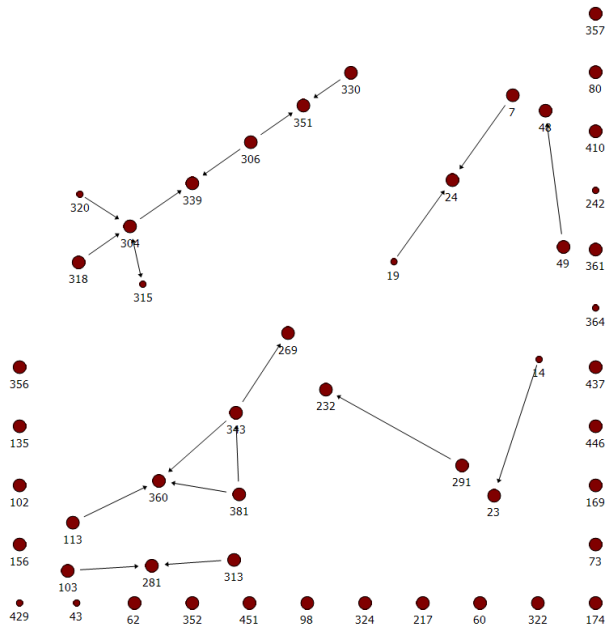
Figure 14 Scenario 1: reassign experts

Figure 15 Scenario 2: reassign young employees

For both scenarios a network graph is created for the situation in the old organization which can be compared to the 'as-is' situation. These network graphs are presented in Appendix N. However, because of the large amount of interactions (over four thousand) no useful statements can be made based on the graph alone. Therefore, the most important characteristics of the networks are compared and presented in Table 18. Because the two scenarios overlap, the characteristics of the network differ only slightly. The characteristics provide insight in the connectedness of the network and can be used to choose the most suitable scenario. The explanation of each characteristic is provided in Appendix N.

Characteristic	'as-is' situation	Old situation (scenario 1)	Old situation (scenario 2)	New situation (scenario 1)	New situation (scenario 2)
# of links	4281	3620	3611	25	20
Density	0,021	0,022	0,022	0,010	0,008
Average degree	9,382	8,914	8,891	0,5	0,4
Mean distance	3,088	3,065	3,070	1,475	1,231
Node connectivity	0	0	0	0	0
Inclusiveness	0,980	0,978	0,978	0,540	0,500

Table 18 Characteristics of the knowledge networks

At this moment the case company did not define the size of the group of employees that should be reassigned in the following stages of the transformation. Therefore, no scenarios can be created for that stage. However, as soon as the size of this group is defined, the same approach can be used to identify those employees that should be reassigned.

Discuss different scenarios. The different scenarios are presented to the business executive whereby the advantages and disadvantages of each scenario are discussed and the knowledge graphs and network characteristics are presented. The business executive chose the second scenario. Reason for this decision is that younger employees lead to flexibility and continuity in the workforce and the organization. Because a codification strategy will be implemented only a few experts are required. The experts will keep the repository up to date and handle the special cases. Beginners or intermediates can consult the knowledge repository in case they lack knowledge to conduct business.

Reassign actors to the new organization. The actual reassignment of actors to the new organization will be done in the upcoming years. This is beyond the scope of this research. The constructed method describes a high-level approach which can be used to conduct this reassignment. The exact execution of this reassignment should be defined by the case company.

Evaluate transformation. Because the actual reassignment of actors to the new organization is beyond the scope of this research the business transformation cannot be evaluated yet. The evaluation of the transformation should be conducted by the case company after the actors are reassigned and the new organization is fully operational.

Chapter 7: Findings

The results of the case study, the discussion with management of the case company, and the expert evaluations were used to grade the correctness, completeness, ease of use and the practical value for the organization of the constructed method. This evaluation approach is based on the research of Helms, Bosua and Ignatio (2009).

Correctness

Correctness is used to evaluate whether the method facilitates a business transformation in knowledge-intensive organizations.

Case study

In the case study, the actual reassignment of employees and the evaluation of the method are not conducted. However, the results indicate that the method is highly suitable for a business transformation in knowledge-intensive organizations by complementing already existing methods. It provides valuable insights in knowledge possession and sharing within the organization. Based on this information, decisions on the reassignment of employees can be made, as presented in the last step of the case study.

Evaluation with management and experts

Both management of the case company and the experts indicated that the BTMKIO is suitable for the identification of knowledge areas and knowledge sharing and to make reassignment decisions based on this data. However, it cannot be used as a stand-alone approach to facilitate a transformation.

One of the experts pointed out a limitation of the BTMKIO in its current form. The method mainly focuses on the knowledge areas that are currently present within the organization and only partially on new knowledge areas. This makes it almost impossible to significantly change the way in which business is conducted. This is a limitation, because it could be the case that changes in the environment require a significant change in the way business is conducted. Thus, in the experts' opinion, the BTMKIO should pay more attention on identifying knowledge areas outside the organization. However, the same expert also indicated that this limitation has no effect on the outcomes of the case study as the insurance industry is perceived as very traditional: it is highly unlikely that a significant change will occur.

Completeness

Completeness is used to evaluate whether there are activities missing in the method.

Case study

During the execution of the method no missing activities surfaced. The case study showed exactly which aspects of a business transformation are covered and which aspects should be covered by already existing methods. The BTMKIO has a knowledge-focused approach and does not take aspects as training of employees, software applications, or IT into account. As presented in Figure 10, an existing method can be used to cover the aspects lacking in the BTMKIO and to give this existing method a knowledge-focused approach.

Evaluation with management and experts

Both management and experts indicated that an interaction with the works council ('ondernemingsraad' in Dutch) is missing. In the Netherlands, the works council has to be consulted in case of a large workforce reduction. Its advice, in addition with laws and regulations, may also restrict the list of employees that can be reassigned. Besides that, the Human Resource department should also be involved in decision making.

Additionally, management indicated that, besides creating a business case, an outline of the new organization should be created in the first step of the method. Currently, this is done in the penultimate activity of the method which is, according to management, too late.

The experts underline that the BTMKIO is not a stand-alone approach. However, they do not see this as a limitation. Existing methods and techniques can be combined with the developed method to construct a complete approach, as already discussed before.

One of the experts indicated that it is pivotal to specify a business case. However, he indicated that it is even more important to keep this business case up to date, especially in an evolutionary transformation which can take up to several years. He observed that in the field too often the business case is created after which no more attention is paid to it, while the environment and requirements change. This may result in a failed transformation. Reviewing the specified business case should be a recurring activity within the BTMKIO.

Ease of use

The ease of use consists of the time needed to conduct the method and the complexity of the steps that have to be taken.

Case study

The managers of the case company that filled in the knowledge portfolio indicated that this is a process subject to interpretation. Although the knowledge portfolios of the managers were almost identical, they had discrepancies regarding the importance of 4 knowledge areas. A discussion showed that a slightly different vision led to these discrepancies. By explaining and discussing their interpretation and vision consensus was reached on the final knowledge portfolio. This indicates that it is highly unlikely that two persons will end up with the exact same knowledge portfolio. In case multiple managers will fill in the knowledge portfolio, an additional session should be organized to discuss the different knowledge portfolios and to create a final one. This may lead to valuable insights, but it makes conducting the method more time-consuming.

In the case study, the 'Collect data' activity was quite time-consuming. It took two months to reach a response rate of 70%. Probably this was caused by the fact that the survey was sent out in the holiday period. However, one should keep in mind that conducting a survey can be a time-consuming process, which highly depends on the size of the organization. The higher the amount of actors, the longer it takes to collect and analyze the data. Because preparing and conducting a business transformation often is a time-consuming process this is not perceived as a problem.

During the execution of the 'Analyze knowledge network' activity it became clear that sufficient underlying knowledge on network analysis is required to interpret the data. Scientific literature was consulted to interpret the results of the different measurements described in section 4.3. In comparison to the other activities, this step is quite complex and time-intensive.

Evaluation with management and experts

Because management of case company did not conduct the full method themselves, statements regarding the required time and the complexity of the activities cannot be made. However, management indicated that it is highly unlikely that the method can be conducted by the organization without the support of an expert. Sufficient underlying knowledge is required to conduct the network analysis. This knowledge is probably not present within the organization which makes it nearly impossible to successfully interpret the data from the survey. In order to visualize and analyze the knowledge network of the organization a tool like Netminer[9] of Ucinet[10] is required. Thus, a time investment has to be made to master the use of a network tool. The experts affirm these findings of management of the case company.

One design criterion of the method is that it can be used by responsible management that wants to conduct the business transformation, i.e. no external team has to be hired. Although it is still possible, the method will take longer to conduct or an additional employee has to be assigned to the transformation team to conduct the network analysis. One of the experts expects that management will not use the network tool itself, but that this activity will be assigned to someone in the Human Resource department.

Another remark made by an expert is that interpreting the notation technique in which the BTMKIO is modeled is quite hard. A time-investment is required to understand the different concepts used in the PDD modeling technique before the BTMKIO can be used.

Practical value for the organization

This criterion is used to evaluate whether the results of the method are usable.

Case study

The execution of the method provided the case company with valuable insights regarding knowledge possession and knowledge sharing. The case company received a list that indicates for each employee whether he or she possess the required knowledge areas, which level of expertise he or she has, whether he or she meets the demands of management and whether he or she could be reassigned while the old organization remains operational. Based on this list, recommendations can be made on the reassignment of employees. The practical value for the organization can therefore be graded as high.

Evaluation with management and experts

Management indicated that sufficient attention should be paid to the creation of different scenarios. With the survey a large collection of data is gathered. Key is to convert this data into meaningful

---

[9] www.netminer.com
[10] www.analytictech.com/ucinet/

and usable results. It is likely that management is lacking the knowledge to interpret the results of the network analysis. Thus, in order to ensure that the results are applicable for the organization, they should be made as specific as possible.

The experts are of the opinion that the method leads to valuable results for the organization. They indicate that in most of the current business transformations insufficient attention is paid to knowledge. Or as one expert stated "*the identification and transfer of relevant knowledge is an overshadowed aspect in business transformations*". Often, the reassignment of employees is not based on knowledge possession and sharing but on personal insights of management. This method will show whether these insights are correct and provide management with additional ones. The experts find these insights very relevant.

Compared to existing methods

As discussed in the literature study on page 23 and 24, existing methods have three main limitations. This method tried to tackle these limitations.

First of all, these methods pay little or no attention to knowledge present within the organization. In the developed method, knowledge plays a central role. Decisions on the reassignment of employees are based on the knowledge they possess and share.

Secondly, existing methods often neglect the old situation during the transformation. This method ensures that the old organization remains operational by not reassigning employees that are still required in the old organization.

Thirdly, the majority of existing methods is oriented towards experts. Except for the 'Analyze knowledge network' activity the method can be conducted by the organization itself without the help of experts.

Adjustments

Based on the execution of the case study and the evaluation sessions four changes can be made to the method:

- The activity 'Create new organizational structure' is added to the first step. This replaces the first sub activity of the activity 'Reassign actors to the new organization'.
- The specified business case should be reviewed on a regular basis. The business case may become outdated due to changes in the market and direct environment. If this is the case, the business case should be updated. This may affect the scope of the transformation, and thereby the selection of crucial knowledge areas. Reviewing the business case will not be visually presented in the PDD, but it will be implemented in the activity table of the first step.
- In the activity 'Identify knowledge areas' more attention will be paid to the identification of knowledge areas *outside* the organization. This can, for instance, be done by organizing brainstorm sessions with experts originating from different fields (i.e. marketing, sales or anthropology). This change is not visualized in the PDD, but it will be mentioned in the activity table of the first step.

- The activity 'Consult work council and HR department' is added. Because informing and consulting the works council is mandatory in case of a large workforce reduction, this activity should be conducted. Consulting the HR department is not mandatory but highly recommended.

The changes made in the PDDs of the method are presented in Appendix L. The final version of the method is presented in Figure 16.

As indicated by the experts, in its current format the method cannot be used by a layman in the field of network analysis. One way to tackle this problem is by offering a step by step approach that describes how an analysis should be conducted and how the results of the analysis should be interpreted. However, future research should investigate whether such an approach is suitable and desirable. Hence, the method is not yet adjusted on this point.
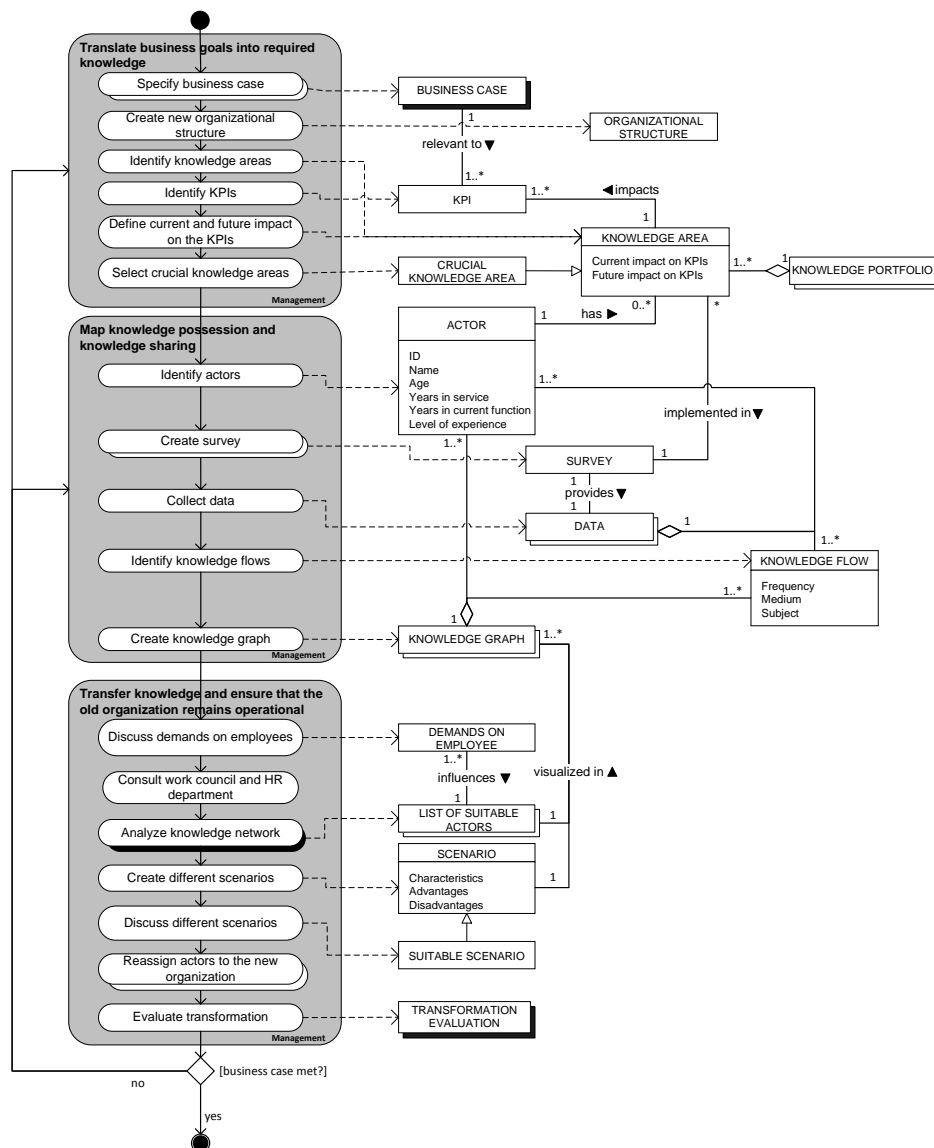

Figure 16 The improved BTMKIO

58

Chapter 8: Conclusions

In this chapter the sub and main research questions are answered. Additionally, the most important findings resulting from the case study and expert evaluation are discussed.

Sub research questions

This section provides an answer to the four formulated sub research questions.

> *Which business transformation methods already exist?*

There exists a wide range of methods and approaches. Because it is nearly impossible to investigate all existing methods two frameworks were scrutinized. These frameworks tried to identify a general approach based on a collection of methods. By investigating two frameworks a wide range of existing approaches is covered.

The investigation of these two frameworks showed that these methods are not usable in knowledge-intensive organizations because of several limitations. First of all, most of the currently existing methods pay little or no attention to knowledge within the organization. Secondly, the majority of these methods do not pay attention to the old organization, which should remain operational in case of an evolutionary transformation. Thirdly, most methods are oriented towards specialists. Management cannot conduct the transformation itself: costly external parties have to be hired to conduct the transformation.

This investigation made it clear that there is need for a method that can facilitate a transformation in a knowledge-intensive organization. The structure of this method is based on the approach of Dalmaris, Tsui, Hall and Smith (2007) which consists of three steps: audit, analyze and design.

> *How can organizational goals be translated into required knowledge (areas)?*

In the audit step, the current and desired situation are investigated. This means identifying the knowledge areas that are present in the current organization and identifying those which are required in the new organization. In order to ensure that the right knowledge is transferred it should be determined what the required knowledge is. This can be done by translating organizational goals into knowledge areas. Two techniques were discussed in detail: the Knowledge Strategy Process (KSP) and the KP^3 method. The KSP was perceived as most suitable for the new method. It is slightly adjusted and incorporated in the newly developed method.

> *How can the required knowledge areas and knowledge sharing within an organization be mapped?*

In the analyze step, knowledge areas and knowledge sharing within the organization are mapped. The third sub research question focuses on the investigation of techniques that can be used to map knowledge possession and knowledge sharing. A knowledge audit is suitable to do so. Three data gathering techniques were discussed that can be used to conduct a knowledge audit: interviews,

Knowledge Network Analysis, and data mining IS/IT. Of these three methods, the KNA was reviewed as the most suitable technique. Its basic principles can directly be used in a business transformation context.

> *How can the required knowledge be transferred from the old organization to the new one, whereby the old organization remains operational?*

In the design step, recommendations for the new organization are made based on the audit and analyze steps. This consists of transferring the required knowledge to the new organization and ensuring that the old organization remains operational. This can be achieved by reassigning suitable employees to the new organization. Employees are suitable when they possess the crucial knowledge areas, meet management's requirements and when his or her reassignment will not lead to crucial knowledge loss or network disconnectedness in the old organization. Several network analysis measurements can be used to identify suitable employees.

Main research question

> *How can a method be developed that complements existing business transformation methods and that facilitates a business transformation in knowledge-intensive organizations that acknowledge the knowledge domain?*

Techniques available in scientific literature are used to construct the Business Transformation Method for Knowledge-Intensive Organizations (BTMKIO). The Knowledge Strategy Process and the Knowledge Network Analysis are combined into a new method which is presented in Figure 16. The method can (partly) be incorporated in existing business transformation method resulting in a complete approach suitable for knowledge-intensive organizations.

Method evaluation

The new developed method is evaluated by means of a case study and semi-structured interviews with experts in the field of business transformations and network analysis. The purpose of these evaluations was to grade the correctness, completeness, ease of use and the practical value for the organization of the BTMKIO. The most important results are discussed here.

Correctness

Correctness is used to investigate whether conducting the method leads to the expected results, i.e. a transformed knowledge-intensive organization. Because the actual reassignment was not conducted during the case study it is not possible to verify whether the goals of the transformation are actually met. However, the experts and management of the case company expect based on the gathered data that the method is suitable to transform a knowledge-intensive organization.

Completeness

Completeness is used to decide whether there are activities missing in the method. The case study did not reveal missing activities. The management of the case company and the experts indicate the BTMKIO cannot be used as a stand-alone approach. Existing business transformation methods

should be used to focus on the transformation of IS/IT, business processes, etcetera. Because this method is developed as a complement to existing methods, this is not perceived as a problem.

Both management and experts indicated that a discussion with the works council is lacking. Because this council can put restrictions to the workforce reduction and reassignment of employees, a discussion with its members should be incorporated in the third step of the BTMKIO.

Ease of use
The ease of use consists of the time needed to conduct the method and the complexity of the steps that have to be taken. The time needed to conduct the method highly depends on the size of the organization. The bigger the organization, the more time the data gathering and data analysis activities will take. The conducted case study took approximately three months, whereby the last two activities were not conducted, i.e. the actual reassignment and the evaluation. In addition, the time to conduct the method also depends on the nature of the transformation: a revolutionary transformation will take less time than an evolutionary one.

The evaluation showed that it is highly unlikely that the BTMKIO can be conducted by management without the support of an expert. Underlying knowledge on network analysis is required to translate the gathered data into meaningful and usable results. Thus, the requirement that the method could be conducted by management without the help of external experts or consultants is not met.

Practical value for the organization
The practical value for the organization investigates whether the results of the method are actually usable in the organization. The method provides the organization with valuable insights. The results of the method can actually be used in a business transformation, as indicated by both the experts and management of the case company. Conducting the method provides valuable insights on knowledge possession and knowledge sharing within the organization.

The conduction of the case study and the discussion with management of the case company and the experts led to four improvements to the BTMKIO. The final version is presented in Figure 16.

In this research a method that supports a business transformation in knowledge-intensive organizations is created. Although the proposed solution is not flawless, it provides a knowledge-intensive organization with tools and guidance to conduct a transformation. This method tackles at least two of the three limitations of existing business transformation methods: it focuses on knowledge within the organization and it ensures that the old organization remains operational during the transformation. The third limitation, a focus oriented towards experts, is not completely resolved. Although major part of the method can be conducted by management, an expert is required to analyze the network. Future research should investigate how the method can further be improved.

Chapter 9: Discussion and Future research

This chapter consists of two sections. In the first section several limitations of this research are discussed. In the second section topics for future research are suggested.

Discussion

In design science research it is hard to apply rigorous evaluation methods (Zelkowitz & Wallace, 1998). One way to evaluate the created artifact is to conduct a case study. However, the results of a case study are hard to generalize (Markus, Majchrzak & Gasser, 2002). Therefore, it is highly recommended to conduct multiple case studies in different environments, compare their results, and make generalizable conclusions. In this research only one case study is conducted, which limits the generalizability of the results.

Inherent to previous point is the generalizability of the used network analysis measurements. It is unknown if the list of measurements used in this case study is applicable in other business transformations as well. It could be the case that a different transformation, with different demands and restrictions, requires other or additional measurements.

There are two major limitations that apply to the focus of the method. First, the recommendations made are based on knowledge possession and knowledge sharing only. Aspects as skills or personality of the employee are not taken into account. However, it is plausible that these aspects influence the decisions on the reassignment of personnel as well.

Secondly, the recommendations are based on a snapshot of the organization. In the case study, decisions were made based on the situation in the summer of 2012. However, the organization evolves over time: employees obtain new knowledge and create new knowledge sharing relations. This results in a different knowledge network. Especially in evolutionary transformations this could lead to mistakes because decisions are based on obsolete data.

There are four limitations that apply to the survey that is conducted during the case study. The first limitation applies to the way the survey had to be filled in. In the survey an employee first had to indicate in which department a colleague works that provides him or her knowledge (see also Appendix J). This choice was made to prevent the survey from taking too much time to fill in. Scrolling through a list of 454 employees is not desirable. However, this could have led to employees who were not able to find their colleagues, resulting in an incomplete knowledge network. It can be the case that employees receive knowledge from colleagues of whom they did not think of while filling in the survey. By not seeing the entire list of colleagues an employee will not be reminded of him or her.

A second limitation regarding the survey is that the employees had to indicate their own level of expertise. This information could not be verified, as there is no system or procedure in place which keeps track of which employee possesses what knowledge on which level of expertise. It is possible that employees made up their own level of expertise, leading to biased results.

The third limitation is related to the response rate of the survey. Although almost 70% did fill in the survey, still 30% response is missing. It is plausible that additional response would have led to

valuable new insights regarding knowledge possession, level of expertise, power, cutpoints, etcetera. For example, with additional response it could become clear that an actor is a cutpoint in a particular knowledge network which is not visible with current data. Because this data is missing, employees could be marked as suitable to reassign while they are still required in the old organization. Although this has no influence on the evaluation of the BTMKIO, it influences decision making in the case company. Because a significant part of the workforce did not fill in the survey, the business executive should not use the results of the survey as a basis for the decisions on reassignment of employees.

The last limitation is the quality of the data retrieved from the survey. The data showed that some employees selected themselves as actors who provide them with knowledge. Although this has no influence on the conducted network analysis, it may indicate that the survey was not filled in thoroughly, seriously or honestly. This may have led to biased results. There is no data available to verify the results from the survey.

One final remark on the survey concerns ethics. In the case study, the original goal of the survey was not communicated to the employees of InsuranceCo. Communicating one goal and using the results for another can be defined as unethical. However, one should keep in mind that communicating the real goal of the survey probably leads to refusal of filling in the survey or to biased results. An organization that wants to conduct the BTMKIO needs to take this into consideration.

Future research

In this research a first attempt is made to create and evaluate a method that facilitates a business transformation in knowledge-intensive organizations. The focus of this method is the identification of required knowledge areas and the sharing of knowledge. The method complements existing business transformation methods that lack a knowledge-focused approach. Because the business transformation of the case company is a multiannual plan the actual reassignment and evaluation of the method could not be conducted. In future research this reassignment should be conducted and the transformation should be evaluated.

Besides that, more research should be conducted at the case company to identify the reasons why some actors have high power. Are they actually blocking the usage of the knowledge repository? Or are the frequently consulted by colleagues because they possess knowledge that is not present within the repository? The results of this future research influence the decisions on the reassignment of employees.

The method is an addition to currently existing business transformation methods. Hence, it cannot be used as a stand-alone approach. This means that an existing business transformation method is needed to conduct a full business transformation, i.e. including new processes, buildings, IT, etcetera. In the case study this method is not combined with an existing business transformation method. Future research should be conducted in order to identify which existing method is most suitable to combine with this method to facilitate a full business transformation in a knowledge-intensive organization.

Future research should also investigate how the method should be adjusted in order to make it completely feasible for responsible management to conduct the business transformation. Currently, underlying knowledge on network analysis is required to convert gathered data into useful and meaningful results. A possible solution is to provide a step by step approach that describes how an analysis should be conducted and how the results of the analysis should be interpreted. It should be investigated whether such an approach is suitable and desirable. Besides that, the proposed adjustments should be assessed to see if they actually improve the method.

Additionally, future research should focus on the *validation* of the created method. In this research the method is only evaluated.

References

Ahn, J. H., & Chang, S.-G. (2004). Assessing the contribution of knowledge to business performance: the KP^3 methodology. *Decision Support Systems*, *36*(4), 403-416.

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, *25*(1), 107-136.

Alvesson, M. (2004). *Knowledge Work and Knowledge-Intensive Firms*. New York: Oxford University Press.

Ashurst, C., & Hodges, J. (2010). Exploring Business Transformation: The Challenges of Developing a Benefits Realization Capability. *Journal of Change Management*, *10*(2), 217-237.

Bonacich, P. (1987). Power and Centrality: A family of Measures. *American Journal of Sociology, 92*, 1170-1182.

Borrás, S., Chaminade, C., & Edquist, C. (2009). The challenges of globalization: strategic choices for innovation policy. In G. Marklund, N. Vonortas and C. Wessner (Eds*.), The Innovation Imperative: National Innovation Strategies in the Global Economy*. Cheltenham: Edward Elgar.

Bosilj-Vuksic, V., Stemberger, M. I., Jaklic, J., & Kovacic, A. (2002). Assessment of E-Business Transformation Using Simulation Modeling. *Simulation*, *78*(12), 731-744.

Brzozowski, M. J. (2009). WaterCooler: exploring an organization through enterprise social media. *Proceedings of the ACM 2009 international conference on Supporting group work*. New York, NY, USA, 219-228.

Buchanan, S., & Gibb, F. (1998). The Information Audit: an Integrated Strategic Approach. *International Journal of Information Management 18*, 29-47.

Carley, K. M. & Reminga, J. (2004). *ORA: Organization Risk Analyzer* (CMU-ISRI-04-106). Pittsburgh: Carnegie Mellon University.

Choy, S. Y., Lee, W. B., & Cheung, C. F. (2004). A Systematic Approach for Knowledge Audit Analysis: Integration of Knowledge Inventory, Mapping and Knowledge Flow Analysis. *Journal of Universal Computer Science*, *10*(6), 674-682.

Cook, N. (2008). *Enterprise 2.0*. Hampshire: Gower Publishing Limited.

Cowan, R. & Foray, D. (1997). The economics of codification and diffusion of knowledge, *Industrial & Corporate Change 6*, 595-622.

Cross, R., Parker A., & Borgatti, S. (2002). *A Bird's-eye View: Using Social Network Analysis to Improve Knowledge Creation and Sharing*. Somers: IBM Corporation.

Dalkir, K. (2005). *Knowledge Management In Theory and Practice*. Boston: Elsevier.

Dalmaris, P., Tsui, E., Hall, B., & Smith, B. (2007). A framework for the improvement of knowledge-intensive business processes. *Business Process Management Journal*, *13*(2), 279-305.

Davenport, T. H., & Prusak, L. (1998). *Working knowledge: how organizations manage what they know*. Boston: Harvard Business School Press.

Davenport, T.H., Short, J.E., 1990. The new industrial engineering: Information technology and business process redesign. *Sloan Management Review 31*(4), 11–27.

Desouza, K. C. & Evaristo, J. R. (2004). Managing knowledge in distributed projects. *Communications of the ACM - Human-computer etiquette 47*(4), 87-91.

DiMicco, J., Millen, D. R., Geyer, W., Dugan, C., Brownholtz, B., & Muller, M. (2008). Motivations for social networking at work. *Proceedings of the 2008 ACM conference on Computer supported cooperative work*. New York, NY, USA, 711-720.

Ditillo, A. (2004). Dealing with uncertainty in knowledge-intensive firms: the role of management control systems as knowledge integration mechanisms. *Accounting, Organizations and Society, 29*, 401-421.

Donaldson, L. (2001). Reflections on knowledge and knowledge-intensive firms. *Human Relations 57*(7), 955-963.

Drucker, P. (1998). *Managing in a Time of Great Change*. New York: Penguin Putnam.

Duff, A. (1996). The literature search: a library-based model for information skills instruction. *Library Review*, *45*, 14-18.

Eagle, N., Pentland, A., & Lazer, D. (2009). Inferring social network structure using mobile phone data. *PNAS*, *106*(36), 15274–15278.

Fitz-Gibbon, C.T. (1990). *Performance Indicators: a BERA Dialogue.* Avon: Multilingual Matters.

Freeman, L. C. (1979). Centrality in Social Networks: Conceptual clarification. *Social Networks 1*, 215-239.

Gladwell, M. (2008). *Outliers: The Story of Success*. New York: Hachette Book Group.

Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm. *Strategic Management Journal*, *17*, 109-122.

Grover, V., & Malhotra, M. K. (1997). Business process reengineering : A tutorial on the concept, evolution, method, technology and application. *Journal of Operations Management*.

Hammer, M. (1990). Reengineering Work: Don't Automate, Obliterate. *Harvard Business Review 68*(4), 104-112.

Hall, M. (2006). Knowledge management and the limits of knowledge codification. *Journal of Knowledge Management, 10*(3), pp. 117-126.

Hanneman, R. A., & Riddle, M. (2005). *Introduction to social network methods*. Riverside: University of California, Riverside.

Hart, C. (2001). *Doing a literature search: a comprehensive guide for the social sciences*. London: Sage Publications Ltd.

Heisig, P. (2009). Harmonisation of knowledge management – comparing 160 KM frameworks around the globe. *Journal of Knowledge Management, 13*(4), pp. 4 – 31.

Helms, R.W. (2007). Redesigning Communities of Practice using Knowledge Network Analysis. In A.S. Kazi, L. Wohlfart & P. Wolf (Eds.), *Hands-On Knowledge Co-Creation and Sharing: Practical Methods and Techniques*. Knowledgeboard.

Helms, R.W., Bosua, R., & Ignatio, R. (2009). Impact assessment of knowledge sharing bottlenecks: The Knowledge Sharing Environment Model (KSEM). *Proceedings of the 20th Australasian Conference on Information Systems*, pp. 132-143.

Helms, R.W. & Buijsrogge, C.M. (2006). Application of Knowledge Network Analysis to identify knowledge sharing bottlenecks at an engineering firm. *Proceedings of the 14th European Conference on Information Systems*, Göteborg, Sweden, 12-14 June, 2006.

Hevner, A., March, S., Park, J., & Ram, S. (2004). Design Science in Information Systems. *MIS Quarterly*, *28*, 75-105.

Hofer-Alfeis, J. (2003). Effective Integration of Knowledge Management into the Business Starts with a Top-down Knowledge Strategy. *Journal of Universal Computer Science, 9*(7), 719-728.

Hong, S., van den Goor, G., & Brinkkemper, S. (1993). A Formal Approach to the Comparison of Object-Oriented Analysis and Design Methodologies. *Proceedings of the Twenty Sixth Annual Hawaii International Conference on Systems Sciences*, Hawaii, 689–698.

Hooff, B. van den, & Weenen, F. L. van (2004). Committed to share: commitment and CMC use as antecedents of knowledge sharing. *Knowledge and Process Management*, *11*(1), 13–24.

Huisman, M. (2000). Imputation of Missing Item Responses: Some Simple Techniques. *Quality & Quantity 34*(4), 331-351.

Ignacio, R., Helms, R.W., Brinkkemper, S., & Zonneveld, A. (2009). Limitations of network analysis for studying efficiency and effectiveness of knowledge sharing. In E. Bolisani & Scarso (Eds.), *Proceedings of the 10th European Conference on Knowledge Management* (pp. 399-408). Academic Conferences.

Jarvenpaa, S. L., & Stoddard, D. B. (1998). Business process redesign: Radical and evolutionary change. *Journal of Business Research, 41*(1), 15–27.

Jashapara, A. (2004). *Knowledge Management, An Integrated Approach*. Harlow: Pearson Education Limited.

Kallio, J., Saarinen, T., Salo, S., Tinnilä, M., & Vepsäläinen, A.P.J. (1999). Drivers and tracers of business process changes. *Journal of Strategic Information Systems, 8*, 125-142.

Kaplan, R. S., & Norton, D. P. (1992). The balanced scorecard--measures that drive performance. *Harvard Business Review*, *70*(1), 71-9.

Kettinger, W. J., Teng, J. T. C., & Guha, S. (1997). Business Process Change: A Study of Methodologies, Techniques, and Tools. *Management Information Systems*, *21*(1), 55-80.

Kiger, P.J. (2005). The coming knowledge drain. *Workforce Management*, November 21, 52-54.

Kim, S., Hwang, H., & Suh, E. (2003). A Process-based Approach to Knowledge-Flow Analysis: A Case Study of a Manufacturing Firm. *Knowledge and Process Management*, *10*(4), 260-276.

Kwak, H., Lee, C., Park, H., & Moon, S. (2010). What is Twitter, a social network or a news media? (pp. 591–600). Presented at the WWW '10 Proceedings of the 19th international conference on World wide web, Raleigh, North Carolina, USA: ACM.

Kwon, D., Oh, W., & Jeon, S. (2007). Broken Ties: The Impact of Organizational Restructuring on the Stability of Information-Processing Networks *Journal of Management Information Systems 24*(1), 201–231.

Lesser, E. & Prusak, L. (2004). *Creating Value with Knowledge: Insights from the IBM Institute for Business Value*. New York: Oxford University Press.

Levantakis, T., Helms, R. W., & Spruit, M. (2008). Developing a Reference Method for Knowledge Auditing. *Practical Aspects of Knowledge Management* (pp. 147-159). Heidelberg: Springer Berlin.

Li, L.C., Grimshaw, J.M., Nielsen, C.P., Judd, M., Coyte, P.C., & Graham, I.D. (2009). Evolution of Wenger's concept of community of practice. *Implementation Science, 4*(11), 1-8.

Liebowitz, J. (2005). Linking social network analysis with the analytic hierarchy process for knowledge mapping in organizations. *Journal of Knowledge Management*, *9*(1), 76-86.

Lobontiu, G., & Big, R. (2006). Implementing business process reengineering. *Proceedings of the 6th International Carpathian Euro-Region Specialists in Industrial Systems,* 231-236.

Mansar, S. L., & Reijers, H. A. (2007). Best practices in business process redesign: use and impact. *Business Process Management Journal, 13*(2), 193–213.

Markus, M. L., Majchrzak, A., & Gasser, L. (2002). A Design Theory for Systems that Support Emergent Knowledge Processes. *MIS Quarterly 26*(3), pp. 179-212.

Martin, R. L. (2011) The local geographies of the financial crisis: from the housing bubble to recession and beyond*. Journal of Economic Geography, 11*, 587–618.

Matthews, J. R. & Matthews, R. W. (2008). *Successful scientific writing: a step-by-step guide for biological and medical scientists*. New York: Cambridge University Press.

Moran, J. W. & Brightman, B. K. (2001). Leading organizational change. *Career Development International, 6*(2), 111 – 119.

Muresan, S., Tzoukermann, E., & Klavans, J. L. (2001). Combining linguistic and machine learning techniques for email summarization. *Proceedings of the ACL/EACL 2001 workshop on computational natural language learning (ConLL),* Toulouse, France, pp. 1–8.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization science*, *5*(1), 14–37.

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A Design Science Research Methodology for Information Systems Research. *Journal of Management Information Systems*, *24*(3), 45-77.

Porter, M. E., & Millar, V. E. (1985). How information gives you competitive advantage. *Harvard Business Review*, *63*(4), 149-160.

Povey, B. (1998). The development of a best practice business process improvement methodology. *Benchmarking: An International Journal*, *5*(1) 27 – 44.

Reijsen, J. van & Helms, R.W. (2009). Revealing Knowledge Networks from Computer Mediated Communication in Organizations. P*roceedings of the 17th European Conference on Information Systems*, Verona, Italy, pp. 2503-2515.

Reijsen, J. van, Helms, R.W., Jackson, T.W., Vleugel, A., Tedmori, S. (2009). Mining E-mail to leverage knowledge networks in organizations. *Proceedings of the 10th European Conference on Knowledge Management*, Vicenza, Italy, pp. 870-878.

Remus, U., & Schub, S. (2003). A Blueprint for the Implementation of Process-oriented Knowledge Management. *Knowledge and Process Management*, *10*(4), 237-253.

Rylander, A. & Peppard, J. (2004). What is Really a Knowledge Intensive Firm? An Analysis of the Dependent Variable. In Bart, Bontis and Head (Eds.) *Proceedings of the 25th McMaster World Congress*, Janeiro de 2004, Hamilton, Canada: MWC.

Safran, R. J., Neuman, C. R., McGraw, K. J., & Lovette, I. J. (2005). Dynamic Paternity Allocation as a Function of Male Plumage Color in Barn Swallows. *Science*, *309*(5744), 2210 -2212.

Schreiber, G., Akkermans, H., Anjewierden, A., De Hoog, R., Shadbolt, N., Van de velde, W., & Wielinga, B. (2000). *Knowledge engineering and management: The CommonKADS Methodology.* Cambridge: MIT Press.

Scott, J. (2000). *Social Network Analysis: A Handbook*. London: Sage Publications.

Seeley, C. P. (2002). Igniting Knowledge in your Business Processes. *KM Review*, *5*(4), 12-15.

Sethi, V. & King, W.R. (1998). Introduction to Business Process Reengineering. In Sethi, V., King, W.R. (Eds.), *Organizational Transformation through Business Process Reengineering. Applying the Lessons Learned (p. 3-36)*. New Jersey: Prentice Hall.

Shaw M., Subramaniam C., Woo Tan G., & Welge, M. (2001). Knowledge management and data mining for marketing. *Decision support systems. 31*(1), 127-137.

Simon, H. (1996). *The Sciences of Artificial*. Cambridge: MIT Press.

Spek, R. van der, Hofer-Alfeis, J., & Kingma, J. (2003). The knowledge strategy process, in Holsapple, C.W. (Ed.), *Handbook on Knowledge Management 2: Knowledge Directions*, Springer, Berlin, pp. 443-66.

Starbuck, W. H. (1992). *Learning by knowledge intensive firms. Journal of Management Studies, 29*(6), 713-740.

Teece, D.J., Pisano, G. & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal, 18*, 509–533.

Treacy, M., & F. Wiersema (1993). Customer intimacy and other value disciplines. *Harvard Business Review, 71*(1), 84–93.

Tsai, W. (2001). Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. *Academy of Management Journal, 44*(5), 996–1004.

Valirys, G., & Glykas, M. (1999). Critical review of existing BPR methodologies: The need for a holistic approach. *Business Process Management Journal, 5*(1), 65-86.

Wasserman, S., & Faust, K. (1994). *Social Network Analysis: Methods and Applications,* Cambridge, England: Cambridge University Press.

Webster, J., & Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review. *MIS Quarterly*, *26*(2), 13-23.

Weerd, I. van de, & Brinkkemper, S. (2008). Meta-modeling for situational analysis and design methods. In M.R. Syed and S.N. Syed (Eds.), *Handbook of Research on Modern Systems Analysis and Design Technologies and Applications (pp. 38-58)*. Hershey: Idea Group Publishing.

Wenger, E., McDermott, R., & Snyder, W. (2002). Cultivating Communities of Practice. Cambridge: Harvard Business School Press.

Wenger, E., & Snyder, W.M. (2000). Communities of Practice: The organizational frontier. *Harvard Business Review*, 78 (January-February), 139-145.

Yin, R. (2003). *Case study research: Design and methods*. Beverly Hills: Sage Publishing.

Zack, M. (1999). Managing Codified Knowledge. *Sloan Management Review 40*(4), 45-58.

Zack, M., McKeen, J., & Singh, S. (2009). Knowledge management and organizational performance: an exploratory analysis. *Journal of Knowledge Management, 13*(6), 392 – 409.

Zelkowitz, M., & Wallace, D. (1998). Experimental Models for Validating Technolog*y. IEEE Computer, 31*(5), pp. 23-31.

Zhuge, H., (2002). A knowledge flow model for peer-to-peer team knowledge sharing and management. *Expert Systems with Applications*, 23(1), pp. 23-30.
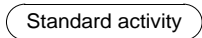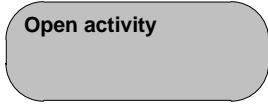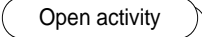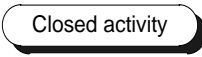
Appendices

Appendix A: Thesis planning

Deliverable	Phase	Date
Research Request	Preparation	01/04/2012
Long Proposal	Preparation	20/04/2012
Related work chapter	Literature study	27/04/2012
Research approach chapter	Literature study	15/05/2012
Related literature chapter	Literature study	01/06/2012
Organizational goals translation approach (step 1)	Literature study	25/06/2012
Knowledge domains and knowledge sharing mapping (step 2)	Literature study	05/07/2012
Knowledge transfer approach + ensure that old organization remains operational (step 3)	Literature study / case study	15/08/2012
First version survey	Case study	19/06/2012
Final survey	Case study	22/06/2012
Define demands new organization (regarding employees)	Case study	August 2012
Survey data analysis	Case study	01/09/2012
Preliminary results	Case study	15/09/2012
Expert evaluation	Case study	September / October 2012
Recommendations for InsuranceCo	Case study	01/10/2012
Results	Finalize thesis	04/10/2012
Conclusions & Discussion	Finalize thesis	07/10/2012
0.99 version of thesis	Finalize thesis	15/10/2012
First version scientific paper	Finalize thesis	26/10/2012
Final version scientific paper	Finalize thesis	10/11/2012
Final version of thesis	Finalize thesis	10/11/2012
Thesis defense	Finalize thesis project	20/11/2012

Appendix B: PDD Quick guide

This appendix provides a short explanation of the different elements used in a Process Deliverable Diagram (PDD). All descriptions are based on van de Weerd and Brinkkemper (2008).

Activities

A PDD can consist of different activities. These activities are defined for the following reasons: the scope of the PDD can be defined, the clarity of the diagram can be improved, or to indicate that the sub activities are not relevant in the specific context. The different activities and their explanation are presented in the table below.

Activity	Type	Description
Standard activity	Standard	An activity that has no further sub activities.
Open activity Open activity	Complex, open	An activity that consists of sub activities that are described in the same PDD (as indicated by the top image) or in a different diagram (as indicated by the bottom image).
Closed activity	Complex, closed	An activity that consists of sub activities that are not discussed any further, because these are not known or not relevant for the specific context.
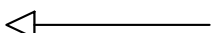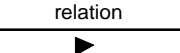
Concepts

In a PDD (almost) all activities have a deliverable, called a concept. There exist three different types of concepts. It could be the case that there are properties assigned to a concept. These are written in lower case below the concept name. The names of concepts are always written in capitals. The different concepts are discussed in the table below.

Concept	Type	Description
STANDARD CONCEPT	Standard	A concept that has no further sub concepts
OPEN CONCEPT	Complex, open	A concept that consists of an aggregate of other concepts which are discussed in the same PDD or an accompanied one.
CLOSED CONCEPT	Complex, closed	A concept that consists of an aggregate of other concepts. These other concepts are not further discussed because they are unknown or not relevant for the particular context.

Relations

The PDD makes use of different types of relations between the deliverables (concepts). These relations are indicated with different arrows which are presented in the table below. Each arrow is accompanied with a multiplicity characteristic. This value indicates how many concepts are connected to other concept(s).

Arrow	Type	Description
	Aggregation	A 'has a' or 'consists of' relationship or it specifies a relation between a concept containing other concepts.
	Generalization	A relationship between a general concept and a more specific concept.
relation	Association	A structural relationship that specifies how concepts are related to each other. The arrow is accompanied with a description and a direction.

Appendix C: Open complex activities

Specify business case
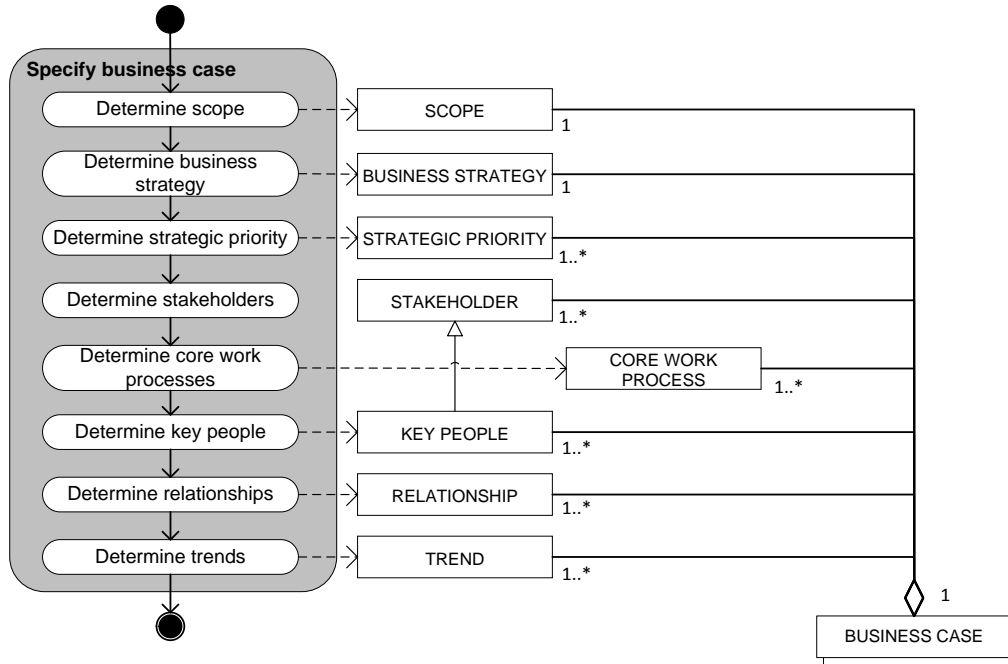
Figure 17 Activity: Specify business case

Activity	Sub activity	Description
Specify business case	Determine scope	The scope of the business transformation is defined.
	Determine business strategy	The business strategy of the new organization is defined.
	Determine strategic priority	The strategic priority of the activities related to the business transformation is defined.
	Determine stakeholders	The stakeholders of the business transformation are identified.
	Determine core work processes	The most important work processes within the organization are identified.
	Determine key people	The key people related to the business transformation conduction are identified.
	Determine relationships	Relationships with other parties are identified.
	Determine trends	Trends in the (direct) environment are identified.

Table 19 Activity table 'Specify business case'

Deliverable	Description
SCOPE	The scope describes what will be done during the business transformation and what is outside its scope.
BUSINESS STRATEGY	The strategy of the to-be developed organization.
STRATEGIC PRIORITY	The activities that should be conducted first.
STAKEHOLDER	Actors that are involved in the business transformation.

CORE WORK PROCESS	The most important work processes that are involved in the transformation.
KEY PEOPLE	The actors involved in the business case, i.e. who play an active role in the transformation.
RELATIONSHIP	Interactions with other parties (e.g. other departments) that may influence the transformation
TREND	Important developments in the (direct) environment that may impact the transformation.

<div align="center">Table 20 Deliverable table 'Specify business case'</div>

Create survey
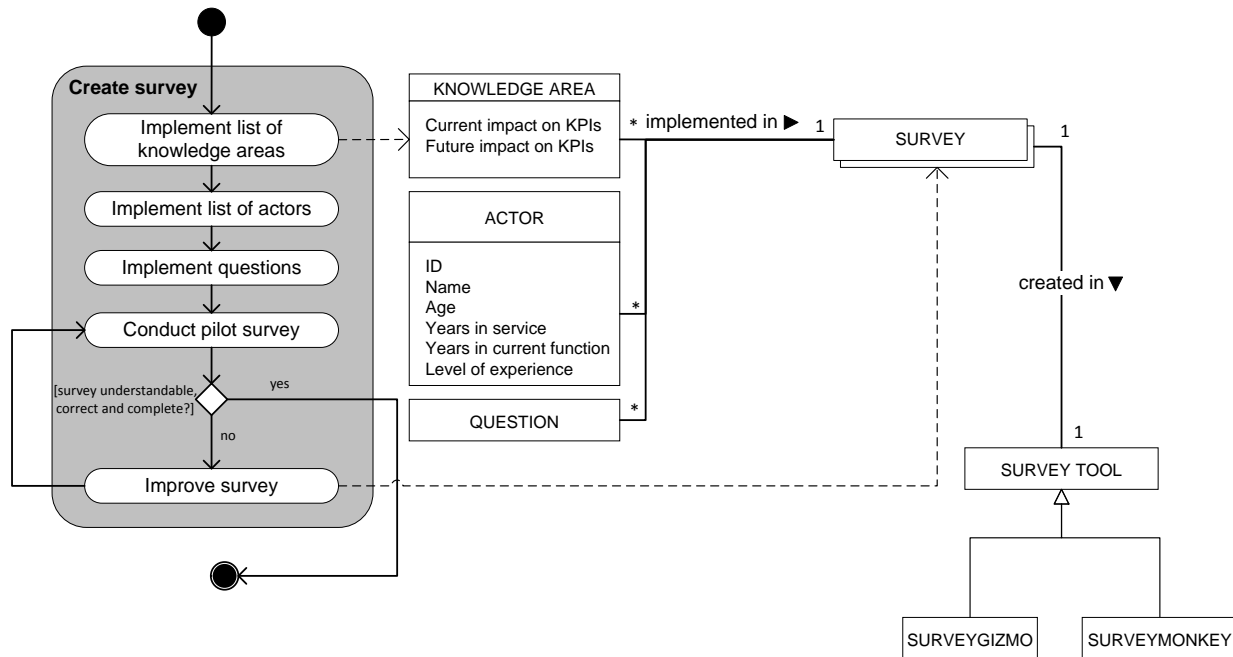
<div align="center">Figure 18 Activity: Create survey</div>

Activity	Sub activity	Description
Create survey	Implement list of knowledge areas	The KNOWLEDGE AREAs which are identified within the organization are implemented in the survey to identify which employee possesses what knowledge.
	Implement list of actors	The list of ACTORs is implemented in the SURVEY in order to let employees indicate from whom they receive knowledge
	Implement questions	The QUESTIONs of the survey are implemented.
	Conduct pilot survey	A pilot SURVEY is conducted in order to determine whether the SURVEY is understandable, correct and complete.
	Improve survey	Based on the results of the pilot SURVEY the SURVEY is improved. In case of numerous improvements one can decide to conduct another pilot.

<div align="center">Table 21 Activity table 'Create survey'</div>

Deliverable	Description
KNOWLEDGE AREA	A knowledge domain or area is defined by Schreiber et al. (2000) as "*a coherent cluster of insights, experiences, theories, and heuristics*".
ACTOR	The employees of the organization or department that is subject of the business transformation. They have to fill in the SURVEY and are part of it.
SURVEY	Collection of questions that identify KNOWLEDGE AREAs that employees possess and how knowledge is shared within the organization.
QUESTION	A QUESTION asks the respondent to provide information.
SURVEY TOOL	A tool used to create and conduct a survey. A SURVEY TOOL also provides means to store and analyze survey results.
SURVEYGIZMO / SURVEYMONKEY	Two examples of SURVEY TOOLs. Numerous (online) tools exist. One can also decide to create the SURVEY on paper.

Table 22 Deliverable table 'Create survey'

Reassign actors to new organization
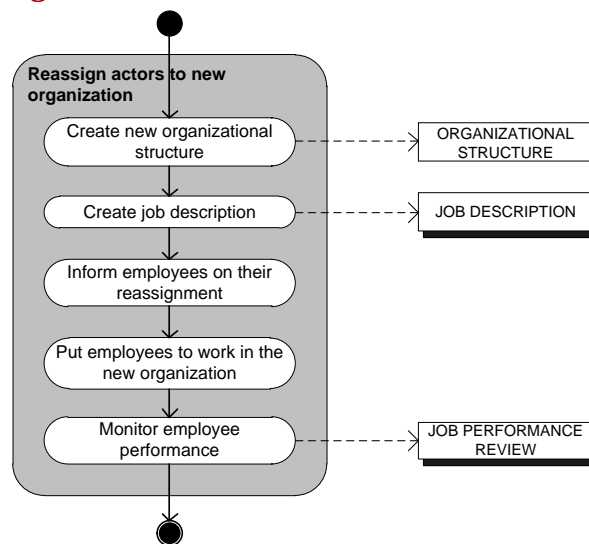
Figure 19 Activity: Reassign actors to new organization activity

Activity	Sub activity	Description
Reassign actors to new organization	Create new organizational structure	A structure for the new organization is created. This structure describes the amount of employees or FTE, the assignment of tasks and responsibilities.
	Create job description	For each new function in the new organization a JOB DESCRIPTION is created. This consists of a description of tasks and responsibilities, competences, information on wages, etcetera.
	Inform employees on their reassignment	As soon as the list of employees that will be reassigned is final these employees should be informed by management on their reassignment.

	Put employees to work in the new organization	The employees start to work according their new JOB DESCRIPTION.
	Monitor employee performance	Monitor whether employees are doing their work at the required level of quality.

Table 23 Activity table 'Reassign actors to new organization'

Deliverable	Description
ORGANIZATIONAL STRUCTURE	Describes the amount of employees or FTE, the assignment of tasks and responsibilities, and the hierarchy within the organization.
JOB DESCRIPTION	This is a description of tasks and responsibilities, competences, information on wages, etcetera.
JOB PERFORMANCE REVIEW	This review investigates the quality of work an employee delivers.

Table 24 Deliverable table 'Reassign actors to new organization'

Appendix D: Knowledge portfolio template

		KPI 1		KPI 2		Total	
	Weight factor	**1**		**2**			
	Knowledge area	**current**	**future**	**current**	**future**	**current**	**future**
A	Knowledge area 1	1	3	1	2	1	3
B	Knowledge area 2	2	4	1	5	1,33	4
C	Knowledge area 3	2	2	3	2	2,67	2
D	Knowledge area 4	1	2	2	2	1,67	2
E	Knowledge area 5	3	4	3	3	3	3,33
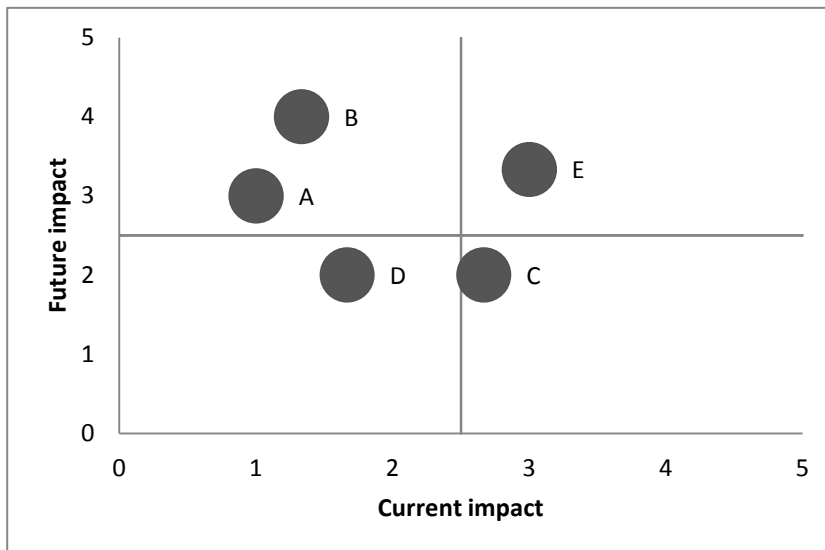
Appendix E: Case study design

A study's question

The case study will be conducted in order to evaluate the developed method. The results of the case study will be compared to the goals of the method in order to gain insight into the correctness, completeness, ease of use, and practical value for the organization of the business transformation method. The case study will answer the following question:

"Is the developed method *correct, complete, easy to use, and valuable* for organizations whereby knowledge areas and knowledge networks play an important role?"

To check correctness the results of the method will be discussed with involved management to validate whether the overview of the employees that should be reassigned seems plausible. The purpose and goals of the method are compared to the results of the method to check whether the method is complete, i.e. all goals that should be achieved with the method are actually achieved. The ease of use is measured by evaluating the usage of the method. Criteria that will be discussed are the time needed to conduct the method and the complexity of the steps that have to be taken. The practical value of the method will be graded based on discussion of the results with management. Management can indicate whether the results of the method add value to the organization, i.e. that decisions can be made based on the results.

Propositions

Several propositions are formulated that will be used to evaluate the method. These propositions are listed in this section.

- The Knowledge Strategy Process is a suitable method for translating the business goals into knowledge domains that are required to reach those goals.
- The Knowledge Network Analysis is a suitable technique to map different knowledge domains and knowledge networks within an organization.
- Based on the information gathered while conducting the Knowledge Strategy Process and Knowledge Network Analysis useful decisions can be made regarding knowledge transfer and to ensure that the old organization remains operational.
- The method is correct, complete, easy to use, and valuable for an organization.

Unit of analysis

The unit of analysis in this case study is the department business insurances of the Dutch insurance company InsuranceCo. This department will undergo a business transformation in the upcoming years. The department consists of approximately 454 employees divided over 24 sub divisions.

Logic linking of data and propositions

The propositions will be adopted or rejected based on three different sources. First of all, the data gathered during the case study will be used to evaluate whether KSP and KNA are suitable approaches. Secondly, the execution of the method itself will be evaluated by means of a discussion with management in order to grade the correctness, completeness, ease of use, and value for the organization. Lastly, the method will be evaluated by business transformation experts and a

network analysis expert, also to grade the correctness, completeness, ease of use, and value for the organization.

Criteria for interpreting the findings
Different criteria will be used to interpret the findings of the case study and to answer its question. For each aspect on which the business transformation is evaluated during the case study the criteria are discussed.

Correctness. During and after conducting the case study the gathered information will be reviewed in order to decide whether the method is correct. Correctness means that the method can facilitate a business transformation in knowledge-intensive organizations (by complementing existing methods).

Completeness. After the case study is conducted the completeness of the method is discussed with management. This discussion results in an overview of steps and/or elements that are missing in the current form of the method. Based on this overview decisions can be made on a possible extension of the method.

Ease of use. The method should be developed and modeled in a way that it is easy to use by management that wants to conduct a business transformation. It is also important that all stakeholders can understand and interpret the output of the method. Criteria that will be used are the time needed to conduct the method and the complexity of the steps that have to be taken.

The practical value of the method. The practical value of the method can best be measured by the usability of the results of the method. Therefore, these results will be discussed with management. They can grade their usability and provide suggestions for additional results that the method should deliver.

Appendix F: Case study protocol

Background

The research already conducted in the field of business transformations, business goals translation, and knowledge network analysis is discussed in detail in the third and fourth chapter of this thesis. Therefore, related literature will not be discussed in the case study protocol.

The main research question of this research is: *"How can a method be developed that complements existing business transformation methods and that facilitates a business transformation in knowledge-intensive organizations that acknowledge the knowledge dimension?"*. This method will be developed based on existing methods and techniques discussed in literature. The purpose of conducting a case study is to evaluate the developed method in a real-life setting. Thereby the following question will be answered: "Is the developed method *correct, complete, easy to use, and valuable for organizations* that acknowledge knowledge domains and knowledge networks?".

Additional sub questions are defined to support the main research question of this thesis:

1. Which business transformation methods already exist?
2. How can organizational goals be translated into required knowledge (areas)?
3. How can the required knowledge areas and knowledge sharing within an organization be mapped?
4. How can the required knowledge be transferred from the old organization to the new one, whereby the old organization remains operational?

Design

In this research a single holistic case study is performed. Reason to conduct only a single case study is that the case company is representative for other knowledge-intensive organizations. Holistic means that there is only one unit of analysis, namely the department business insurances of InsuranceCo.

The object of the study is a newly developed method suitable for organizations that acknowledge the knowledge dimension. During the case study this method will be evaluated.

The propositions derived from the case study question are discussed in detail in the case study design (Appendix E).

Data Collection

Data to be collected. Data will be collected on different topics from different sources. First of all, data on the business case of the transformation will be collected. This will be done based on the Knowledge Strategy Process (Van der Spek, Hofer-Alfeis & Kingma, 2002). Management of the department will be interviewed to define the business case and to translate business goals into required knowledge areas. Secondly, data on the knowledge network will be collected based on the Knowledge Network Analysis (Helms, 2007). This consists of data on which knowledge employees possess and how this knowledge is shared within the organization.

Data collection plan & Data storage. Data to create the business case will be collected by conducting interviews with management of the department business insurances. This will take place in the first 8 weeks of the case study. Minutes are taken during the interviews so valuable information will be retained. The created business case, the execution and result of the Knowledge Strategy Process will also be documented.

Data on knowledge domains and knowledge networks will be collected based on a survey. This survey is created with an online survey tool, called SurveyGizmo[11]. The survey is sent out on the 26th of June, 2012. Responses is collected in a period of approximately three months. Of the 454 employees 316 filled in the survey, which is a score of 69.5%. The results were stored in a spreadsheet. After that, the spreadsheet was imported in Netminer for analysis.

Analysis
Different criteria will be used to interpret the findings of the case study and to answer its question. The criteria are discussed in Appendix E.

Plan Validity
The validity of the case study is discussed in section 2.4.

Study Limitations
The method is only evaluated with a single case study. Therefore, the results are hard to generalize. To overcome this limitation the method is evaluated with business transformation and network analysis experts.

Reporting
The results of the case study will be discussed in two different reports. The first report will be used to answer the case study's question: "Is the developed method *correct, complete, easy to use, and valuable for organizations* that acknowledge knowledge areas and knowledge networks?". This report will be incorporated in this thesis and in the scientific paper with the purpose to discuss the method. Target audience is the scientific community. The second report will be used to provide InsuranceCo advice on their business transformation process. This document will consist of recommendations on which knowledge should be transferred to reach the goals of the new organization, which employees have this knowledge, and the effects of the reassignment of employees in the old organization. Target audience is the management of the department business insurances of InsuranceCo.

---

[11] http://www.surveygizmo.com

Appendix G: InsuranceCo - Business case

Scope

InsuranceCo is coping with major challenges as a result of the development of the (direct) environment:

- Tough economic conditions.
- Changing needs of customers.
- Low customers' confidence in insurance companies.
- Changing competition.
- Tighter laws and regulations.

These challenges require a transformation in the way InsuranceCo is conducting business. This transformation has to lead to new products that focus on specific segments of the market. Part of InsuranceCo is business insurances which insures companies against damage.

Business strategy

The changes in environment and customers' needs have led to a new strategy for InsuranceCo. This strategy consists of the following objectives:

- InsuranceCo is at the top of insurances companies and has the highest customer satisfaction rating.
- InsuranceCo is leading the way in its sector and delivers a healthy and permanent result for its shareholders.
- For employees, InsuranceCo is a company where you want to work.

To reach these objectives the following priorities are established:

- InsuranceCo changes from customer-focus to customer-driven.
- InsuranceCo makes genuine choices in products, services and distribution.
- InsuranceCo renews its systems and thereby in products or services at a competitive price.

InsuranceCo translated this strategy and its priorities in the following objectives for the period until 2016:

- Optimal customer satisfaction via excellent service through multi-channel distribution.
- Customer satisfaction and Net Promoter Score (NPS) as basis for continuous improvement.
- One SAP-landscape (no outdated IT-systems).
- Streamlining processes by substantial efficiency improvement in the back office.
- Radically improve time-to-market.

Based on these objectives, the following concrete goals can be defined:

- Create a rationalized product range. Put focus on selected target audiences and sectors.
- Achieve and maintain a faster growth than the market.
- Achieve and maintain a combined ratio improvement.

- Achieve an efficiency improvement, partly based of a high degree of Straight-Through Processing (STP).
- Achieve and maintain a cost ratio improvement.
- Achieve and maintain a positive NPS-score
- Create an organization with employees that fit in the newly created profile and that are fan of InsuranceCo.
- Create a converted portfolio to the target platform, i.e. implement new information systems that fit to the product portfolio.

Strategic priority

A high level planning indicates which activities should be conducted first. However, because this is competitive sensitive information it is left out.

Stakeholders

The stakeholders are left out, as this is competitive sensitive information. Only the roles/functions are provided.

Role / function
Business Executive transformation business insurances
Sponsor of the transformation business insurances
Senior Manager business insurances / Senior User
Senior Manager business insurances / Senior User
Program Manager transformation C&TI/Senior supplier
Manager Acturial / Senior Supplier
Senior HR Consultant/ responsible for HR transition
Senior Marketer/ Senior Supplier/ Project leader workflow Customers / Marketing
Business Development manager business insurances / Benefits management
Manager (pilot) Team Zekerheidspakket/ Projectleader HR& Organisatie
Project leader Conversion business insurances Project leader ADN
IT Project leader Zekerheidspakket
Employee operational risk management/Internal Control
Compliance Officer/Legal & Compliance
Finance/MA
Master Blackbelt InsuranceCo
Manager Communicatie InsuranceCo
Directeur Sales InsuranceCo
Accountmanager Sales
Accountmanager Sales
Communications officer Transformation business insurances

Core work processes

This following table describes the most important phases of the business transformation.

Project Delivery Structure –Project Schedule			
Name	**Short Description**	**Planned Start date**	**Planned End date**
Program plan	Increase clarity of the transformation. Define goals, budget, related projects, impact, resources, and etcetera.	04-06-12	01-08-12
Products, Processes and IT.	Development of target products and related processes and system architecture.	01-01-10	01-01-16
Customers	Translation of the InsuranceCo strategy to target groups, products and distribution and communication channels.	01-01-11	01-07-15
HR & Organization	The development of an organizational structure that fits to the new processes and products.	01-07-12	01-01-16
Conversion	Clear the old Legacy systems and facilitate the conversion from the old data to the new SAP system.	01-06-12	01-07-15
Communication	Defining a communication plan to communicate the transformation, to facilitate the internal and external communication and to monitor the execution.	01-09-12	01-07-15
Benefits management	Development of a business case for the transition.	25-06-12	01-01-16

Key people

Key people in this business case bear the responsibility of a successful transformation of the department business insurances. However, because this is confidential information it is left out of this thesis.

Relationships

There are numerous other projects within InsuranceCo that have overlap with the transformation of business insurances. The relationship between the transformation of business insurances and other projects is presented in the table on the next page.

Name project	Relationship with transformation business insurances
NPS	Defines measure for customer perception. Indicates what a specific score on the NPS means. Provides input for improvements of customer perception.
CRM	Provides information on customers. Provides insight on how to proactively approach existing customers.
Distribution strategy intermediary	Distribution of products to customers.
Distribution strategy	Distribution of products to customers.
Project Customer View CITO	SAP installation. Conversion to new IT systems.

Trends

InsuranceCo is coping with major challenges as a result of the development of the (direct) environment. The development of the following trends should be taken into account during the transformation because they could lead to a change in scope and/or requirements.

- Tough economic conditions.
- Changing needs of customers.
- Low customers' confidence in insurance companies.
- Changing competition.
- Tighter laws and regulations.

Appendix H: Knowledge areas list

The following list of knowledge areas was created based on function profiles, discussion with management, clustering, and a pilot survey.

A. Acceptatiebeheer (inclusief risicobeheersing / risicobeoordeling / risicoanalyse/ administratieve afhandeling)
B. Fraudedetectie / fraudeanalyse / fraudepreventie / fraudebestrijding
C. Klantcontact
D. Klantbehoeften / wensen
E. Marktontwikkeling
F. Portefeuillebeheer
G. Schadebehandeling (schadebeheersing + schadeafhandeling)
H. Project- en changemanagement
I. Audit uitvoering
J. Productmanagement (productontwikkeling / productbeheer)
K. Productbeleid / ketenregiebeleid / beleidsvorming
L. Accountmanagement
M. Support: Grafische producten / ICT / Medische adviezen / Juridische aspecten / Administratie / Financiële planning
N. Business analytics (data analyse)
O. Kwaliteitsbeheer
P. Technische inspectie
Q. Bouw / Vervoer / Transport

Appendix I: Full knowledge portfolio

	Knowledge area	Weight factor	NPS 3		Productportfolio 0		Market growth with respect to competitors 1		Combined ratio 2		STP rate 1		Cost ratio 1		WPC score 2		Conversion rate 2		Total	
			current	future	current	future	current	future	current	future	current	future	current	future	current	future	current	future	current	future
A	Acceptatiebeheer (inclusief risicobeheersing / risicobeoordeling / risicoanalyse/ administratieve afhandeling)		5	5	5	2	0	0	4	4	5	3	4	4	0	0	5	2	4,7	3,6
B	Fraudedetectie / fraudeanalyse / fraudepreventie / fraudebestrijding		0	0	0	0	0	0	2	2	3	1	2	2	0	0	0	0	2,25	1,166667
C	Klantcontact		3	5	0	0	0	0	0	0	0	1	0	0	0	0	1	5	2,2	5
D	Klantbehoeften / wensen		5	4	5	3	5	5	0	0	3	1	0	0	0	0	4	4	4	3,625
E	Marktontwikkeling		2	4	5	3	5	5	0	0	0	0	0	0	0	0	0	0	3,2	4
F	Portefeuillebeheer		0	0	0	0	0	0	4	4	0	0	4	4	0	0	2	2	3,2	1,3
G	Schadebehandeling (schadebeheersing + schadeafhandeling)		5	5	0	0	0	0	4	4	5	3	4	4	0	0	0	0	4,571428571	4,285714
H	Project- en changemanagement		5	3	5	3	5	3	5	3	5	3	5	3	0	0	5	3	5	3
I	Audit uitvoering		0	0	0	0	0	0	4	2	0	0	4	2	0	0	0	0	4	2
J	Productmanagement (productontwikkeling / productbeheer)		5	3	5	3	5	3	5	3	5	3	5	3	0	0	5	3	5	2,727273
K	Productbeleid / ketenregiebeleid / beleidsvorming		0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	3	3
L	Accountmanagement (richting tussenpersonen)		5	3	0	0	3	3	0	0	0	0	0	0	0	0	1	5	3,333333333	3,666667
M	Support: Grafische producten / ICT / Medische adviezen / Juridische aspecten / Administratie / Financiële planning		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N	Business analytics (data analyse)		1	5	1	5	3	5	4	5	0	3	1	3	1	3	0	0	1,63	3,9
O	Kwaliteitsbeheer		1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
P	Technische inspectie		2	4	0	0	0	0	3	3	0	0	3	3	0	0	0	0	2,5	3,5
Q	Bouw / Vervoer / Transport		2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2

Appendix J: The survey

On the 26th of June, 2012 the survey was sent out by the managers to the different sub departments within business insurances. The following email introduced the research to the employees (in Dutch):

Beste collega,

Voor InsuranceCo is kennis een belangrijke pijler. Het helpt het bedrijf om zich positief te onderscheiden van de concurrenten. Om de kennis ook in de toekomst te kunnen inzetten, is het belangrijk te weten waar kennis zit en hoe die tussen de werknemers wordt gedeeld.

Om hier inzicht in te krijgen heeft Lucas van den Bemd een enquête opgesteld. Lucas is sinds mei gestart als stagiair binnen Verzekeringen voor Bedrijven. Hij is binnen zijn afstudeeronderzoek bezig met het in kaart brengen van kennis en kennisdeling binnen een organisatie. Dit helpt onze organisatie in maximaal benutten van deze kennis.

Om tot zinvolle resultaten over kennis en kennisdeling binnen Verzekeringen voor Bedrijven te komen is het van belang dat **alle** werknemers deze enquête invullen, alleen dan kan inzicht worden verkregen in de kennisdeling binnen het netwerk. Ik wil je daarom vragen om deze enquête zo volledig mogelijk in te vullen. Het invullen van de enquête kost ongeveer 10 minuten van je tijd.

De resultaten van de enquête worden anoniem gemaakt; in de resultaten zijn de gegeven antwoorden dus niet naar jou persoonlijk terug te herleiden.

Je kunt de enquête invullen door onderstaande link te volgen:

https://edu.surveygizmo.com/s3/953128/enquete

Bij voorbaat dank voor je medewerking.

Met vriendelijke groet,

<naam manager>

On the following pages the survey is presented (in Dutch). In red a short English explanation is provided.

Kennisdomeinen en netwerken

The survey started with a short introduction in which the purpose and structure of the survey is explained.

Introductie

Geachte heer/mevrouw,

Allereerst hartelijk dank dat u deze enquête in wilt vullen. Ik ben Lucas van den Bemd en ik volg de master Business Informatics aan de Universiteit Utrecht. Voor mijn afstudeerscriptie doe ik onderzoek naar kennisdeling binnen kennisintensieve organisaties, zoals verzekeraars.

Voor InsuranceCo is kennis een belangrijke pijler. Het helpt het bedrijf om zich positief te onderscheiden van de concurrenten. Het doel van deze enquête is deze kennis in kaart te brengen. Want om kennis ook in de toekomst te kunnen inzetten, is het belangrijk te weten waar kennis zit en hoe die met elkaar wordt gedeeld.

Deze enquête bestaat uit twee delen:

• Het eerste deel gaat over de kennis die u bezit;

• In het tweede deel komt aan de orde van wie u kennis ontvangt, via welk medium dit gebeurt en met welke frequentie deze kennisdeling plaatsvindt.

Invullen van de enquête duurt ongeveer 10 minuten.

Ik ga strikt vertrouwelijk met deze gegevens om en gebruik ze alleen om kennisdeling binnen Verzekeringen voor Bedrijven in kaart te brengen. Ik maak de resultaten van de enquête anoniem. Antwoorden zijn hierdoor niet naar u terug te herleiden.

Wat is het resultaat?

Alle antwoorden komen in een 'netwerk'. Door het gebruik van bijvoorbeeld verschillende kleuren is daarmee snel te zien hoe de kennis 'door Verzekeringen voor Bedrijven heenloopt'. En dus ook waar kwetsbaarheden dreigen te ontstaan.

Indien u een eerder gegeven antwoord wilt wijzigen kunt u gebruik maken van de 'back'-knop van de enquête (onderaan de pagina). Let op: De 'back'-knop van uw browser werkt niet!

Mocht u nog vragen hebben naar aanleiding van de enquête dan kunt u contact opnemen met mij.

Lucas van den Bemd

l.vandenbemd@students.uu.nl

+31649752081

Achtergrondinformatie

Vult hieronder een aantal persoonlijke gegevens in. Uw voornaam en achternaam zijn nodig om het kennisnetwerk op te kunnen bouwen. Het is anders onbekend wie kennis van wie ontvangt.

Wat is uw voornaam?*

_____

Wat zijn uw eventuele tussenvoegsels?

_____

Wat is uw achternaam?*

_____

Wat is uw leeftijdscategorie?*

( ) 18 - 25

( ) 26 - 33

( ) 34 - 45

( ) 46 - 55

( ) 55+

Hoe lang bent u in dienst binnen Verzekeringen voor bedrijven?*

( ) 0 tot 5 jaar

( ) 6 tot 10 jaar

( ) 11 tot 15 jaar

( ) 16 tot 20 jaar

( ) 21 tot 25 jaar

( ) meer dan 25 jaar

Hoe lang bent u in dienst in uw huidige functie?*

( ) 0 tot 5 jaar

( ) 6 tot 10 jaar

( ) 11 tot 15 jaar

( ) 16 tot 20 jaar

( ) 21 tot 25 jaar

( ) meer dan 25 jaar

Kennisdomeinen

Geef in onderstaande lijst aan in welk kennisgebied u minstens 1 tot 2 jaar ervaring heeft. Meerdere keuzes zijn mogelijk (minimaal 1, maximaal 5). Indien een kennisgebied ontbreekt kunt u deze onderaan invoeren.

Let op: het betreft hier gebieden waar u kennis over heeft die u gebruikt tijdens het uitvoeren van uw werkzaamheden.

Het betreft hier dus geen afdelingen binnen Verzekeringen voor Bedrijven!*

[ ] Acceptatiebeheer (inclusief risicobeheersing / risicobeoordeling / risicoanalyse/ administratieve afhandeling)

[ ] Fraudedetectie / fraudeanalyse / fraudepreventie / fraudebestrijding

[ ] Klantcontact

[ ] Klantbehoeften / wensen

[ ] Marktontwikkeling

[ ] Portefeuillebeheer

[ ] Schadebehandeling (schadebeheersing + schadeafhandeling)

[ ] Project- en changemanagement

[ ] Audit uitvoering

[ ] Productmanagement (productontwikkeling / productbeheer)

[ ] Productbeleid / ketenregiebeleid / beleidsvorming

[ ] Accountmanagement

[ ] Support (Grafische producten / ICT / Medische adviezen / Juridische aspecten / Administratie / Financiële planning)

[ ] Business analytics (data analyse)

[ ] Kwaliteitsbeheer

[ ] Technische inspectie

[ ] Bouw / Vervoer / Transport

[ ] Anders, namelijk:

[ ] Anders, namelijk:

Expertiseniveau

Geef uw exerptiseniveau aan van de door uw geselecteerde kennisgebieden.

Beginner: 1 tot 2 jaar ervaring

Gemiddeld: 2 tot 5 jaar ervaring

Expert: meer dan 5 jaar ervaring*

	Beginner	**Gemiddeld**	**Expert**
Knowledge area 1			
Knowledge area 2			

The knowledge domains selected in the previous question are piped in the above table. For example, if an employee chooses 'Accountmanagement' as knowledge domain it appeared as row in the table. The respondent can indicate his or her level of expertise for a particular knowledge area.

Afdelingen

In this question the respondent has to indicate in which sub departments a colleague works from whom he or she receives knowledge.

De volgende vragen hebben als doel om kennisdeling binnen Verzekeringen voor Bedrijven in kaart te brengen. Door aan te geven van wie u kennis ontvangt kan een kennisnetwerk worden gecreëerd. Deze informatie zal dus enkel gebruikt worden voor het maken van het kennisnetwerk.

Alle informatie die u verstrekt zal worden geanonimiseerd en zal nooit openbaar herleidbaar zijn naar uw naam of enige andere vorm van persoonlijke identificatie.

 Geef de afdelingen aan waarin zich collega's bevinden van wie u kennis ontvangt. Op de volgende pagina kunt u dan die collega's aanvinken uit de betreffende afdelingen.

Let op: het gaat hierbij om het ontvangen van kennis behorende bij de kennisgebieden die u in een voorgaande vraag heeft geselecteerd.

Met kennis ontvangen wordt bedoeld:

- Een collega helpt u met het oplossen van een probleem
- Een collega verschaft u een vuistregel bruikbaar voor het uitvoeren van uw werkzaamheden
- Een collega geeft u een tip bij het oplossen van een probleem
- Een collega verschaft u documentatie bruikbaar voor het uitvoeren van uw werkzaamheden

Een voorbeeld van het ontvangen van kennis: Uw collega verschaft u een vuistregel die u helpt bij de beslissing over het al dan niet accepteren van een claim.

Weet u niet zeker onder welke afdeling een collega valt? Vink dan die afdeling aan om alle collega's uit die afdeling te bekijken.*

[ ] Claims AVB BA CAR (Claims Aansprakelijkheidsverzekering voor bedrijven / Beroepsaansprakelijkheidsverzekering / Construction all-risk)

[ ] Claims Brand & Regres

[ ] Claims Letsel & Speciale Zaken

[ ] Claims Transport & WM (Claims Transport & Werkmaterieel)

[ ] Claims Vervoer & Garage

[ ] Generiek Brand Varia

[ ] Generiek BVT (Generiek Bouw Vervoer Transport)

[ ] Letsel

[ ] Planning & Besturing

[ ] Speciale Zaken

[ ] Specifiek Brand Varia

[ ] Specifiek BVT (Specifiek Bouw Vervoer Transport)

[ ] Beheer & Claims

[ ] Business Change Management

[ ] IAM BVT (Intern accountmanagement Bouw Vervoer Transport)

[ ] IAM Noord (Intern accountmanagement Noord)

[ ] IAM Zuid (Intern accountmanagement Zuid)

[ ] Commercie

[ ] Inspectie

[ ] Klantcontact

[ ] Productmanagement & Verzekeringstechniek & Rendement

[ ] Verzekeringstechniek

[ ] Volmachten

[ ] Zekerheidspakket

Afdelingen

Geef in onderstaande lijst(en) aan van wie u kennis ontvangt.

Collega's staan alfabetisch gesorteerd op achternaam.

U kunt een collega snel vinden door de zoekfunctie van uw browser te gebruiken (CTRL + F).

Let op: het gaat hierbij om het ontvangen van kennis behorende bij de kennisgebieden die u in een voorgaande vraag heeft geselecteerd.

Here followed a list of the departments and its employees that were chosen in the previous question. Employees could indicate from whom they receive knowledge. This list is left out because of privacy issues.

Medium van kennisdeling

Geef hieronder aan via welk medium u kennis ontvangt. Meerdere antwoorden zijn mogelijk, minimaal 1 antwoord is vereist.

Indien u via een ander medium kennis ontvangt (bijvoorbeeld Social Media), kies dan de optie 'Anders'.

	Telefoon	Email	Face 2 face	Communicator	Anders
Employee					

Here followed a list of the employees that were chosen in the previous question. A respondent could indicate via which medium he or she receives knowledge. The choices were telephone, email, face 2 face, via the communicator, or other (e.g. via Social Media).

Frequentie van kennisdeling

Geef hieronder aan met welke frequentie u kennis ontvangt.

	tenminste 1x per dag	tenminste 1x per week	tenminste 1x per maand	tenminste 1x per half jaar	tenminste 1x per jaar
Employee					

Onderwerp van kennisdeling

Geef aan van welke kennisdomeinen u kennis ontvangt van onderstaande collega's

Here followed a table in which a respondent could indicate which knowledge he or she received from which colleague.

	Knowledge area 1	Knowledge area 2	Knowledge area 3	Knowledge area 4	Knowledge area 5
Employee					

Ontbrekende collega

Ontbreekt er volgens u een collega in een van de lijsten? U kunt hem of haar dan in onderstaand tekstvak invoeren. Geef per regel één collega wie u om kennis vraagt gevolgd door de frequentie en het medium en over welk kennisdomein kennis wordt gevraagd.

Let op: het dient hier enkel een collega van Verzekeringen voor Bedrijven te betreffen.

In this question a respondent could write down colleagues from whom he or she receives knowledge and that were missing in the list of employees.

Kennisbank

The following two questions investigate the usage of the knowledge repository.

10) Hoe vaak raadpleegt u de kennisbank van InsuranceCo?*

( ) Nooit

( ) Tenminste 1 keer per dag

( ) Tenminste 1 keer per week

( ) Tenminste 1 keer per maand

( ) Tenminste 1 keer per half jaar

( ) Tenminste 1 keer per jaar

11) Heeft u wel eens iets aangedragen voor de kennisbank?*

( ) Ja, dit is daadwerkelijk geplaatst.

( ) Ja, maar dit is nooit geplaatst.

( ) Nee.

Stelling

The last question investigates the respondent's opinion on the strategy of InsuranceCo.

12) Kies uit onderstaande stellingen de stelling die u op dit moment het beste bij InsuranceCo vindt passen.*

( ) InsuranceCo probeert haar kosten voor het aanbieden van haar diensten/producten zo laag mogelijk te houden.

( ) InsuranceCo probeert diensten/producten aan te leveren van een zo hoog mogelijke kwaliteit.

( ) Bij InsuranceCo staat de relatie met de klant centraal.

Opmerkingen enquête

Here, the respondent can give feedback on the survey.

13) U kunt hieronder eventuele op- en/of aanmerkingen op deze enquête noteren.

Bedankt voor uw medewerking!

The respondent is thanked for his cooperation.

Dit was het einde van de enquête. Hartelijk dank voor uw medewerking!

Appendix K: Interview protocol - Expert evaluation

Interviewed experts

Expert	Function	Experience
Dhr. P. Hofman	Partner at Deloitte Consulting	15 years in the field of business transformations
Dhr. F. Bovee	Director Insurance at Deloitte Consulting	13 years in the field of business transformations
Dhr. R. Aalbers	Assistant Professor Strategy & Innovation at Radboud University Nijmegen	10 years in the field of network analysis

Approach

The following steps were conducted during the expert evaluation:

1. The researcher introduces the research (what is the topic, what is the purpose, what is done so far).
2. The researcher describes the purpose of the interview and the topics that will be discussed.
3. The method is introduced. The PDDs are provided and all activities and sub activities are explained to the expert.
4. When the expert understands the method, preliminary results from the case study are presented. By doing so, the expert has an idea of what the output of the method will be.
5. The correctness of the method is discussed. The expert is asked what can be improved.
6. The completeness of the method is discussed. The expert is asked what should be added to the method (and what can be removed).
7. The ease of use is discussed. Focus is on whether the method can be used internally (without the help of an expert).
8. The practical value for the organization is discussed. Focus is on whether the results of the method actually will be used.
9. The expert is asked for any additional comments regarding the method.

Content of the interview
- Introduce research to the expert. What is the goal of the research, what are the results so far?
- Ask the expert his/her field of expertise and the amount of years of this expertise.
- Provide expert with the PDDs (explain the modeling technique) of the method and explain its purpose and approach.

Discuss the following criteria:

- **Correctness**. Is the method suitable for conducting a business transformation?
- **Completeness**. Are there steps missing in the method? Should some aspects be added or removed? What about the method fragments implemented in an already existing method?
- **Ease of use**. What is the time needed to conduct the method? Are the steps of the method too complex (e.g. explain some activities in more detail)? Are the results of the method clear and interpretable?
- **Practical value for the organization.** Are the results of the method usable/valuable for the organization? To what extent (e.g. partly, nice to know, very helpful)? Can they really help the organization in its transformation?

Appendix L: Adjustments made to the method

In this appendix the adjustments made to the method are presented. These adjustments are made based on the conduction of the case study and on the exert reviews. Adjustments made are presented in orange.
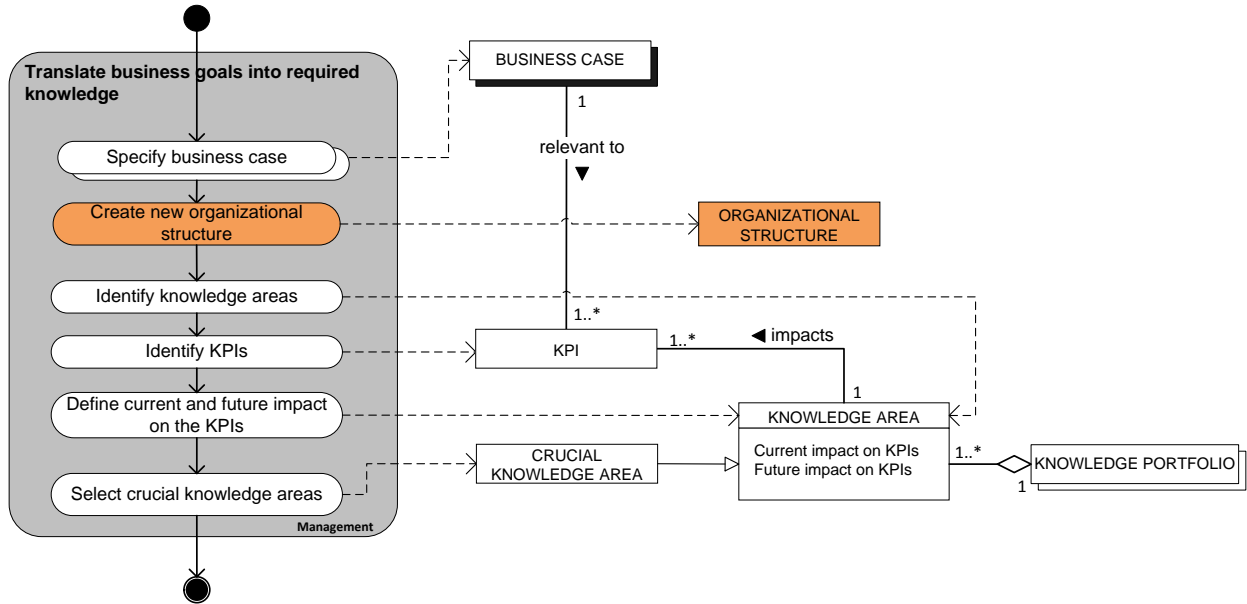

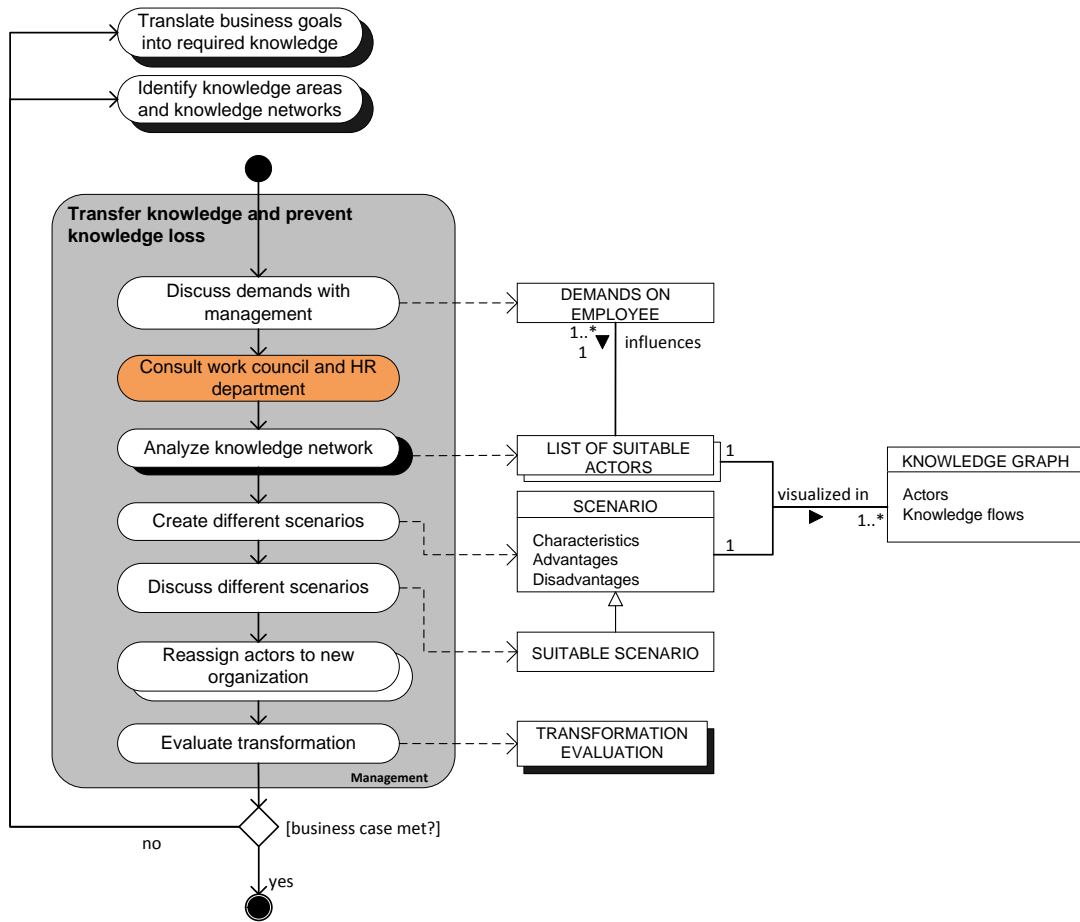Figure 20 Adjusted version of the first step
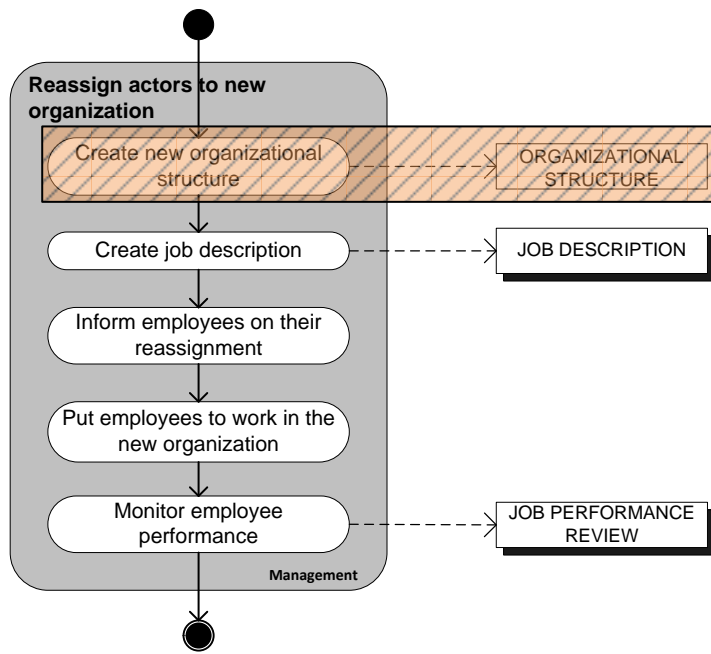
Figure 21 Adjusted version of the third step

Figure 22 Adjusted version of the open activity 'Reassign actors to new organization'

Appendix M: Case study approach

Step 1 Translate business goals into required knowledge

Specify business case. A business case is specified which is discussed in detail in Appendix G.

Identify knowledge areas. The knowledge areas within the organization were identified by analyzing function profiles. These function profiles are documents provided by the organization which describe in-depth what an employee should know and do and what his or her responsibilities are. This analysis resulted in a list of 28 knowledge areas. This list was discussed with management in order to check whether the list was complete and did not contain redundant knowledge areas. This discussion led to some minor adjustments, whereby one knowledge area was added that was not mentioned in the function profiles. Based on a pilot survey that was conducted the list was further improved. By clustering several similar knowledge areas the list was reduced to 17 knowledge areas. This final list of knowledge areas as used in the survey is presented in Appendix H. Although a list of 8 to 12 knowledge areas is perceived as optimal, the choice was made to stop clustering when the list reached the size of 17 knowledge areas. The decision was made because the knowledge areas became otherwise too abstract, i.e. employees did not know which knowledge area covered their knowledge (as became clear during the pilot survey).

Identify KPIs. The Key Performance Indicators which should measure whether the organizational goals are met were already defined by InsuranceCo in the business case.

Define current and future impact on the KPIs. The current and future impact of the 17 knowledge areas on the KPIs was defined during a brainstorm session with a senior product manager and an operational manager, who are both actively involved in the conduction of the transformation. In this case 'future' means in 3 to 4 years from now. First, the managers filled in the matrix individually. Secondly, they compared their matrices and discussed their discrepancies. This brainstorm session led to the final matrix presented in Figure 12 which visualizes the impact of the 17 different knowledge areas on the KPIs. The full knowledge portfolio can be found in Appendix I.

Select crucial knowledge areas. Based on the matrix the crucial knowledge areas could be identified. The crucial knowledge areas are those that have a high future impact on the KPIs (above 2.5), i.e. are pivotal in reaching the new organizational goals.

Step 2 Map knowledge possession and knowledge sharing

Identify actors. In the first activity of the second step the actors that are part of the organization of investigation were identified. These actors are the employees that should fill in the survey. Besides that, these actors are also included as answers on the question regarding knowledge sharing. Relevant data on the employees was provided by the Human Resources department of InsuranceCo. This data consists of email addresses, names, sex, functions, and sub departments. In total, 454 actors were identified.

Create survey. A survey was created to collect data on knowledge areas possession and knowledge sharing. The survey was created and data was gathered with the online tool SurveyGizmo[12]. An offline version of the survey is presented in Appendix J. To prevent resistance of employees to fill in the survey, it was not mentioned that the knowledge network will be used for identifying the suitable employees for the new organization. That is also the reason why all knowledge domains are used in the survey (and not only the crucial ones). The communicated goal was to map knowledge possession and knowledge sharing within business insurances. The survey investigates several aspects:

- **The years of service of an employee**. The years of service of an employee can be used to determine his or her experience level.
- **The age of an employee**. The age is asked in order to identify the possible effects on the knowledge network when employees retire.
- **The knowledge areas that an employee possesses accompanied by his or her level of experience**. The employee indicates for his or her knowledge areas whether he or she is a beginner (1 to 2 years of experience), an intermediate (3 to 5 years of experience), or an expert (more than 5 years of experience). An employee can be defined as an expert when he or she put more than 10,000 hours in a particular topic (Gladwell, 2008). Assuming an employee has a fulltime job for more than 5 years, he or she passes this 10,000 hour threshold. In order to be a beginner, an employee should have at least one year of experience. This threshold was chosen to prevent that each employee identified him- or herself as a beginner for a wide range of knowledge areas while knowledge is only occasionally used.
- **The knowledge sharing between employees**. An employee has to indicate from which of the 454 colleagues he or she receives knowledge. In order to keep the survey clear and organized the employees are subdivided into their departments. A respondent first has to select a department before he or she can select a colleague in this department.
- **The frequency, medium, and topic of knowledge sharing**. The employee has to indicate with which frequency he or she receives knowledge from a colleague (at least once a day, at least once a week, at least once a month, at least once a half year, or at least once a year). Then, the respondent has to fill in the medium through which knowledge is received. The respondent can choose multiple options (by telephone, email, face to face, online communicator, and/or another medium, e.g. social media). Finally, the respondent has to indicate which knowledge he or she receives from a colleague.
- **Whether an employee consulted the knowledge repository and with what frequency**. If the respondent uses the knowledge repository, he or she should indicate if this consultation is at least once a day, at least once a week, at least once a month, at least once a half year, or at least once a year. At InsuranceCo an integrative knowledge repository is in place: employees can only interact with the repository, not with other employees using it (Zack, 1999).

---

[12] www.surveygizmo.com

- **Whether an employee delivered knowledge to the knowledge repository**. Because, employees cannot place knowledge in the repository themselves (this is done by a repository manager), they have to indicate if they delivered content and whether this content was actually placed in the knowledge repository.
- **The strategy of InsuranceCo**. An additional question is asked to identify what employees think the strategy of InsuranceCo is, in order to determine whether this corresponds to the vision of management. They were asked to select the statement that best fits InsuranceCo. These statements are based on the value disciplines of Treacy and Wiersema (1993):
  - At InsuranceCo the relationship with the customer is pivotal (customer intimacy).
  - InsuranceCo tries to offer its products/services with the highest quality possible (product leadership).
  - InsuranceCo tries to keep the costs for offering its products/services as low as possible (operational excellence).

Before the survey was sent out to the employees of business insurances a pilot survey was filled in by a selected group of employees. Purpose of the pilot was to evaluate the survey on the understandability, correctness and completeness of the questions and to discover possible (logical) errors. The pilot showed out that several questions were not entirely clear and that there was an error when switching back and forth between questions. Based on the pilot's results the survey was improved and tested again. Based on this second test it was slightly improved and finalized.

Collect data. The final survey was sent out on the 26th of June 2012 by the managers of the different departments within business insurances. Hereby, management showed their support for this survey which likely resulted in a higher response rate (Helms, 2007). The managers sent a hyperlink to the website of SurveyGizmo were employees could fill in the survey online. By conducting a survey digitally, the data processing and analysis can be done significantly faster. After 4 weeks management sent a reminder to ask employees to fill out the survey if they have not done it yet. After 8 weeks a personal message was sent to those employees who did not fill in the survey, yet. Mid-August the response rate was still low (around 35%) which was probably a result of the holiday period. Hence, the data collection phase was extended with one month. In the second week of September a last reminder was sent by the business executive of the transformation which led to an extra boost in responses. On the 20th of September the data collection phase ended and the data analysis could start. On that date a response rate of 69.45% was reached and the survey was closed.

Identify knowledge flows. Based on the filled in survey knowledge possession and knowledge sharing between employees could be identified. The knowledge flows tell who receives knowledge from whom, with what frequency, via which medium, and on which topic. The collected data was imported into Netminer. Because respondents had to fill in from whom they receive what knowledge, the knowledge possession of employees who did not fill in the survey could be identified. Twenty-two employees where not mentioned by the respondents. Therefore, it is unknown which knowledge they possess.

Create knowledge graph. Netminer can be used to create several different knowledge graphs. The knowledge graphs provide a graphical insight in the different knowledge flows. The knowledge graphs can be used to identify the suitable employees for the new organization (i.e. the third step of

the method). For each different knowledge flow a graph was created. The frequency, each medium, and each knowledge area could individually be displayed. Netminer provide tools to combine the different knowledge graphs, e.g. to gain insight in the sharing of knowledge on 'Klantcontact' via telephone.

Step 3 Transfer knowledge

Discuss demands on employees. In a discussion with the business executive of the transformation, the demands on the employees for the new organization are defined.

The business executive is interested in the usage of the knowledge repository. In the future, this repository will become more and more pivotal in daily operations. Every actor consults the repository when knowledge is required, while only a few actors ensure that the repository remains current. This vision can be classified as a codification strategy which is defined as "*the process of conversion of knowledge into messages which can then be processed as information*" (Cowan & Foray, 1997). The tacit knowledge inside employees' heads is converted into explicit/codified knowledge and stored in a central database in order to facilitate reuse. By using a codification strategy knowledge becomes portable, reusable and/or transferable (Hall, 2006). However, codification also has several limitations (Desouza & Evaristo, 2004):

- Not all tacit knowledge is easily converted to explicit knowledge, resulting in an incomplete knowledge repository
- Valuable context information is often lost/forgotten or not incorporated in the repository
- Information overload, an employee is not able to find what he or she needs
- Employee may be reluctant to share their knowledge with everyone and do not upload their knowledge to the repository

InsuranceCo should keep these limitations in mind when further implementing the codification strategy. It is advised to reassign a group of actors with high power as it could be that they possess knowledge that is not or only partly present in the repository.

Analyze knowledge network. The analysis of the network is conducted to identify employees who are suitable to reassign to the new organization. The measurements discussed in section 4.3 are used to determine which of the 454 employees can be reassigned to the new organization.

Create different scenarios. Based on the knowledge network analysis and the demands of management different scenarios can be created. Additionally, the scenarios provide several knowledge graphs and describe the characteristics of the old network and the new one.

Discuss different scenarios. The different scenarios are presented to the business executive whereby the advantages and disadvantages of each scenario are discussed. Based on this discussion the most suitable scenario is chosen by the business executive. All details of that scenario are provided to the organization so it can be executed during the business transformation. The business executive chose the scenario whereby the youngest employees are reassigned. Because a codification strategy will be implemented only a few experts are required. Beginners or intermediates can consult the knowledge repository in case they lack knowledge to conduct

business. It is important to keep in mind that the two scenarios for the first stage only differ slightly. It is unlikely that one scenario leads to significant different results with respect to the other.

Reassign actors to the new organization. The actual reassignment of actors to the new organization will be done in the upcoming years. This is beyond the scope of this research. The constructed method describes a high-level approach which can be used to conduct this reassignment. The exact execution of this reassignment should be defined by the case company.

Evaluate transformation. Because the actual reassignment of actors to the new organization is beyond the scope of this research the business transformation cannot be evaluated yet. The evaluation of the transformation should be conducted by the case company after the actors are reassigned and the new organization is fully operational.
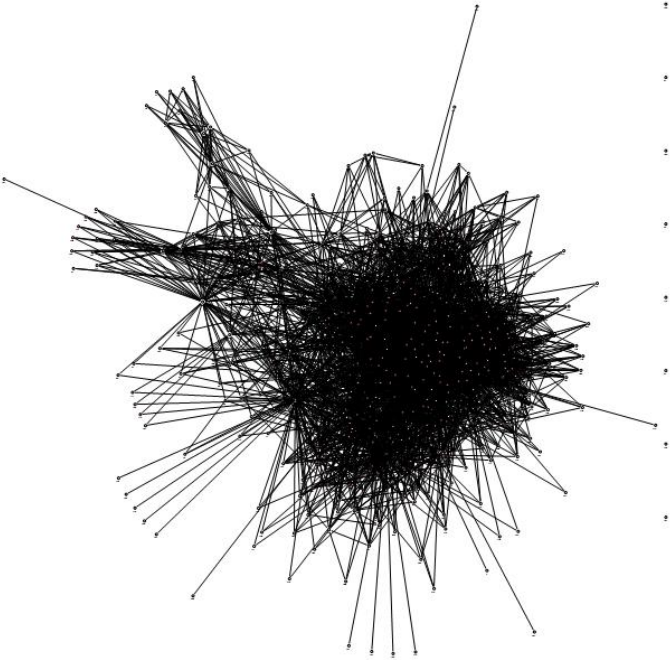
Appendix N: Knowledge graphs of the old organization
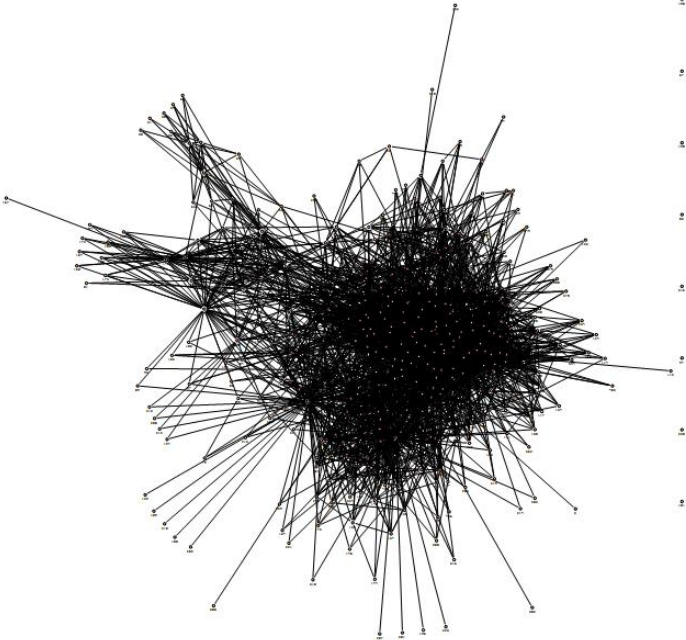
Figure 23 The as-is situation

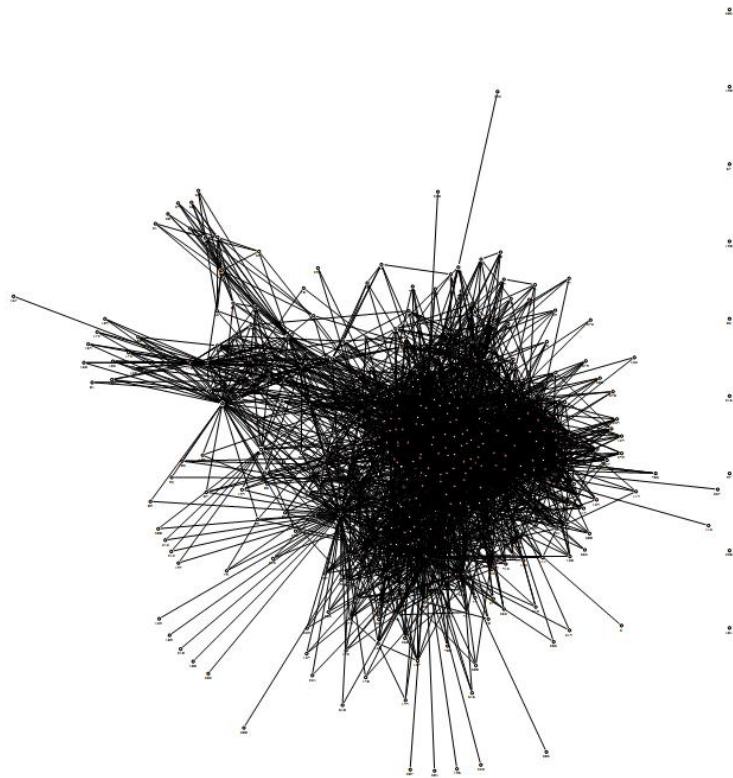Figure 24 The old organization in scenario 1 (experts)

Figure 25 The old organization in scenario 2 (young employees)

Explanation of the network characteristics

# of links: amount of interactions between the nodes in the network.

Density: amount of lines that are actually present in the network. It is the ratio of the number of lines present to the number of the maximum possible lines.

Average degree: the average degrees for all nodes in the network.

Mean distance: average geodesic distance between any pair of nodes in the network.

Node Connectivity: minimum number of nodes that must be removed to disconnect the network.

Inclusiveness: the number of connected nodes expressed as a proportion of the total number of nodes.

Based on Hanneman & Riddle (2005).

Appendix O: Overview on the size of the body of knowledge

Search term	Results on Google Scholar
Knowledge sharing	168.000
Knowledge domain	28.200
Knowledge area	12.100
Knowledge management	593.000
Knowledge loss	3.480
Knowledge-intensive organization	907
Business transformation	12.200
Business reengineering	6.340
Business process redesign	10.300
Business process change management	545
Business goals AND translation	6.330
Knowledge network analysis	153
Social network analysis	57.200
Knowledge repository	17.800
Knowledge base	1.630.000
Business reengineering AND knowledge-intensive	174
Business transformation AND knowledge-intensive	555
Business process redesign AND knowledge-intensive	487
Business process change management AND knowledge-intensive	28

N.B. The table is used to give an impression on the size of the body of knowledge. Besides Google Scholar, other search engines were used to find relevant literature.