

Toward a Process-oriented Knowledge Transfer Framework for a Knowledge Intensive Firm (KIF)

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ABSTRACT

Toward a Process-oriented Knowledge Transfer Framework for a Knowledge Intensive Firm (KIF).

Managing and transferring knowledge within a corporation becomes the ultimate key for survival in the Knowledge Age. Internal knowledge is often unique and lays the foundation for a company's competitiveness. Effective and fast knowledge transfer (KT) is particularly critical to KIFs such as IT consultancies, R&D based companies or firms in the software industry. Intra-firm KT is a complex undertaking though and a number of initiatives fail. Therefore, achieving optimal KT is a compelling need.

The aim of this thesis is to explore what kind of process-oriented framework helps create optimal KT practices in a KIF by applying and adapting the Scrum management and control practices. Scrum was initially formalised for the development of software and can be used to manage complex projects. Enhancing Scrum to enable intra-firm KT represents a novel approach, involving diverse roles across a team of employees and making use of their respective capabilities.

The work makes a contribution to knowledge by introducing clearly defined KT process steps and documentation tools - underpinned by motivational practices, transparency and accountability of individual employees to find ways for them to impart their knowledge. It proffers an extension to existing frameworks and models.

The study could be highly relevant for practitioners concerned with intra-firm KT for two reasons. Employing the newly developed approach helps

investigate appropriate organisational contexts and, more importantly, provides a practical set of tools to assist with the task of enabling KT.

The form of a case study within a KIF, a consultancy firm focussed on digital business transformation, has been chosen as the foundation for the inquiry. The research strategy is rooted in a participatory paradigm. Qualitative data captured in the company were specifically developed through participatory action research (PAR). Documentary analysis, non-participant observation, and open-ended interviews ahead of iterative action-reflection cycles contributed to providing new learning for a team of highly qualified Knowledge Workers (KWs). Overall the team of consultants that was the focus of this case study believes that knowledge in the firm will be transferred faster and sustainably by employing practices of interaction and adaptation within a knowledge-friendly and motivational environment. The time required to phase new consultants into existing projects, where KT was indispensable, was reduced significantly by 50% from four to two weeks.

The research suggests that the newly developed process-oriented framework can greatly improve KT practices in a KIF by applying practices of gathering data and information (*Aggregating*), prioritising them (*Featuring*), reviewing KT progress (*Reviewing*), and utilising newly acquired knowledge (*Doing*).

The key findings of this work, the *AFRD-process* and the *AFRD-framework*, were subject to an audit by an expert panel from the Fresenius University of Applied Science in Munich, Germany, and practitioners in a machine engineering company in Augsburg, Germany.

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of the University of Gloucestershire and is original except where indicated by specific reference in the text. No part of the thesis has been submitted as part of any other academic award. The thesis has not been presented to any other institution in the United Kingdom or overseas. Any views expressed in this thesis are those of the author and in no way represent those of the University.

Signed.....

December 9th, 2017

Date.....

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GLOSSARY AND ABBREVIATIONS

ABC	ABC GmbH (case company, name anonymised)
AFRD	Aggregating, Featuring, Reviewing, Doing
ALS	Active Learning Set
BDU	Bundesverband Deutscher Unternehmensberater e.V.
BYOD	Bring your own device
CA	Competitive advantage
CKO	Chief knowledge officer
COPs	Customer operations
CPX	Document management software (name anonymised)
DEF	Major stakeholder of ABC (name anonymised)
DTL	Digital transformation lab
EBITDA	Earnings before interests, taxes, depreciation, and amortisation
EBT	Earnings before taxes
EUR	Euro(s)
e.g.	exempli gratia, for example
FNC	Project and company name (name anonymised)
GB	Gigabyte(s)
GHI	Machine engineering company (name anonymised)

i.e.	id est, that is
incl.	including
IOKMF	Integrated organizational knowledge management framework
HR	Human resources
IoT	Internet of things
IT	Information technology
IM	Information management
KBI	Knowledge backlog item
KF	Knowledge feature
KF II	Knowledge feature inspected/adapted
KI	Knowledge increment
KIF	Knowledge intensive firm
KM	Knowledge management
KMS	Knowledge management system
KT	Knowledge transfer
KW(s)	Knowledge worker(s)
MAV	Mobile Added Values (Model)
MCB	MCB GmbH (name anonymised)
Mio.	Million
NPD	New product development
NPS	Net promoter score

p.a.	per annum (per year)
PAR	Participatory action research
PKI	Potential knowledge increment
OpCo	Operating Company
QA	Quality Assurance
R&D	Research and development
SECI	Socialisation, Externalisation, Combination, Internalisation
SLC	Social learning cycle
TAM	Technology acceptance model
US	United States
vs.	versus

CHAPTER 1: INTRODUCTION

1.1 Background of the Research

In the increasingly competitive business environment of the Knowledge Age, a company's key to competitive advantage (CA) and survival is its *intellectual capital*: the knowledge of its employees and the knowledge existing in its structures (Birkinshaw, 2001). When highly skilled managers and experts, the so-called knowledge workers (KWs), leave a firm, the organisation can become vulnerable, lose individual knowledge and its capability to internalise knowledge from the outside - and hence lose at least a part of its CA (Leonard, Swap, & Barton, 2015). This always tends to happen when organisations downsize.

On the other hand, it is often claimed that generating and successfully diffusing knowledge from one employee, project team or business unit to another secures a firm's position in the marketplace (Argote, Ingram, Levine, & Moreland, 2000). Knowledge diffusion - even if it seems simple - has specific multidimensional knowledge transfer (KT) processes as its underpinnings (Joshi, Sarker, & Sarker, 2004). Successful management of these processes is a complex and difficult undertaking, and a number of studies note "dysfunctionalities that corporations continue to experience when confronted with the questions of transferring knowledge internally" (Spraggon & Bodolica, 2012, p. 1274). Typical examples are failures to align overarching knowledge management (KM) activities with an organisation's strategic objectives, or issues to make KM part of employees' daily activities at work (Fontaine & Lesser, 2002). Other research studies, exploring knowledge flows within firms, report on massive failures of KM IT-systems in corporations (Mougin, Boujut, Pourroy, & Poussier, 2015).

A large number of KT frameworks and models can be found in the management literature that propose practices to tackle such kind of issues and try to lay the foundation of optimised knowledge flows. Practitioners are aware though that the studies published do not necessarily match their local environment.

1.2 A Need for distinct Terminology

The terms Knowledge, KM and specifically KT can have different meanings in different contexts. Hence there is a need to define early how the terms are used in this research.

1.2.1. Knowledge

It is widely agreed that knowledge builds upon data and information available in an enterprise (Chen, 2001). Data are depicted as structured and mostly numeric. They may be stored in database management systems. Information, on the other hand, is data organised and presented in a context (Galup, Dattero, & Hicks, 2002). Knowledge, in this thesis, is understood as multifaceted. It is information used within a certain context, based on an understanding of how to be applied (Brooking, 1999). Furthermore, the social component, the interaction of individuals, is seen as crucial in the knowledge creation process. Individuals, specifically KWs, are of major importance in this research. Their individual knowledge and experiences, as well as their practices of working together, play a centre role in the study.

1.2.2 Knowledge Management

Over the past two to three decades, KM has become an overarching and dominant term in the Knowledge Age as managing a firm, in the first place, means managing its knowledge. This refers to the firm's KWs and its

structures and processes. Defining knowledge as something that exists within the human mind naturally has implications for explaining KM. How can something that is intangible actually be managed? A number of explanations of KM are available in the current management literature. Birkinshaw (2001), e.g., defines three elements to KM. Firstly, employees should be encouraged to interact and to share their ideas, reflecting an aspect rooted in a company's culture. Hence, social activity within a company may be at the heart of the answer to managing the intangible. Secondly, systems to make knowledge explicit and accessible for KWs are needed. And thirdly, a firm "needs to get access to new knowledge from outside its boundaries" (Birkinshaw, 2001, p. 13). The third element touches upon updates of knowledge of a firm and potential sources of innovation. This aspect is important for a company and its survival in the marketplace, but it is not at the core of this research. This thesis focuses on individual knowledge. Individual knowledge may emanate from external sources of information - it will get updates and grow in the intra-firm KT process, though.

KM in this research is defined as techniques, practices and their underlying processes that enable knowledge-flows between KWs within an organisation. When transfer of knowledge between individuals is analysed, the more specific term of KT is used, as defined in the following.

1.2.3 Knowledge Transfer

In this thesis, KT is specifically defined as a cooperative process of movement of knowledge from one KW to another. On the end of a recipient, knowledge is being absorbed and may be applied in a specific way, for example, to solve a problem at hand (Bartezzaghi, Corso, & Verganti, 1997). It can be argued that a learning process is happening through this phenome-

non, laying the foundation of learning of an entire organisation. This aspect will be analysed at a later stage in this research.

1.3 The Topic for this Research

The topic for this research is concerned with optimal KT practices and their underlying processes in a KIF. Intra-firm KT between individuals, or from individuals to an organisation, is a key outcome of effective knowledge management (KM). Managing knowledge is particularly critical to KIFs such as IT consultancies, R&D-based companies or firms in the software industry (Swart & Kinnie, 2003; Alvesson, 2004). This thesis proposes a fundamentally different approach to KT by applying and enhancing the Scrum management and control practices to successfully transfer knowledge between individuals and units within a firm. Scrum rests on specific practices organising work and interaction, and it was initially formalised for software development projects. The practices can be used to manage complexity and innovation within any kind of project or business area (Rubin, 2014). They foster communication and interaction among employees to share knowledge and control progress on a daily basis. Scrum, within this study, helped build a framework resting on transparency of practices and accountability of the individual to achieve optimal KT.

This research has evaluated Scrum and its benefits and shortcomings in depth. The specific benefit of Scrum was a structured process focusing on results. On the other hand, applying the methodology for KT turned out to be a time-consuming effort - resulting in significant adaptations to Scrum and the development of a completely new process-oriented framework.

1.4 The Case Company ABC GmbH

The research is designed in the form of a case study within ABC GmbH (ABC, name anonymised), a consultancy firm focussed on business transformation based in Munich, Germany. In the past, the company's KT practices led to duplicated work across teams of consultants, and knowledge tended to be lost once employees left the firm. ABC is a subsidiary of DEF (name anonymised), a listed IT company. At the end of 2015, DEF employed more than 5.100 people and its turnover reached around 706 Mio. EUR, up around 12% from the year before; the company reported an EBIDTA result of more than 98 Mio. EUR. DEF is specialised in Internet-based technology and can be considered a technology-savvy network of a number of specialist operating units. These units are set up as individual companies, having DEF as their only or major shareholder.

The limited company ABC was founded in 2014 by DEF and the researcher of this study, with DEF being the main stakeholder. The board of the company has ever since been represented by GS (name anonymised), the Chief Financial Officer, and by the researcher (Chief Sales and Operations Officer). The purpose of founding ABC was to establish a management consulting think tank for clients seeking to establish digital transformation programmes in their organisations. As a consulting firm, ABC prepares clients for their digital journey: ABC mainly builds strategies, digital roadmaps and creates simplified processes - before handing results over to technology partners (preferably from the DEF network) that are developing, operating and maintaining software and technical platform solutions. In December 2016, ABC employed 13 management consultants (board members included). ABC did not employ back-office or assistant resources but booked respective services from DEF in times of need. The average age of consultants at ABC was 38 years at the time the research was conducted,

and five out of the thirteen employees were female. Compared to the German IT consulting market (where the company positions itself), ABC's average employee age mirrors the typical IT consultant group, whereas the share of female consultants is slightly below the average of around 40% ("IT Consultant", 2016; BDU, 2015).

It can be argued that ABC is a typical KIF, mainly because its business, and its business model as a specialist consulting company, rest upon the expert knowledge and experience of its people, i.e. its KWs. Alvesson (2004) lists seven KIF-characteristics, most of which were also observed at ABC during the research project (the subsequent sections, Chapter 5 and Chapter 6 provide more details on observations at the case company): "1. highly qualified individuals doing knowledge-based work, using intellectual and symbolic skills in work; 2. a fairly high degree of autonomy and the downplaying of organizational hierarchy; 3. the use of adaptable, ad hoc organizational forms; 4. the need for extensive communication for coordination and problem-solving; 5. idiosyncratic client services; 6. Information and power asymmetry (often favouring the professional over the client); 7. subjective and uncertain quality assessment." (p. 21.)

1.4.1 KM and KT at ABC

ABC-consultants usually spend most of their working hours at clients' premises and are involved in digital transformation and change initiatives. ABC is seeking to have at least two consultants work on a client project even if only one resource can be billed, reason being that the company is focussed on high quality of the work delivered. Any consultant, junior or senior resource, would usually take on quality assurance (QA) tasks - such as additional research to verify results, or proofread of presentations - within a given engagement, if need be. QA-consultants work closely with a lead

consultant who is accountable for the economic success of a project, or an overarching programme, for the client and for ABC. This agile working style urges KWs at ABC to communicate frequently with alternate colleagues and manage or transfer knowledge so that they can work together, efficiently. The company has experienced an increasing need to transfer knowledge between individual employees, or work groups, mainly because of the complexity of digital transformation initiatives; these require specialists from diverse backgrounds to work closely together, more and more frequently. An e-commerce consulting project for a specialist company in bathroom supplies, for example, required an industry expert as well as a specialist for social media Internet platforms to work closely together and transfer knowledge.

The complexity of the projects turned out to be a challenge for ABC in terms of KM (specifically with regards to appropriate IT-capabilities), and in terms of dedicated KT-practices and their underlying processes. Until the end of 2015, the company had no dedicated database to store or share data and information on company-specific matters, or client projects, at its command. In January 2016, ABC decided to use an Internet-based data and information storage service (*Dropbox*) to commence its KM activities. One senior manager of the company was assigned to creating digital folders within the Dropbox service where key data and information on client projects, or overarching programmes, should be uploaded and thus stored. Furthermore, the service was meant to be used as a depository for market research documentation, e.g. information on specific consumer products or industry sectors.

In several communications to ABC-employees over the first quarter of 2016, the board of the company introduced and explained the newly established service and asked to use Dropbox to share data and information. No process

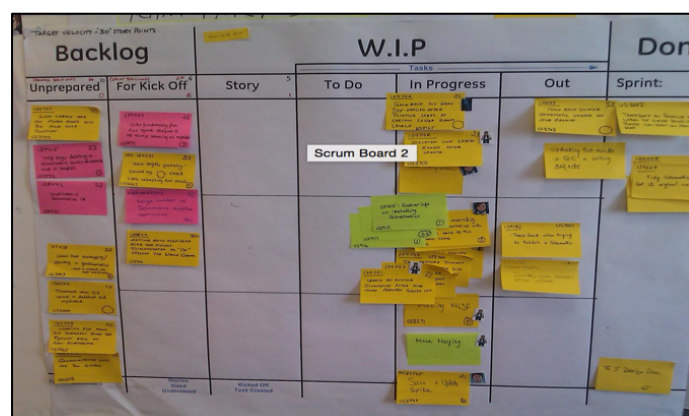
had been established though. Responsibility to use the basic KM system as a foundation for KT between individuals or work groups was with the consultants of ABC. Most individuals uploaded basic presentations related to their respective projects in Microsoft Word, Powerpoint or Excel spreadsheet format, but within months after the introduction of the company's Dropbox, the number of files uploaded to the digital folders tended towards zero. Commencing in the third quarter of 2016, newly joined consultants informed the board members of ABC that the company's KM system, as well as processes to share or transfer knowledge, were confusing or at least not helpful in taking on accountability within projects they were assigned to. In a brainstorming session with all employees, dedicated to the development of ABC in Germany's competitive consulting market, specifically KT issues were openly discussed. The board of ABC then decided to investigate the issues further and to find ways to achieve optimal KT - mainly resulting in this research study. The company also invested in tools such as a digital visualisation board to support KT initiatives, which will be described in more detail in the course of this study.

1.5 Research Aim

This action research aims to establish a process-oriented framework to achieve optimal KT practices and their underlying processes in a KIF. The Scrum management and control practices are at the heart of the framework, fostering communication and interaction among KWs. Within this process, information residing with individuals (implicit knowledge) is identified first and documented on paper stickers (Figure 1). Alternatively, Internet-based applications and devices can be used. The stickers are grouped under "Backlog". Implicit knowledge is then transformed into explicit, commonly accessible, knowledge through interaction of individuals within the next

process step, “W.I.P. (work in progress)”. Here, KWs discuss information and clarify questions, e.g. they agree on tools and databases to access specific material. Once the participants are satisfied that knowledge is then transferred, the stickers are moved under “Done”. Thus, KT can be visualised. Succinctly, Scrum breaks complexity into small procedural steps and helps create motivation among KWs to contribute to transparent KT practices. Ribi re (2001) states that enabling convenient and satisfying practices is a prerequisite for involvement of KWs in KT - and hence of building trust in the underlying process. Here, the thesis makes a contribution to current knowledge on KT: by developing the Scrum management and control practices, resting on transparency and accountability of the individuals, to find ways for them to impart their knowledge. A process-based framework has been created through PAR in the case company, and the trustworthiness of the inquiry has been assessed following a clearly defined process. Chapters 5, 6, and 7 specifically provide more information on this aspect.

Figure 1: Exemplary Scrum Whiteboard to note Progress in KT



(Source: “Sample Scrum Board”, 2011)

1.6 Research Problem, Questions & Objectives

The core research problem that facilitated the study is:

What framework needs to be employed to enable optimal KT in a KIF?

Three questions were formed to investigate the research problem. The questions are introduced in this chapter to explain the focus of the research, but they were developed following the literature review in Chapter 2.

Research question 1: How is knowledge being transferred at case company ABC GmbH?

This question seeks to understand the existing habits and processes underpinning KT in the case company. Focus is on intra-firm KT between individuals working together on customer projects of the case company.

Research question 2: What are the factors impacting KT?

This question seeks to understand the role of key factors affecting KT. Focus is on the positive or negative impact of management processes, incl. organisational structuring, IT and the concepts of trust and motivation.

Research question 3: How can knowledge transfer practices be changed to achieve optimal KT?

This final question draws the prior two questions together and seeks to understand how existing KT practices in the case company can be changed. Especially, the impact of the Scrum management and control practices will be analysed within iterative action-reflection cycles involving key employees of the case company.

Table 1 presents an overview of the above-mentioned research questions and their objectives. Further explanation and justification of the methodology used in this research will be provided in Chapter 3.

Table 1: Research Questions and Objectives

Research Question	Objective
How is knowledge being transferred at case company ABC GmbH?	To understand the existing processes underpinning KT in the case company. Focus is on intra-firm KT between individuals working on customer projects
What are the factors impacting knowledge transfer?	To explore the role of key factors affecting KT. Focus is on the impact of management processes, incl. organisational structuring, IT, and the concepts of trust and motivation
How can knowledge transfer practices be changed to achieve optimal KT?	To investigate how KT approaches in the case company can be changed. Specifically, the scrum management and control practices and their impact will be analysed. The practices are to be optimised and developed further

(Source: Author's editing)

1.7 Research Benefit

The benefits of this research can be considered from both academic and applied perspectives. From an academic standpoint, the thesis proffers an extension of theories on KT by introducing and developing Scrum management and control practices initially formalised for development of software. This is a radically different approach.

The intention of the action research study was to employ Scrum to help change practices and their underlying processes and achieve optimal KT in the case company. Furthermore, a change in group and interpersonal dynamics was pursued, impacting the company's culture in terms of openness to knowledge sharing and transfer.

In terms of applied benefits, the proposed framework foremost provides practitioners in the case company with a set of tools to operationalise KT. Further research into the field should analyse if the generalisability that is stated in the conclusion chapter of this research study, holds up to the challenges of diverse company environments.

1.8 Potential Limitations

The academic sources examined for the literature review of this thesis can be considered a limitation. The review draws on sources published between 1982 and 2017. The choice has a focus on leading academic research publications, including professional practitioners' accounts from the US where KM and specifically KT in organisations emerged as a business topic in recent years. Where other studies are referred to, this thesis mainly draws upon data that were collected in Europe (UK, France, Italy), or Asia.

This research analyses main strands in the current management literature on KM and KT though, as well as influential works of leading academics in the areas, which led to the development of the research questions explained in Section 1.6.

Other limitations refer to the transferability of the study to other, or similar, business environments, as explained in Chapter 8 of this thesis. However, key questions related to the issue were anticipated and addressed (Section 8.3).

1.9 Structure of the Thesis

Chapter 1 sets the context to the research and outlines the challenges that practitioners face in their organisations when applying existing theoretical frameworks to establish appropriate KT practices. The chapter notes dysfunctionalities in the case company ABC, a KIF, such as misalignment of

KM activities with the firm's business model and massive failures in IT-systems used to enable KM and KT, as rationale and motivation for this thesis. The research problem and the research questions, as well as their objectives, are defined.

Chapter 2 provides a critical review of the literature apposite to the development of a process-oriented KT-framework in a KIF. The purpose of the literature review is to introduce three key themes exploring the context and the background to the research: theoretical KM and KT frameworks and models, barriers and enablers of KM and KT, and processes. During this analysis, research gaps are revealed and evaluated, and the research questions are identified. A conceptual framework and the agenda for the remainder of the research are established.

Chapter 3 presents how the research methodology was developed and details the research design. The chapter opens by debating the purpose of the thesis and the implications of adopting different world views. The discussion progresses by identifying a participatory paradigm as the foundation of this research. A case study approach and a participatory action research (PAR) strategy were selected after discussing alternative qualitative approaches. The chapter specifically analyses the measures taken to overcome challenges in the data capture process.

Chapter 4 details how data was captured within a longitudinal qualitative study at the case study company and provides more background on the organisation and its people. The chapter focuses on two phases laying the foundation to building theories within the course of the study. Phase 1: documentary analysis, non-participant observation and open-ended interviews in the case company to generate data. Phase 2: PAR, including the Scrum management and control approach. The chapter describes the role of the researcher within the action-reflection cycles run at the case

company and explains the criteria applied to assess the trustworthiness of the inquiry in detail. Chapters 5 and 6 are dedicated to the two aforementioned phases.

Chapter 5 presents data from documents, non-participant observation and open-ended interviews, specifically discussing how knowledge was transferred in the case company at the time the research study commenced. According to the main findings of the literature review, the impacts of organisational culture, IT and processes on the flow of knowledge are examined.

Chapter 6 sets out the PAR conducted. This chapter briefly discusses how the conceptual framework established in Chapter 2 was introduced and applied within action-reflection cycles (described as PAR-cycles in the following) at the case company. The chapter progresses with a detailed description of the results of the action research phases, seeking solutions to achieve optimal KT first and finally proposing and applying an approach to achieve change: the AFRD-process (based on the consecutive KT steps of Aggregating, Featuring, Reviewing, and Doing), and the AFRD-framework.

Chapter 7 explores the trustworthiness of the study, specifically scrutinising the aspects of validity, reliability, and transferability. The output of the PAR-cycles is assessed, reflecting back on the key topics explored in the literature review. The findings, referring to the establishment of optimal KT practices, are discussed among the participants of the PAR-cycles at ABC, as well as with KT experts from the Fresenius University of Applied Sciences in Munich, Germany.

The penultimate Chapter 8 focuses on the main findings and conclusion of the thesis. It defines the process-oriented AFRD-framework and its underlying AFRD-process evolving from Scrum management and control practices, as a potential enabler for practitioners to achieve optimal KT within

a KIF. The chapter proffers an extension to existing frameworks and theories on KT. It outlines the methodological Scrum-based contribution as well as the significant changes to Scrum that have been made as a result of the PAR. The chapter concludes by giving an outlook on the next potential steps the researcher pursues, such as further research and commercial options related to the AFRD-framework.

The final Chapter 9 reflects on the implications of undertaking a DBA journey and explores the root causes of a research study in the area of KM and KT, as well as its outcomes.

A concluding section is presented at the end of each chapter to document the learning points and the development process in the course of the research study.

1.10 Conclusion to Chapter 1

The key learning points of the introductory chapter are as follows:

1. Background of the research introduced, gaps in KT frameworks and models indicated.
2. Purpose of the research described, and Scrum management and control framework as potential novel KT-enabler presented.
3. Research problem, questions, objectives and methods defined.

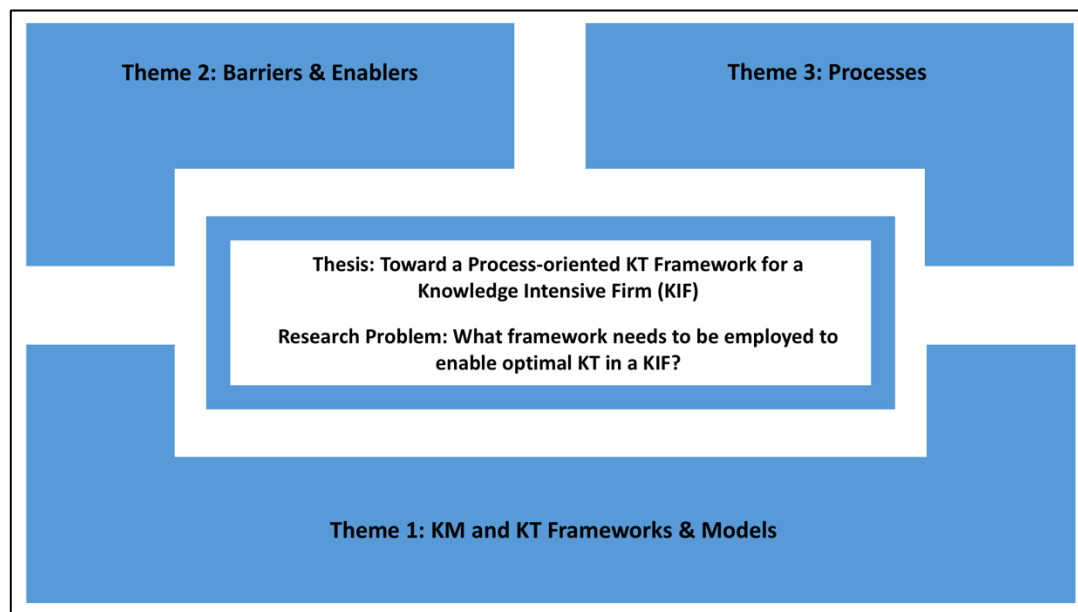
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction and Format of Chapter

This literature review introduces three key themes related to intra-firm KM, KT and the research problem depicted in Section 1.6. The chapter draws on academic sources mainly published in the US, Europe, and Asia over more than three decades between 1982 and 2017.

Figure 2 presents the foundational research theme of the study: KM and KT Frameworks and Models, complemented by the second and third theme: Barriers and Enablers, as well as Processes.

Figure 2: Literature Review Themes



(Source: Author's editing)

The aim of this chapter is twofold. Firstly, the review is to explore existing frameworks and models for KM and KT. A specific focus is on previous research in KIF environments. Most of the frameworks and models that can be found in the existing management literature concentrate on barriers and enablers of KM and KT, and they are underpinned by certain processes, such as processes of communication between individuals or groups of employees. Hence, this literature review examines barriers and enablers, and processes in more detail, and the literature has been organised into groups, accordingly. Secondly, this chapter is to identify unresolved issues that arise from studying the management literature. These issues reflect the core of the research problem and the research questions that are explored in the remaining chapters of the thesis.

2.1.1 Criteria for Inclusion and Exclusion of Literature

The research aim, as outlined in Section 1.5, defined the criteria to include or exclude certain academic sources in this review. Primarily, the researcher's focus to establish a process-oriented framework and to achieve significant change within ABC influenced the decision to consider management literature appropriate, or inappropriate, to help answer the research questions. The approach to collect data and assess literature in the light of the research aim by, e.g., realising and valuing instrumental patterns or themes, is following recommendations for qualitative research from Terre Blanche, Durrheim and Painter (2006), Randolph (2007), and Creswell (2013).

Specifically, the following criteria were employed to determine the suitability of academic literature for review in this chapter, and each source had to satisfy one or more of the following four items:

1. The literature covers at least one of the three key areas of intra-firm KM and KT in depth: frameworks and models, barriers and enablers, and processes. Those themes are consistently mentioned as major strands in the management literature on KM and KT in business environments (Nelson, 2004; Ho, Hsieh, & Hung, 2014).
2. A framework or model has evolved as unique proposition, with little or no reference to pre-existing scientific contributions.
3. KM or KT framework or model foremost provides enabling aspects and does not primarily focus on impediments and their root causes. The complexity of the proposed approach must be explained and how different aspects, specifically organisational culture, structure, or motivation of individuals, are addressed.
4. Academic sources on barriers and enablers, as well as on processes, have an explicit reference to the management of information or knowledge within a business environment. The literature explores aspects relevant to KIFs where intellectual capital is core to a firm's success (Stewart, 1997). The specifics of KIFs in the Knowledge Age are explained in more detail in Section 2.3.1, as well as in the course of the research study.

Literature was categorically excluded if authors used single theories to reflect on KM or KT phenomena. It can be argued that such approaches cannot explain the complexity of KM and KT which is depicted in more detail in the

course of this thesis. Consequently, e.g. a prominent publication from Rubenstein-Montano, Liebowitz, Buchwalter, McCaw, Newman and Rebeck (2001), evaluating 26 different frameworks based on systems thinking, was excluded from the review. Also, it can be argued that approaches based on single theories are related to a more realist paradigm, whereas the researcher's stance is rooted in a participatory paradigm as depicted in Chapter 3.

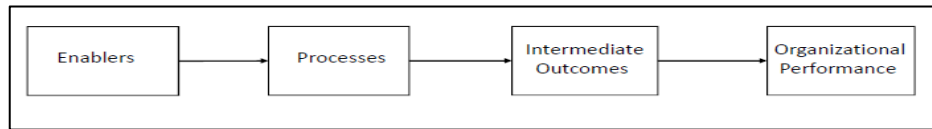
2.1.1.1 Assessment of the Approach

The literature review criteria for inclusion and exclusion of certain sources, by necessity offer both advantages and limitations for the resultant analyses. The adopted approach enabled the researcher to perform a focussed in-depth literature review in the light of the research aim, and within the available resource boundaries. In this sense, the criteria were considered as adequate to support a results-oriented progression of the study.

2.2 Definition of Frameworks and Models

The two terms *framework* and *model* are often used interchangeably in the existing management literature on KM and KT. In this chapter, a framework is understood as a holistic solution plan to KM or KT initiatives, comprising guidelines and recommended practices. A framework, according to this definition, also provides structure to a solution plan. The conceptual KM framework provided by Lee and Choi (2003) can be considered a typical representative of this category (Figure 3). The framework comprises various components, such as KM-enablers that trigger or impact intra-firm processes and lead to first measurable outcomes within a business environment. This step-wise progression was accepted as being able to sustainably impact organisational performance.

Figure 3: Conceptual KM Framework



(Source: Lee & Choi, 2003)

The term model, on the other hand, is used if a KM or KT approach is primarily focussed on a process. It provides, for example, detailed execution steps to share and help transfer knowledge. A typical example of a KM model is the Socialisation, Externalisation, Combination, Internalisation (SECI) model from Nonaka and Takeuchi (1995). The SECI model describes integrated activities of knowledge creation, and it will be explained in more detail in the course of the study.

2.3 Theme 1: KM and KT Frameworks and Models

Frameworks and models were selected for review and categorised according to the criteria described in Section 2.1.1, Section 2.1.1.1, and Section 2.2. An overview of the grouping is presented in Table 2 and Table 3 in the following. In advance of depicting their content in more detail, the background to ascribing certain frameworks and models “high relevance for KIFs” in the tables is explained in the subsequent section.

Table 2: Frameworks of KM & KT

Framework	Summary	Key descriptive Aspects	High Relevance for KIFs
Skyrme & Avidon (1997)	Plan to initiate a KM program, promoting continuous learning within an organisation to improve efficiency of the program	Seven success factors, ranging from vision and leadership to information technology as an enabler. Clear focus on organisational factors	
Davenport et al. (1998)	Definition of critical success factors to achieve KM and KT within an organisation	Multiple channels of KT are key to overall KM success in an organisation. Change in motivational practices is among crucial success factors	✓
Liebowitz (1999)	Identifying essential components to implement a successful KM process	Six ingredients: strategy, CKO-function, knowledge ontology as formalisation, systems and tools, incentives, culture	✓
Holsapple and Joshi (2000)	Describing environmental and organisational factors that impact successful KM initiatives	Three key influencers: managerial (e.g., leadership, control), resource-related (e.g., human, knowledge, financial), environmental (e.g., competitors, market, time, technology)	
Calabrese (2000, 2006)	Holistic KM framework, based on key functions within an organisation	Four pillars: leadership, organisation, technology, and learning. Linkages between pillars becomes more important in the Knowledge Age of the 21st century as companies need to adapt to ever faster changing environments	✓
Heisig (2009)	Definition of four success factors of KM	Four factors are: human-oriented factors, organisation, technology, management (strategy, goals, measurement)	✓
Ahmed & Ahsan (2014)	Technology-based approach aimed to improve the flow of knowledge in the software development industry, in particular	Technical architecture providing individuals and teams access to data, information and knowledge as well as to organisational business processes and project management processes	✓

(Source: Author's editing)

Table 3: Models of KM & KT

Model	Summary	Key prescriptive Aspects			High Relevance for KIFs
Nonaka & Takeuchi (1995)	Knowledge is transformed over successive stages, called conversions, during the KT process	Four different stages: externalisation, combination, internalisation, socialization (spiral or SECI model)	Barriers / Enablers	Processes	✓
Wiig (1997)	Identifying four key organizational enablers of KM: governance, staff (e.g. focus on the right people), KM operations, valuing knowledge (e.g. sharing culture)	Detailed explanation of how knowledge assets are organised, created and renewed (process-view)	✓	✓	
Oma (1999)	Process-based approach to develop information policies that impact people behaviour within the organization	Information policy process implies review of a number of organizational elements, e.g. people management, IT practices, organizational structures	✓	✓	
von Krogh, Ichijo & Nonaka (2000)	Stating that five enablers are required to use knowledge effectively, ranging from a company's vision regarding knowledge to various organizational aspects	Deep-dive on development of maps of the current expertise or technology available in a company	✓	✓	✓
Sveiby (2001)	Three structures are the foundation of KT: competences of people, internal structures like processes, external structures (relationship of organisations with customers or suppliers). Knowledge-based theory of the firm	In the KT process, conversions occur from one structure to another, and within the structure itself. Nine different conversions are pointed out		✓	✓
Boisot (1995), Boisot & Canals (2004)	I-Space model: Metaphor of a cube used to represent information flows among a population (human or computers)	Social learning circle composed of six phases: scanning, codification, abstraction, diffusion, absorption and impacting		✓	✓
Wu et al. (2010)	Expanding the SECI model towards an ontological shift SECI model	Knowledge creation activities occur in various ontological entities: individual, group, organization or social network. Tool for ontological diagnosis developed	✓	✓	✓
Frank & Ribeiro (2012)	Integrative model for KT process between new product development teams, based on five successive phases	Five KT phases: knowledge generation in the source, knowledge identification, knowledge processing, knowledge dissemination, knowledge application in the recipient	✓	✓	✓
Maruta (2014)	Focus on knowledge creation and innovation. Advice on management actions to stimulate insight for knowledge creation	Categorization of Type-1 Knowledge Workers (knowledge based on learning) and Type-2 Knowledge Workers (self-created knowledge). Approach to transform Type-1 into Type-2		✓	✓
Mougin et al. (2015)	Approach (modelling framework) to enable KT in different environments applying different methods	Discussions, on-the-job-training, formalised documents to achieve KT	✓	✓	✓

(Source: Author's editing)

2.3.1 KIF Relevance Criteria

In general, KIFs are understood as organisations where intellectual material such as information and personal experience of highly skilled employees are an asset and can create wealth (Stewart, 1997; Section 1.1). Specifically, IT consultancies, R&D based companies or firms in the software industry can be categorised as KIFs (Newell, Robertson, Scarbrough, & Swan, 2009). In these environments, knowledge is usually referred to as *human* or *intellectual capital* comprising of individual *tacit knowledge* and *explicit knowledge* which has been elicited and documented for sharing (Nelson & Winter, 1982; Nonaka & Takeuchi, 1995). The importance of, and the difference between, tacit and explicit knowledge will be further explored in the course of this literature review.

Apart from the aforementioned importance of the individual KW to KIFs, according to Newell et al. (2009), those companies tend to rely on “flatter, less bureaucratised ways of organizing that are becoming more common across all sectors in the twenty-first century” (p.35). Furthermore, the authors argue that a knowledge-intensive firm can be considered an *adhocracy* - one of five archetypal structural forms reflecting the ways firms organise as defined by Mintzberg (1979). Adhocracies are specifically described as decentralised in decision-making, based on self-organised processes around teams and coordinated by mutual individual adjustment (Newell et al., 2009). Based on the insight mentioned before, five of the seven frameworks, and eight out of the ten models were ascribed high relevance to KIFs in Tables 2 and 3. Each source had to satisfy at least one of the following three criteria:

1. Particular focus on KWs, their tools of KT, or the organisational context they are working within.

2. Scrutiny of the complexity of KM and KT, as well as the management of their components.

3. A model of KM or KT discusses barriers and enablers or processes in detail, i.e. two of the three key strands in the literature on KM and KT (Section 2.1.1).

In Table 2, *key descriptive aspects* have been assigned to frameworks in order to reflect that they are focussed more on the presentation of guidelines or plans and less on in-depth process documentation - in line with the definition of frameworks in this thesis (Section 2.2). The frameworks from Skyrme and Avidon (1997), Holsapple and Joshi (2000) were not assigned high relevance for KIFs as they do not specifically discuss the work situation of the individual KW (the prior), or do not provide detailed information on the management of KM or KT complexity (the latter). They still provide factors impacting KM and KT and help understand the importance of the topics with respect to intra-firm knowledge-flows.

In Table 3, *key prescriptive aspects* - comprising barriers and enablers, as well as processes - have been assigned to models to reflect that they are more focussed on specifying the execution of KM or KT operations and underlying processes. Barriers and enablers are understood as factors either blocking or enabling KM and KT operations. In this respect, a company's organisational structure, for example, can be considered a crucial factor (Lee & Choi, 2003). Barriers and enablers impact on operational processes of KM and KT as shown before in Figure 3. The body of management literature on KM processes is diverse, and their importance is permanently reiterated when knowledge of individuals, groups of KWs and entire organisations is analysed (Ho, Hsieh, & Hung, 2014).

The models from Wiig (1997) and Orna (1999) are not assigned high relevance for KIFs as they are not based on those companies' particular characteristics outlined in the first two paragraphs of this section. But they provide insight into the management of foundational aspects of KM and KT (Wiig), or the establishment of key processes (Orna) which may specifically help practitioners within corporate environments.

2.3.2 The Essence of KM and KT Frameworks

First research studies and papers describing approaches to achieve information management (IM) within business contexts appeared since 1982 (Nelson, 2004). Marchand (1982) provided an early framework approach, delineating, for example, organisational structures and functions as well as individual and group behaviour as impacting factors in establishing IM. The complexity of managing knowledge transfer did not appear to be explored though. Frameworks for implementing KM or KT, presenting processes and key steps, have been published since 1995 (Nelson, 2004).

Skyrme and Amidon (1997a, 1997b) provided one of the first studies of critical success factors of KM, distilling them into a number of different aspects ranging from vision and leadership to information technology as an enabler. Davenport, De Long and Beers (1998) went further and explored factors related to the effectiveness of KM implementations. The authors provided a study of 31 KM projects across 24 companies and identified 18 successful projects and eight key enablers. The outcomes of the research partly expands the findings of Skyrme and Avidon (1997a, 1997b) as it explores - among other factors - multiple channels for knowledge transfer within an organisation and a change in motivational practices as prerequisites for success in KM. Motivation of employees to contribute to KM or KT activities within a firm is related to company culture,

and this point will be analysed in more detail in the course of this research study.

The KM frameworks proposed by Skyrme and Avidon (1997a, 1997b) and Davenport et al. (1998) both highlight organisational aspects as success factors for KM or KT. Liebowitz (1999), confirming the importance of this factor, even proposes the function of a Chief Knowledge Officer (CKO) to ensure successful KM implementation and operations. This potential function within a firm could be relevant for KIFs. It might be inadequate for a number of smaller firms though, especially if perhaps questions about the impact of KM and KT on a company's business performance or competitiveness prevail.

Specifically, Holsapple and Joshi (2000), and Calabrese (2000, 2006) add an external view on competitors or market developments to the discussion about effective KM and KT frameworks within a firm. Calabrese (2006) states that the Knowledge Age "has surfaced the need for more flexible and responsive knowledge-based organisational entities capable of rapidly adjusting to the increasing rate of change and demands in both products and services" (p. 12). According to this argument, a company's ability to react to market needs is both based on knowledge and rooted in an intertwining of organisational and operational, as well as technical, capabilities. This wider view on intra-firm KM and KT reflects the complexity of the topic. It can be argued that frameworks focusing on one theory component, such as technology, may finally not be sufficient to help a firm achieve its strategic targets in the marketplace. Heisig (2009), analysing 160 frameworks to identify KM success factors, confirms this view by identifying four closely related key components: organisation (processes and structures), factors related to humans (culture, people, leadership), technology (applications, infrastructure), and overall management (strategy, goals and their

measurement). The study does not reveal though what the implications of pursuing those factors and implementing related initiatives might be for an organisation or the practitioner.

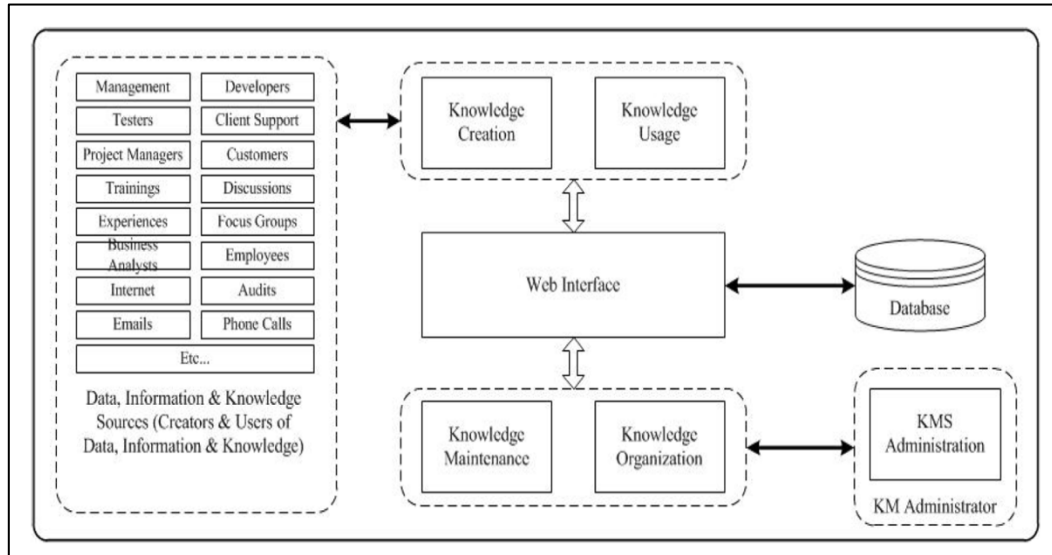
2.3.2.1 Unresolved Issues

The existing frameworks present a whole range of diverse factors that should be considered to achieve success in KM or KT. As they stand, they are unlikely to be useful to support the implementation of such activities, though. Practitioners may need more advice on how to combine the various factors and to establish an appropriate KM or KT roadmap in their individual environments. Terms like organisation or culture, for example, are often applied loosely without detailed explanation. Auernhammer and Hall (2014), analysing existing case studies and exploring organisational goals pertinent to KM and knowledge creation, go further stating that “practitioners who hope to draw on examples of good practice for their own implementations will be disappointed because the actualities of published case studies in the organisations in question do not match their local environments” (p. 155).

Ahmed and Ahsan (2014), developing an integrated organisational KM framework (IOKMF), do realise that coordinated steps and underlying processes are required to implement successful KM initiatives. The authors propose a web-based platform connecting with key databases within a firm, e.g. providing data and information across clients, projects and individual employee knowledge which has been made explicit and is available in the form of documents.

Even if the IOKMF-approach is technology-focussed and misses to address the above-mentioned complexity of KM and KT, practitioners may find the blueprint useful to establish a process-oriented foundation of their intra-firm information and knowledge flows (Figure 4).

Figure 4: Integrated Organizational KM Framework (IOKMF)



(Source: Ahmed & Ahsan, 2014)

In general, approaches based on technology platforms can be considered enablers of change (Hossain & Heidemann Lassen, 2017) toward a KT-based organisational culture. This aspect will be elaborated further in the course of this inquiry.

The models analysed in the following depict and define specific aspects with regards to the execution of KM or KT in significantly more depth. They may be more useful for practitioners planning to establish knowledge flows or knowledge transfer within a firm.

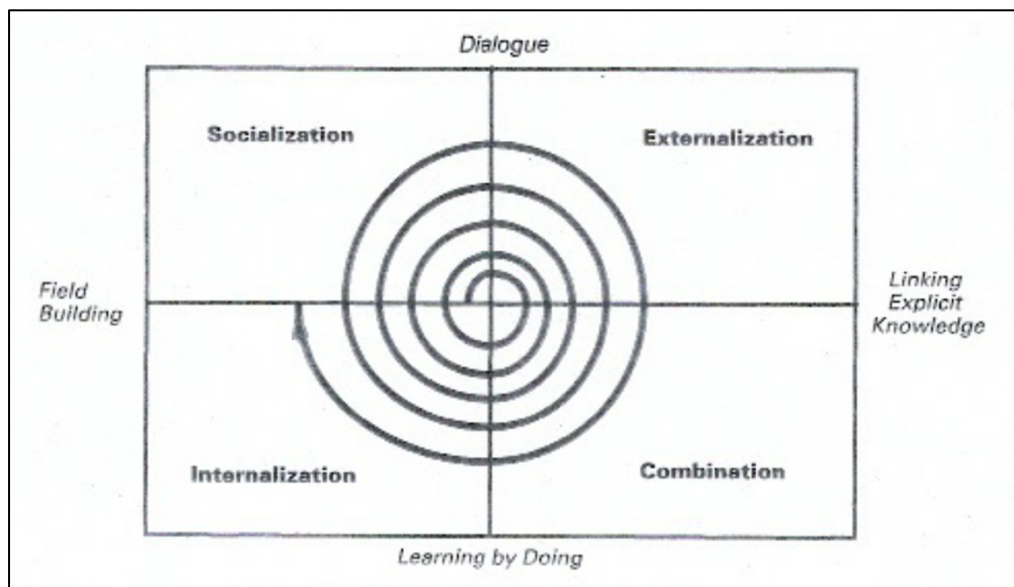
2.3.3 The Essence of KM & KT Models

In the existing management literature on KM and KT, the spiral model of knowledge conversion from Nonaka and Takeuchi (1995) takes a key role.

Figure 5 visualises the model. The definition of knowledge as human capital - encompassing tacit knowledge held by the individual, and explicit knowledge that has been elicited and documented for sharing - is at the core of this approach. The concept of tacit knowledge can be traced back to Polanyi (1958) who suggests that individuals know more than they can say. This implies that knowledge is unwritten and unspoken and comprising of experiences, emotions and intuition. Kogut and Zander (1992) rephrase Polanyi's statement and argue that "organizations know more than what their contracts can say" (p. 383).

The model from Nonaka and Takeuchi is focussed on how knowledge is created and transformed over successive *conversions* between tacit and explicit knowledge (Nonaka & van Krogh, 2009).

Figure 5: The Spiral Model of Knowledge Conversion



(Source: Nonaka & Takeuchi, 1995)

Four different conversions are explained as a spiral: socialisation, externalisation, combination, and internalisation; hence, the model is also known as the SECI model. Socialisation represents conversion from tacit into tacit knowledge and is associated with collective action. Socialisation depends on specific contexts and, in most cases, verbal language is of low priority (Spraggon & Bodolica, 2012). Nonaka, Umemoto and Sasaki (2000) mention traditional apprenticeship as a typical example representing this process step: “Young apprentices work with older master craftsmen, thereby acquiring technical skills through observation, imitation and practice.” (p. 148.) Externalisation refers to the conversion of tacit into explicit knowledge through articulation. Individuals, in this step, may codify knowledge into a tangible format like documents, using specific templates.

Combination stands for conversion from explicit to explicit knowledge with individuals exchanging knowledge. This can, for example, refer to knowledge available across an organisation, i.e. in different organisational repositories (Nonaka & Takeuchi, 1995). Here, people can categorise pieces of knowledge and will create new knowledge (Auernhammer & Hall, 2014). Internalisation finally is defined as the conversion of explicit into tacit knowledge. Explicit knowledge, perhaps documented into text or sound formats, facilitates this process step. “For example, engineering case studies help novice engineers to internalize explicit knowledge that has been externalized from veteran engineers’ experience-based tacit knowledge of their design process.” (Nonaka et al., 2000, p. 149.)

A whole body of management literature adopts the SECI model to explore intra-firm knowledge flows or a company’s ability to generate new knowledge (Haggie & Kingston, 2003; Aurum, Daneshgar, & Ward, 2008). This stream of inquiry has been challenged on a number of accounts though (Spraggon & Bodolica, 2012). It can be argued that some studies fall short

of considering the impact of organisational aspects as well as aspects related to the individual on KM and KT, because the implicit assumption is that no barriers exist during the four conversion stages. This reveals a major limitation of the model. It fails to address specific reasons why KM or KT endeavours can fail, such as potential lack of employees' motivation to share knowledge, or perhaps competition among KWs or units of a firm.

KWs in a corporation have a tendency to protect their specialist knowledge and their perceived market value as employees. Hence, a culture of trust is particularly crucial in an economy that relies on intellectual capital, i.e. specifically the knowledge and experience of the individual (Savage 1996; Davenport & Prusak, 1998; Bertels & Savage, 2000). Trust becomes a key enabler of KT between the knowledge participants, *trustor* and *trustee* (Tan, 2011) or *provider* and *receiver*. Buckman (1999) states that a receiver must have trust in the accuracy of the knowledge captured from the provider, and the provider, in turn, must have trust in the way the recipient is utilising that knowledge. Trust is a crucial aspect in the area of KT and will be further analysed and elaborated at a later stage in this Chapter.

2.3.3.1 The Importance of the Individual and Work Groups

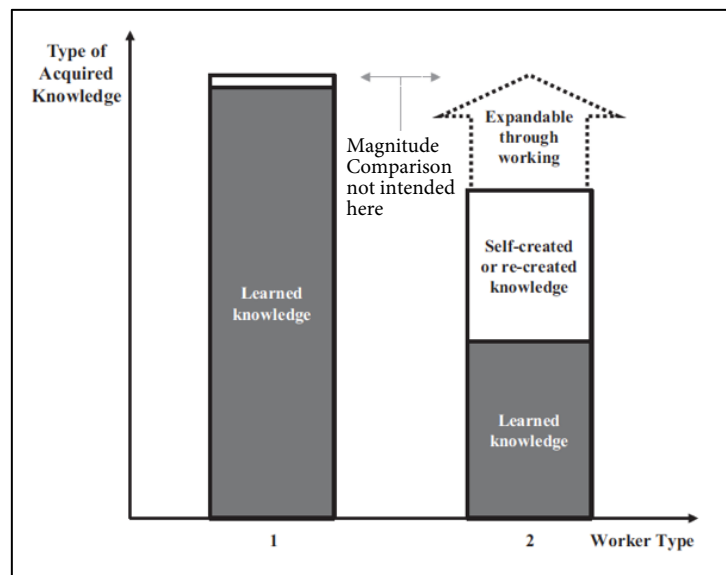
Recognising the importance of the interaction of individuals or work groups in KM and KT processes, Nonaka and Konno (1998) expanded the SECI model. The authors introduced the concept of “Ba” - equivalent to “place” in English. *Interacting Ba* for example, relevant to the aforementioned externalisation phase of the SECI model, is described as a physical or virtual space where employees get to understand the learning processes of other individuals, and where they “reflect and analyse on their own collectively” (Auernhammer & Hall, 2014). Wu, Senoo and Magnier-Watanabe (2010) elaborate on the aspect of individual behaviour within the SECI model and

try to operationalise knowledge conversion processes. Their *ontological shift SECI model* is to specifically help practitioners diagnose knowledge creation behaviours within an organisation. Even if the approach seems theoretical and certainly has to be tested in different organisational environments, managers accountable for intra-firm KM and KT initiatives may be encouraged to focus more on individuals and their work-related environments. The approach can trigger thinking about tools to enable and spur knowledge exchange. Wiig (1997), considering focus on people as one of four key activities for organisational KM, provided early practical advice, such as the development and establishment of lessons learned programmes or corporate universities. Maruta (2012) categorised employees in corporations into *knowledge workers* and *non-knowledge workers* and emphasised the importance of the prior group of people for an organisation because of their expertise, education, or experience. In a model focussed on individual knowledge acquisition and creation, the author further specified KWs and their work, categorising them into two groups, *Type-1* and *Type-2* KWs (Maruta, 2014), as shown in Figure 6. The first category represents workers whose knowledge acquisition mainly depends on learning opportunities. “Type-1 knowledge workers are generally highly motivated to study and acquire the latest information and knowledge.” (Maruta, 2014, p. 30.) On the other hand, Type-1 KWs are described as workers having difficulties to handle unprecedented events as the knowledge acquired may not be sufficient to fulfil the task at hand. Therefore, managers in organisations should try to transform Type-1 KWs into the next category of workers: “The Type-2 worker has ample experience with creating or re-creating knowledge in addition to learned knowledge. Whenever facing a situation where existing knowledge is not sufficient to solve an issue, they

naturally try to find a resolution using their own thinking.” (Maruta, 2014, p. 30.)

The author states that the transformation process from Type-1 to Type-2 is possible if Type-1 KWs are put into situations where knowledge creation is constantly stimulated. This view is related to the concept of social relationships in learning, connecting knowledge generation with a process of observation and learning (Argyle, 1978). Maruta’s model actually can be considered a mental model though, putting specific light on reflexive skills of the KW. This aspect is important especially for KIFs and intra-firm knowledge exchange. However, the model overall does not sufficiently address activities related to KT.

Figure 6: Type-1 and Type-2 KWs



(Source: Maruta, 2014)

To approach KM, and specifically intra-firm KT which is at the core of this thesis, other models try building a foundation first, by analysing an organisation's state of information and knowledge as outlined in the following section.

2.3.3.2 Building the KM and KT Foundation

Orna (1999) develops an *information audit* as a tool to lay the foundation for KM and KT initiatives in a firm. The audit is aimed at the development of policy and strategy within an organisation supporting those initiatives. Orna specifically notes the following six elements that may impact policy establishment and related implementation processes: architecture (defining what information is most important to a firm); behaviours (exploring the support individuals receive in the KM and KT process as well as their communications habits); culture (analysing how and why an organisation works in a certain way); IT practices (outlining how IT can support knowledge activities); people management (definition of skills required, training requirements or knowledge retention strategies), and organisational structures (examining organisational prerequisites).

Establishing policies or clear guidelines, i.e. control and command processes, will give structure to the development of KM and KT initiatives in a firm. It can be argued though that policies may be interpreted differently across practitioners and KWs, resulting in less efficient or even failing practices. Von Krogh, Ichijo and Nonaka (2000) take a critical stand on command and control processes. This is following their constructivist worldview believing "that knowledge is socially constructed rather than a concrete representation of reality" (p. 6-7). Similarly to Orna (1999), the authors recommend to generate a mental map of existing expertise in a firm.

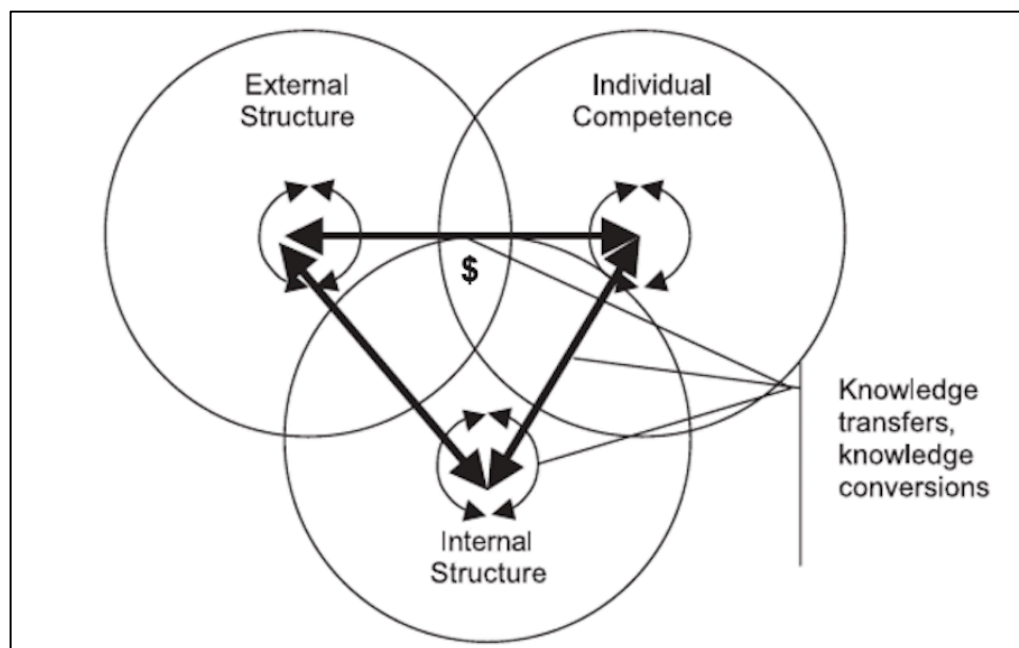
This step though, in their model, follows the definition of a clear vision about what knowledge a company should hold in the future. Von Krogh et al. (2000) define five high-level components for effective use of knowledge and the achievement of KT: vision as a foundation; conversations among employees; knowledge activists e.g. coordinating knowledge creation; right organisational structures, and spreading knowledge across an organisation. The aforementioned models aimed at outlining prerequisites and recommending step-by-step approaches to achieve KM, and specifically KT, may help practitioners build their execution plan. Specifically, the models help understand that KT and knowledge creation are closely related to the interaction of individuals. What is still missing though are considerations on how knowledge flows can be enabled and thus help manage the complexity of KT. Two key models addressing this issue are analysed in more detail in the following.

2.3.3.3 Establishing Knowledge Flows

Sveiby (2001) proposed a knowledge-based theory of firms, thus providing an alternative to the product-based view. At the core of the theory is a KT-model of *structures* and *intangible assets*. According to the model, structures are the result of human interactions and individuals constantly create those structures, such as internal or external relationships. Intangible assets represent, for example, all internal processes of a company or the competence of experts of the firm. As outlined in the following, the model builds upon the knowledge spiral from Nonaka and Takeuchi (1995) with regards to knowledge conversion from tacit to explicit knowledge, but it gives considerably more visibility into knowledge flows within a firm and into the complexity of KT.

Sveiby differentiates between *external structure*, *internal structure* and *individual competence* (Figure 7) and allocates intangible assets to the three components. The external structure “consists of relationships with customers and suppliers and the reputation (image) of the firm” (Sveiby, 2001, p. 346). The internal structure is established when people work internally and comprises, among other elements, of concepts, patterns, or models. Also, a company’s culture is defined as part of its internal structure. Individual competence means “the competence of the professional/technical staff, the experts, the R&D people, the factory workers, sales and marketing” (Sveiby, 2001, p. 346).

Figure 7: Knowledge-based Perspective of the Firm

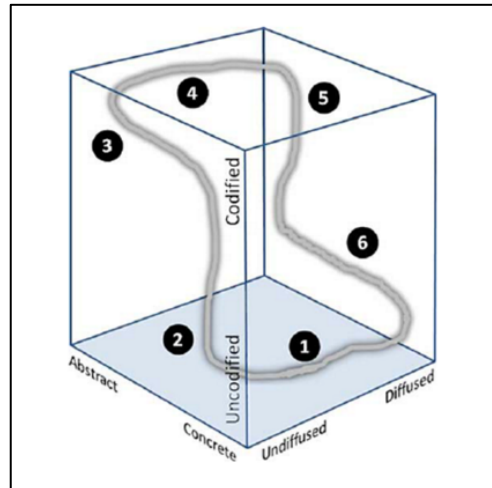


(Source: Sveiby, 2011)

Analysing KT processes based on the model of structures and intangible assets, Sveiby concludes that nine basic knowledge transfers exist in firms: “(1) between individuals; (2) from individuals to external structure; (3) from external structure to individuals; (4) from individual competence into internal structure; (5) from internal structure to individual competence; (6) within the external structure; (7) from external to internal structure; (8) from internal to external structure; and (9) within internal structure” (Sveiby, 2001, p. 348). The author touches upon a crucial point that was important during the PAR-cycles of this thesis as well (Chapter 6): employees may have built external relationships, and knowledge being created externally can be of importance for intra-firm KT as well. This aspect will be explained at a later stage in this research study. Practitioners may benefit from Sveiby’s model to reflect on their individual company environments and the related potential knowledge flows. It may be unsuitable though to explain KT at the level of the individual. Also, the model does not provide a comprehensive action plan for managing intra-firm KT.

Boisot (1995; 1998), introducing the information space (I-Space) model used the metaphor of a cube to explain information flows among a population, people or even computers or systems if the latter are processing data. Boisot also uses the term *agents* for individual members of the population. Information is considered to flow according to three dimensions, i.e. the three axes of a cube as shown in Figure 8: codification (formalisation and categorisation of information), abstraction (reduction of the number of categories and generalisation) and diffusion (sharing of information across an organisation). Boisot states that the more information can be codified and abstracted, the more rapidly and extensively it can be shared.

Figure 8: I-Space and Social Learning Cycle



(Source: Boisot, 1998)

Boisot and Canals (2004) focus on the difference between data, information and knowledge and consider information as the intermediary between data and knowledge. This view is in line with the definition of key terms used in this thesis (Section 1.2). Knowledge and knowledge sharing, i.e. value for a corporation like a KIF, according to the I-Space model is created by movement in the I-Space through six phases of a Social Learning Cycle (SLC), illustrated by numbers one to six in Figure 8: (1) Scanning: insights are gained from generally available (diffused) data; (2) Problem-solving: structures and coherence are given to the insights within the codification phase and problems are solved, such as uncertainty regarding information; (3) Abstraction: the newly codified insights are generalised to a range of situations; (4) Diffusion: the new insights are shared; (5) Absorption: knowledge is absorbed and leads to learnt behaviour - and becomes uncodified or tacit; and (6) Impacting: abstract knowledge becomes

embedded in concrete practices, rules or patterns. The I-Space model inherits the concept of different phases of a continuum of information and knowledge from the SECI model from Nonaka and Takeuchi (1995). I-Space emphasises the impact of codification and abstraction of information on the efficiency of sharing which is core to the competitiveness of KIFs in the Knowledge Age. Also, I-Space helps understand the uniqueness of information and its value in comparison to other goods and shows the movement of knowledge within a certain population. Practitioners seeking optimal KT in their organisations will miss the level of the individual though. I-Space is focussed on flow-processes and is detached from a human, personal perspective. It remains unclear what actually happens with knowledge within a person, how accountability and motivation in the sharing process may be achieved, and the model says nothing about options to adapt it to different company cultures.

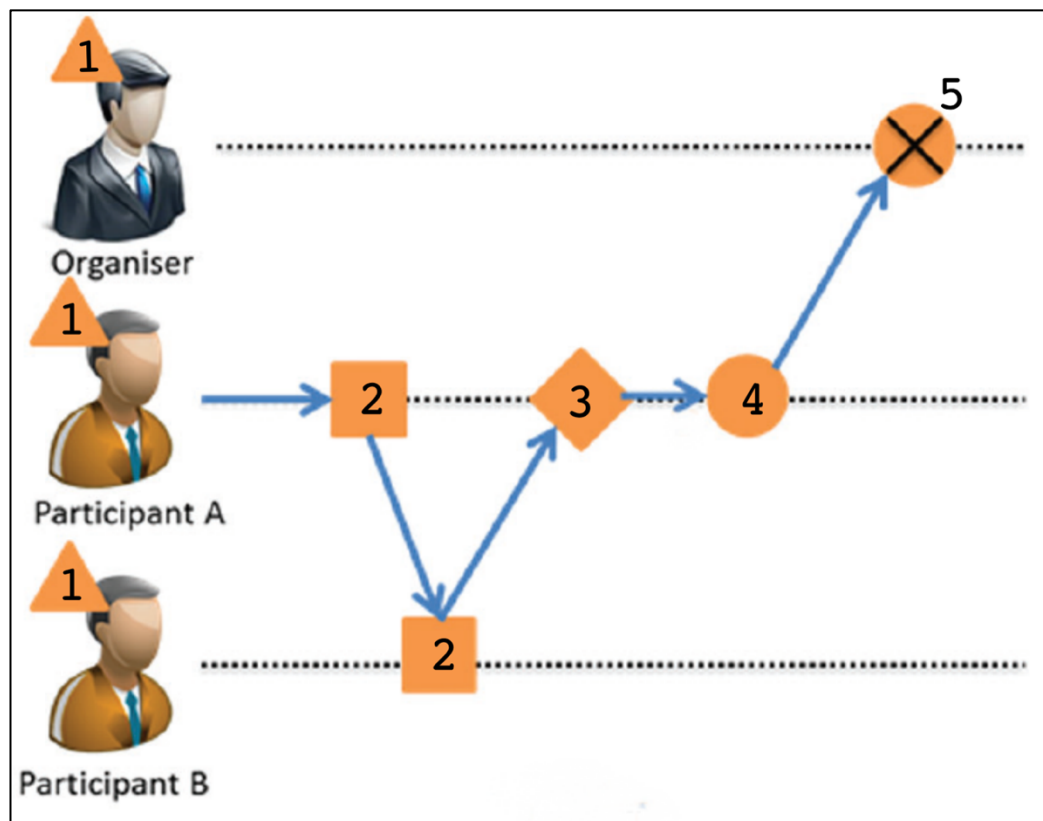
2.3.3.4 Toward a KT Implementation Plan

Various models in the management literature take note of the aforementioned KT-complexity and try to weld its key aspects into detailed step-by-step descriptions of efficient practices. Factors such as the ones analysed before, i.e. knowledge conversion, importance of the individual and work groups, knowledge status of an organisation, and knowledge flows, are usually presented in the form of process- or phase-based plans. It can be argued that following those plans will help practitioners implement KT in their individual environments. At least, the plans may give structure to implementation initiatives by defining a starting point and milestones for an intra-firm journey towards KT. They will not be suited though to serve as general tools addressing specific challenges arising, for example, from a firm's organisational boundaries or issues related to a firm's culture.

Frank and Ribeiro (2012) provided a comparison of 14 knowledge transfer models from the existing management literature and classified them into two categories, “the emergent approach (which considers the dynamics and integration of the team) and the engineering approach (which considers the organization and management of knowledge)” (p. 1). The analysis builds the foundation for a unified model of KT between new product development (NPD) teams. NPD, which is usually considered a unified process of launching a new product into the market, falls into the category of knowledge-intensive activities (Ramesh & Tiwana, 1999; Goffin & Koners, 2011), and hence Frank and Ribeiro’s approach is specifically relevant to this thesis. The authors, assuming the process view of KT, arranged all the models explored in five phases: Phase 0: Knowledge generation in the source, i.e. in the context of individuals and within teams. Phase 1: Knowledge identification (finding and abstracting knowledge). Phase 2: Knowledge processing (related to the execution of the transfer of identified knowledge from the source by using, for example, documents with codified explicit knowledge). Phase 3: Knowledge diffusion, i.e. making knowledge available to team members, and finally Phase 4: Knowledge application in the recipient which refers to “knowledge reuse in new contexts” (Frank & Ribeiro, 2012, p. 7). In spite of its detailed process-view, the unified model from Frank and Ribeiro falls short of a clear description of the interaction of participants in the KT process, though. Mougin et al. (2015) specifically focus on this key component of successful KT and “classify knowledge and the different states of transformation within the knowledge transfer process” (p. 312). Figure 9 exemplifies the process that is facilitated by an organiser and two further participants: from the creation of a *knowledge footprint* (oral or written element, externalised by an individual) over a *shared knowledge footprint* (result of interaction of provider and receiver, for example further explanation

and interpretation) to *knowledge object* (formalised document) and *packaged knowledge object* representing a formalised document compatible with a technical knowledge management system (KMS).

Figure 9: KT Process with three Participants



(1): **Organiser & Participants** (2): **Knowledge footprint** (3): **Shared knowledge footprint** (4): **Knowledge object** (5): **Packed knowledge object**

(Source: Mougin et al., 2015)

Mougin et al. build upon existing models such as the knowledge spiral from Nonaka and Takeuchi (1995) or the fundamental idea of Chevallard's (1991) *didactic transposition* concept according to which knowledge gets produced and then selected and rearranged in a societal context. The phased approach helps operationalise KT processes and may be useful for practitioners seeking ways to document knowledge along an intra-firm KT-journey. The approach is also an important reference for the conceptual framework of this thesis (Section 2.7), but it can be argued that it misses, for example, components related to trust between the KT-participants or a clear explanation of the role of the organiser who seems to remain passive and without impact on in the interaction of the individuals. Furthermore, it remains unclear how a KIF could adjust the five KT-phases to the need for flexibility which is a key characteristic of the Knowledge Age (Calabrese, 2006).

2.3.3.5 Unresolved Issues

The analysis of KM and KT models has revealed a number of learning points as well as gaps in the management literature that this thesis tries to address. The four key findings of this literature review so far are as follows:

1. According to the SECI model, tacit knowledge is converted into explicit knowledge. Interaction of individuals along a continuum is key to achieve KT and depends on organisational culture.
2. Individuals, work groups, and mutual trust to share knowledge are core to the success of KT.
3. Building a KM and KT execution plan for an organisation may require building a foundation first, i.e. understanding the state of knowledge,

mapping individual knowledge or knowledge of the organisation and the vision.

4. The flow of information and knowledge within an organisation is a major component of the aforementioned execution-plan. Knowledge flows are company-specific, are influenced by internal and external factors - and depend on how individuals interpret data and information and create knowledge from those components.

The models provide valuable insights into the enablement of KT but do not provide practitioners with holistic execution plans. Partly, this is due to the fact that no one-fits-all solution exists as organisations differ, specifically across industries. Partly, current management literature concentrates on single aspects rather than exploring effective combinations of tacit/explicit knowledge conversion, enablers (and exclusions of barriers), and transparent processes (Spraggon & Bodolica, 2012). Also, the need for flexibility - a major tenet of the ever faster changing environment of the Knowledge Age (Calabrese, 2006) - is not considered at all in most of the models referred to in this thesis. Specifically, no links to KIFs can be found in those studies.

With regards to the research problem, a deeper analysis of barriers and enablers as well as processes of KT is required. Findings from those two areas will help understand the factors enabling optimised KT in a KIF better.

2.4 Theme 2: Barriers and Enablers

14 of the 17 frameworks and models analysed in this research study (Table 2; Table 3) seek to increase awareness of a whole range of barriers or enablers of KM and KT. The remaining models from Sveiby (2001), Boisot and Canals (2004) as well as Maruta (2014) are more concerned with single

aspects of KT such as knowledge-flows. Enablers of KT, i.e. the various factors that have to be considered to implement KT successfully in a firm, are at the core of this thesis and will be further detailed in the following. Regarding barriers, i.e. the impediments to successful KT, key aspects that can be found in the management literature will be discussed.

2.4.1 Strategies to overcome Barriers

The studies explored rather do not describe barriers in detail but concentrate on depicting enablers such as managerial, organisational or technological aspects. Establishing or focusing on enablers in an organisation implies that potential underlying hurdles to KT are addressed. Szulanski (1996) and Minbaeva (2007) distil barriers to KT into the following clusters: (1): Source of knowledge (e.g., reliability or lack of motivation); (2): Quality or characteristics of knowledge (e.g., ambiguity or unprovenness); (3): Recipient of knowledge (e.g., lack of motivation, capacity to manage knowledge); and (4): Context (e.g., organisational culture impeding knowledge sharing). This list of clusters can give practitioners only a general overview of the several impediments to KT that they may be confronted with in their specific organisational environment. Practitioners will be more focussed on answers to the question of how impediments can be overcome, though.

Ichijo, von Krogh and Nonaka (1998) defined a number of barriers to knowledge creation (the foundation of KT). They argued that corresponding activities should be used to mitigate their impact. The impediments range from *mindset* over *communication*, *structure* (i.e. organisational structure facilitating knowledge development) and *relationships* (interaction of individuals) to *human resource management* (Table 4). These are juxtaposed with business intent (i.e. the definition of knowledge as a precious

resource), organisational conversation, pursuance of competitive advantage of a firm, management of internal relationships and people development. Undoubtedly, an understanding of impediments to the creation of knowledge and strategies to overcome them is important for practitioners of KT. It can be argued though that the analysis is missing depth. IT as a potential impacting factor, for example, is not mentioned at all. In 2000, von Krogh, Ichijo and Nonaka elaborated on organisational barriers and described how impediments to knowledge creation such as lack of strategy and organisational focus were overcome in a KIF. The consultancy firm they analysed applied a holistic approach to create an enabling situation.

Table 4: Knowledge Impediments and Mitigation Strategies

Potential Impediments to KM/KT	Strategies to overcome Barriers
Mindset Understanding that knowledge is a key competence of the firm	Create a knowledge intent
Communication Creation of a common language to externalise and express knowledge	Enable and develop conversations across the organisation
Structure Support of innovation as well as outward focus	Align structure with the context for competitive advantage of the firm
Relationships Trust and respect to build collective knowledge	Build care relationships (referring to human interactions and quality of a relationship rather roles or functions)
Human Resources Management Senior management to place high value on sharing and contributing to knowledge	Develop knowledge managers

(Source: Adapted from Ichijo, von Krogh & Nonaka, 1998, and Nelson, 2004)

The case study may give practitioners valuable insight into an individual case but it does not provide a comprehensive analysis of enablers that is required to understand how optimised KT can be achieved. The following section is therefore dedicated to a more detailed exploration of enablers of KT.

2.4.2 Key Enablers of intra-firm KT

Organisational structure and culture, business vision and strategy, IT, the individual, as well as leadership within an organisational framework are among the key enablers of intra-firm knowledge transfer (Zheng, Yang, & McLean, 2010).

The analysis of the 17 frameworks and models performed for this thesis broadly confirms that statement, and Table 5 on the subsequent page provides the essence of the most important factors facilitating intra-firm KT. The list of enablers ranges from compelling vision, organisational culture, technical infrastructure, over knowledge processing - to on-the-job trainings for KWs.

The list cannot be complete, and it can be argued that it does not provide practitioners sufficient advice on how to assess enablers and their probability to meet specific KT needs. These needs will be different, depending on the individual business environment. There is a general paucity of management literature on this aspect, as highlighted in the following.

Table 5: Key Enablers of intra-firm KT

Authors / References	Year	Enabler
Skyrme & Avidon	1997	Strong link to business imperative; compelling vision; knowledge leadership; knowledge creating and sharing culture; continuous learning; well-developed technology-infrastructure; and systematic organisational processes
Davenport et al.	1998	Clear purpose and language; multiple channels for knowledge transfer; standard and flexible knowledge structure (referring to repositories and content); organisational culture; technical and organisational infrastructure; change in motivational practices; senior management support
Frank & Ribeiro	2012	Integrative KT model to enable five phases: knowledge generation in the source; knowledge identification; knowledge processing; knowledge dissemination; and knowledge application in the recipient
Mougin	2015	Discussions, on-the-job-training, formalised documents to capture content and enable KT in a structured way

(Source: Adapted from Theriou, Maditinos, & Theriou, 2011)

2.4.3 Unresolved Issues

The various analyses of barriers and enablers provide practitioners with a broad overview - but they do not proffer clear advice on how to successfully implement KT-initiatives, i.e. on how to plan timelines or build implementation roadmaps. Similarly to the frameworks and models themselves, details on impediments and solution strategies in those studies seem fragmented or inferred from individual cases that may be hard to replicate. Among the

frameworks and models investigated for this literature review, only Mougin et al. (2015) take note of the ever faster changing business environment of the Knowledge Age and approach a more flexible model to enable KT in different environments. By applying a mix of methods and tools to achieve KT, complemented by clear procedural steps as noted before (Figure 9), the authors' modelling framework tries to manage KT-complexity in a pragmatic way. The approach can be challenged though and, for example, does not elaborate on motivational aspects or incentives for KWs to share and help transfer knowledge. But it reveals the importance of flexibility or *agility* - to use a common term of the Knowledge Age - in processes. Processes, if employed appropriately, are key to successful KT. The subsequent section is dedicated to processes and focuses on agility which is at the core of the Scrum management and control framework probed within the PAR-cycles of this thesis to achieve optimal KT in a KIF.

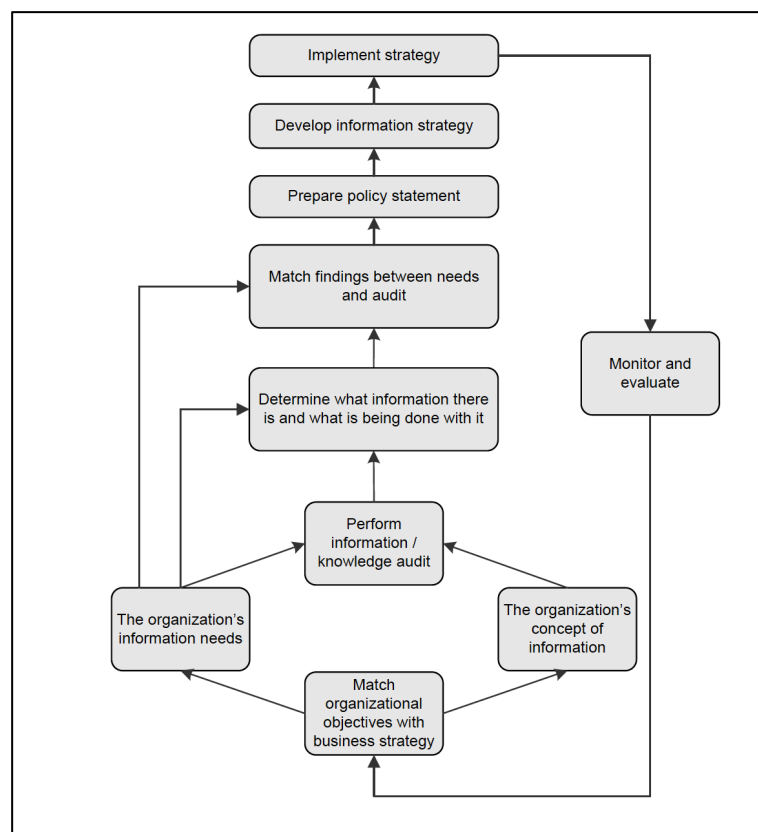
2.5 Theme 3: Processes

The importance of processes in KM and KT is permanently reiterated in the management literature and especially in the 17 frameworks and models investigated for this thesis (Table 2; Table 3). A whole body of studies assigns an integral role to KM and KT processes as they are considered value contributors and key factors impacting a company's CA and business results. This makes processes specifically important to KIFs. Ho et al. (2014) state that "KM processes refer to the use of the most efficient method to 'transform' the implicit, fragmentary and private knowledge of individuals or groups (...) into valuable intellectual assets for the organization" (p. 736). The authors adopt a conceptual framework defined by Lee and Choi (2003) according to which enablers of KM impact upon processes that trigger

intermediate outcomes and - finally - organisational performance. Figure 3, as referred to before, visualises the framework.

KM and KT processes in the management literature are typically presented in flow diagrams. Orna (1999) provided a classic presentation explaining the development of an information policy within an organisation (Figure 10). The process describes activities on a strategic level, aligning KM with business objectives of a firm.

Figure 10: Process of Information Policy Development



(Source: Orna, 1999)

The flow diagram shows detailed process steps, including activities of monitoring and evaluating progress achieved during the implementation and execution of the information policy.

Other process-based approaches depict procedures on a more granular level, providing concrete advice for practitioners on how to detect the KM and KT status quo of an organisation and then build the foundation for implementation. Notably, Lee, Lee and Kang (2005) identify five key processes - knowledge creation, accumulation, sharing, utilisation, internalisation - and assign certain indicators (*items*) to them. This approach can be considered an activity to assess an organisation's operational status quo with regards to KM (Table 6). The items comprise aspects such as KWs' individual understanding of information based on personal interaction, database access and usage, openness to sharing and utilising new knowledge within a firm, and capabilities to internalise new knowledge.

Most of the frameworks and models analysed in this thesis elaborate on one or more of the processes presented in Table 6. What is missing though is a discussion of how flexible those process-oriented proposals are.

Table 6: KM & KT Processes and their Measurement Items

Process	Items	Explanation
Knowledge creation	Tasks understandings	Extent of understanding of the task through the assistance and interaction with predecessors
	Information understandings	Extent of understanding of personally accessed information
Knowledge accumulation	Database utilisation	Extent of employees' search in corporate databases to obtain knowledge
	Systematic management of task knowledge	Extent to which knowledge need for given tasks (including legal guidelines and task-related policies) is systematically stored for further usage
	Individual capacity for accumulation	Extent to which employees' individual knowledge and education are formally or informally stored
Knowledge sharing	Core knowledge sharing	Extent of sharing general information and knowledge relevant to core abilities for improving task efficiency
	General knowledge sharing	Extent of sharing general information and knowledge about the organisation with internal and external teams
Knowledge utilisation	Degree of knowledge utilisation in the organisation	Extent to which organisation-wide information and knowledge are used to facilitate processing tasks
	Knowledge utilisation culture	Extent to which employees are encouraged to utilise existing knowledge through a reward mechanism (motivational aspects)
Knowledge internalisation	Capability to internalise task-related knowledge	Extent to which KWs can obtain knowledge for task mastery and to generate new knowledge from learning and applying best practices
	Education opportunity	Extent to which university-administered education and on-job training is provided
	Level or organisation learning	Extent to which the organisation-wide standards for information resources and professional knowledge are systematically managed and regularly updated.

(Source: Adapted from Lee et al., 2005, and Ho et al., 2014)

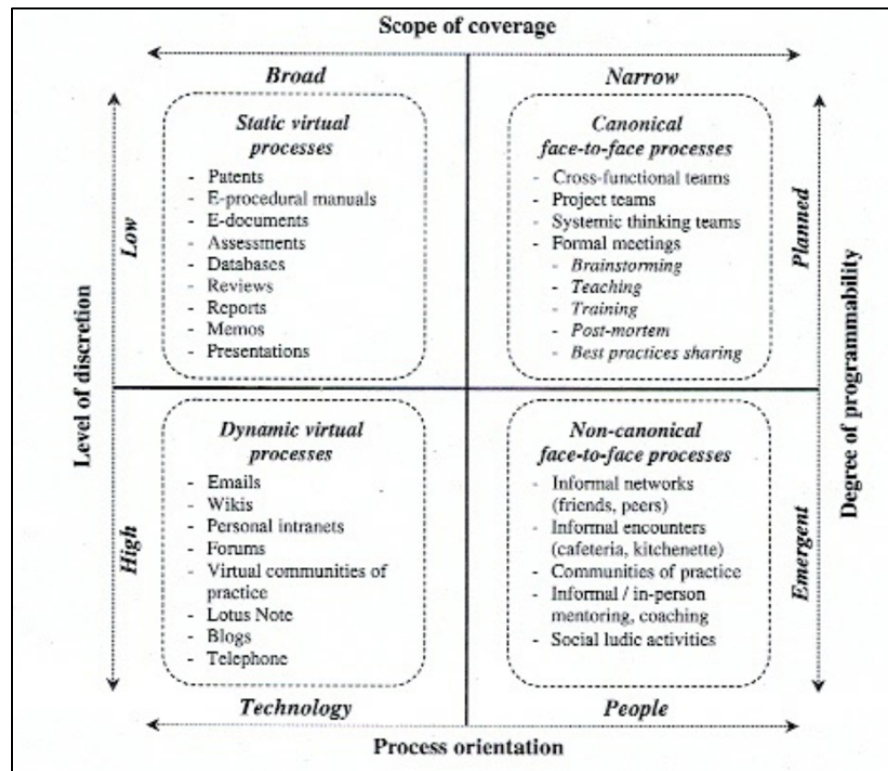
As touched upon before, the approach of Mougin et al. (2015) to create a *modelling framework* is potentially useful to be adapted to the swiftly developing business environment of the Knowledge Age. It is an exceptional study but is still missing, for example, sufficient guidance on how to weld a team of employees together and foster a spirit of cooperation to achieve optimal KT. Also, it remains unclear when exactly specific practices should be employed to meet organisational issues - and thus achieve successful

KT. It can be argued that an integrated approach combining key KT processes with a clear schedule of implementation is not available in the management literature. One main reason may be that themes related to KT developed in isolation without focus on a holistic approach to the complexity of KT (Section 2.3.2.1). This thesis set out to address this issue as outlined in the following.

2.5.1 Unresolved Issues

Process-oriented approaches to KT are based on the definition of a sequence of certain practices. The processes are usually presented in the form of flow charts also known as waterfall diagrams (Figure 10). And those visualisations clearly reflect the inflexibility of the approaches. Practitioners may be disappointed when trying to use those process-plans in their specific individual environments. Spraggon and Bodolica (2012), recognising the need to go beyond the limitations of rigid single processes, propose a multidimensional taxonomy to enhance KT-effectiveness and align process idiosyncrasies “with the specific knowledge needs and broader strategic orientation of the organisation” (p. 1275). Figure 11 shows the taxonomy comprising of four theoretical constructs (*canonical face-to-face processes*, *static virtual processes*, *non-canonical face-to-face processes*, and *dynamic virtual processes*) at its core. The constructs are shown in quadrants. Their positioning, for example, depends on the degree a process is more technology- or people-oriented (perspective of *process orientation*) or planned in advance and formal vs. more emergent and informal (perspective of the *degree of programmability*). It can be argued that this integrative taxonomy approach seeks to adapt KT-initiatives and respective practices to different environments and hence might be beneficial to KIFs and their specific set-ups (Section 2.3.1) as well.

Figure 11: Taxonomy of KT Processes



(Source: Spraggon & Bodolica, 2012)

But a clearly outlined, nimble approach that helps enable KT between individuals and across teams, covering business vision and strategic intent, organisational and cultural as well as technical aspects - the key enablers of KT (Section 2.4.2) - is not provided and can generally be considered a gap in the management literature.

This thesis set out to address the gap by employing and extending the Scrum management and control framework and its specific agile practices to achieve optimal KT in a case company, a KIF. Scrum practices were

introduced in PAR-cycles run with a selected team of employees. Why Scrum is considered useful to enable optimal KT in a firm and why the agile practices of the Scrum framework are crucial to the conceptual framework of this thesis, will be depicted in the subsequent sections.

2.6 The Scrum Management and Control Framework

Scrum is a framework comprising of a set of values, principles and practices used to organise and manage work (Rubin, 2012). Scrum, originating from software and product development, is considered an agile framework and is consistent with values of the Agile Manifesto describing collaborative efforts of self-organising, cross-functional teams (Collier, 2012). The term *agile* was coined in 2001 when a group of software developers came together “to uncover better ways of developing software by doing it and helping others do it” (Manifesto for Agile Software Development, 2001). In this approach, the interaction of individuals and openness to change, to name two characteristics, are of major importance.

The term Scrum is not an acronym, but rather a shortcut for *scrummage* and has been borrowed from the sport of rugby, presuming fair play and reflecting team collaboration. Related to rugby, Scrum describes a method to restart a play with players packing closely together, trying to get hold of the ball. Interestingly, Takeuchi and Nonaka (1986) introduced the metaphor of rugby earlier to describe a team-based approach to product development in Japanese companies, stating that “a holistic or ‘rugby’ approach - where a team tries to go the distance as a unit, passing the ball back and forth - may better serve today’s competitive requirements” (p. 138). In 1993, a software development team at Easel corporation in the US created an initial Scrum process, inheriting concepts from the product development approach of Takeuchi and Nonaka and combining it with other components such as

process control or iterative and incremental development (Rubin, 2012). Agile development was the foundation of the approach at Easel. Scrum has been elaborated ever since and is considered a framework rather than a single process. Its principles are being used across industries to develop products - or to organise flows of work. The work-flow aspect is specifically relevant to this thesis as it seeks to present an integrated set of practices to enable optimal KT. This means to involve individuals or teams of employees and to organise the way they interact and thus work together, successfully. "Scrum is a refreshingly simple, people-centric framework based on the values of honesty, openness, courage, respect, focus, trust, empowerment, and collaboration." (Rubin, 2012, p. 13.) These characteristics were probed within the PAR-cycles of this research study (Chapter 6).

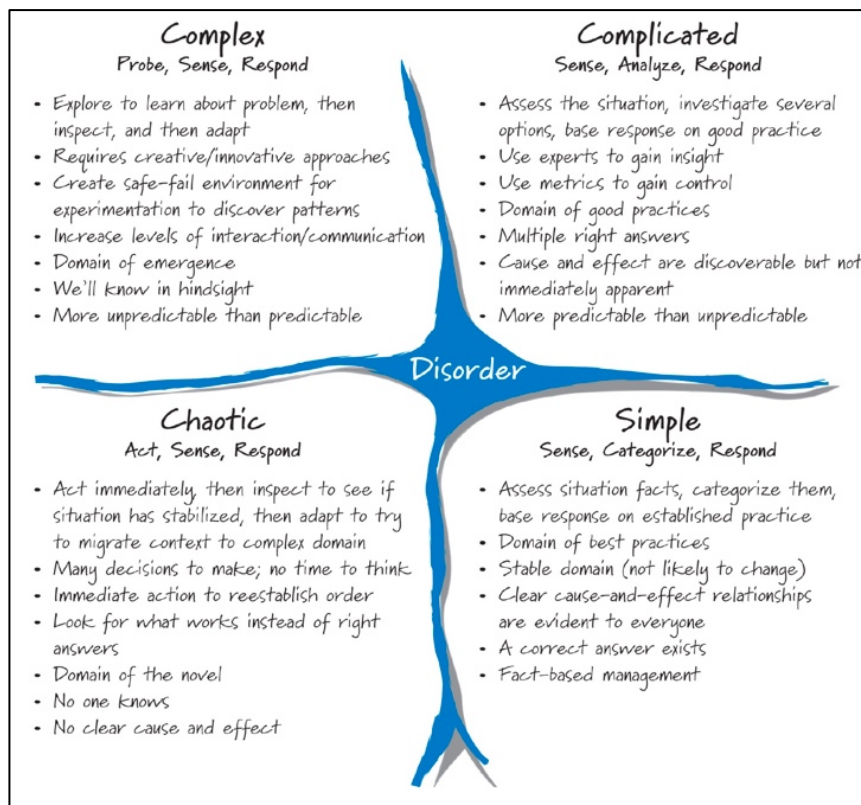
2.6.1 The Relevance of Scrum

The complexity of intra-firm KT - ranging from technological over process-related to organisational and cultural aspects within a firm - has been analysed in depth in the preceding sections of this literature review. Scrum has mainly been chosen to address this complexity and to explore the capability of the framework to help achieve optimal KT. In the management literature, Scrum is usually described as a framework applied "to manage complex product development" (Ordonez de Pablos, 2014, p. 131). Rubin (2012) goes further and provides a more general statement: "Scrum is particularly well suited for operating in a complex domain. In such situations our ability to probe (explore), sense (inspect), and respond (adapt) is critical." (p. 8.)

The essence of a complex domain, and approaches to address it, were argued by Snowden (2000) in the *Cynefin* framework. *Cynefin* is a Welsh word actually meaning habitat or places, and the framework has its roots in

KM (Kurtz and Snowden, 2003). It defines different domains of situations and appropriate actions to manage them: *complex*, *complicated*, *chaotic*, and *simple*. The fifth dimension, *disorder*, occurs when a situation is unclear. Figure 12 presents the framework as well as activities per domain. Increasing interaction (of individuals) or adaptivity (related to problems), for example, are assigned to complexity.

Figure 12: The Cynefin Framework



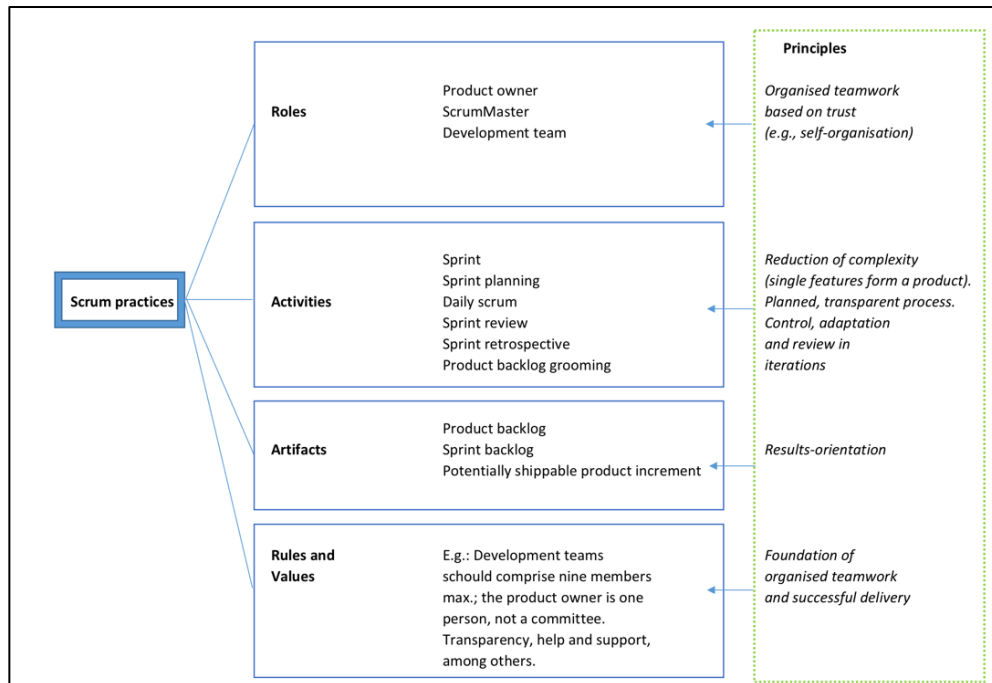
(Source: Rubin, 2012)

The activities reflect the tenets of Scrum which has an agile and adaptive approach at its core, i.e. it comprises of procedures ready to respond to fast changing business environments. This aspect leads to one key statement of this thesis: Scrum may be much more suited to enable KT in a KIF than normative waterfall approaches (Section 2.5), as explored before. Rubin (2012) underscores the adaptivity of Scrum and its capability to be catered to a firm's specific needs: "The result will be a version of Scrum that is uniquely yours." (p. 13.) Testing the Scrum practices in the PAR-cycles to achieve optimal KT was key within the data generation process of this research study as depicted at a later stage.

2.6.2 Scrum Roles and Practices

Scrum is characterised by specific roles for individuals, activities, artifacts (by-products), and associated rules. These domains will be explained on a high level in the following. More important than detail with regards to roles and activities are the underlying principles that can be identified. Figure 13 presents an overview of practices and their associated key principles. Practices and values of Scrum are defined in the Scrum Guide provided by American software developer Ken Schwaber, and Jeff Sutherland who was among the team promoting the agile approach at Easel corporation.

Figure 13: Scrum Practices and Principles

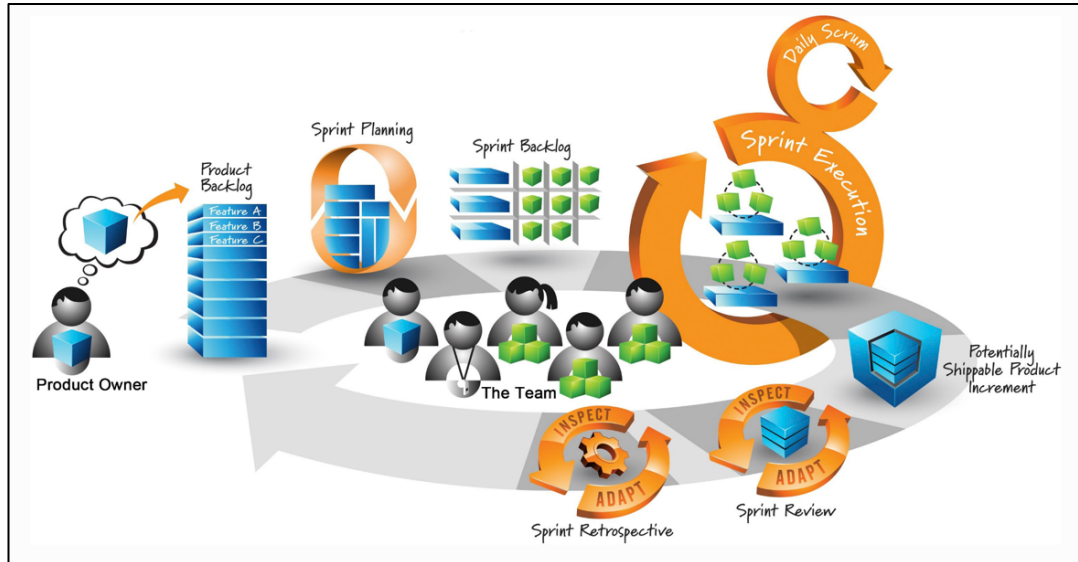


(Source: Author's editing)

The major organisations developing and specifically teaching Scrum nowadays, Scrum Alliance, Scrum Inc., and Scrum.org, support the Scrum Guide which is available as a document online and is regularly updated. The Scrum practices, and the underlying principles identified in this thesis, are described and defined in the following.

Figure 14 shows a visualisation of the Scrum framework and its inherent processes. As Scrum originates from IT and software and product development, the descriptions may seem technical or reduced to technical coding practices - in fact, they are first of all crucial to organise work-flows.

Figure 14: The Scrum Framework



(Source: Scrum: A powerful agile framework, 2015)

Scrum Practices and Principles

Roles: In Scrum, individuals are organised in teams, and three roles are defined: Product Owner, ScrumMaster, and Development Team. The Product Owner is overall responsible for what will be developed. The ScrumMaster guides the development team which is empowered to organise and manage its own work.

Principles: The principle that can be inferred here is organised teamwork built on trust.

Activities: Development activities are called sprints. The duration of a sprint is typically one calendar month, and the number of sprints needed to complete a certain product depends on its complexity. Before a sprint starts, the product owner's vision of what is to be created is broken down into prioritised features. This activity is called grooming. The result of the grooming process is a prioritised list, the product backlog. A sprint is thoroughly planned and comprises of the development work (termed sprint execution) and closes with a review and a retrospective (both explained in the following). When a sprint commences, the development team creates a subset of the product backlog consisting of features to be completed. The team members then compose a sprint backlog describing how the selected features are designed, built, integrated and tested. During the following sprint execution, "the team members help manage the flow of work by conducting a synchronization, inspection, and adaptive planning activity known as the daily scrum" (Rubin, 2012, p.18). The result will be a potential product increment. A crucial component specifically reflecting the agile character of Scrum is represented by the two final activities of inspecting and adapting. In the first, called sprint review, all responsible individuals inspect the product they are working on. In the second, termed sprint retrospective, the Scrum team reviews the process applied and may agree on adaptations. Once a product is delivered, the sprint cycle repeats.

Principles: The principles that can be inferred are reduction of complexity (product broken down to features), a planned and transparent process as well as adaptiveness, process control and process iteration.

Artifacts: Product backlog, sprint backlog and the potentially shippable product increment are called artifacts or by-products. “Scrum’s artifacts represent work or value to provide transparency and opportunities for inspection and adaptation. Artifacts defined by Scrum are specifically designed to maximize transparency of key information so that everybody has the same understanding of the artifact.” (Schwaber & Sutherland, 2016, p.12.)

Principles: The key principle inferred here is results-orientation.

Rules and Values: Throughout the Scrum Guide provided by Schwaber and Sutherland, rules and values are promoted. One key rule, for example, says that development teams should not exceed nine members as this would mean “too much coordination” (Schwaber & Sutherland, 2016, p. 6) potentially resulting in complexity. Transparency, help and support are key values Scrum rests upon. Rules and values specifically relevant to the PAR-cycles of this thesis are explained in Chapter 3 and Chapter 4.

Principles: Clearly communicated foundation of organised teamwork and successful delivery.

Not all aspects of Scrum could be outlined in the previous part of this section. The key principles though have been depicted. Scrum, employing an iterative approach, is based on empirical process control theory (Schwaber and Sutherland, 2016), which was useful to investigate optimal KT procedures within the PAR-cycles carried out for this research study. Also, the Scrum framework was adopted as an important referent model for the definition of the conceptual framework of this thesis, as described in the following section.

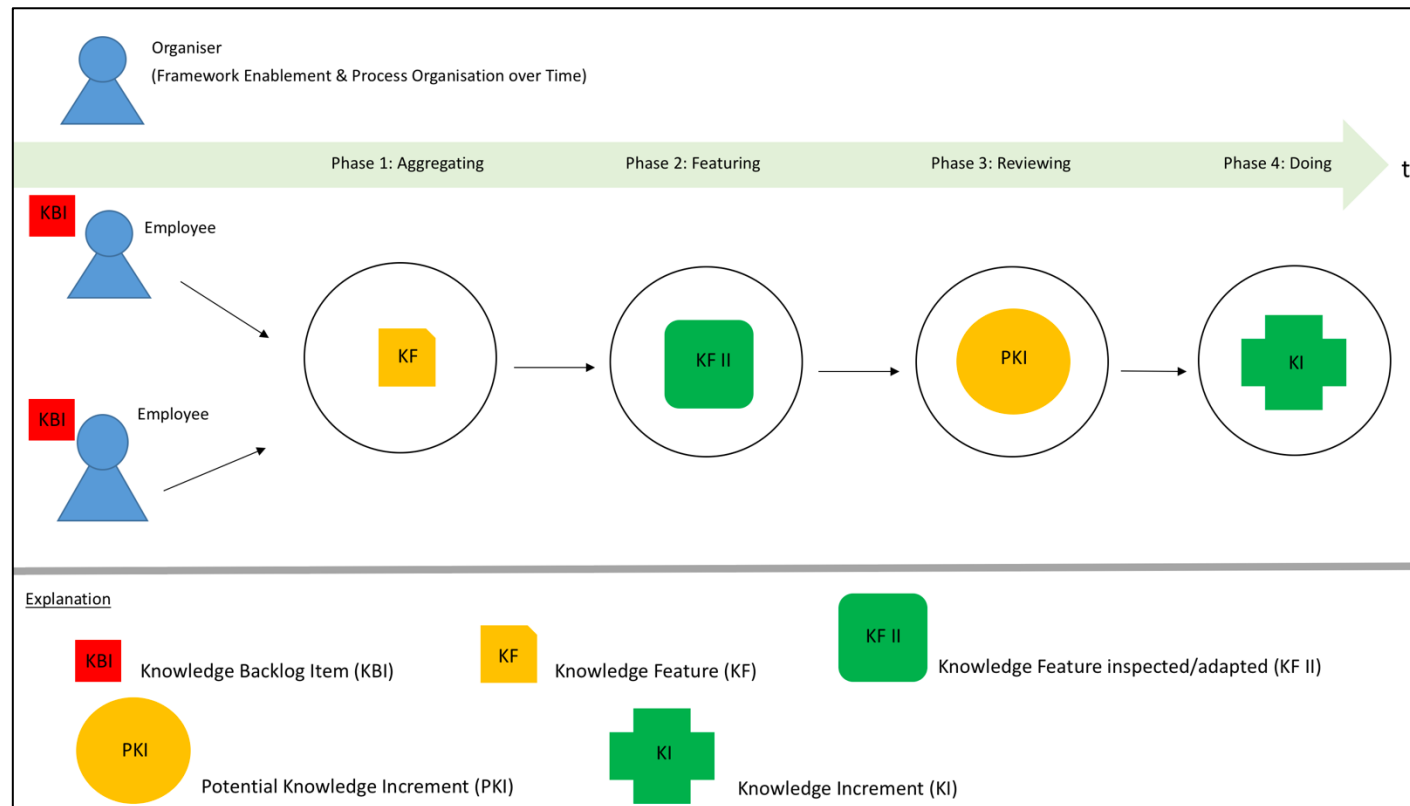
2.7 Conceptual Framework

The sources explored so far in this thesis have revealed a number of issues that are not being resolved by existing frameworks and models of KM and KT. Specifically, the literature review indicates that an integrated, adaptive framework for KT, focusing on flexible or agile processes required in the fast changing business environment of the Knowledge Age, is not available. Some of the more strategic studies advise on an alignment of KT practices and business targets which may be important for practitioners to justify their KT-initiatives - but generally the frameworks and models do not provide sufficient detail on how the implementation should be planned or executed (Auernhammer & Hall, 2014). It can be argued that completeness, in terms of addressing the entire complexity of intra-firm KT, is missing. The aim of this thesis is to try to close this gap by establishing a process-oriented framework evolving from Scrum practices. This section is to explain the conceptual framework that has been developed for reasons of observation and analysis in the case company ABC.

The conceptual framework of this thesis incorporates the KT-model of Mougín et al. (2015), as depicted in Section 2.3.3.4 and visualised in its basic form in Figure 9, and the practices and principles of the Scrum framework as outlined in this section. By doing so, the conceptual framework visualised in Figure 15 emerges. Details of the conceptual framework will be explained in detail in Chapters 3 and 4 on methodology and methods. In general, the tenets of the framework are as follows:

1. Knowledge is understood as a product that can be broken into its components (data, information). Knowledge rests with employees and is termed *Knowledge Backlog Item (KBI)*.
2. The KT process occurs over four phases. The process is organised by an *Organiser* enabling the framework and organising the process over time. At least two employees take part in the KT process. Teams of people may also attend (which may even be the usual case).
3. In Phase 1 (*Aggregating*) employees come together and interact. They break knowledge down into its components and create *Knowledge Features (KF)* which are documents (non-digital and/or digital and comprising text or multimedia elements) with keywords describing the knowledge components. Example: paper sticker on a white board displays name of database storing key technical information of a customer project. In Phase 2 (*Featuring*) employees discuss the relevance of the KFs, prioritise them, plan knowledge flows and try to execute knowledge transfer.

Figure 15: Conceptual Framework: Process-Oriented KT



(Source: Author's editing)

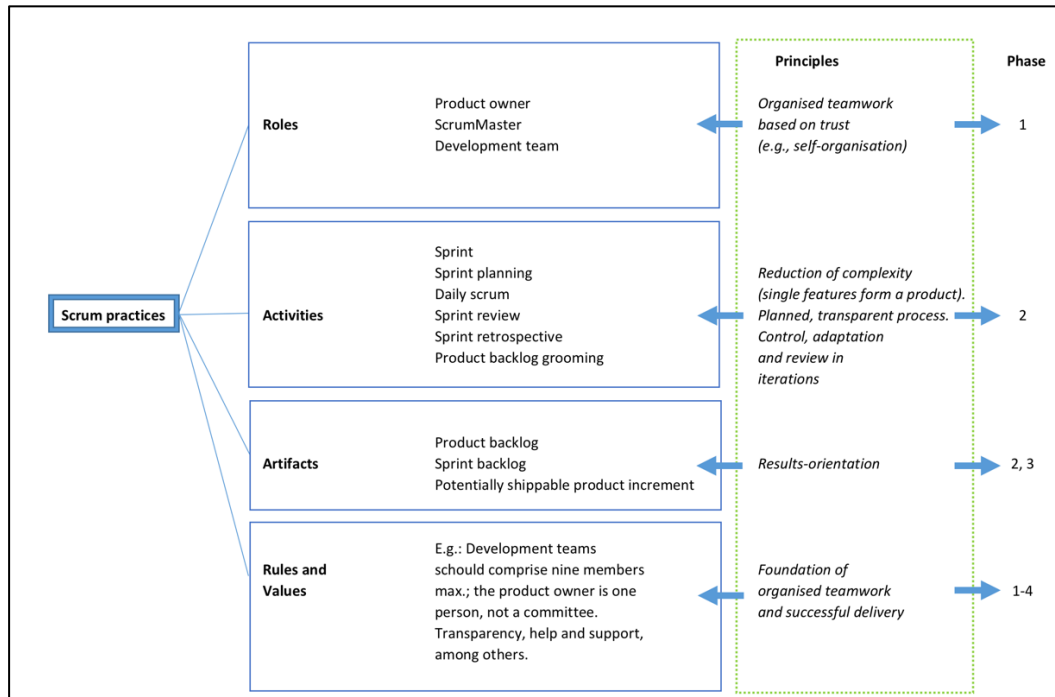
Phase 3 (*Reviewing*) is about assessing if successful KT is happening or if adaptations to the process have to be made. In the Reviewing phase, more elaborated documentation (e.g., preliminary texts or multimedia material), called *Potential Knowledge Increment (PKI)*, is produced.

In Phase 4 (*Doing*) the knowledge transfer is completed by producing final documentations (non-digital and/or digital and comprising text or multimedia elements), and thus a *Knowledge Increment (KI)* emerges. Participants of the KT process apply newly acquired knowledge.

4. Finally, the process cycle is repeated if needed and if the overall KT process is considered successful by Organiser and employees.

Figure 16 on the subsequent page, expanding Figure 13, additionally visualises which Scrum principles (Section 2.6.2) impact which of the four key phases of the conceptual framework.

Figure 16: Scrum Principles impacting the four Phases of KT



(Source: Author's editing)

The conceptual framework uses theoretical foundations of frameworks and models already available in the management literature. Notably, the KT-model from Mougin et al. (2015) itself is based on the knowledge spiral developed by Nonaka and Takeuchi (1995). Of course, not all potential interactions of employees in KT processes can be observed and analysed based on the conceptual framework proposed here. But it helped understand the initial KT processes in the case company and provided a foundation to explore ways towards optimal KT within PAR-cycles.

2.8 Arising Research Questions

The literature review has made apparent that extant frameworks and models of KM and KT cannot provide sufficient help to resolve the research problem (**What framework needs to be employed to enable optimal KT in a KIF?**). To provide a working KT-framework is a complex undertaking, ranging from organisational to technological aspects. This led to the formation of the three research questions.

The first question aims to detect whether principles of certain frameworks and/or models are already being applied and if their weaknesses are reflected in existing habits. The question is also about understanding the KT status quo and existing processes: **How is knowledge being transferred at case company ABC GmbH?**

The literature review has examined a number of barriers and enablers to KT. Explanations of their impacts in the management literature are often missing depth though (Section 2.3.2.1) and need to be explored in much more detail. This led to the formulation of the second research question: **What are the factors impacting KT?**

Finally, this thesis sets out to investigate ways to change existing procedures in the case company to approach optimal KT. Existing frameworks and models do not provide sufficient guidance on how to overcome barriers and find solutions in fast changing business environments. To address this, the Scrum framework and its practices have been employed in PAR-cycles. The underlying third research question was: **How can knowledge transfer practices be changed to achieve optimal KT?**

2.9 Conclusion to Chapter 2

The key learning points of the second chapter are as follows:

1. Gaps in the management literature on KM and KT models related to their successful implementation, specifically in KIFs, revealed.
2. Conceptual framework developed, incorporating basic concepts from the knowledge spiral, Mougín et al. (2015), and practices from the Scrum agile framework to help resolve the main research problem.
3. Three research questions clearly inferred from the literature review, supporting observation, deep analysis and action-reflection cycles in the case company.

CHAPTER 3: METHODOLOGY AND RESEARCH DESIGN

3.1 Introduction and Format of Chapter

This Chapter delineates the research methodology and strategy, the underpinning ontological and epistemological positioning, as well as the research design. The goals of the research project were twofold: to evaluate whether the Scrum management and control framework can help change working procedures to achieve optimal KT in a KIF, and second to make a theoretically sound and useful contribution that develops Scrum practices and their potential weak points in KT environments. The literature review concluded with the learning that existing frameworks of KM and KT do not provide sufficient help to resolve the research problem, and three research questions were formed. The subsequent section outlines the objectives of the questions as well as the respective methods applied to generate data for further analysis. The underlying research methodology that has been designed and a justification of the participatory research design are explained in the course of this Chapter.

3.2 Research Questions, Objectives and Methods

Table 7 extends Table 1 by juxtaposing the research questions with the methods chosen to capture data in the case company. Documentary analysis, non-participant observations and open-ended interviews helped understand the status quo of KM and KT in the organisation. Employing the methods, for example, data related to the factors impacting on KT were generated, such as organisational structuring or aspects concerning the IT infrastructure of ABC.

Table 7: Research Questions, Objectives, and Methods

Research Question	Objective	Method
How is knowledge being transferred at case company ABC GmbH?	To understand the existing processes underpinning KT in the case company. Focus is on intra-firm KT between individuals working on customer projects	<ul style="list-style-type: none"> - Documentary analysis (based on secondary data) - Non-participant observation (primary data) - Open-ended interviews (primary data)
What are the factors impacting knowledge transfer?	To explore the role of key factors affecting KT. Focus is on the impact of management processes, incl. organisational structuring, IT, and the concepts of trust and motivation	<ul style="list-style-type: none"> - Documentary analysis (based on secondary data) - Non-participant observation (primary data) - Open-ended interviews (primary data)
How can knowledge transfer practices be changed to achieve optimal KT?	To investigate how KT practices in the case company can be changed. Specifically, the scrum management and control practices and their impact will be analysed. The practices will potentially be optimised and developed further	<ul style="list-style-type: none"> - PAR-cycles, incl. participant observation (primary data) - Open-ended interviews (primary data) - Open-ended interviews (primary data)

(Source: Author's editing)

PAR-cycles involving the researcher as well as a team of selected employees were instrumental in achieving change of practices and developing ways towards optimal KT. Observations during and after each PAR-cycle were again the methods chosen to help infer theories of how working procedures can be directed towards successful interaction of individuals and - finally - successful transfer of knowledge.

The following sections describe in detail and justify how the research methodology emerged. The methodology developed after reflecting on various concepts and frameworks available in the management literature. The overall approach to achieving KT in a KIF was designed incrementally through *three major distinct stages* that are outlined in the subsequent part of this chapter.

3.3 Emerging Research Methodology

To develop the study and answer the research questions, the design of the research methodology and strategy followed an initial reflection on the ontological and epistemological positioning of the work. In this thesis, *ontology* is understood as the nature of being and reality; *epistemology* relates to the origin and forms of knowledge, and guidelines applied to gain that knowledge are considered the *methodology* of a research study. Ontology, epistemology and methodology, grouped together with methods to capture data such as observations or interviews, are interrelated and referred to as the *research paradigm* (Scotland, 2012; Creswell, 2014). Reflections on the participatory paradigm chosen for this thesis form the first two stages in the development of the research approach.

3.3.1 Ontological and Epistemological Positioning (Stage 1)

According to Merriam (1998), embarking on a research project commences with a researcher's reflection on his or her perception and understanding of reality, i.e. with the ontological stance. Grix (2004) shares this view and becomes more specific by pointing out that a researcher needs to realise the impact an ontological position can have on the subject of the study and on how the study is conducted.

This thesis initially considers the tenets of the participatory paradigm and reflects on its ontological and epistemological foundation. The choices that have been made with regards to methodology, and specific methods employed, will then be discussed and justified in the light of the goals of this research.

3.3.1.1 Positivism and Interpretivism

Positivism (also termed objectivism) and *interpretivism* (also known as subjectivism or constructivism) are on opposite ends of a continuum related to ontology (Tuli, 2010). A researcher with a positivist orientation believes that reality can be sufficiently observed and described by the use of the senses, and discoveries about human actions are provided as factual statements after identified, piloted, and quantified (Bassey, 1995; Mutch, 2005). Positivist researchers believe they should remain detached from the subject of their study, and the classic view taken from natural sciences claims that “knowledge is a given and must be studied using objective ways” (Tuli, 2010, p. 101). Hence, positivist research findings are usually represented in numbers (Cohen, Manion & Morrison, 2000); if carried out correctly, the findings provide a reasonable trend and are generalisable to the (sample) population as a whole.

The complexity of KT is a challenge to a positivist stance and epistemological positioning. It can be argued that various factors impacting on KT, such as individual interpretation of data and information or motivation to share knowledge at all, cannot be explained within a positivist research approach. Nonaka et al.’s (2000) classic case of apprentices learning from older masters through observation and imitation, as referred to earlier, can hold as an example: a positivist research study may describe the situation and take note of successful or failing events, but it will not reflect on mental processes, forms of learning, or organisational and cultural aspects associated with this specific KT process. Interaction between individuals and culture, for example, are key components of KT though which have been explored in the literature review. Impacts such as these are reflected in interpretive research studies. Interpretive researchers consider reality as a human construct (Mutch, 2005; Tuli, 2010). Their studies are based on qualitative

methodology, and methods such as open-ended interviews or focus group discussions are employed to describe and interpret social realities (Bassey, 1995). Typically, words are used to describe findings in textual form. The participants of qualitative research studies (the researcher included) can be considered “writers of their own history rather than objects of research” (Tuli, 2010, p. 101). Reflecting on the goals of this study, which is based on social processes, there was an early indication that an interpretive approach helps answer the research questions. To develop the research, the wider context of the participatory paradigm was considered.

3.3.1.2 Research Paradigms

Kuhn (2012), in early studies, defined paradigms as “universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners” (p. Xlii). More specifically, paradigms focus the activities of practitioners and provide a theoretical framework directing the research and practice in the field (Willis, 2007). Kuhn’s definition of a scientific paradigm impacted the ontological and epistemological positioning of this work as it indicates that analyses of research findings may not be static but in flux over time. This theoretical foundation was of major importance to the way this research was conducted and theses were inferred. Even if the PAR-approach led to solutions of the research problem, initial findings were challenged by the participants. Some results were finally considered appropriate, others were revised with the intent to find improved ways to achieve optimal KT. Chapter 6 provides detailed descriptions of the PAR-cycles performed as part of this study.

Lincoln, Lynham and Guba (2011) articulated competing paradigms of scientific inquiry and their differentiations which have achieved a generally accepted consensus in the management literature. The authors argue that

research activities are defined by four main paradigms: *positivism*, *postpositivism*, *critical theory*, and *constructivism*. Heron and Reason (1997) added a participatory paradigm to these belief systems, stating that the constructivist paradigm “is unclear about the relationship between constructed realities and the original givenness of the cosmos” (p. 275). The authors specifically contend that a participatory world view instead allows for the understanding that individuals can “join fellow humans in collaborative forms of inquiry” (p. 275), reflecting that humans are connected or related with the living world. Table 8, taken and adapted from Heron and Reason (1997), provides the key part of an overview of the major belief systems. The authors specifically added the dimension of *axiology* to explain scientific paradigms.

Axiology is the study of values or the value system an individual holds. It can be argued that a researcher’s values affect how a research study is performed, e.g. if different perspectives the participants may have are appreciated and what overall is valued in research results. For Reason and Heron, “the first value question to be raised is about the valuing of knowledge itself” (p. 286). This position differentiates axiology from ontology, epistemology and methodology. The latter, as crucial components of the anatomy of a paradigm, are all about matters related to scientific truth. The definition of truth, and if awareness of the truth in propositional (or perceived factual form) is understood as an end-in-itself, is key to any inquiry paradigm. This reflects the position of Aristotle who stated that all human actions aim at some end, or good, with the highest good being that at which all actions aim: an end-in-itself, i.e. a self-sufficient ultimate end (Bostock, 2000). Asking the axiological question when detecting a paradigm does neither explore reality nor the nature of knowledge or methods to attain truth.

Table 8: Foundations of Scientific Paradigms

Issue	Positivism	Postpositivism	Critical Theory et al.	Constructivism	Participatory
Ontology	Naive realism - 'real' reality but apprehendable	critical realism - 'real' reality but only imperfectly and probabilistically apprehendable	historical realism - virtual reality shaped by social, political, cultural, economic, ethnic and gender values crystallized over time	relativism - local and specific constructed realities	participative reality - subjective-objective reality, co-created by mind and given cosmos
Epistemology	dualist/objectivist: findings true	modified dualist/objectivist; critical tradition/community; findings probably true	transactional/subjectivist; value mediated findings	transactional/subjectivist; created findings	critical subjectivity in participatory transaction with cosmos; extended epistemology of experiential, propositional and practical knowing; co-created findings
Methodology	experimental/manipulative; verification of hypotheses; chiefly quantitative methods	modified experimental/manipulative; critical multiplism; falsification of hypotheses; may include qualitative methods	dialogic/dialectical	hermeneutical/dialectical	political participation in collaborative action inquiry; primacy of the practical; use of language grounded in shared experiential context
Axiology	propositional knowing about the world is an end in itself, is intrinsically valuable		propositional, transactional knowing is instrumentally valuable as a means to social emancipation, which is an end in itself, is intrinsically valuable		practical knowing how to flourish with a balance of autonomy, co-operation and hierarchy in a culture is an end in itself, is intrinsically valuable

(Source: Adapted from Heron & Reason, 1997; based on Guba & Lincoln, 1994)

Within the participatory paradigm, for example, axiology is based on “human flourishing, conceived as an end in itself, where such flourishing is construed as an enabling balance within and between people of hierarchy, co-operation and autonomy” (Heron and Reason, 1997, p. 287). Hence, the recognition of knowledge originating from an individual’s flourishing in a given culture dominates this value framework. This stance adds a social component to a critical or constructivist axiology valuing *transactional* knowledge (also termed *subjectivist* knowledge) and assuming that realities are individually constructed (Table 8).

3.3.1.2.1 Personal Stance: Ontology, Epistemology, and Axiology

To further position this research within the main scientific paradigms described before, the researcher considered his personal stance. Views associated with the key themes of this study - such as the importance of communication and interaction of individuals in the KT process, or a company’s culture - were taken into account. An assessment from within the paradigms was then undertaken to infer the appropriate framework.

3.3.1.2.1.1 Positivism and Postpositivism

Positivism has been at the core of the academic discourse in the physical and social sciences since the 17th century (Reason, 1998). The paradigm is based on the belief that there is a single, measurable reality and truth (Lincoln et al., 2011). From an epistemological perspective, there is a belief in total objectivity, and “there is no reason to interact with who or what researchers study” (Lincoln et al., 2011, p. 103). Researchers would follow the falsification principle (results and findings are true until refuted) and value quantitative data produced by studies that can be replicated (Merriam, 1991; Lincoln et al., 2011). Reverting to the dimension of axiology depicted earlier, the value

framework of this paradigm would define propositional (or perceived factual) knowing as an end-in-itself (Table 8).

Postpositivism emerged as a modified form of positivism over the past few decades and its historical roots become apparent in the studies of Marx, Freud, Adorno, and Marcuse (Grix, 2004). The ontological position within this paradigm is similar to a positivistic world view in the sense that a single reality is accepted, but it is recognised “that nature can never fully be understood” (Lincoln et al., 2011, p. 102). Hence, researchers can only approximate nature, and findings are probably true (Table 8). Still - similar to a positivistic stance - interaction with research subjects is kept to a minimum, and the use of quantitative data and statistics is key. Also, a researcher in this paradigm values propositional knowledge as an end-in-itself.

In reflecting on positivism and postpositivism, the researcher’s personal view is that both positions cannot sufficiently explain the KT-phenomena described in the literature review and in the 17 frameworks and models analysed. Statistical methods and data may, for example, allow for a high-level description and interpretation of the impact of human interaction on KT processes, if knowledge and its transfer are demoted to an exchange of measurable data such as lines of text. KT is more complex though. Only reading a textbook on flying an aircraft will not put a student pilot in the position of actually doing so without further help. Different forms of KT and learning (i.e. the application of knowledge) will be important, specifically related to the interaction of individuals, such as flight instructor and trainee, to stick with the example. The root causes of mental processes or motivation of individuals, to name only two aspects, can hardly be detected nor predicted in a world of positivistic methodologies. Even if postpositivism allows for mixed quantitative and qualitative methodologies, the general stance that the research community provides validity of research, and not the

participants of a study, is not appropriate in the wider context of this thesis. One goal of this inquiry is to trigger change of KT-practices in the case company. Hence, the holistic understanding of interaction of individuals, the importance of their interpretation of data and information, as well as the general primacy of collaborative research are the foundation to answer the research questions.

3.3.1.2.1.2 Critical Theory and Constructivism

Critical Theory represents a series of paradigms encompassing, for example, neo-Marxism, feminism or materialism. Lincoln et al. (2011) characterise this belief system as a world “based on a struggle for power” (p. 102). From an epistemological perspective, research in the Critical Theory paradigm “is driven by the study of social structures, freedom and oppression, and power and control” (Lincoln et al., 2011, p. 103). Researchers believe that knowledge generated in the course of their study can help change and fight oppressive structures through empowerment (Merriam, 1991). Hence, with regards to the value framework, transactional knowledge is recognised as a factor enabling social emancipation and as an end-in-itself (Table 8). Reflecting on the goals of this research study, it cannot be positioned in Critical Theory.

In contrast to the realist world view of the positivist paradigm, constructivism provides a focus on ontological relativism and is represented by a different epistemological, methodological and axiological foundation. Constructivism is based on the belief that multiple mental realities exist and that knowledge is created through individual experiences and through interactions among members of a given society (Guba & Lincoln, 1994). This position can be argued as a tenet of the constructivist paradigm, and it is key to this research study. The literature review specifically revealed the impact of individual

interpretation and reflection on KT processes (Section 2.3.3.1), as well as the importance of humans within work groups in the creation of knowledge within a firm. Introducing a constructivist world view within this research would value those aspects. At the same time, it would not sufficiently place importance on the relation between the individual and the living world and therefore needs to be extended, as explained in the following section. The conceptual framework of this thesis introduced in Chapter 2 (Figure 15) reflects my transactional and participatory epistemological standpoint, contending and valuing co-created findings. From a methodological perspective, constructivism is characterised by a hermeneutical approach: “Actions lead to collection of data, which leads to interpretation of data which spurs action based on data (...).” (Lincoln et al., 2011, p. 105.) Qualitative methods, such as interviews and observations, and an axiology valuing transactional knowledge as an end-in-itself, are key to constructivism.

3.3.1.2.1.3 Participatory

The participatory paradigm that Heron and Reason (1997) introduced defines realities as both subjective and objective. The authors state that realities are co-created: “Mind and the given cosmos are engaged in a co-creative dance, so that what emerges as reality is the fruit of an interaction of the given cosmos and the way mind engages with it.” (Heron and Reason, 1997, p. 279.) In an earlier publication, Heron (1996) provides a more explicit example of a subjective-objective ontology: “Worlds and people are what we meet, but the meeting is shaped by our own terms of reference.” (p. 11.) It can be argued that a subjective-objective definition of reality has its roots in the philosophical discipline of phenomenology as promoted by Husserl or Heidegger. Heron and Reason’s key point to be considered though is that encounters are transactional. It is this aspect which is at the core of this

thesis. Transaction can cause complexity in KT as a number of individuals may be involved in the process, or because organisational barriers need to be overcome. To manage this complexity in a firm is about understanding in detail how people reach out to each other within processes of knowledge exchange, how they interpret data and information, or how they are empowered to execute KT from an organisational point of view.

3.3.1.2.1.3.1 PAR-Cycles as a Foundation of this Study

The PAR-cycles performed as part of this study revealed the importance of *experiential* and *practical* knowledge evolving within a number of iterations to achieve optimal KT (Chapter 6). Experiential knowledge, for example, refers to interactions such as face-to-face meetings with at least two individuals involved; practical knowledge is about “knowing how to do something” (Heron & Reason, 1997, p. 281). Heron and Reason furthermore define a fourth dimension termed *presentational* knowing which is based on experiential knowledge and relates to symbols used to document individual understanding. Symbols are described as “graphic, plastic, musical, vocal and verbal art-forms” (Heron & Reason, 1997, p. 281). Symbolisation is a key aspect of Scrum management and control practices and was used in this study, for example, to document progress in KT (Figure 1).

Epistemology within the participatory paradigm has been described as *critical subjectivity*, with researchers seeking to understand “how we know what we know” (Lincoln et al., 2011, p. 103). Following on from this standpoint, a researcher’s value framework recognises practical knowing how to flourish as an individual in a given culture as an end-in-itself, as outlined earlier. The methodology focuses on collaborative action inquiry, and typical methods are interviews, focus-group discussions, or PAR-cycles as part of an overall action research strategy.

3.3.1.2.1.4 Summary

In conclusion, the ontological and epistemological position adopted for this research is participatory in nature. Even if the constructivist paradigm is specifically focussed on insights into individual constructions of reality and findings (an aspect which was highly relevant to answering the research questions of this study), the researcher considered the participatory paradigm as appropriate for mainly two reasons. Firstly, reality is both subjective and objective and hence, for example, encounters in the living world do happen between physical humans but may be perceived and interpreted differently by the individuals. Secondly, the participatory paradigm (as an extension of constructivism) specifically realises and values co-created findings. Chapter 6 of this study outlines in detail how important three categories of knowing that were differentiated before - experiential, practical and presentational knowing - were in finding ways for employees to impart their knowledge in an optimal way.

3.3.2 Purpose of this Research (Stage 1)

The ontological and epistemological positioning of a research study must be considered against the background of its purpose. This study was to evaluate if Scrum management and control practices can help find ways to achieve optimal KT in a KIF. Specifically, the aim of the research was to develop a process-oriented framework that enables communication and interaction among a group of employees - the foundation of successful KT. Approaching KT from within a positivist or postpositivist paradigm would rely on classic naturalist explanation, prediction and control (Table 8). As outlined before, this position would lead to a restricted view on the multidisciplinary character of KT, describing and characterising phenomena but omitting their underlying dynamics which may be rooted in individual motivation, trust or processes

emanating from human interaction. Opposing this, a view taken within a participatory paradigm would try to understand the social component of humans working in groups to optimise intra-firm knowledge flows. At case company ABC, co-created findings of individuals working together finally led to improved ways of transferring knowledge. The researcher's participatory stance helped analyse the KT processes that evolved within PAR-cycles and led to theories on how optimal KT could be achieved, as depicted in Chapters 5-7.

3.3.3 Qualitative Methodology and Approach (Stage 1)

The ontological and epistemological position adopted for a research study is linked to its methodology (Grix, 2004). The participatory paradigm chosen for this research is based on an interpretive ontology and hence considers natural science methodology “not appropriate for social investigation because the social world is not governed by regularities that hold law-like properties” (Ormston, Spencer, Barnard, & Snape, 2014, p. 24). A social researcher will have to work with participants and try to understand the world from their viewpoint. Reflecting on this aspect put emphasis on the qualitative data associated with understanding the complexity of KT, multiple experiences of individuals and their interpretations of information. Within the participatory paradigm, exploration is focussed on social interaction - taking into account both the participants' and the researcher's understanding of an issue (Ritchie & Lewis, 2003). It became apparent that conducting an objective, value free research would not be possible and that a qualitative methodology was appropriate to guide the collection of data for this thesis. Creswell (2013) provides an overview of the key aspects of qualitative research as described by LeCompte & Schensul (1999), Hatch (2002), and Marshall and Rossman (2010).

Table 9: Characteristics of Qualitative Research

Characteristics	LeCompte & Schensul (1999)	Hatch (2002)	Marshall & Rossmann (2010)
Is conducted in a natural setting (the field), a source of data for close interaction	Yes	Yes	Yes
Relies on the researcher as key instrument in data collection		Yes	
Involves using multiple methods	Yes		Yes
Involves complex reasoning going between inductive and deductive	Yes	Yes	Yes
Focuses on participants' perspectives, their meanings, their multiple subjective views	Yes	Yes	
Is situated within the context or setting of participants/ sites (social/political/ historical)	Yes		Yes
Involves an emergent and evolving design rather than tightly prefigured design		Yes	Yes
Is reflective and interpretive (i.e., sensitive to researcher's biographies/social identities)			Yes
Presents a holistic, complex picture		Yes	Yes

(Source: Creswell, 2013)

Table 9 presents various categories of qualitative research studies Creswell has identified. Three categories are instrumental in the light of this thesis: focus on participants' perspectives, their meanings, their multiple subjective views; emergent and evolving design; and presentation of a holistic, complex picture. Reflecting on the latter aspect in particular made clear to the researcher that the correct methodology had been selected.

3.3.3.1 Research Approach

To progress the research, a case study approach was chosen. Case studies generally provide in-depth analyses of a programme, certain activities, or processes within a specific business environment (Creswell, 2014). Researchers, within this approach, use a variety of detailed data and information collected over a bounded period of time (Stake, 1995; Creswell, 2013).

Different characterisations of case study research can be found in the management literature. Stake (2005), for example, considers the approach a choice of what is to be explored (and not a methodology), whereas other authors define a case study as an overall research strategy (Denzin & Lincoln, 2005; Creswell, 2013). The explanations are sometimes confusing and their boundaries overlap. In this research, a case study is understood as a qualitative methodology guiding the exploration of intra-firm KT over time, the collection of data from multiple sources within the case company ABC (documentary analysis, non-participant observation, open-ended interviews, and PAR-cycles), and an in-depth evaluation of the data.

3.3.3.1.1 Case Study Reflection

To reflect on the choice of a case study, the researcher used a comparison of common research approaches provided by Creswell (2013), as shown in Table 10, and studied further management literature. The different approaches have similarities, specifically with regards to the forms of data collection and their underlying data analysis strategies. Most importantly though, it became clear that an in-depth description of the situation of KM and KT at ABC (and its change or evolution over time) was crucial to explore ways to achieve optimal KT. Hence, this focus gave an early indication that a case study approach was an appropriate choice.

Narrative research and phenomenology were considered as well, mainly because individual experiences are key to these approaches. As outlined before, the role of individuals in intra-firm KT processes - e.g., their personal motivation to share knowledge and their interpretations of data and information - play an important role in the process of KT. Narrative researchers collect *stories* from individuals and their told experiences. Riessman (2008) emphasises that the stories may convey specific personal messages or points as they follow the interaction of the researcher and the participant. The stories may also provide insight into “the identities of individuals and how they see themselves” (Creswell, 2013, p. 71). One objective of this research study though was to concentrate on the activities a selected group of individuals would perform together, on documents and artefacts they might create to change the status quo of KT in their working environment. It was mainly for this reason that narrative research was excluded from the potential approaches.

Table 10: Characteristics of Qualitative Research Approaches

Characteristics	Narrative Research	Phenomenology	Grounded Theory	Ethnography	Case Study
Focus	Exploring the life of an individual.	Understanding the essence of the experience.	Developing a theory grounded in data from the field.	Describing and interpreting a culture-sharing group.	Developing an in-depth description and analysis of a case or multiple cases.
Type of problem best suited for design	Needing to tell stories of individual experiences.	Needing to describe the essence of a lived experience.	Grounding a theory in the view of participants.	Describing and interpreting the shared patterns of culture and sociology.	Providing an in depth understanding of a case or cases.
Discipline background	Drawing from humanities including anthropology, literature, history, and sociology.	Drawing from philosophy, psychology, and education.	Drawing from sociology.	Drawing from anthropology and sociology.	Drawing from psychology, law, political science, medicine.
Unit of analysis	Studying one or more individuals.	Studying several individuals that have a shared experience.	Studying a process, action or interaction involving many individuals.	Studying a group that shares the same culture.	Studying an event, a programme, an activity, more than one individual.
Data collection forms	Using primarily interviews and documents.	Using primarily interviews with individuals although documents, observations, and art may also be considered.	Using primarily interviews with 20 to 60 individuals.	Using primarily observations and interviews, but perhaps collecting other sources during extended time in field.	Using multiple sources, such as interviews, observations, documents, artefacts.
Data analysis strategies	Analysing data for stories, 'restorying' stories, developing themes, often using a chronology.	Analysing data for significant statements, meaning, units, textural and structural description, description of the 'essence'.	Analysing data through open coding, axial coding, selective coding.	Analysing data through description of the culture-sharing group; themes about the group.	Analysing data through description of the case and themes of the case as well as cross case themes.
Written report	Developing a narrative about the stories of an individual's life.	Describing the 'essence' of the experience.	Generating a theory illustrated in a figure.	Describing how a culture sharing group works.	Developing a detailed analysis of one or more cases.

(Source: Adapted from Creswell, 2013)

In contrast to narrative research, phenomenology is not only concerned with one or more individuals and their personal experiences but takes several individuals and their shared experiences into account. Basically, this would have qualified phenomenology as an approach for this research study. But the purpose of phenomenology also is to find “a composite description of the essence of the experience for all of the individuals” (Creswell, 2013, p. 76). Van Manen called this process the “grasp of the very nature of the thing” (van Manen, 1990, p. 177). This was not a focus though as the major objective was to achieve change of a given situation in the case company, as depicted earlier.

Grounded theory is concerned with discovering “a general explanation (a theory) of a process, an action, or an interaction shaped by the views of a large number of participants” (Creswell, 2013, p. 83). The theory is to be grounded in data from individuals involved in a process or a specific situation (Strauss & Corbin, 1998), and the primary method applied by researchers is interviewing. Those characteristics excluded grounded theory as an approach because a universal theory of a process was not in the centre of the inquiry; also, multiple sources of data, including close interaction of participants within PAR-cycles, were to be employed. Interestingly, authors such as Clarke (2005) put emphasis on the “positivist underpinnings” (p. xxiii) of grounded theory which generally is not compatible with the researcher’s ontological and epistemological stance.

Finally, ethnography was not considered as it usually employs intensive field-work and detailed observations over a long period of time (Yin, 2014); both aspects basically do not fit with the case company approach. Ethnographies focus on an entire cultural group (Table 10), and researchers, for example, are primarily concerned with the group’s behaviours, beliefs or language (Harris, 1968).

3.3.3.1.1.1 Case Study: Limitations and Strengths

Some authors have held case studies in low regard. Flyvbjerg (2011) noted academic discussions about the scientific contribution of the methodology and that case study knowledge may be considered less valuable than theoretical knowledge. Campbell (Campbell & Stanley, 1966) even stated that “such studies have such a total absence of control as to be of almost no scientific value” (p. 6-7).

The reasons for critical views on case studies may be rooted in poor understanding of the methodology, though (Gerring, 2004). Flyvbjerg lists five misunderstandings related to case study research, ranging from the value of the knowledge the approach can achieve, over bias towards verification, to difficulties of developing general standpoints. However, case studies have been a key component of scientific history, and what has emerged is a “paradox of the case study’s wide use and low regard” (Flyvbjerg, 2011, p. 302).

However, some academics changed their critical view towards case studies, with Eysenck (1976) giving a prominent example when contending that “sometimes we simply have to keep our eyes open and look carefully at individual cases - not in the hope of proving anything, but rather in the hope of learning something!” (p. 9.) Also, in a later scientific work, Campbell (1975) valued that case studies are well suited to generate context-dependent knowledge. Flyvbjerg (2011) extended Campbell’s view and argued that case study research - because of the variety of data usually collected - helps revise “preconceived views, assumptions, concepts, and hypotheses (...) on essential points” (p. 309).

The researcher of this study supports Flyvbjerg’s standpoint, and specifically Chapter 6 of this thesis points out that his initial personal assumptions and

stance with regards to optimal KT changed during the progression of the research and the analysis of data and information.

Elaborating on the strengths of the case study approach, the researcher studied further management literature from Robson (2002) and Gerring (2007) and considered the exploratory character of qualitative research and case studies, which the authors point out, as key arguments for his choice. One objective of this research study was to explore within PAR-cycles if Scrum practices can help achieve optimal KT at ABC, and a decision was made to adopt a case study approach.

3.3.3.1.1.1.1 Triangulation and Transferability

It can be argued that the data collected at case company ABC (Section 3.3.3.1) laid the foundation to two key aspects of the inquiry: triangulation and potential transferability to other, or similar, business environments.

Triangulation concerns the “careful reviewing of data collected through different methods in order to achieve a more accurate and valid estimate of qualitative results” (Oliver-Hoyo & Allen, 2005, Paragraph 1). As delineated in Section 3.7.1 - and specifically explained within the fourth chapter of the study which is dedicated to the methods and the research process employed -, documentary analysis, non-participant observation, open-ended interviews, and PAR-cycles, contributed to providing validity to the findings. Section 5.2.4.1 and Section 6.3 give insight into the theses inferred from triangulation.

As outlined in Chapter 4, and in more detail in Chapter 7, the purpose of this study was not to achieve generalisable results. However, the broad data collection supported deep descriptions of KT-practices performed at ABC, as well as their development and improvement over time. This specifically refers to the four PAR-cycles analysed in Chapter 6. Shenton (2004) argues that a

rich description of the phenomena under investigation enables readers to compare given instances with those emerging from different situations. Thus, they can decide on their own if findings can be considered transferable. Lincoln and Guba (1985), as well as Firestone (1993), provide similar arguments and contend that a researcher has to ensure that sufficient contextual information “is provided to enable the reader to make such a transfer” (Shenton, 2004, p. 70). Following this suggestion, Chapter 6 provides reference to the employment of key findings of this inquiry in company environments different from ABC. Those findings are discussed and enable the reader to assess their potential transferability to other, or similar, business environments. The aspect of transferability will specifically be explored in Chapter 7.

3.4 Nature of this Inquiry (Stage 2)

This inquiry was focussed on the researcher’s company ABC and employed PAR-cycles to explore optimal KT, as further detailed in Chapter 6. Foundation of the approach was the conceptual framework depicted in Chapter 2.8 and visualised in Figure 15.

The case study would document how KT between individuals or small groups of people could be improved collaboratively. The employees were working on complex business projects and applied Scrum management and control practices to help improve: 1. The generation of data, information and knowledge; 2. communication and interaction among each other; 3. the exchange of knowledge; and, finally 4. the application of knowledge. Application of knowledge implies successful KT and reflects that (organisational) learning occurred. The scope of the research, as defined in the introductory part of this chapter, is deep in that it attempts to make a useful contribution by developing Scrum practices in KT environments. The

results of the research were taken back to the PAR-cycle team at ABC for the purpose of establishing validity. An academic dialogue with lecturer and KM- and KT-practitioner Daniel Helbig, and a team of ten selected students of entrepreneurship at Fresenius University of Applied Sciences in Munich, Germany, as well as an application of some of the key research findings at machine engineering company GHI GmbH (GHI, name anonymised) in Augsburg, Germany, were instrumental to assess the trustworthiness of the study. Chapter 4 explains the criteria that were applied, Chapter 7 presents the analyses in more detail.

3.4.1 Data Collection Sheet (PAR-Cycles)

Stage 1 of the development of this inquiry's methodology was mainly focussed on the ontological and epistemological positioning of the research. This section reports how the research methodology evolved to reflect the tenets of the conceptual framework.

Table 11 shows the data collection sheet that was developed to capture the researcher's participant observations, the progress of the KT process and specifically the impact of the Scrum management and control practices in the course of the PAR-cycles. Section 3.7 will explain the research design and the data collection process in more depth, the latter comprising documentary analysis, non-participant observation, open-ended interviews, and PAR-cycles including participant observations (Table 7). Chapter 4, dedicated to the methods and the research process employed, will provide a structured report on how this inquiry was conducted in detail. The data collection sheet was particularly instrumental in noting observations and interactions of individuals within the Knowledge Increment (KI) generation process. It also helped document how adaptations to the KT process emerged over the period of the various PAR-cycles.

Table 11: Data Collection Sheet (PAR-cycles)

Cycle #x	Phase 1 (Aggregating)	Phase 2 (Featuring)	Phase 3 (Reviewing)	Phase 4 (Doing)
Participants	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT
Activities	Activities of Organiser and further five participants are noted in detail. In this Aggregating phase, the Organiser explains the aim of the PAR-cycle, and the employees start collecting data and information (= KBIs: Knowledge Backlog Items), and they agree on the KBIs to work with in the next phase (= KFs: Knowledge Features)	In this Featuring phase, the employees discuss the KFs from the previous phase and may adapt them if, for example, descriptions are unclear, some aspects should be elaborated or if the further process to be applied needs further explanation. The results are KF IIs: Knowledge Features inspected/adapted . Employees start interacting with the intent to transfer knowledge	The Reviewing phase is key to the entire KT process. Organiser and employees review results of the KT process so far, i.e. if the individuals believe that knowledge has been shared and transferred and if the process was successful, so far. In the case of successful progression, the team (Organiser and employees) sign off PKIs (Potential Knowledge Increments)	In the final Doing phase, individual employees will apply PKIs in their respective environment. They may have access to critical information, data bases, are aware of structures within projects and know how to achieve specific results. This phase actually is to test if knowledge has been transferred. If this is the case, KIs (Knowledge Increments) have been successfully created
Interactions	Report on first potential interactions of participants	Detailed report on interaction of individuals which is expected to be significant in this phase	Detailed report on interactions and how PKIs have been achieved	Observation of potential interactions among participants, and interactions of individuals in new project or work environments
Output	Overview of results of this phase	Overview of results of this phase	Overview of results of this phase	Overview of results of this phase
Prevailing Scrum Principles	Key Scrum principle applied (Section 2.6.2, Figure 13)	Key Scrum principle applied (Section 2.6.2, Figure 13)	Key Scrum principle applied (Section 2.6.2, Figure 13)	Key Scrum principle applied (Section 2.6.2, Figure 13)
Agreed Next Process Steps	Organiser's and employees' decision on way forward	Organiser's and employees' decision on way forward	Organiser's and employees' decision on way forward	Organiser's and employees' decision on way forward

(Source: Author's editing)

The sheet may be appropriate for other researchers or practitioners exploring the use of Scrum within KT, and a clarification of the terminology used in Table 11 is considered helpful: The researcher took the role of *Organiser*. In this role, and because of the participatory character of this study, he was a member of the *participants* of the study. If the participants, except for the researcher, are referred to, the term *employee* is used.

3.5 Research Strategy Development: Action Research (Stage 3)

This section puts emphasis on the development of the methodology and the research process of this inquiry. Starting from a case study approach (stage 1) and a definition of the nature of the inquiry and its underlying conceptual framework (stage 2), the further strategy focussed on action research to generate practical knowledge (stage 3). Action research represents a key pillar of the design of this research (Section 3.7). Easterby-Smith, Thorpe and Jackson (2012) point out two key aspects of action research. Specifically, the second aspect was crucial to achieve the main aim of this thesis, i.e. to explore what kind of process-oriented framework helps create optimal KT practices in a KIF by applying and adapting Scrum management and control practices: “1. The best way of learning about an organisation or social system is through attempting to change it, and this therefore should be an objective of the action researcher. 2. The people most likely to be affected by, or involved in implementing, these changes should as far as possible become involved in the research process itself.” (Chapter 3.) To clarify the approach, in action research, the inquirer is part of the organisation within which the change is going to happen (Coghlan & Brannink, 2005; Saunders, Lewis, & Thornhill, 2011) - as reflected in the conceptual framework explained earlier. Because the organisation itself is going to learn how to adapt processes or create them

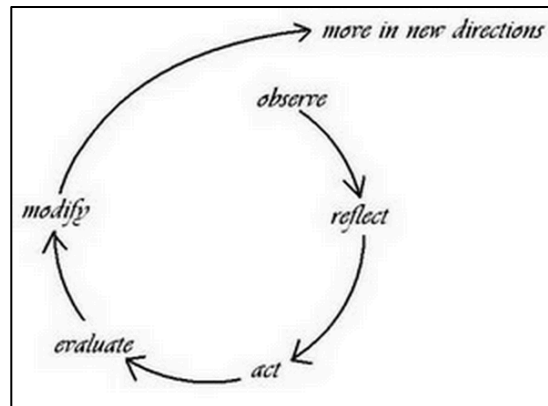
anew, and because individuals are providing personal experiences as input in the course of the inquiry, a researcher - in an ideal set-up - builds “a collaborative democratic partnership” (Saunders et al., 2011). This aspect is important in exploring the researcher’s role in the research and how - from an axiology standpoint – worldviews, values or understanding of ethics may impact findings. These aspects will be further elaborated in Section 3.7 of this chapter.

3.5.1 Cycle of Action and Reflection

Action research results can be considered *open* in the sense that researchers, as well as the group of people they immerse in, will generate learnings in the course of the project. This new knowledge will have an impact on the way forward of pursuing change. Within this cycle of action and reflection, the inquirer identifies a problem, tries out a specific way of acting, reflects on the outcome, consults with members of the group - and then tries “a different way that may or may not be more successful” (McNiff & Whitehead, 2011, Chapter 1). Figure 17 visualises progress within a so-called action-reflection cycle. As depicted in Section 1.9, in this thesis the term PAR-cycle is used to describe the method, and the subsequent section provides more background to the topic.

The principle of iterative action and reflection is a tenet of the conceptual framework described in Section 2.7 and was applied in the action research phase of this study (stage 3, as delineated in the previous section). Chapter 4 will provide in-depth information on the underlying process and on how data was collected and research results emerged.

Figure 17: Action-reflection Cycle



(Based on McNiff & Whitehead, 2011)

3.5.2 Participatory Action Research (PAR)

Gillis and Jackson (2002) described action research as a “systematic collection of data for the purpose of taking action and making change” (p. 264). Participatory action research (PAR) more specifically relates to the direct involvement of all participants at all levels of the research process and can be considered “a subset of action research” (MacDonald, 2012, p. 35). The term was introduced by Kemmis and McTaggart (2005) and also puts emphasis on the role of the researcher. PAR enables the inquirer “to be a committed participant, facilitator, and learner in the research process which fosters militancy, rather than detachment” (MacDonald, 2012, p. 39). These definitions of PAR reflect the nature of this inquiry, its research process as well as its ontological and epistemological positioning, and therefore the acronym PAR is used throughout the thesis.

As any process of inquiry though, PAR presents challenges for the researcher and the participants (MacDonald, 2012). This inquiry, for

example, revealed the importance of maintaining the commitment of the employees to the research project. During the course of the longitudinal study over a period of ten months, the selected employees of ABC had to reserve time for attending the PAR-cycles at the company's headquarters in Munich, Germany, whilst taking care of their duties as consultants working with international customers. On the other hand, the researcher and Organiser of the cycles had to plan the PAR set-up carefully beforehand which required sensitivity to his and the employees' (potentially hidden) agendas. Also, the researcher had to make sure that a participatory or democratic process was in place (and was maintained) with regards to attendance of the cycles, because he did not want to put the employees under pressure to find respective timeslots.

Gillis and Jackson (2002), as well as Maguire (1987), raise potential power imbalances, or the development of egalitarian relationships, as challenges to PAR. These issues were addressed prior to planning the inquiry. Specifically, the researcher reflected on the aspect of power on his side, as he had a seat on the board of ABC while conducting this study. Section 3.7.2 in the following, and Chapter 4, explain the role of the researcher and how ethical considerations were to mitigate the risk of biased reports in more detail.

3.5.2.1 Building Theories

It can be argued that PAR supports the concept of *theories of action* introduced by Argyris and Schön (1978). According to the authors, human beings either hold explicit theories on why they act in a certain way (e.g. in specific environments), or they are unaware of the theories that drive their behaviour and they act based on „tacit cognitive maps“ (Argyris, Putnam & Smith, 1987, p. 82). Defining the two kinds of theories of action, Argyris and Schön use the terms *espoused theory* (for the prior) and *theory-in-use*. In

many cases, individuals as well as organisations employ theories-in-use, and action science may help practitioners realise and understand their theories from observed behaviour: „Theories-in use are those that can be made explicit by reflecting on action.“ (Argyris, Putnam & Smith, 1987, p. 82.) In this research study, theories were inferred from the results of four different PAR-cycles, and Chapter 6 provides detailed information on how the six participants first reflected on, and then adapted their behaviour to achieve optimal KT. In this context, optimal KT refers to Phase 4 of the conceptual framework (Section 2.7; Figure 15): individuals or work groups can successfully apply newly generated knowledge in their respective environments.

3.5.3 Skills and Values

Before the first PAR-cycle commenced, the researcher reflected on the skills required to conduct a respective study, as well as on the aspect of axiology referred to earlier (Section 3.3.1.2). Reason (2002) specifically considers facilitation skills of an inquirer and an attitude of openness and empathy as prerequisites of co-operative inquiries. This view was adopted, and the researcher of this study attended classes related to qualitative research methods at the University of Amsterdam to develop his skills.

In the course of the PAR-cycles of this study, specifically the importance of reflection on how a researcher would value the opinion of individuals within PAR became apparent. This topic is depicted in more detail in Chapter 6 and can be considered crucial for future researchers into the field of KT who may be interested in using Scrum to help achieve improved KT results.

3.6 Summary of Methodology Development

Table 12 summarises the three stages of methodology development. The overview provides the key management literature referred to, the concepts and approaches reflected on - and finally the number of choices the researcher has made.

Table 12: Summary of Methodology Development

Stage	Management Literature / Actions	Concepts and Approaches	Reflections	Output / Choices
1	Merriam (1991; 1998); Grix (2004); Bassey (1995); Mutch (2005); Cohen, Manion & Morrison (2000); Tuli (2010); Kuhn (2012); Willis (2007); Lincoln, Lynham and Guba (2011); Heron and Reason (1997); Guba and Lincoln (1994); Ormston, Spencer, Barnard and Snape (2014); Ritchie and Lewis (2003); Creswell (2013); LeCompte and Schensul (1999); Hatch (2002); Marshall and Rossman (2010); Stake (1995); Creswell (2013); Denzin & Lincoln (2005); Stake (2005); Riessmann (2008); van Manen (1990); Strauss and Corbin (1998); Clarke (2005); Yin (2014); Harris (1968); Campbell and Stanley (1966); Campbell (1975); Gerring (2004; 2007); Eysenck (1976); Robson (2002); Diamond (1996).	Ontology, epistemology, methodology and axiology; Positivism and interpretivism; Research paradigms; Postpositivism; Critical Theory; Constructivism; Participatory paradigm; Quantitative and qualitative methodology; Research approaches; Case study: limitations and strengths.	Researcher's worldview and nature of this inquiry. Definition and discussion of various scientific paradigms. Ontological and epistemological positioning of this research study. Approaches to qualitative research. Case study approach in comparison to other key alternatives potentially appropriate for an inquiry on KT in KIFs. Data collection within PAR-cycles.	Ontological and epistemological position is participatory in nature. Case Study approach. PAR.
2	In this stage, the Data Collection Sheet was developed, building on the conceptual framework of this thesis (Section 2.7; Figure 15).	Data Collection Sheet.	Nature of this inquiry and ways to collect data among participants seeking change of existing KT practices. Reliability and validity.	Data Collection Sheet, based on conceptual framework developed earlier. Results of study to be taken back to employees. Lecturer-discussion (Fresenius University of Applied Sciences). Application of results at a machine building company in Augsburg, Germany.
3	Eastwery-Smith, Thorpe and Jackson (2012); Coghlan and Brannink (2005); Saunders, Lewis and Thornhill (2011); McNiff and Whitehead (2011); Gillis and Jackson (2002); MacDonald (2012); McTaggart (2005); Maguire (1987); Argyris and Schön (1978); Argyris, Putnam & Smith (1987); Reason (2002).	Action Research; Action-reflection cycles; Participatory Action Research (PAR); Theories of action.	Specifics of Action Research, its strengths and limitations. Building theories in Action Research. The essence of co-operative inquiry. Individuals' constructions of meanings. Values and skills required to conduct PAR.	PAR, with researcher and selected team of employees deeply involved. Training of key researcher skills.

(Source: Author's editing)

3.7 Research Design

The overall research design that has been chosen to seek to answer the research questions is visualised in Figure 18. The development of this framework's underpinning strategy started after the formal acceptance of the RD-1 by the University of Gloucestershire, in March 2016.

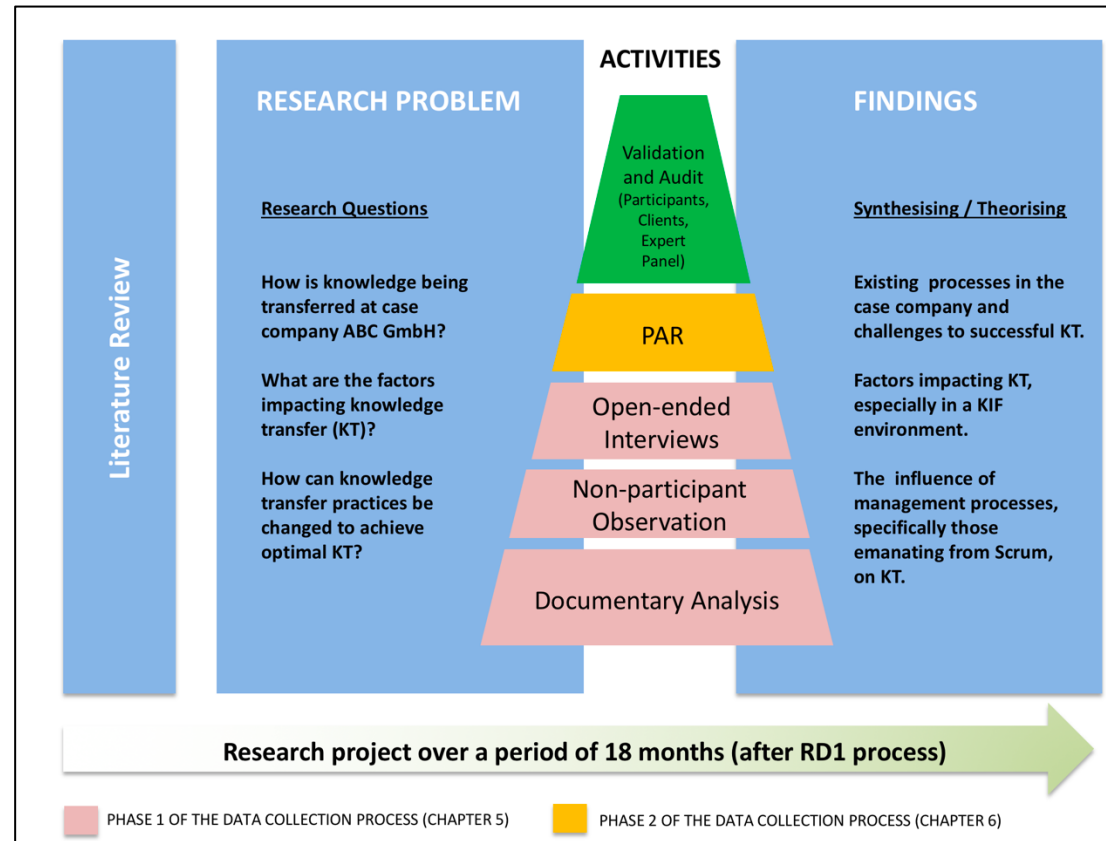
A case study allows for a variety of different methods to collect data (Creswell, 2013). This section presents the choices made for this inquiry within a diagrammatic representation of the research design. The subsequent Chapter 4 provides a justification of the methods, their advantages and disadvantages, and how they were applied during the inquiry at ABC. Also, the sampling strategy, and resulting issues, are depicted in that chapter.

3.7.1 Specific Methods

The data collection process comprised of two distinct phases and was followed by comprehensive validation activities :

- Phase 1: documentary analysis, non-participant observation, and open-ended interviews. Chapter 5 of this thesis is dedicated to this phase
- Phase 2: four different PAR-cycles, including participant observation during the cycles. Chapter 6 provides an in-depth analysis of PAR-activities and observations collected during this phase lasting ten months
- Validation and audit: member validation encompassing the participants of the study, clients of ABC, and an audit conducted by an expert panel from the Fresenius University of Applied Sciences in Munich, Germany. Chapter 7 is dedicated to the trustworthiness of the study, including an in-depth analysis of its validity.

Figure 18: Research Design



(Source: Author's editing)

The phases of data collection, and the validation and audit activities, were preceded by the deep literature review of this thesis (Chapter 2), and the activities presented in Figure 18 represent the output of the stages of the methodology development outlined in the previous sections of this chapter. The entire research project was planned and conducted over 18 months after the formal acceptance of the RD-1.

3.7.2 The Researcher's Role

The role of the researcher within this study was complex. It was partly predestined by the conceptual framework according to which the researcher takes the role as Organiser of a KT-process (Section 2.7; Figure 15). At the same time, a specific power asymmetry between the (inside) researcher and the participants prevailed: as a board member of ABC, the author of this thesis was in a formal position to hire or dismiss employees. The subsequent sections will explain in more detail that this asymmetry specifically had to be considered, and reflected upon, when the open-ended interviews and the PAR-cycles were conducted and analysed. Furthermore, the researcher had to work the political system at ABC, balancing his own and his company's aims, as well as the participants' potential personal agendas.

Those aspects, impacting the role of the researcher, and possibly his assessment of data and findings, are explored in more detail in the subsequent sections.

3.7.2.1 The Researcher as Organiser

Planning and leading the PAR-cycles for this study, the researcher essentially enabled the interaction of all participants, by exploring ways for them to share and help transfer knowledge, and guiding and overseeing a process aimed at achieving optimal KT.

The approach bears analogy to components of a variant framework (typology of inquiry) for action researchers introduced by Schein (1999). The author differentiates between *pure inquiry*, *exploratory diagnostic inquiry* and *confrontive inquiry*. Within a pure inquiry approach, the action researcher encourages discussions about a situation or status quo, listens and reflects in a neutral way. Applying exploratory diagnostic inquiry goes further and is concerned with the process of how data is assessed - whereby other researchers (e.g., the participants of the PAR-cycles within this study) conduct the assessment, comprising the exploration of, and the reflection on, actions and processes. Confrontive inquiry refers to the researcher defining the direction of the inquiry by, for example, challenging others to assume different viewpoints to approach solutions to the research problem.

All three approaches were employed within the PAR-cycles and provided results to progress the study. The subsequent chapter presents more detail on the process of the data collection, and Chapter 6 depicts and analyses the results that were achieved.

3.7.2.2 Power Concerns

The aforementioned aspects of power relationships and power asymmetry between the researcher and the participants of an inquiry are the heart of interview methodologies, as well as PAR (Anyan, 2013; Cornwall & Jewkes, 1995).

Karnieli-Miller, Strier, and Pessach (2009) point out that the roles of the two parties are not mutually exclusive. Within interview situations, for example, a researcher will oftentimes set the agenda, rule and terminate the conversation. The interviewee on the other hand can determine the level of cooperation by shifting the focus of the conversation, deliberately holding information back, or - in the same way - by terminating the interview. This

behaviour may, for example, be influenced by the individual's role within an organisation, competence or social status.

Within PAR-cycles, a researcher will have to involve all actors to contribute to the study and achieve change (Section 3.5.2). PAR allows for different data collection methods, such as participant observation or interviews, and may be impacted by several power differentials (Cornwall & Jewkes, 1995), potentially leading to participant behaviour such as non-participation or withdrawal. The latter would have put the collection of data within this inquiry, and potentially the entire research study, at risk. However, as laid out in the following, that situation did not occur.

3.7.2.2.1 Reflexive Awareness

The roles of researchers and participants may develop during inquiries, e.g. based on the level of trust that has been established between the individuals (Råheim, Magnussen, Sekse, Lunde, Jacobsen, & Blystad, 2016). To manage power relationships, potential power shifts and to recognise their possible impact on the objectivity of a study as good as possible, some scholars recommend the practice of reflexive awareness during the course of an inquiry (Cornwall & Jewkes, 1995; Anyan, 2013; Råheim et al., 2016). The researcher of this study followed the authors' approach, and the reflective character of this study, and the researcher's own reflections with respect to power issues, specifically become apparent in Chapters 5 and 6 (Sections 5.3.5; 6.2.1.2.1; 6.2.1.2.1.1; 6.2.1.8.3; 6.2.2.5.2; 6.3). The open-ended interviews in Chapter 5 are analysed by taking findings from documentary analysis and non-participant observations into consideration. This triangulation approach within the chapter supported a highly reflective approach, helping look at the interview situations from different perspectives and hence assess and value the data collected, accordingly.

Group reflection on results, or change achieved, is inherent to action research, and specifically to PAR, as the participants are actively involved in collecting data and shaping the progression of the research. It can be argued that Chapter 6 of this thesis is highly reflective, specifically because the path towards establishing a process-oriented framework of KT was the result of continuous critical assessment of results achieved, and potential changes and optimisations, among all participants. Furthermore, feedback from ABC's clients was scrutinised to obtain outward perspectives on the work group's findings.

3.7.2.2.2 Non-hierarchical Atmosphere

Anti-authoritative environments, embracing emotional care for participants, can help establish an atmosphere of power equality (Karnieli-Miller et al., 2009). Taylor and Bogdan (1998) argue that in such environments researchers should try to develop a feeling of empathy, for "people (to) open up about their feelings" (p. 48). The author of this study followed the scholars' views and tried to diminish power issues by creating a welcoming and non-hierarchical atmosphere - to motivate participants to share their experiences during open-ended interviews and PAR-cycles.

When this inquiry commenced, the participants from ABC were invited to contribute to the inquiry. It was clear from the start that the company would not, for example, pursue organisational restructuring but rather innovation in KM and KT to maintain its position in the marketplace and to potentially become more competitive. Within personal conversations, the researcher pointed out that attendance was voluntary and that findings would be taken back to the team for reasons of validity. (Chapter 4 provides more detail on the research process.) All six participants valued the approach and attended

the study. Specifically, the information that PAR-cycles were planned to be conducted - key to establish a non-hierarchical atmosphere - was perceived positively.

However, diminishing hierarchy, or building a partnership with participants, must not neglect scientific rigor, and a research study primarily has to follow a thorough process and certain ethical guidelines (Karnieli-Miller et al., 2009). Key conditions, such as explaining the purpose of a study to individuals in detail, as well as protecting participants' anonymity and conveying their ideas in an undistorted manner, were also applied in the course of this research study. Section 3.7.3.1 and Chapter 4 elaborate on those aspects.

Ensuring scientific rigor for a researcher also means to be sensitive to sources of bias, specifically when power issues, such as asymmetries, have to be managed. In the scientific literature, *social desirability* is broadly considered one of the most impactful sources of bias, affecting the validity of research findings in various situations (Nederhof, 1985). The phenomenon is specifically to be considered when questionnaires are used (which is not the case in this study), but is also relevant within interviews or PAR. The subsequent section depicts social desirability, and the measures that have been employed in this research study to mitigate its impact.

3.7.2.2.3 Social Desirability

Social desirability represents the tendency of participants within research studies to choose responses which they consider socially desirable, instead of providing answers, or ideas, reflective of their true feelings (Grimm, 2010). Nederhof (1985) goes further, describing social desirability as “the tendency to say things which place the speaker in a favourable light.” (p. 264.)

The researcher of this study reflected on the potential bias rooted in social desirability, specifically because of his dual role as board member of ABC, and inquirer within the firm, as delineated before. In the management literature, several key methods of coping with the phenomenon are recommended, such as neutral questions, the selection of specific interviewers (if more than one individual collects data) or participants, or proxy subjects who offer information about participants (Wicklund, 1975; Nederhof, 1985). In this research study, mainly two methods were considered sufficient to assess the potential impact of social desirability from different perspectives:

1.) *Proxy subjects* (Sudman & Bradburn, 1974; Crandall, 1976; Nederhof, 1985): Instead of the participant, a person who knows him or her is questioned about the individual's behaviour or performance (in business environments). This approach was applied when clients were asked about the performance of ABC-consultants after they had taken up project-related work within the client organisation. Chapter 6 elaborates on the aspect, in detail (Sections 6.2.1.8.2; 6.2.5.1).

2.) *Task-oriented individuals*: For situations where more than one actor collects data, task-oriented, self-assured participants are recommended to be preferred above person-oriented individuals (Weiss, 1970; Rogers, 1976). Nederhof (1985) describes the latter as empathetic, or "warm" (p. 274). This aspect was specifically relevant during the PAR-cycles. As outlined in Section 4.3.2, the sampling strategy focussed on individuals who were involved in day-to-day KT-practices and who had actively asked for change and optimisation of KT. The employees could be considered career-oriented,

assertive consultants seeking to change their work environment for the better. Section 4.3.2 provides further detail related to this aspect.

3.7.2.3 Confirmation Bias and Groupthink

Because of the specific character of this inquiry, which particularly draws on theses inferred from interviews and group activities within PAR-cycles (Chapter 6), two further factors potentially influencing the validity of the study were considered: *confirmation bias*, and *groupthink*.

In the scientific literature, confirmation bias describes the behaviour of individuals seeking for information, or interpreting evidence, to support their beliefs and to ignore information not supporting them (Ask & Granhag, 2005; Powell, Hughes-Scholes, & Sharman, 2012). The researcher of this study was specifically sensitive to that aspect. Hence, the work groups developing a new KT-process within ABC were changed in the course of the four PAR-cycles, and different participants were assigned to different iterative change tasks to provide their individual standpoints. Also, findings were probed within three different client environments to collect further (external) input on the effectiveness of an emerging new KT-process.

The interview questions addressed to the five sampled participants of this research study (Chapter 5), furthermore were laid out as *open-ended questions* and not as *leading questions* potentially implying an (intended) answer. Powell et al. (2012) argue that open-ended questions in general “elicit more accurate (...) statements” (p. 132). Chapters 5 and 6 provide further detail on the aspect of confirmation bias in dedicated sections (Sections 5.3.5; 6.2.1.2.1; 6.2.1.2.1.1; 6.2.1.8.3; 6.2.2.5.2; 6.2.5.3.1; 6.2.5.3.1.1; 6.3)

Groupthink occurs within teams when the consensus of opinion is valued over critical reasoning, or evaluation of consequences or alternatives. The

term was introduced by social psychologist Irving L. Janis who proposed increased critical assessment of research results to reflect on, and potentially mitigate, the impact of groupthink on the validity of research results (Janis, 1991). The researcher of this study reflected on the potential impact of groupthink on the findings, and specifically encouraged the participants to take a critical stand on the results achieved during the PAR-cycles and discuss alternatives. Further detail on this point, as well as an in-depth discussion, is provided in Chapter 6 of this thesis (Sections 6.2.1.2.1; 6.2.1.2.1.1; 6.2.1.8.3; 6.2.2.5.2; 6.2.5.3.1; 6.2.5.3.1.1; 6.3).

3.7.3 The Political Dimension and Research Ethics

Research in an organisation is always associated with political dynamics impacting its progress and outcome. Coghlan and Shani (2005) state that politics in a firm „can undermine research endeavors and block planned change“ (p. 537). Action research may be perceived as a threat to long-lived habits, organisational structures or individual functions. Mainly for these reasons, and because of the researcher's specific position as a researcher and a board member at ABC, as previously explained (Section 3.7.2), he was particularly concerned with the political and ethical dimension of this inquiry. Within personal meetings, the researcher explained to the participants that their anonymity was ensured and that one of the aims of the research was to enable them to change their business environment for the better.

Coghlan and Shani (2005) described how to manage the political dimension of action research, and their advice was considered explicitly useful for this inquiry: „Action researchers need to be prepared to work the political system, which involves balancing the organisation's formal justification of what it wants in the project with their own tacit justification for political activity.

Throughout the project they will have to maintain their credibility as an effective driver of change (...). “ (p. 537-538.)

As explained in the introductory chapter, the research had support from across the company. Issues around KM and KT, and a need to act and achieve change, had frequently been communicated to the inquirer. This was helpful to working with a selected team of employees towards achieving optimal KT. Chapter 4 will explain the composition of the team of employees that attended the PAR-cycles and the rationale behind the people decisions taken.

3.7.3.1 Ethical Principles

Walker and Haslett (2002) point out that ethical questions may arise at all stages of the PAR-cycles, from planning over action to reflection. The researcher specifically needs to make sure that conflicting needs are balanced over the entire action research process. For this research, four ethical principles initially articulated by Gellerman, Frankel and Ladenson (1990), and cited by Coghlan and Shani (2005), were adopted:

- “1. Serve the good of the whole
2. Treat others as we would like them to treat us
3. Always treat people as ends (*in themselves; the researcher*), never only as means; respect their being and never use them for their ability to do; treat people as persons and never as subjects
4. Act so we do not increase power by more powerful stakeholders over the less powerful.” (p. 540.)

Specifically, Chapter 7 will elaborate on the ethical principles pursued and employed for this research study.

3.8 Conclusion to Chapter 3

The key learning points of the third chapter are as follows:

1. Ontological and epistemological position defined (participatory).
2. Research paradigm chosen (participatory).
3. Research methodology developed, approach and strategy chosen (case study, PAR).
4. Data collection sheet developed.
5. Research Design defined and visualised.
6. Researcher role described, including issues emerging from power issues.
7. Political dimension of action research and research ethics discussed.

CHAPTER 4: METHODS & PROCESS

4.1 Introduction and Format of Chapter

This Chapter depicts, in detail, the methods and the research process chosen to capture data within the longitudinal qualitative inquiry at ABC. In contrast to the previous and the subsequent chapters, first person pronouns are used to describe the progression of the study. Shultz (2009) suggested the use of the first person to enhance clarity in scientific writing, “if used in a limited fashion” (p. 412).

Following this position, I used the first person to emphasise that major decisions, such as the application of the key methods, were made by me and not by the participants of the PAR-cycles who by necessity contributed to the collection of data (Section 3.7.2.2). Focus was on the research work and not on me personally, and hence the approach was considered helpful to contribute to the authenticity of the thesis.

The two phases of data collection depicted in Section 3.7.1 were scheduled for a period of ten months, commencing in December 2018. Phase 1 focussed on data available in the form of company presentations or email communication, as well as participant interviews. Phase 2 specifically was dedicated to the four PAR-cycles. Analyses and interpretations of the two phases will be provided in Chapters 5 and 6, respectively.

To assess the validity and reliability, or the trustworthiness, of the study, I decided to examine four criteria proposed by Guba (1981): credibility, dependability, transferability, and confirmability which are explained in detail in Section 4.7.1 - Section 4.7.4. The approach was to be based on a clearly defined process, e.g. comprising of an academic dialogue with lecturer and KM- and KT-practitioner Daniel Helbig and his team of ten selected students from Fresenius University of Applied Sciences in Munich, Germany.

Furthermore, Augsburg-based machine engineering company GHI was considered to employ and test some of the key research findings within a client project. This chapter explains the process related to examining the trustworthiness of the inquiry, and the results are analysed in detail in Chapter 7.

4.2 Accessibility and Disposability

The selection of a case, or a unit of analysis, is determined by a number of factors such as the research purpose and the theoretical context (Rowley, 2002). When employing PAR in a case company, as in this inquiry, two further constraints can be considered prerequisites for conducting a case study: accessibility and disposability of resources (Rowley, 2002). Accessibility refers to the data required, and if they can be collected from the organisation. Disposability is concerned with the availability of the participants and if they are willing to support the research study.

As a board member of ABC, I had access to company-internal information such as presentations, research papers or other communication related to KT as sources for notes and analyses. Furthermore, within the company, I was formally in a position to invite a team of interested employees to open-ended interviews and PAR-cycles to explore optimal KT. Hence, from an accessibility and disposability point of view, I was able to gather all the data, and convene the meetings, I considered relevant to investigate the research problem.

In terms of disposability of the employees, I considered managing six different schedules (including my own) a challenge from the start of the data collection process. My assumption was that specifically employees' motivation to contribute to change in the company would help facilitate timeslots for interviews or action-reflection cycles. I expected that the participants would be inspired to develop their own working environment by

creating a culture of knowledge sharing and - by doing so - improve their own perceived market value in the Knowledge Society. Specifically, motivational aspects will be analysed in Chapters 5 and 6.

4.3 Sampling Considerations

Sampling in qualitative research refers to the individuals to be selected as participants of a study, the site (or sites) where the study is conducted, the sample strategy, as well as the size of the sample. Creswell (2013) proposed the concept of *purposeful sampling*, according to which “the inquirer selects individuals and sites for study because they can purposefully inform an understanding of the research problem and central phenomenon in the study” (p. 156). I reflected on Creswell’s suggestion and considered the approach helpful to collect data from individuals within ABC, and to answer the research questions (Section 1.6).

4.3.1 Site & Individuals

As outlined in the introductory chapter of this thesis, the inquiry was to be conducted at business transformation consultancy ABC. I aimed to schedule interviews and PAR-cycles at the firm’s premises in Munich, Germany, as specific facilities were available, such as meeting rooms where participants could frequently convene for meetings, or a digital screen to support KT practices. Further detail on the environment is offered in the course of this chapter.

ABC employed 13 consultants at the time this research study was conducted (two board members included), constituting the potential group of participants to be directly involved in the study. Nine of the individuals can be considered senior *hybrid professionals*, i.e. they had competences spanning marketing or sales as well as technology expertise. One employee

was a technology specialist experienced in complex backend systems. Three further consultants were junior resources who joined ABC in autumn 2016, immediately after they had finished their university studies in business administration or mathematics, or after gaining first experience with a different employer.

My decision on the sample of participants to be included in interviews and action-reflection cycles had to be considered in the light of the sample strategy. The subsequent section explains the approach.

4.3.2 Sample Strategy & Size

In the scientific literature, several qualitative sample strategies are discussed (Onwuegbuzie & Leech, 2007; Creswell, 2013). In general, it can be argued that sample strategies flow from the design of a research study. They reflect a researcher's approach of choosing a sample that represents the population it is drawn from (Landreneau & Creek, 2008).

The sampling can take different forms, depending on the individual inquiry, specifically the availability of resources, or access to data. Following the concept of purposeful sampling (Section 4.3) within the existing environment at ABC, I decided to consider a *criterion-based* strategy. As part of this strategy, participants need to meet a specific criterion, such as qualification or competence in a certain area, to help explore phenomena by means of in-depth inquiry.

The employees I intended to ask to participate in the open-ended interviews, and in the PAR-cycles as well, hence were the key individuals usually involved in KM and KT practices at ABC - i.e., those best able to provide research insights. Two participants were senior hybrid resources as categorised above, three resources were junior consultants. From my experience with the individuals, they could be considered task-oriented

employees (Section 3.7.2.2.3) who had actively asked for change related to KT. They were seeking to change their work environment for the better. The criterion-based strategy defined the sample size of five employees to be selected for open-ended interviews and the PAR-cycles. ABC's remaining employees were usually more focussed on administrative work and were not involved in KT-related practices at the time the research study was to commence. I aimed to communicate my selection process at the company's usual summer get-together meeting in August 2017 (Section 6.2.5). My expectation was that the approach would be well perceived by all employees, specifically because the firm's consultants most experienced in KT, and most aware of existing KT-issues, would be committed to try find ways to optimise KT at ABC.

The selected employees are characterised in the following (apart from my initials, all other initials are fictional to keep identities anonymous):

- VG: Researcher, Organiser of the PAR-cycles, and board member of ABC, male.
- CE: Senior hybrid resource, strategic consultant, frequently leading teams within client projects, specifically involved in KM and KT initiatives, female.
- NK: Senior hybrid resource, project manager, frequently using information stored in ABC's Internet storage folders, involved in KT initiatives, male.
- TH: Hybrid resource, project manager, frequently using information stored in ABC's Internet storage folders, involved in KT initiatives, male.
- MX: Junior resource, project manager, frequently using information stored in ABC's Internet storage folders, frequently joining new projects and specifically involved in KT initiatives, female.

BX: Junior resource, project manager, frequently using information stored in ABC's Internet storage folders, frequently joining new projects and specifically involved in KT initiatives, male.

The average age of the participants was 35 years, and they represented the young group of employees at ABC. Two of the individuals had proposed modern, web-based KM-solutions in the past to try managing existing KT-issues within the firm. I expected that most of the employees might prefer digital tools, web-based services or smartphone applications to share knowledge among themselves. This behaviour would follow the zeitgeist of the Knowledge Age as described by NT (initials anonymised), the chairman of ABC's major shareholder DEF. He characterised young generations' attitude towards life in the Knowledge Age as follows in an email communication to employees: "The young want to be everywhere, virtually - using modern media and data transmission tools, and they want to share experiences, contents, objects and thoughts in real-time. The barriers between physical and digital world, and between real and virtual environments, disappears forever and irretrievably." (Appendix A, own translation.)

I reflected on this statement when I was planning for the open-ended interviews and the PAR-cycles, and I decided to specifically explore the aspect of innovation with regards to the KM-tools used to enable KT, after discussing the approach with the young participants.

4.4 Phase 1: Documentary Analysis, Non-participant Observation and Open-ended Interviews

I chose documentary analysis, non-participant observation, and open-ended interviews to provide key data within the first phase of the research study. Before using company-internal information within this inquiry, I initiated a formal board approval for ABC to share data and information with me as a researcher. Prerequisite of the approval was that the study would conform with the Handbook of Research Ethics of the University of Gloucestershire. Subsequently, I scheduled timeslots for open-ended interviews with the five employees. They were set up for week 50 in December 2016, before the first PAR-cycle was conducted. Section 4.4.1.3.1 depicts the interview settings in more detail.

4.4.1 Methods: Advantages and Limitations

This inquiry was laid out to employ different qualitative methods supporting the triangulation of data (Section 3.3.3.1.1.1.1). As any scientific method, the ones planned to be chosen for this inquiry are by necessity characterised by advantages and limitations. In the following, the rationale for my data collection approach is justified in more detail.

4.4.1.1 Documentary Analysis

As a researcher and board member of ABC, I had access to company-internal presentations and communication material, such as emails, which I planned to use within the study (Section 4.2). The material represented data to which either the firm, or its employees, had given attention and hence could be considered written evidence of issues and processes related to KT, or other matters. As a limitation of the method, Creswell (2014) points out that documents collected may not be authentic, comprehensive, or accurate.

I considered this aspect and specifically used the open-ended interviews and the PAR-cycles to explore further evidence for key themes mentioned in documents (Sections 5.2.4.1; 5.3.6).

4.4.1.2 Non-participant Observation

When a researcher is taking field notes and is not involved in group activity, the term non-participant observation is broadly used in the scientific literature (Creswell, 2013). I aimed to employ this method when visiting the company's major project room, the *Digital Transformation Lab* (DTL), watching teams involved in KT activities, or describing data and material they used (Section 5.2.3).

Creswell (2013) introduced the term *complete observer* as a next step of observation; it refers to activities where the researcher "is neither seen nor noticed by the people under study" (p. 167). I reflected on this method and planned to employ it to collect information concerning the usage of the firm's Dropbox (Sections 1.4.1; 5.2.2.3.1). The Dropbox was employed to start KM-activities, and monitoring its usage was meant to document progress in KM- and KT activities.

The advantages of the aforementioned forms of observation, for example, are potential gains in objectivity and neutrality, as the method can enable a detached and unbiased view about participants and their activities (Young, 1966). However, non-participant observation can also create bias as individuals - when observed - may behave, or provide information, in an unnatural way. I took those aspects into consideration when analysing and triangulating data in depth in Chapter 5 and Chapter 6 within respective sections (Sections 5.2.4.3; 5.3.6; 6.3).

I planned to address potential ethical questions related to the method of complete observation at ABC's summer get-together in August 2017 (Section

4.3.2), making sure to all employees that information would be treated with confidentiality and - if used for the inquiry - would be anonymised.

4.4.1.3 Open-ended Interviews

Interviews with the five selected employees were key to collect detailed, in-depth information on the firm's KT status quo, and to help answer the research questions. Chapter 5 offers an in-depth analysis of the interviews.

I decided on open-ended questions (Section 4.4.1.3.1), because their form allows for as little as possible influence on responses (Yeo, Legard, Keegan, Ward, McNaughton Nicholls, & Lewis, 2014). I specifically intended to enable participants to express themselves freely, hence I would not propose options - but leave decisions with them on what answers to provide.

Limitations of open-ended questions concern, for example, detailed answers that may have no relevance or may be difficult to analyse. At this point, I would have to run analyses in my own way, entailing potential personal bias. In a contrary scenario, some participants might find it difficult to provide detailed answers at all and leave questions unanswered (Creswell, 2014). Yeo et al. (2014) furthermore argue that open-ended interviews "put the onus on the participant" (p. 191), which implies that participant bias could be introduced if the individual answering a question has biases about a specific topic.

I reflected on the aforementioned reasons for, and sources of, potential bias before scheduling the interviews and weighed participant answers accordingly when analysing the interviews in depth in Chapter 5 (Section 5.3 - Section 5.3.6).

4.4.1.3.1 Interview Process

I decided on the following process to conduct the open-ended interviews:

1. Phone call to the designated participants in week 49 of 2016, one week ahead of the actual interviews, to provide general information on the research study, to formally invite the individuals and to offer the opportunity for the individuals to ask questions and receive more information on the research.
2. After the phone calls, e-mail to the attendees via ABC's Outlook in-house email system, providing a written introduction and further details to the research, as presented in Appendices B, and C.
3. Electronic meeting invites to the individuals via ABC's in-house system. Assumed duration: 45 Minutes. To buffer potential delays (e.g., to explain the interview procedure and ask for final permission to record the interview or to clarify further questions), a time frame of one hour was scheduled.

To conduct the interviews with each participant individually, I booked the company's DTL. Schreier (2012) contends that phenomena researched can only be interpreted in their unique setting. Assuming the author's view, it can be argued that the environment chosen for the interviews (and the PAR-cycles later on) was authentic. The DTL was well known to all employees and hence could be considered a natural real-life setting.

I composed the following five interview questions which mainly emerged from the three research questions (Table 7), and tried to explore motivational aspects related to sharing knowledge and working for a KIF such as ABC.

Q1: How would you describe the way we manage and transfer knowledge in the company today?

Q2: What do you think are the factors impacting KT?

Q3: What do you think, how could our working procedures with regards to KT be changed?

Q4: How would you describe your motivation to share knowledge with the company?

Q5: What was your main reason to join ABC?

I was aware that the first question was complex as it basically covered two different topics. It can be argued though that the selected participants were quite familiar with both aspects, as explained before (Section 4.3.2). Hence, I expected well-weighed answers with regards to issues around KM and KT. Furthermore, answers to questions four and five had to be ascertained carefully as they potentially could not be taken at their face value. My intention was to examine personal agendas of the participants within the PAR-cycles. Also, the analytical Chapter 5 will reveal my critical reflection on the values of the responses.

To test the interview procedure, the questions as well as administrative and organisational aspects, I scheduled a pilot interview with NU, an experienced senior manager with ABC, two days before the open-ended interviews commenced. The purpose was to specifically optimise the usefulness of the questions, or the interview process, in case of a need of improvement.

In terms of recording of the interviews, and confirmation from all participants, I decided to apply the following process and procedures:

1. Electronic recording of the interviews and assignment of a professional transcription service (tied to a confidentiality agreement).
2. Sign-off of the transcripts of the interviews by the participants within three weeks from the interview date, and, based on consent to the documents, completion of the process of data collection related to open-ended interviews

4.4.2 Data Analysis Template

I created a *data analysis template* to record and reflect on data and information, applying a format proposed by Creswell (2013). The template was to be used for my documentary analyses and non-participant observations. For analysing the open-ended interviews, a different format, based on a Microsoft Excel spreadsheet was to be applied, as described in detail in the subsequent section.

The template comprises a header to number data and to report on date, time or physical locations. A section with *descriptive notes* contains summaries of my personal or participants' activities (Appendices D - H). Also, photos or graphs providing further information to support my notes, were integrated into the sheets.

A second section termed *analysis and reflective notes* provides information about content analyses, processes, my reflections on tools, communication material (Powerpoint presentations, anonymised emails), or implications the current status quo of KM and KT might have for ABC. The documentary analyses and non-participant observations will be discussed in detail in Chapter 5.

I considered the notes key to providing answers to the first research question: **How is knowledge being transferred at case company ABC GmbH?**, and the second research question: **What are the factors impacting knowledge transfer?** (Table 7.)

4.4.3 Data Analysis Approach

Qualitative content analysis is a process to describe and frame the data and information gathered within a research study. Specifically, with regards to interviews, it can be argued that the process comprises data reduction by inferring categories of information and the interpretation of these (Tharenou, Donohue, & Cooper, 2007). Aggregating text into topics, or small units of information, is described as the procedure of *coding* (Creswell, 2013). Creswell refers to those units as *categories*. In this thesis, I use the terms *sub-themes* (equivalent to categories) and *primary-themes*. The latter reduce sub-themes and group them into four to six major themes per interview. I chose Microsoft Excel as document format as well as different colours per sub-theme to compose *coding sheets* for the respective open-ended interviews. The spreadsheet will be discussed in the subsequent Chapter 5 and has been added to the Appendices (Appendices K; L).

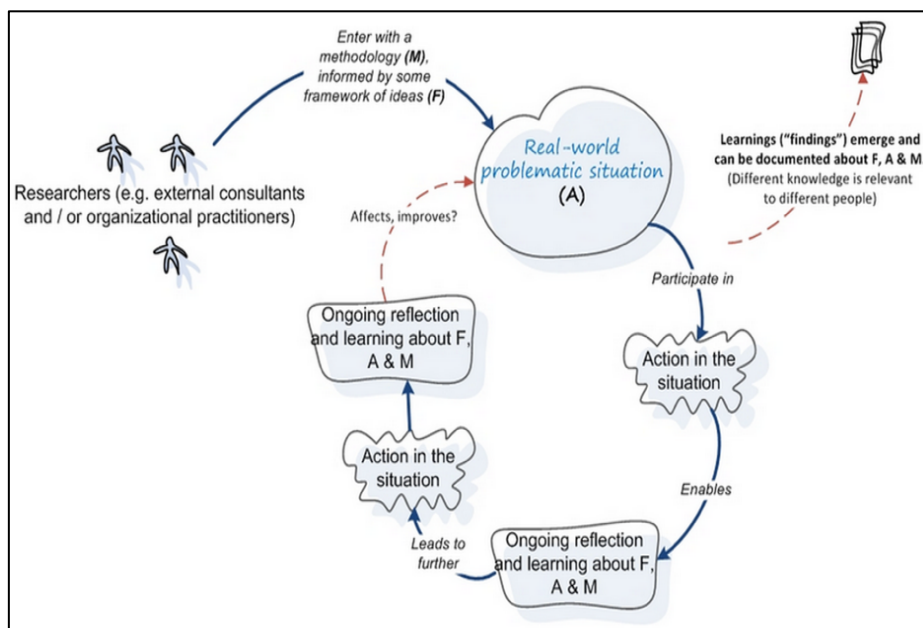
The principle of grouping small units of information into major themes has also been applied for the documentary analysis of this thesis. Based on the sub-themes analysed within a document, a *key theme* was created. If only one topic was considered relevant in the context of this research, I also used the term *key theme* to categorise the content (Appendices D; E; F; I; J).

4.5 Phase 2: PAR-Cycles

The second phase of data collection was designed to comprise of four consecutive PAR-cycles, scheduled between December 2016 and October

2017 in ABC's major project room (DTL), with all six participants listed in Section 4.3.2 involved. Each cycle was planned to comprise of four coherent phases, applying the process outlined in the conceptual framework of this thesis. It can be argued that this approach is in line with the concept of cycles of action research in human situations, as described by Checkland and Holwell (1998). Figure 19 visualises the process: the researcher tackles a current, real problem situation (A) by clearly articulating the methodology (M) and a framework of ideas (F), first.

Figure 19: The Cycle of Action Research



(Source: Ortiz, 2012, adapted from Checkland & Holwell, 1998)

Action in situations and reflections of all participants then lead to iterations to find ways to solve a problem. Findings will emerge and form the foundation for further cycles.

4.5.1 Cycle 1: Introduction

The purpose of this cycle can be described as the introduction to the research topic, to the aim of the study and the plan to achieve solutions to existing KT-issues in the firm. Furthermore, the cycle was planned to apply the KT process outlined in the conceptual framework, as well as the underlying principles of the Scrum management and control practices.

4.5.2 Cycle 2: Refinement

The cycle was designed as an iteration with the intent to improve the results achieved in the previous meetings. I expected first results with regards to future KT-practices as well as KM- and KT-tools. Also, within this iteration, enablers of knowledge flows through an organisation were to be probed.

4.5.3 Cycle 3: Completion

The third cycle was planned to define new KT-practices and the wider KT-framework within a client project, either to transfer knowledge between individual ABC-employees or between groups of people. Also, I particularly aimed for a discussion among all participants on company culture and motivation as enablers of KT - and how these aspects should be reflected at ABC.

4.5.4 Cycle 4: Commercial Utilisation

The final cycle was to focus on a potential commercial utilisation of some of the key findings. The meeting was laid out in the form of a discussion round

on the blueprint of a software application, based on the improved KT process, incorporating features to use multimedia content and other digital sources of data and information, and, for example, a loyalty functionality to recognise usage of the application (addressing the motivational aspect mentioned above).

4.6. Data Collection and Analysis Approach

As delineated in Section 3.4.1 (Table 11), I designed a customised Excel spreadsheet to capture data and information throughout the cycles and each of their phases. This *data collection sheet* specifically was to help me note participant observations and interactions of individuals during the phases of the cycles. I considered the sheets for all cycles instrumental in building theories on roadblocks to, and ways towards, optimal KT, which will be described in detail in the analytical Chapter 6.

4.7 Trustworthiness of the Study

Guba (1981) proposed four criteria to examine the *trustworthiness* of a qualitative research study: credibility, dependability, transferability, and confirmability. Trustworthiness was also discussed by several other authors, such as Bryman (2008), and defined as a concept to assess the quality of the findings of an inquiry. In the following, I will illustrate how I planned to assess the quality of this research study according to the above-mentioned criteria. The subsequent sections provide an overview of the key procedures and the process applied. A detailed analysis of the phases will be presented in Chapter 7.

4.7.1 Credibility

Silverman (2006) argues that credibility refers to “the extent to which an account accurately represents the social phenomena to which it refers” (p. 289). This aspect is usually referred to as validity of an inquiry. For this research study, I planned to initiate various measures during and after completion of the research process to ensure that data was captured and checked in accordance with good practice.

I decided to apply a member validation where the participants of the open-ended interviews and the PAR-cycles would be provided data collected within the research process, as well as my interpretation of the data. The intention was to have the individuals check the material and comment on the outcome of the research.

I structured the approach as follows:

1. Individual email, via the in-house system, to the participants encompassing coding sheets of their interviews, two weeks ahead of a two-hour discussion session which was scheduled for end of October 2017.
2. Consideration of participant-feedback on the individual data provided, and potential modifications.
3. Within the two-hour session, discussion on the key findings, with me presenting my data analysis templates, data sheets and interpretations in the form of a Microsoft Powerpoint presentation and as handouts to the employees (sources anonymised).
4. Feedback of the employees on the data and the outcome of the study.

5. Potential modification of the material and consideration of changes to the findings of this study within Chapter 8 which is concerned with conclusions and implications.

As delineated earlier, I had planned for electronic recording of the open-ended interviews to capture details accurately, as well as sign-off of transcripts by the interviewees - both measures increasing the credibility of this research study.

4.7.2 Dependability

Thyer (2001) defined dependability “as the extent to which the set of meanings derived from several interpreters are sufficiently congruent” (p.274). This aspect is usually referred to as reliability of an inquiry and means, for example, that observations, the analysis procedure and interpretations of other researchers are similar to the ones of the original researcher. This research study is structured to correspond to these requirements, and I have chosen procedures which would - in general - allow for a replication.

I decided to conduct an external audit, based on the following approach:

1. Presentation of the wider KT-framework and the key findings of this study to an expert panel from Fresenius University of Applied Sciences in Munich. Explanation of the newly developed practices proposed to achieve optimal KT at ABC during an all-day session.

2. Check of the research process and its outcomes, allowing lecturer Helbig and his team to scrutinise the process (by asking detailed questions) and to

assess if the methods applied, and the interpretations, are dependable from their point of view.

3. Reflection on the feedback in Chapter 8.

All steps of the research process - such as capturing observations, deciding on participants, or composing PAR-cycles - have been made apparent in this thesis and thus enhance the dependability of this study. The approach supports a replication of the inquiry by other researchers or examiners.

4.7.3 Transferability

The setting of qualitative research studies is usually unique, and the samples may be small. Hence, inferring conclusions and asking if these can be transferred to other cases must be considered a challenge to qualitative research (Graneheim and Lundman, 2004). Transferability can be argued though if care is taken of a similar (although different) environment.

The purpose of this research study, in the first place, was not to achieve generalisable results, but to find solutions to KT-issues within the consultancy firm ABC. However, as delineated in Section 3.3.3.1.1.1, I generally adopted the view of Shenton (2004) who argues that a rich description of the phenomena under investigation enables readers to compare given instances with those emerging from different situations - thus, they can decide on their own if findings can be considered transferable.

Furthermore, in an attempt to go beyond in-depth descriptions of phenomena, I planned for the following approach to collect data resulting from the application of the key findings of the study:

1. Introduction of the wider KT-framework at Augsburg-based machine engineering company GHI, commencing in September 2017, with a team of selected employees trying to optimise company-internal KT practices.
2. Reflection on the feedback in Chapter 7 and Chapter 8.

4.7.4 Confirmability

Confirmability within a qualitative research study concerns the steps taken to help ensure that the findings of the inquiry reflect the views of the participants, rather than the researcher's prepossession. Whilst my role and my behaviour as a researcher at ABC has already been outlined (Section 3.7.2), the concrete measures planned to strengthen confirmability of this thesis are as follows:

1. Specifically, within the analytical Chapters 5 and 6, covering the open-ended interviews and the progress of the PAR-cycles, my beliefs and assumptions are to be clearly admitted, recognising potential weaknesses related to the methods employed and their implications for the study.
2. Focus on inferring theses from the PAR-cycles where I aimed to take the role of an Organiser (Section 3.7.2.1), enabling action-reflection iterations conducted and supported by the entire team of participants rather than by me alone, and taking everybody's views and ideas into consideration.

3. Triangulation, i.e. using more than one method (documentary analysis, non-participant observation, open-ended interviews, and PAR-cycles) to collect data on the same topic and explore answers to the research questions.

4. Using the third PAR-cycle of the inquiry to have the selected employees employ components of the wider framework of KT within a real-life client project.

4.8 Conclusion to Chapter 4

The key learning points of the fourth chapter are as follows:

1. Case study set-up at ABC explained.
2. Key methods introduced: documentary analysis, non-participant observation, open-ended interviews, and PAR-cycles.
3. Data collection process and analysis approach depicted, as well as tools explained.
4. Process to assess trustworthiness of the study described

CHAPTER 5: PHASE 1 – DOCUMENTARY ANALYSIS, NON-PARTICIPANT OBSERVATION AND OPEN-ENDED INTERVIEWS

5.1 Introduction and Format of Chapter

In this Chapter, the research findings from documentary analysis, non-participant observation and from the open-ended interviews at case company ABC are presented and discussed. The results will specifically be considered in the light of previous academic research publications and from within a number of theoretical KM and KT frameworks. The documentary analysis, and the analysis of non-participant observation, follows the same structure employed for the literature review, focusing on three key themes: KM and KT frameworks and models; barriers and enablers; and processes (Figure 2). The section concerned with findings from the open-ended interviews and their interpretation is determined by six primary themes and their three clusters, resulting from the coding frame explained in the previous chapter (Section 4.4.3). Each section finally examines the relevance of the findings to the research questions.

This phase of the inquiry was considered the first step of exploring and pursuing options of change within ABC. The selected employees' motivation to improve their working conditions became apparent and built a foundation to the four PAR-cycles performed with them (Phase 2 of this inquiry): key aspects related to KM and KT, such as organisational structure, processes, technology, trust and motivational practices, were elaborated in the action-reflection sessions. An analysis and interpretation of the PAR-cycle results is provided in the subsequent Chapter 6.

5.2 Documentary Analysis and Non-participant Observation: Findings and Interpretations

After a formal board approval in December 2016, stating that this inquiry conforms with the Handbook of Research Ethics of the University of Gloucestershire, personal notes related to KM and KT within ABC were collected. The documentary analysis specifically encompassed company internal information, such as Powerpoint presentations, emails (anonymised within this study) and visual documentations of tools used by the company to enable KM and KT.

5.2.1 KM & KT Frameworks and Models at ABC

In December 2016, when the research study within ABC commenced, the company did not base its KM or KT activities on any of the frameworks or models described in the literature review of this thesis. Some of the key characteristics of KT models, such as clearly defined policies (Orna, 1999) or formalised documents (Mougin et al., 2015), were not observed in the firm. ABC, after its foundation in 2014, could still be considered a start-up company. Its revenue had grown from less than 800,000 EUR (and a negative EBT) in its first year of operations, to more than four Mio. EUR p. a. (and a slightly positive EBT) at the end of 2016, with the number of employees more than quadrupling to 13 consultants within 18 months. The firm concentrated on business development and less focussed on policies, or organisational structure. As outlined in the introductory chapter, the management of ABC was however aware of the need of a clearly defined knowledge transfer approach and was in a process of seeking quick optimisations of the status quo.

Tenets of successful holistic intra-firm KM and KT approaches - a compelling vision related to knowledge aggregation or a company culture of knowledge

creating and sharing - were not officially pursued. The firm's focus had rather been on hiring experienced professionals from other KIFs, or young assertive consultants accustomed to a culture of sharing (Section 4.3.1 - Section 4.3.2). The intention was to create a team of specialists with a mind-set of innovation, motivated to help clients set up and run digital transformation projects, and to establish an organisational culture of teamwork at ABC. Four of the firm's experienced consultants were educated in Scrum management and control practices and were specifically hired to establish efficient work-flows and simplified processes for some of the firm's major clients. The individuals' experience in Scrum was core to the decision of the researcher to employ its principles for this inquiry. Key characteristics of the methodology were to help establish optimal KT at the firm, such as: transparent processes, process control and iteration, as well as organised teamwork built on trust (Section 2.6.2). With regards to teamwork and trust, ABC was at the beginning of a change process and this was reflected in a number of emails from employees. Those emails were exchanged between individuals or among work groups, or they were directed directly to the researcher, as described in the following section.

5.2.1.1 Responsibility and Trust

The first data analysis template (Appendix D) provides descriptive and reflective notes on an email from MX, a young consultant who had joined ABC less than six months ago. (To keep identities anonymous, fictional initials will be used throughout the chapter.) MX worked for a large KIF before, a software company with a global presence, and had a *hybrid background*, i.e. experience in marketing- and technology-related areas (Section 4.3.2). She had acquainted herself with aspects of KM and KT, when working in projects for her former employer and during her business

studies. MX was specifically hired because she had presented herself as interested in a fast-moving and fast-changing environment during her interview, and because she had a good understanding of how KM and KT were organised at the KIF she worked for in the past. MX, later on, was among the participants of the open-ended interviews and the PAR-cycles, as well. When asked to do research on a client project, she wrote the following to the researcher, directly:

“I have found some key information on the client, but it is not clear to me who actually filed them (sic). Is there anyone who can let me know more about the topic? Is the information reliable? Also, (...) it was not clear to me who would take care of the quality assurance of everything we put in the company Dropbox. Who can I talk to?” (MX) (Email #1, Appendix F.)

The quotation mirrors issues in various areas, the solutions of which ABC had not yet followed through or put into practice. Specifically, MX referred to a structural topic when stating that the source of information, and its quality assurance, could not be traced back to an individual within the ABC team. In early 2016, when the firm started to store data and information within the Internet-based service Dropbox, NU, a senior manager, was asked to organise and take care of the service. He took responsibility for structuring the digital Dropbox-folders and - in the beginning - made sure that a basic standard of document quality was assured, e.g. data and information were tagged with key information concerning their source. Over time though, NU allocated less time to the management of the service as he was engaged with one the company's largest projects, FNC (name anonymised). This project in the area of document management systems within a media company involved around 60% of ABC's resources in summer 2016. NU,

together with his colleagues, got distracted from some of his responsibilities, and he lost focus on his activities related to KM and KT. ABC's board on the other hand, did not follow up on the activities. Other topics were considered more important, such as focus on business development and growth of the firm (Section 5.2.1). ABC, at this point in time, lost its focus on establishing KM and KT practices.

Kotter (2014) described a firm's distraction from its initial ideas, such as ideas of innovation, as part of the lifecycle of start-up companies. This observation can be applied to ABC. In summer 2016, two years after its foundation, the firm had reached a critical point of its start-up lifecycle and had to balance growth, people management and development, as well as the creation of a unique spirit and culture - keeping the firm attractive for its employees in a competitive market seeking for highly-skilled consultants such as ABC's. It can be argued that the firm had *muddled through* with regards to some of its general management decisions and specifically its challenges related to KM and KT. The term was initially introduced by Lindblom (1959). Applied to a firm's development approach, muddling through, for example, refers to little or no centralised planning. ABC did not strategically follow a muddling through approach - it was a consequence of the current phase of the firm's start-up-lifecycle.

MX, in her email, openly questioned the reliability of the information she had found and thereby touched upon an aspect related to ABC's organisational culture. The employee was sceptical with regards to the reliability of the information available. This, on the one hand, can be expected from assertive consultants. On the other hand though, in an environment open to information and knowledge sharing, employees would trust each other and the accuracy of data and information available to everybody within a firm. MX's comment revealed a need for the company's senior management to

actively work on the creation of a culture of sharing and trust. Trust is core to company culture and a crucial enabler of intra-firm KT (Tan, 2011). To achieve optimal KM and build the foundation of KT, Calabrese (2000, 2006) and Heisig (2009) proposed holistic frameworks combining - besides other aspects - organisational structure and culture. This approach was pursued further in the course of this research study to infer tenets of the proposed KT-framework. When the researcher planned the inquiry, the introduction of Scrum management and control practices was meant to organise work and establish knowledge flows resting on teamwork, transparent processes and mutual trust. The latter aspect in particular was explored in the subsequent analysis of the open-ended interviews and the PAR-cycles (Chapter 6).

5.2.2 Barriers and Enablers

The majority of the 17 KM and KT frameworks and models discussed in the literature review of this thesis are concerned with strategies to overcome intra-firm barriers to KM or KT, addressing underlying hurdles that might exist in different areas of a company or across its units. In this section, the focus of analysis is on the case company's potential impediments related to company structure (thus further exploring potential areas of change indicated in the previous section), the concept of motivation, IT, and processes. Individual motivation to contribute to a better KM and KT environment, and the importance of IT and processes in this respect, became apparent as the most important factors within this first phase of the inquiry.

5.2.2.1 Company Structure

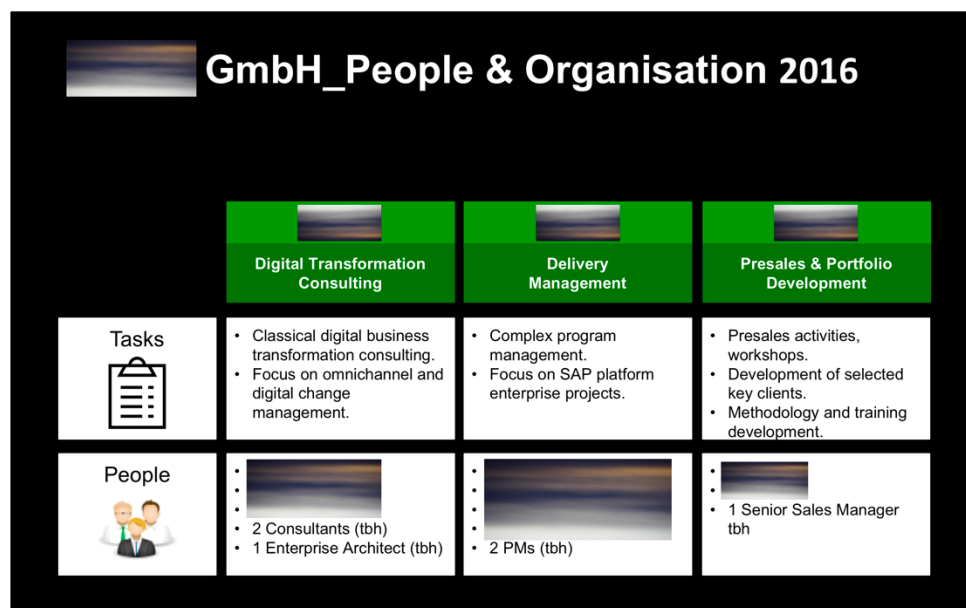
When ABC was founded in 2014, the company comprised of only three employees: the company's two board members, and one senior manager who had worked with DEF, ABC's major shareholder, for a number of years.

He was interested in setting up a start-up consultancy focussed on digital transformation activities and was helpful in establishing business relationships within DEF's network of more than 100 different portfolio companies. With the number of clients, and employees, growing rapidly, ABC decided to maintain a lean organisational structure intended to support quick information and knowledge flows within the company, and to remain focussed on teamwork and quick project execution.

When the research study commenced in December 2016, the company's structure was still flat. Figure 20, and the second data analysis template (Appendix F), provide more detailed insight into the ABC organisation. The latest official company diagram presented three separate business units: Digital Transformation Consulting, Delivery Management, and Presales & Portfolio Development, respectively run by senior managers who reported into the researcher of this study (and board member of the company). In general, the organisation had parallels with a classic business unit structure. The terms Knowledge, Knowledge Management or Knowledge Transfer were not used in the descriptions of the business units' core tasks, though. Also, no role assigned to KM or KT across the organisation was presented. It can be argued that ABC's set-up was obstructive to some of the key concepts of successful intra-firm KM and KT, such as organised and seamless knowledge flows, frequent interaction of individuals and work groups, or a holistic approach towards collaboration across the firm. The units did not operate as non-cooperative silos though. Board and senior management of the company had deliberately decided to establish units and position them as competence centres because this set-up matched the market demand in 2016: clients across industries in the German marketplace were specifically looking for dedicated resources and support services in digital consulting, and delivery management; the presales team had become a

competent client partner preparing potential engagements. The units were working closely together with regards to project management and sales or upsell opportunities which was reflected in the company's strong growth (Section 5.2.1). But the units had not yet joined forces to enable KT across the company. As outlined before, ABC's management disregarded a focus on the topic and its underlying organisational foundation. Assuming the view of Ichijo, von Krogh and Nonaka (1998), who specifically underlined the importance of organisational structure as key enablers of KT, ABC's set-up became a focus of analysis in the course of the research study.

Figure 20: ABC Organisational Structure



(Source: ABC GmbH, anonymised; Data Analysis Template #2, Appendix F)

To help build the framework of KT proposed in this thesis, ABC's organisation to achieve optimal KT was specifically discussed and elaborated within the PAR-cycles described in Chapter 6.

5.2.2.2 Motivation and Organisational Routines

Within only days after the introduction of ABC's Dropbox in early 2016, consultants started to upload data and information to the company's web-based storage service. After two months, employees had opened more than 40 digital folders, and the web-space comprised 25 gigabytes (GB) of data. 1 GB is equivalent with almost twice the amount of data a CD-ROM can hold. ABC's senior manager NU, asked to oversee and manage the use of the firm's Dropbox (Section 5.2.1.1), had set up first categories - such as folders for client projects or research data - and defined basic quality criteria: documents in the digital folders had to at least provide dates of their creation and contact data of the document owner. 25 GB of digital data and information in the form of Word, Powerpoint, Excel files or videos reflected active contribution and motivation of the firm's employees to create a base of knowledge and build the foundation of KT. But, as outlined in the introductory chapter, a declining usage of the storage service was witnessed. Only two further GB of data was uploaded between April 2016 and the end of the year when this research study commenced, although the number of employees grew from seven to 13 in the same period and the number of managed client projects increased from four to nine.

From mid-2016, issues related to KM and KT in the company became apparent. Newly joined consultants reported to ABC's board members that the firm's Dropbox, and the existing processes of sharing data and information, were not helpful in transferring knowledge between individuals, or between individuals and work groups (Section 1.4.1). Some employees

raised issues in direct emails to the researcher, such as BX, a young technical consultant. His case is analysed in the following.

BX, who had joined the company in summer 2016, frequently raised issues around KM and KT. He represented ABC's employees with a strong digital innovation mind-set (Section 5.2.1). BX was a specialist in the area of technical analytics and was used to work with huge amounts of different data and information. He was an assertive and very ambitious consultant and usually outspoken when communicating with others. In his interviews for the role at ABC, BX had clearly expressed his aspirations of helping create a successful digital consultancy company. The decision to hire him was unanimous across the senior managers who interviewed him, mainly because BX showed interest in changing a work environment for the better - besides his capabilities as a digital transformation consultant.

When BX was assigned to a new project at a media company in October 2016, he had difficulties to acquaint himself with some of the basics he would need to know for his day-to-day work. His predecessor in the role had left to work with a different client within days, and no coordinated process of knowledge sharing or transfer had taken place. The data and information on the project available within ABC's Dropbox were not sufficient for BX to seamlessly take on responsibility for the project. (The situation can be considered a typical case of loss of knowledge at ABC which, apart from other issues, led to the initiation of this research study.) In an email message directly addressed to the researcher, BX wrote the following:

"I have to build a documentation from scratch and talk to many people involved again (...) I am offering part of my time to build a new Knowledge management system if we plan to do that. Can we talk about this next time we meet (...)?" (BX) (Email #2, Appendix G.)

As much as BX's email reveals a lack of formalised processes of KT, it shows the employee's motivation to thrive for change within ABC. BX approached the existing issue from the technical perspective of creating a new KM system, which is explainable from his professional background. His general willingness to help develop a sharing culture at ABC confirmed the researcher's impression from BX's hiring interview: the consultant was a potential change agent within the firm and hence a valuable resource in pursuing newly-to-be-established KT practices. The employee's frequent prior comments on the existing status quo of KM and KT were in line with the intention expressed in his email, and BX had a genuine interest in creating a better and more efficient work environment.

This case relates to findings from Szulanski (1996) and Minbaeva (2007) who contend that individual motivation plays a central role in intra-firm KT processes. Motivation refers to all participants of a KT process and can be achieved in different ways within an organisation. One option is to incentivise employees to share knowledge. ABC's major shareholder company DEF had introduced an initiative called *DEF Berries* awarding employees who frequently attended internal development courses or helped build a project knowledge base. The individuals were granted free educational courses at universities or private institutions. At this point of the research it was unclear if a similar initiative could balance ABC's business targets and the employee's interests in the right way to achieve optimal KT. Hence the concept of individual motivation was pursued further in the open-ended interviews and in the PAR-cycles. Specific focus was on entrenching KT habits within the firm's culture and to constantly motivate individuals to follow them. At ABC, sharing and transferring knowledge still had to "become part of 'the way things are done'" (Swart and Kinnie, 2003, p. 71) - a phrase used

by the authors to describe successful organisational routines which encouraged the sharing of knowledge at a KIF in the software industry.

5.2.2.3 Information Technology

ABC mainly utilised the technology infrastructure of its holding company DEF to enable internal digital communication needs. All employees were provided web-based Microsoft Office accounts (MS Office 365 Business), administered by DEF's IT organisation. Consultants at ABC usually employed at least two or three different devices to manage their professional day-to-day work: a multimedia notebook, a smartphone and in many cases an iPad computer as well. The firm had taken the decision to employ a cloud-based Microsoft Office solution to support access to data and information from any location and from any device, and to encourage employees to use modern tools - thus representing ABC as an innovative consultancy of the Knowledge Age. The decision was well received by ABC's employees, specifically by those consultants who travelled regularly. Young consultants had often demanded access to the company's internal network from their private devices, asking for a working style of "bring your own device" (BYOD). Already in early 2015, ABC approved BYOD despite some security concerns raised by DEF's IT organisation. Within two years after the introduction of the policy no major security issues - such as network hacks or email leaking - were reported.

Even though ABC was supportive of the use of innovative and efficient communication tools by its employees, the firm had not yet built a strong infrastructure with regards to KM when this research study commenced. As outlined before, the company started its technological KM and KT journey by using the web-based storage service Dropbox at the beginning of 2016. Mid of the year, ABC invested in a digital visualisation wall to help improve the

participant experience within client workshops as the wall, for example, allowed to display multimedia material such as videos or three-dimensional images. The intention was to use the digital wall for KT practices as well. But guidelines on how to use it appropriately still had to be set up.

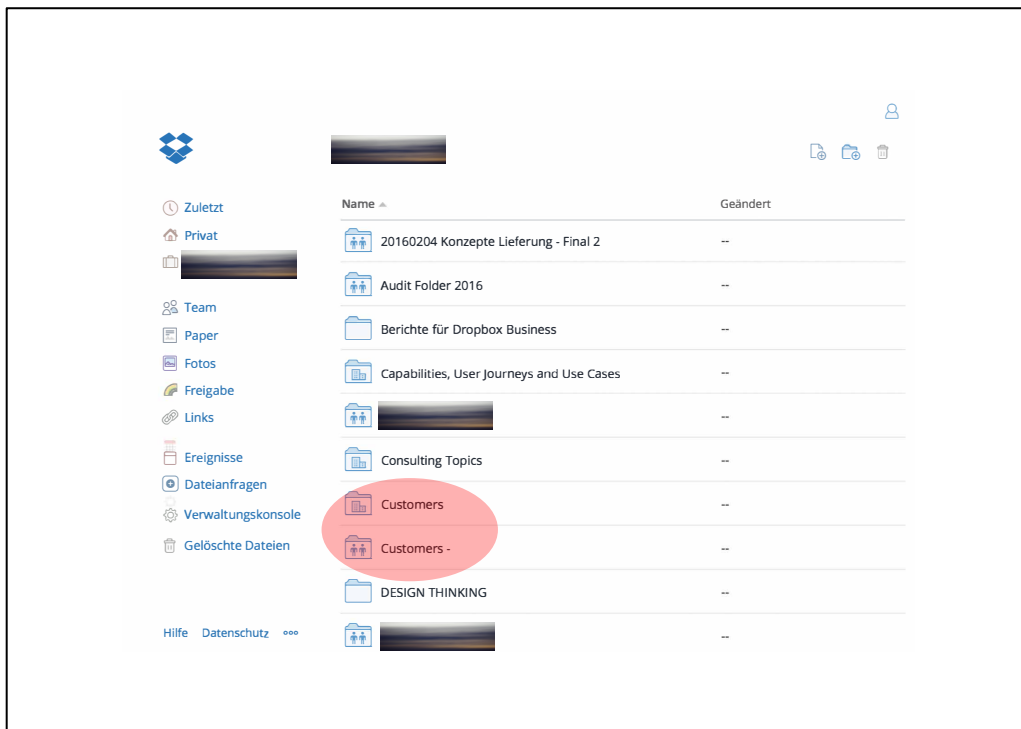
No professional KM system was available at ABC though, encompassing enhanced search capabilities to find data or information quickly. The board of the company had refrained from significant investments in the area, mainly because of different priorities in the early building phase of the start-up company. Furthermore, the management was not experienced in KM systems, and an assumption was prevailing that the existing web-based communication tools, as well as further services available on the Internet, would be sufficient to build a KM foundation and hence support KT practices. The researcher, and member of the ABC-board, was sceptical that expensive technology systems would meet KM or KT challenges and assumed that adequate processes and a culture of sharing would be more impactful - specifically with regards to KT. This view contrasts some of the key findings emerging from the literature review of this thesis, according to which comprehensive IT systems are crucial enablers of KM and KT. Specifically in KIFs. Besides leadership, organisation and learning, Calabrese (2000, 2006) defined technology as one of the four pillars for firms pursuing successful KM, thus building a foundation to KT. Linkages between the pillars, according to the author, are becoming more important in the Knowledge Age of the 21st century as companies have to adapt to ever faster changing environments. And it can also be argued that in a KIF such as ABC, with consultants frequently working from clients' premises (Section 1.4.1), IT is key to connect individuals.

5.2.2.3.1 Acceptance of the Company's KM Service

Dropbox could be considered the company's main KM service as it held key data and information on clients and related projects. The service enabled the establishment of digital folders and files, thus providing basic features of a comprehensive, and professional, KM system. However, at ABC employees frequently raised issues related to Dropbox - either referring to the comprehensiveness or originality of the contents stored, or regarding the tool's usability. Some features, such as the creation of access rights for team members, were described as complicated or confusing. Also, the search capability inherent to the service was only basic and did not support complex and efficient search requests.

Namings of some of the digital folders within the service were not intuitive, or simply generic, such as "Consulting Topics". Also, the thematical structure did not follow a clear categorisation. For example, two separate folders, each named "Customers", existed. Both folders contained certain data and information on client projects (Data Analysis Template #3, Appendix G). At least in one case, information on the same project was spread across the two different "Customers"-folders. Figure 21 presents a screenshot of the Company's Dropbox and the duplicated digital deposits (highlighted by a red oval). Some of ABC's employees used complementing services to publish information internally and share it across teams, such as the web-based project management service *Slack* or a service called *Jira*, primarily used by technology companies within software development projects. As in the case of Dropbox though, usage of the tools was declining. Hence, ABC's technology foundation became of central interest in the course of this inquiry. The firm's consultants were open to experiment with different modern and Internet-based tools to manage data and information. But the tools, at this point of the research, were not integrated into a unique KT strategy for ABC.

Figure 21: Screenshot of Company Dropbox



(Source: ABC GmbH, anonymised; Data Analysis Template #3, Appendix E)

A significant body of research has identified factors that influence a user's acceptance of technical systems. The technology acceptance model (TAM) from Davis, Bagozzi and Warshaw (1989), has received attention as a concise model to predict acceptance behaviour. TAM theorises that a person's acceptance behaviour related to a technology, or a specific system, is determined by its *perceived usefulness* and *perceived ease of use*. Mun and Hwang (2003), referring to the model, define the two terms as follows: "Perceived usefulness is the extent to which a person believes that using the

technology will enhance his or her job performance, and perceived ease of use is the extent to which a person believes that using the technology will be free of effort (...)." (p. 432.) These factors were further explored in the course of the research and will specifically be discussed in Chapter 6 of this thesis. In the case of ABC, it can be argued that perceived usefulness and perceived ease of use of the existing immature tools to support KM and KT, such as an inappropriate database environment (Section 1.4.1), had a negative impact on the consultant's motivation to support respective practices, and the analysis of the open-ended interviews in this chapter provides more evidence for this standpoint. Hence, a new technology foundation was crucial to establish a solid framework of KT at ABC.

5.2.3 Processes

End of 2016, ABC was working on a number of processes to be established across the company, specifically in the areas of organisational structure, people management, and IT. As outlined before, the company had *muddled through* with regards to different tactical and strategic management decisions (Section 5.2.1.1). The need to employ more formalised processes and planning procedures became apparent as ABC did not meet some of its internal efficiency criteria. For example, it took the company up to three days to compose and send an official offer to a potential client as only few standardised templates existed and because internal approval processes were not automated. The benchmark across the portfolio companies of ABC's major stakeholder DEF was only one to two days.

The researcher's decision to use Scrum management and control practices to organise intra-firm KT was taken against the background of ABC's immature process landscape. Scrum was to help create an efficient KT process, involving diverse roles across the firm's employees and making use

of their respective capabilities. Establishing solid processes to enable KT relates to the ten models of KM and KT presented in the literature review of this thesis (Table 3). Orna (1999) in particular recommended an information policy within organisations and a clear implementation process, encompassing, for example, people management, IT practices, and organisational structures. At ABC, the process of achieving optimal KT was shaped in a different, more agile, way though.

When initiating this research study within the firm, the researcher decided to utilise the firm's major project room, the DTL (Section 4.4.1.3.1), and its technology - such as the digital visualisation wall - to support KT practices. The wall could display any Microsoft Office document, content from Internet browsers, or *digital stickers* (small digital display windows, visually resembling paper stickers) which could be created using a special electronic pen. The senior managers of the company were asked to integrate the wall, which measured six square meters, within internal project work, specifically to provide visibility to data and information available for a project. This was to address some of the issues raised in the past by some employees, such as findability of data and information, and the ability to trace sources. In December 2016, ABC's consultants started to use the wall frequently. Between calendar week 40 and 51, the DTL was booked on ten days for internal project meetings, and consultants already started to reserve the meeting room for sessions in the beginning of 2017.

Data Analysis Template #3 (Appendix H) presents photographs of the screen, displaying reports on a client company's performance, innovation ideas for another ABC-client, and general information concerning e-commerce policies across different countries. Most of the data and information had been uploaded from ABC's Dropbox, others were directly written onto the screen. The employees started to share information within

their work groups, applying a new process of coming together, transparently sharing information and discussing and reviewing them within work groups. End of 2016, the process was still immature, and it had been introduced without dedicated or intense planning. ABC, step by step, was progressing towards a new KT set-up. The subsequent open-ended interviews provided further insight into details to achieve optimal KT. The PAR-cycles finally tested processes in action, building upon the key findings from non-participant observations and the employee interviews (Chapter 5).

5.2.4 Key Themes and Triangulation

The prior sections reflect key themes emerging from the documentary analysis (Section 5.2.1.1 - Section 5.2.2.2; Appendix F), and the researcher's observations as complete and non-participant observer (Section 5.2.2.3; Appendix G; Section 5.2.3; Appendix H). The different forms of observation are explained in Section 4.4.1.2. The content analysis of employee emails is based on the coding approach explained in Section 4.4.3, and the analysis results are presented in the respective data analysis templates (Appendices D; E).

5.2.4.1 Documentary Analysis

From the documentary analysis of employee emails outlined in the prior sections, the following four key themes emerged (Appendices D; E):

- Responsibility for KM/KT not clear
- No formalised processes in place
- Missing trust with respect to KT-process
- Motivation to achieve change in KT prevailing.

The analysis of ABC's organisational chart (Section 5.2.2.1; Appendix F) reveals issues concerning the company's organisational structure, because KT as a strategic topic is not assigned to a senior manager of the company, and can be compared to the aforementioned first key theme on unclear responsibilities for KM and KT.

5.2.4.2 Observations

The researcher's observations within ABC (Section 5.2.2.3.1 - Section 5.2.3) specifically reveal that KM- or KT-related processes at the company were immature. Employees had, for example, started to use the company's Dropbox to store data and information, but its file-structure and its user interface were poor and confusing (Section 5.2.2.3.1). Also, no sustainable organisational responsibility had been assigned to the system and its maintenance.

With regards to tools available in the firm's DTL, such as the digital visualisation wall (Section 5.2.3), it became apparent that employees were motivated to use it and try to integrate the screen into KT-practices. However, ABC had not focussed on educating their employees with respect to the tool or underlying KT-processes.

5.2.4.3 Triangulation

Both methods employed so far, documentary analysis and observations, reveal issues rooted in ABC's company structure and technical process foundation: responsibilities with respect to KM and KT are not clearly defined, and processes are immature or have not been established at all. Those issues can be considered key barriers of KT and are discussed in depth in the management literature. Ichijo et al. (1998), for example, underscored the importance of organisational structure as instrumental enabler of KT (Section

5.2.2.1). Ho et. al. (2014), as described in the literature review of this thesis, contend that processes are the foundation to seamless KT (Section 2.5). The concept of individual motivation, considered by Szulanski (1996) and Minbaeva (2007) crucial to intra-firm KT (Section 5.2.2.2), was a key theme in the second employee email (Appendices E; J): the individual clearly expressed his motivation to achieve change and establish a better KM-system at ABC. General motivation of ABC-consultants to achieve optimal intra-firm KT could not be confirmed during the researcher's observation activities. However, the concept of motivation will play a key role in Chapter 6, and its importance for this study will be discussed in detail. The concept of (missing) trust concerning individuals and processes with respect to KT was inferred as a key theme in the first employee email (Appendices D; I). The researcher did not perceive further evidence related to the aspect of trust in the course of his observations, but it is reconsidered in the analysis of the open-ended interviews in the subsequent sections.

5.2.5 Relevance to Research Questions

Data and information within company-internal documents and the researcher's non-participant observations present the case company in a phase of change, related to its internal management processes and its KM and KT activities. The documentary analysis and the analysis of non-participant observations helped answer the first research question of this thesis (**How is knowledge being transferred at case company ABC GmbH?**), and gave first solid indications on the factors impacting KT at ABC and how working procedures could be changed (second and third research question).

The key findings and interpretations at this point of the research process were as follows:

1. When the research commenced, ABC did not employ any of the frameworks or models of KM and KT described in the literature review. The company *muddled through* with regards to KM and - specifically - KT. A need for a new, holistic framework, bespoke to ABC, became apparent.
2. Missing individual responsibility and trust were among the key barriers at ABC. These had to be addressed to achieve optimal KT.
3. Employees at ABC showed motivation to contribute to establishing KM and KT at the firm. There was a need though for sustainable motivational practices and organisational routines to finally create a culture of sharing.
4. No sophisticated KM system to support KT practices, and no elaborated processes, were available. The opportunity for ABC was to support its employees' motivation with a focus on a dedicated technology solution to be integrated into a new strategy and framework of KT.

5.3. Open-ended Interviews: Findings and Interpretations

This section is aimed to analyse and interpret the open-ended interviews with the ABC-employees. The interviews were conducted as outlined in the previous chapter (Section 4.4.1.3.1), after the usefulness of the questions and the interview process had been confirmed in a pilot interview with NU, a senior manager at ABC. Particular focus in this section is on solutions to ABC's KT-related issues and how change within the firm could be achieved.

In this sense, the section builds upon the findings from the documentary analysis and the researcher's non-participant observations. From the interviews, six primary themes emerged. They were ranked according to the number of references as provided below:

- Primary theme 1: Guidelines, structured and updated tools and processes for KM or KT not in place (5/5, *i.e. mentioned by five out of five interviewees*)
- Primary theme 2: Motivation to share knowledge is to grow with the company (5/5)
- Primary theme 3: Direct access to senior management and innovative environment reasons for joining ABC (5/5)
- Primary theme 4: Responsibility for KM and KT is crucial (potential role in the organisational chart) (4/5)
- Primary theme 5: Framework (people, systems and processes) needed to enable KM and KT (4/5)
- Primary theme 6: Knowledge sharing across employees is poor and needs to be improved to enable KM and KT (3/5).

The primary themes were distilled into three thematical clusters. The clusters were prioritised by taking a closer look at KT-aspects rooted in the company's technology- and process-foundation first, followed by the two more conceptual or abstract clusters related to culture, organisation, and motivation:

1. Process, Technology, and People (combining primary themes 1, and 5).
2. Company Structure and Organisational Culture (themes 4, and 6).
3. Motivation (themes 2, and 3).

It can be argued that the third cluster on motivation is thematically connected with the second, which specifically discusses company culture. The depth of data and information collected within the open-ended interviews though, and the importance of individual motivation for the company's change process, justified a separate cluster. Appendices K and L provide an overview of the interview questions and the coding frame (subthemes, and primary themes). Appendices M and N present an exemplary interview transcript (interview with NK). In the following, each of the clusters will be described and interpreted, based on evidence from the interview text.

5.3.1 Cluster 1: Process, Technology, and People

All five employees proposed a number of changes within ABC, specifically related to process execution, the technology employed to enable KM and KT, and the way consultants were working together within client projects (Appendix K). MX, drawing from her experience with KT at her former employer (Section 5.2.1.1) and from frequently being introduced to new projects at ABC, addressed the existing KT practices, directly:

"I think it is important to create a structured process which is binding for every project and every employee at ABC." (MX)

TH extended this view. He was a junior consultant himself and had been assigned to ABC's major project, FNC (Section 5.2.1.1). FNC was a multi-dimensional software project covering internal processes across a large number of the client's business units. TH was used to work in complex project environments and was talented in communicating with diverse stakeholders

on the side of ABC's clients. TH clearly thematised aspects beyond processes to enable KT:

"We have to brainstorm, and then we need to identify the information we want to exchange among each other. We have to look for ways to communicate seamlessly in a transparent way. This is how we can make knowledge transfer happen – within a certain framework." (TH)

TH touched upon the key enablers of KT discussed in the literature review of this thesis: close interaction of individuals and work groups, the creation of knowledge flows across an organisation, and transparency with regards to the relevant data and information to be transferred. As outlined in the previous sections, ABC had already started to encourage consultants to work together more closely, making regular use of the DTL and its technology. The company was in a process of defining more formalised procedures for employees to impart their knowledge. A successful process of KT had not yet been defined, though.

Both MX's and TH's comments spoke for a framework of KT. Establishing a framework delivering against ABC's specific needs at the time the inquiry started, required to integrate processes and working modes, as well as IT as a key enabler. Specifically, the latter aspect was pursued further within the course of the open-ended interviews. The researcher assumed the stance of Ahmed and Ahsan (2014) who contended that the creation of seamlessly working processes had to complement an appropriate technical enablement to achieve successful KM - and thus the foundation of KT.

In his interview, the young consultant BX who had offered to contribute to building a new KM system at ABC (Section 5.2.2.2) earlier, envisioned concrete principles and features of a future IT platform:

"We need a network where people find documents, where people can upload documents, start discussions, form groups for a certain subject. (...) Where people maybe show photos and contact dates (sic: data) (...)." (BX)

Four of the five participants proposed technology-solutions as a crucial component of ABC's future KT approach. This led to the researcher's decision to explore software-based applications, tailored to the consultants' specific needs, as a pillar of the future process-oriented KT framework. During the fourth PAR-cycle, particular focus was put on the aspects of perceived usefulness and perceived ease of use of the technology to be employed, the two pillars of the TAM model introduced by Davis et al. (1989) (Section 5.2.2.3.1). Chapter 6 will discuss potential solutions in detail.

5.3.2 Cluster 2: Company Structure and Organisational Culture

From their experience with KT practices at the firm, four out of five interviewees saw a need for a dedicated organisational structure at ABC.

The consultants proposed a *moderator*, a person foremost organising knowledge flows within the company. MX and BX specified the tasks of the individual and his or her capabilities further:

"Let me call it the personal or human factor. Somebody who knows the knowledge management system in detail, who can help to find the right data

and information and share it. This would be important. A person you can trust and would connect people.” (MX)

“Someone needs to organise the way we impart our knowledge. And this person needs to explain the big picture of knowledge management and knowledge transfer - it’s about the future of the company, everybody’s job.” (BX)

The consultants’ views mirror the previously discussed organisational gap at ABC (Section 5.2.1.1), and they relate to recommendations made in other academic management studies. Liebowitz (1999) proposed the introduction of structural changes within a company by introducing the role of a CKO, a *Chief Knowledge Officer*, to enable knowledge flows and pursue KM policies, thus supporting intrafirm-KT. This step can be considered costly and not appropriate for a relatively small consulting company such as ABC. On the other hand, creating a CKO-role within ABC would send a strong message to the organisation, reflecting the firm’s intent to value the importance of knowledge and making changes to its cultural foundation. The role reminds of the Organiser-function within the conceptual framework of this study, building on the introduction of Scrum practices to help organise work and establish knowledge flows. The Organiser supports teamwork, transparent processes and promotes activities based on mutual trust - and hence must be understood as part of a wider framework enabling KM and KT within a firm.

The researcher prioritised to explore an encouraging environment for the firm’s future knowledge management and knowledge transfer practices. Consequently, ABC’s organisational culture became a crucial aspect at a later point in time.

5.3.2.1 Culture of Sharing

By proposing a dedicated individual in the organisation who explains the “big picture” of KM and KT at the company, BX challenged ABC’s senior management in his interview. The importance of specialist knowledge for the company, and the way it is managed, is a strategic topic, and hence should be on a KIF’s leadership management agenda - and has to be rooted in its organisational culture. A number of contending definitions of the term can be found in the academic management literature. Marshall and McLean (1985), for example, provide a broad description, aggregating key aspects the participants of the open-ended interviews touched upon: “Organisational culture is the collection of traditions, values, policies, beliefs and attitudes that constitute a pervasive context for everything we do and think in an organisation.” (p. 2.)

CE, a senior manager with ABC, specifically thematised the firm’s organisational culture in her interview. She was experienced in managing complex projects and had taken on overall responsibility for ABC’s largest project FNC (Section 5.2.1.1) as project lead. CE realised the need for employees to work closely together, share knowledge in an efficient way and thus manage a project in an efficient manner.

“The culture of the company has to support knowledge sharing and then transfer will happen.” (CE)

CE, as MX and BX before, recommended foundational aspects of KM and KT, such as frequent interaction of individuals and a culture of embracing knowledge (and its transfer), that are cornerstones of some of the academic studies discussed in the literature review: the SECI model from Nonaka and

Takeuchi (1995), and the modelling framework from Mougin et al. (2015) which rests on discussions among participants of a KT process, and on-the-job training. To actively make changes to a firm's culture is a complex undertaking though. CE's impression that KT might "happen" at ABC once a culture of sharing is established, must be considered as a process over a longer period of time. This is particularly reflected in this inquiry's approach of conducting PAR-cycles within ten months - with the intent to pursue significant change at the case company (mid-December 2016 to mid-October 2017).

In their interviews, ABC's employees revealed a professional and constructive working relationship among each other, reflecting a culture of collaboration. NK, a young consultant who had joined ABC less than six months ago, described his working relationship with his senior manager as follows:

"I feel that we pretty much transfer knowledge face to face, from person to person. For example, if CE sees that I am working on a topic that I have not worked on before, she will provide me some paperwork, some documentation about the topic, and then I will just educate myself (...) I can always come back to her and ask questions." (NK)

It can be argued that the consultants understood themselves as a team, reflecting a culture based on teamwork and mutual support. This early notion was confirmed by further quotations analysed in the subsequent section, related to the individuals' motivation to work at ABC; the employees liked working in their environment and felt valued as individuals. The researcher regarded this as a solid foundation to develop a knowledge-friendly culture and was aware of the potential business impact of organisational culture.

Schein (2010) argued that a company's culture can determine its strategy. From this follows that changes to organisational culture can have considerable impact on a firm's well-being and development.

The development of ABC's culture related to knowledge sharing and transfer had to address the concepts of trust, as revealed in the first part of this chapter, and individual motivation to help the firm improve existing practices. The fourth and the fifth interview question (Section 4.4.1.3.1) specifically aimed at the concept of motivation, and the next section provides a more detailed analysis and interpretation of the topic.

5.3.3 Cluster 3: Motivation

All five participants either mentioned ABC's flat hierarchical structure, perceived values, or its booming market segment of digital transformation as key reasons for joining the company. In one of his statements, BX appreciated the company's culture of people management:

"I joined ABC, because it is a start-up environment. Also, you are valued as a person, as an individual. You are actually not just a number, but a name with a person behind that name, for the company. This makes ABC a comfortable work environment." (BX)

The consultant had taken a most critical stand on ABC's organisational structure and its KM and KT practices in the past, and hence his viewpoint was unexpected. The researcher had no evidence though that BX was perhaps pursuing his personal agenda and was seeking for potential advantages for his career within ABC, by praising the company's values. As previously outlined, even if BX was a very ambitious young consultant and

usually outspoken in addressing issues, he was rather solution-oriented than acting politically within the organisation. BX confirmed his role as a change agent within ABC, and he played a centre role in spurring the participants' motivation to drive change within the KIF. Changing the firm's culture by building on the value of the individual became a key aspect within the PAR-cycles of the second phase of the inquiry and will be analysed in the subsequent chapter.

5.3.3.1 Approaching Incentives for KT

With regards to their motivation to help transfer knowledge, the employees' answers could be categorised within a broad range: from considering KT as a general obligation and part of the job of a KIF-representative, to clearly stating that KT is part of a "give-and-take"-continuum that should be rewarded by the company.

Two employees connected their motivation to share knowledge and enable KT with the company's well-being in the Knowledge Age. This perspective was clearly expressed by TH, a young and ambitious consultant who had joined ABC around a year ago:

"Sharing knowledge means help the company grow. And if the company grows, then this is an opportunity for me to develop and improve as a consultant." (TH)

Three out of five employees made comments which were less idealistic, and they clearly expressed that they expected something back from the company for sharing and helping transfer their knowledge. Statements such as the following can be considered usual for KWs in a KIF who have a tendency to protect their specialist knowledge (Section 2.3.3):

“You share your knowledge with others, you get rewarded for it – this is how it should work.” (BX)

The researcher pursued the aspect of incentivising KT within the PAR-cycles of this research study. At the time the inquiry commenced, ABC did not specifically spur individuals' motivation to share or contribute to knowledge transfer. The principle of rewarding openness to knowledge-related activities, which was employed at ABC's holding company DEF (Section 5.2.2.2), provided an insightful example. In the specific case of ABC itself, it became apparent that the KWs expected something back from the firm for sharing specialist knowledge.

5.3.4 Relevance to Research Questions

In particular, the open-ended interviews provided further answers to the second and third research question (**What are the factors impacting KT?**, and: **How can knowledge transfer practices be changed to achieve optimal KT?**). It became apparent that ABC had the opportunity to build on strong individual motivation to achieve change within the firm, and to pursue a holistic framework for optimal KT. Creating a culture of sharing and openness was core to the approach, and the company had to define a more coordinated way of achieving its aim to establish new, and successful, KT practices. This contrasted with the existing approach of muddling through - emanating from the firm's start-up phase two years after its foundation. Disposition to share and transfer knowledge required dedicated motivational practices, built on clearly defined and transparent processes. Findings from the interviews were missing detail though, and a practitioner at ABC would not be in a position to achieve optimal KT solely based on

those results. Specifically, the participants' answers related to a sensitive topic, such as individual motivation, had to be reflected with care because of potential bias. Hence the findings' relative value for this study was realised. The PAR-cycles were crucial to explore actionable solutions to the actual KT issues at ABC.

5.3.5 Power Issues, Confirmation Bias and Groupthink

The researcher specifically reflected on the potential impact of power asymmetries, social desirability, confirmation bias and groupthink on the validity of the research findings during the two phases of data collection (Section 3.7.2.2 - Section 3.7.2.3.).

One key aim was to establish an atmosphere of power equality for the five interviews. The following suggestions from other scientific researchers, as delineated in Section 3.7.2.2.2 and Section 3.7.2.3, were considered:

1.) The company's DTL was chosen as the environment for open-ended interviews, because it was part of the natural real-life setting for consultants at ABC, as opposed to - for example - the researcher's office at ABC. This approach was to contribute to establishing a non-hierarchical atmosphere (Karnieli-Miller et al., 2009).

2.) Open-ended questions were generally used to encourage the participants to speak freely about their opinions and feelings with respect to KM and KT at ABC. Powell et al. (2012) argue that open-ended questions lead to increased accuracy in interview responses.

During the interviews, the author did not have the impression that the participants followed their individual agendas of, perhaps, presenting themselves in overly positive light, or had a tendency to choose responses which they considered (socially) desirable (Section 3.7.2.2.3). All interviewees spoke freely about their views related to existing intra-firm KT-issues, made recommendations on how to achieve change at ABC, and underscored positive and negative aspects related to their work environment at the firm.

The concepts of confirmation bias and groupthink (Section 3.7.2.3) were not explored in the course of the analysis of the face-to-face interviews. Those aspects are more relevant with respect to the four PAR-cycles conducted for this thesis. Chapter 6 provides detailed analytical sections on the matter.

5.3.6 Triangulation

The primary themes emerging from the five open-ended interviews (Section 5.3) confirm the following aspects related to intra-firm KT at ABC that were inferred from the documentary analysis and the researcher's observations (Section 5.2.4 - Section 5.2.5):

- Responsibility for KM/KT is crucial (but not yet defined)
- No formalised processes in place
- Motivation is key (and employees are motivated to achieve change).

During their interviews, the participants mentioned further aspects they considered key enablers of KT at the consulting firm, specifically:

- KT-Framework covering people, systems and processes
- Organiser of KT (moderator) required at ABC

- Culture of sharing crucial to achieve optimal KT.

The development of a framework of KT, bespoke to ABC's needs, was pursued during the four PAR-cycles of this research study and will be discussed from different perspectives in Chapter 6 (taking data collected with the different methods applied in this study into account). Section 6.3 is dedicated to triangulating the different data.

The organiser role proposed by the participants extends the aforementioned theme of responsibility and refers to a potential role within the organisational structure of ABC. As mentioned before, Liebowitz (1999) proposed a similar role (CKO) to enable knowledge flows in firms (Section 5.3.2), i.e. the foundation to KT. The role is reflected in the conceptual framework of this study (Section 2.7; Figure 15) and will be further discussed in the subsequent chapter.

The aspect of organisational culture, specifically referring to the firm's openness to knowledge sharing and a general atmosphere of knowledge-friendliness, was of importance for the development of the new KT-framework of KT. The topic is specifically discussed during the first PAR-cycle (Section 6.2.1.4 – Section 6.2.1.9.1).

5.3.7 Transfer to PAR-Cycles

The four PAR-cycles built on the Scrum management and control practices to support the development of a holistic framework of KT, unique to ABC's requirements. The iterative action-reflection sessions with the interview-participants were focussed on exploring:

1. Seamless processes and tools for KT.

2. Structural and people-related aspects with regards to responsibility for managing and transferring knowledge.
3. Introducing or changing practices to support trust and motivation.

5.4 Conclusion to Chapter 5

The key learning points of the fifth chapter are as follows:

1. Documents, non-participant observations, and open-ended interviews analysed and interpreted.
2. Fragmented KT-issues across different areas revealed (processes, IT, organisational structure, and culture), and solution path developed.
3. Four iterative PAR-cycles of Phase 2 of the inquiry to approach the creation of a holistic, process-oriented KT framework for ABC.

CHAPTER 6: PHASE 2 – PARTICIPATORY ACTION RESEARCH CYCLES

6.1 Introduction and Format of Chapter

This Chapter describes and discusses the research findings from the four consecutive PAR-cycles, performed between December 2016 and October 2017 at case company ABC. This second phase of the inquiry was to explore and pursue further options of change within the firm and, specifically, provide solutions to the existing KT issues. The PAR-cycles built on the findings from the previous phase of the research (documentary analysis, non-participant observation, and open-ended interviews), and focussed on processes and tools of KT, individual responsibility for transferring knowledge, and the concepts of trust and motivation. Scrum management and control practices were introduced to help support the development of a framework of KT within ABC. In the following, findings within each of the four cycles are analysed and interpreted in the light of previous academic research publications, and their relevance to the research questions is discussed. The Chapter closes by presenting a novel framework to achieve optimal KT, unique to ABC's requirements. Details of the research progress within the cycles have been noted in data sheets. An exemplary data sheet for the first PAR-cycle has been added to the Appendices (Appendix O).

6.2 PAR-Cycles: Findings and Interpretations

The series of cycles commenced with an introductory meeting and the researcher explaining the principles of Scrum, as well as the four steps of collective inquiry depicted in the conceptual framework of this thesis (Section 2.7; Figure 15). The researcher took the role as Organiser.

The first cycle focussed on processes, basic future tools and components of a framework of KT. The second cycle utilised initial findings and refined KT practices and their complementary documentation. Cycles 3 and 4 were characterised by clear definitions of future processes and tools, the completion of a newly-developed KT-framework, as well as a potential commercial utilisation of the research findings.

6.2.1 Cycle 1: Introduction

The first PAR-cycle comprised of two meetings in the firm's DTL, scheduled on 16th December 2016 and 5th January 2017. All five selected employees, who had participated in the open-ended interviews, attended the first meeting. Commencing the cycle, the researcher depicted the PAR-approach of achieving solutions within iterative sessions, based on Scrum management and control practices. Specifically, the clear aim of collectively exploring a successful KT framework at ABC was communicated. As outlined in Chapter 4, the researcher applied a process defined by Checkland and Holwell (1998) and especially detailed the methodological progression at the beginning of the first meeting. In line with the conceptual framework of this thesis (Section 2.7), the PAR-cycles were aimed to explore a clearly-structured process encompassing four phases (*Aggregating*, *Featuring*, *Reviewing*, and *Doing*) to achieve change in action. The approach was discussed among all participants (the researcher included) and was considered helpful, in particular because all employees had experience in Scrum or had at least attended projects based on Scrum practices. The team was aware of the principles of the approach, such as transparency with regards to information sharing and process steps, individual responsibility, or clearly defined roles among work groups (Section 2.6.2). Before entering the first phase of the cycle though, the employees aimed for a definition of the

KT-state to be achieved, i.e. a definition of *optimal KT* which is at the core of the purpose of this inquiry.

6.2.1.1 Definition of Optimal KT

The previous chapter's conclusion foremost revealed the need of appropriate processes, practical tools and clearly-defined people-related tasks to improve KT at ABC. During the first PAR-cycle meeting, the researcher reported on these aspects, besides topics related to the concepts of trust and motivation as well as overall company culture, as the key findings from the first phase of the inquiry. In a discussion lasting around 30 minutes, the employees broadly considered the results of the research so far as an adequate interpretation of the root causes of ABC's KT impediments. The group contended that ABC would need a process-oriented framework, embedded into a knowledge-friendly organisational culture of sharing, as a foundation to optimal intra-firm knowledge transfer. The need to potentially integrate external knowledge from cooperation partners or contractors was also raised within the discussion, but this aspect was deprioritised to focus on critical day-to-day internal KT.

What remained unclear to the team at this point in time was the path towards a bespoke framework of KT, as well as the specification of future tools enabling the KT process, such as documents explaining topics and tasks, or detailed process specifications. It was understood and supported though that these aspects should be explored within the consecutive cycles. Furthermore, the team commenced a discussion on the Scrum management and control practices - core to the conceptual framework of this thesis - as the intended methodological approach to help solve existing issues and achieve change. A discussion over a period of more than one hour commenced among the employees, as summarised in the following.

6.2.1.2 Challenging Scrum

One employee, NK, a process-specialist in the area of simplified digital workflows and logistics, challenged the four phases of the conceptual framework (Section 2.7). The phases were formally adopted from the classic Scrum-related process flow, to ensure stepwise progress and its control (Section 2.6.2). NK considered the four steps a theoretical construct not ensuring relevant output and hence not helping overcome existing impediments to KT (Section 1.4.1) in an iterative manner. The employee basically was in favour of agile project management approaches such as Scrum, but took a critical stand on the four clearly defined steps of the conceptual framework which - from his standpoint - would curb creativity. This view was in contrast to two of the individuals' experience within complex client projects. TH, a young consultant who had taken on responsibility within the firm's largest project (Section 5.3.1), FNC, reported on the project's critical phase when he was assigned to the project and how Scrum and its clearly structured steps helped define milestones and establish deadlines - a procedure which enabled the project team to finally achieve the most important targets. CE, building on her experience within projects at a media company, rejected NK's notion that Scrum might curb creativity. She argued that tight deadlines, which Scrum helped manage, actually urged her work groups to seek creative ways to overcome impediments and find solutions. The employees unanimously followed NK's thinking with regards to one aspect, though: Scrum procedures have their roots in software development as well as project management, and hence needed an adjustment and potentially a number of changes to enable complex KT processes. The entire team, NK included, finally argued that the key principles of Scrum, such as transparent communication, responsibility of the individual or iterative control of progress, would be beneficial to improve KT across the company. Also, a decision was

taken to apply the formal four phases of Aggregating, Featuring, Reviewing, and Doing and test their impact within the cycle-meetings to follow.

6.2.1.2.1 Power Issues, Confirmation Bias and Groupthink

The potential impact of power asymmetries, confirmation bias or groupthink on the objectivity of the research findings, as delineated before (Section 3.7.2.2 - Section 3.7.2.3), will be discussed throughout this chapter within dedicated sections (Table of Contents).

In the course of the study, the researcher applied different approaches to help mitigating the impacts of the aforementioned phenomena. In particular, the participants were continuously encouraged to take a critical stand on findings, reflect on PAR-cycle results and thus consider if, perhaps, groupthink prevailed. This approach was supported by the PAR-cycles' general reflective character, and the conceptual framework's iterative layout. For inquirers, reflexive awareness to create sensitivity with respect to power issues is suggested in the scientific literature to realise and critically assess their impact on findings (Section 3.7.2.2.1). Particularly for this reason, the researcher introduced proxy subjects - to collect external perspectives on consultants' performance and, consequently, reflect on his personal views. Thus, the potential impact of social desirability or confirmation bias on research results was to be addressed (Section 3.7.2.2.3). In the course of the study, two clients of ABC were consulted for direct feedback (Sections 6.2.1.8.2; 6.2.5.1).

6.2.1.2.1.1 Cycle 1: Power Asymmetry Concerns

Commencing the first PAR-cycle, the inquirer supported a discussion over a period of more than one hour on Scrum as a potential enabler of KT (Section 6.2.1.1). The intention was to explore if the participants weighed pros and

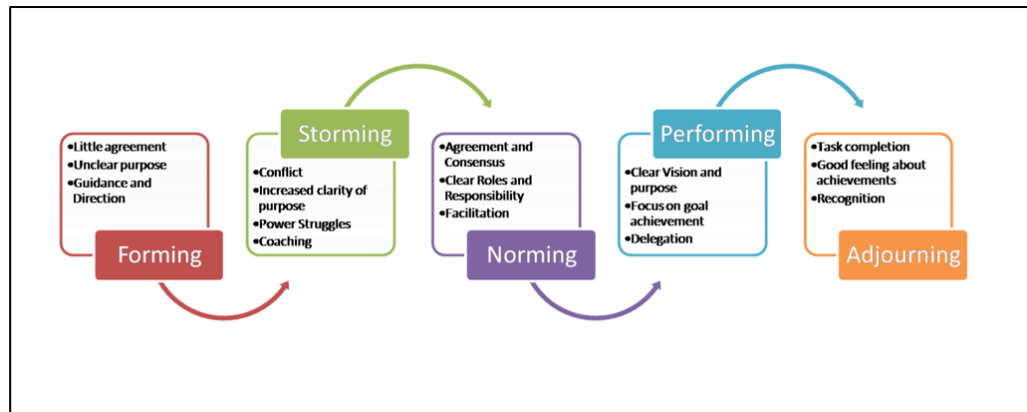
cons of the approach and did not simply support it because the researcher, and board member of ABC, had decided on it, i.e. potentially for reasons of power asymmetry and social desirability. As described before, the researcher realised that the participants had developed their own critical views and were not simply following his thinking. He came to the conclusion that sensitivity for power issues would develop over time - on his side, and on the side of the selected employees.

6.2.1.3 Team Performance

The researcher at this point reflected on the team dynamics. Motivation to achieve change within the company on the side of the employees had become apparent as the work group was actively discussing ways to achieve optimal KT. This was already noted during the phase of documentary analysis, non-participant observation and open-ended interviews (Chapter 5). At the same time, the researcher was aware that developing a new framework would require the team members to work seamlessly together and that reaching this state would only happen within days or weeks. Tuckman and Jensen (1977) argued that work groups do not provide their best performance from the start, but go through a development that the authors split into five stages (Figure 22) - from *Forming*, *Storming*, *Norming* to *Performing*, and *Adjourning*.

In the phase termed “Performing”, work groups will be most successful, specifically because of team dynamics focussed on goal achievement. It was clear to the researcher that no exact forecast was possible on when, within the period of the four consecutive PAR-cycles, the team would reach its stage of best performance with regards to collective problem solution. That state was to be achieved as fast as possible.

Figure 22: Five Stages of Team Development



(Source: Hillary, M., n.d.; adapted from Tuckman & Jensen, 1977)

To minimise the potential impact of the first three stages Tuckman and Jensen defined - such as little agreement, conflicts, or missing consensus - the researcher decided to build on the employees' strong motivation to achieve change at ABC and focussed on topics the work group had unanimously prioritised as key impediments to intra-firm KT: process-related issues and non-structured tools for KT (Section 5.2.5). It can be argued that the team members had a clear understanding of the aspects. Specifically, they had proposed innovative ideas on how to improve data and information management at the firm (and thus build the foundation to KT) in their open-ended interviews (Section 5.3).

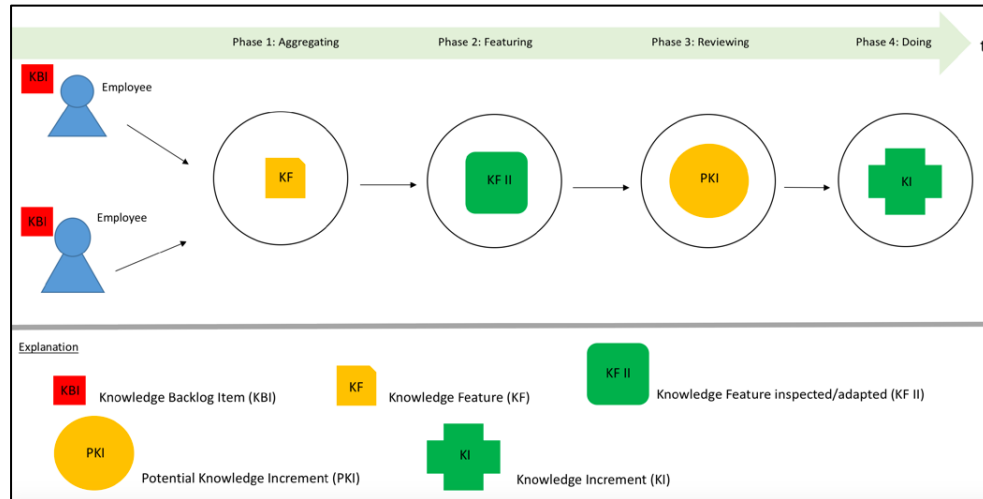
6.2.1.4 First Phase: Aggregating

Commencing the first phase, the participants decided on a practical approach. The work group agreed to perform a typical day-to-day business situation, with a project manager transferring knowledge to a new member of

his or her project team. The young consultants MX and TH volunteered to apply the process and execute the tasks defined in the conceptual framework (Figure 15; Figure 23 presents the core process). TH was to transfer key knowledge related to the company's largest project, FNC (Section 5.3.1), to MX who had joined the firm less than six months ago. TH was assigned to the FNC project in spring 2016 and knew the overall project structure, its key components, deadlines and achievements. Also, he was responsible for the delivery of some major milestones, such as process definitions and software releases. The work group defined that TH should give MX an overview of FNC and put her in a position to take on a role as a manager of the roadmap of the project. She was to look after milestone achievements and deadlines, prepare status reports, as well as acquaint herself with key project management tools. The team's expectation was that MX should be in a position to manage the tasks without further support from TH within two weeks. MX agreed on this way forward. A period of two weeks was considered a desirable *phase-in-stage* for project managers newly joining existing teams at ABC. At that point in time, in December 2016, phase-in-stages at the firm took up to four weeks and were not considered successful at all because of non-appropriate KT processes (Section 1.4.1).

Within the first step of aggregating data and information, the two participants were asked to brainstorm on knowledge to be transferred and prioritise ideas, i.e. gather Knowledge Backlog Items (KBIs) and Knowledge Features (KFs) (Figure 23). These activities are core to the underlying Scrum practices of generating a backlog and performing a sprint planning (Figure 14). Applied to KT, the approach is crucial to initiate communication and interaction between participants, i.e. build the foundation of KT. It can be considered similar to the initial stages of the SECI model from Nonaka and Takeuchi (1995), as explored in the literature review of this thesis (Chapter 2).

Figure 23: Conceptual Framework: Core Process



(Source: Author's editing)

6.2.1.4.1 The FNC Project

FNC, considered by the PAR-cycle work group as a potential reference case for establishing ABC's new KT process, was a software project in the area of digital document management (Chapter 5.2.1.1). The same-named client of the project, a company for rights management and royalty payments for musicians and artists, had started a number of digital transformation activities in 2015. Storing and managing digital documents, such as contracts with artists or event firms, legal documents, or information on payments, was at the core of the client's business. The organisation had decided to introduce a modern digital document management system called OpenText. This new platform, amongst other features, in particular offered a number of content search capabilities crucial to optimising processes at FNC.

Digital documents within an existing system, called CPX (anonymised), were to be connected to OpenText. ABC, and specifically its consultant TH, was involved in managing the multi-dimensional project, building and overseeing the roadmap and making sure that key use cases were developed. FNC-users (i.e. internal employees) were to be enabled to manage documents using OpenText within a period of twelve months. Figure 24 presents an anonymised original document delivered by FNC, listing the key use case for users of the new system (originally in German language, and translated in the following).

Figure 24: Overview of Key FNC Use Cases (anonymised)

Strukturierung – Technische Use Cases	
Übersicht	
Techn. Use Cases	Demo
1. Anlegen und Nutzen einer Akte (mit SAP)	✓
2. Dokumente zur Akte hinzufügen	✓
3. Anbinden	✓
4. Suchen	✓
5. Einakten/Umakten	✓
6. Revision gemäß	✓
7. Allgemeine Themen	✓

(Source: FNC, 2016)

The cases were defined by the client when the project commenced, and they covered the following seven items:

- Creating and using a file of documents
- Adding documents to a file
- Connecting the existing system CPX
- Searching
- Moving content from existing files to new files
- Preparing documents for audits (legal or financial)
- General use cases.

The PAR-cycle team had decided on a complex project revealing the need for MX and TH to work in a prioritised manner. Internal ABC-tools to manage a project such as FNC, and FNC tools and systems to access data and information, turned out to be key topics for the two employees, as outlined in the following.

6.2.1.4.2 Generating KBIs and prioritising KFs

Over three hours, BX and TH gathered twelve different topics which they considered crucial to the FNC project, and thus generated their list of KBIs. Figure 25 shows the following two clusters of KBIs on ABC's digital wall (Section 5.2.2.3), as defined by the two employees: an introduction to technology-related aspects of the project, and an area termed "Big Picture" - summarising topics such as tools to manage the project, the project plan, or information on stakeholders. Project management tools referred to software applications run on desktop office computers, either owned by ABC or the client of the FNC project.

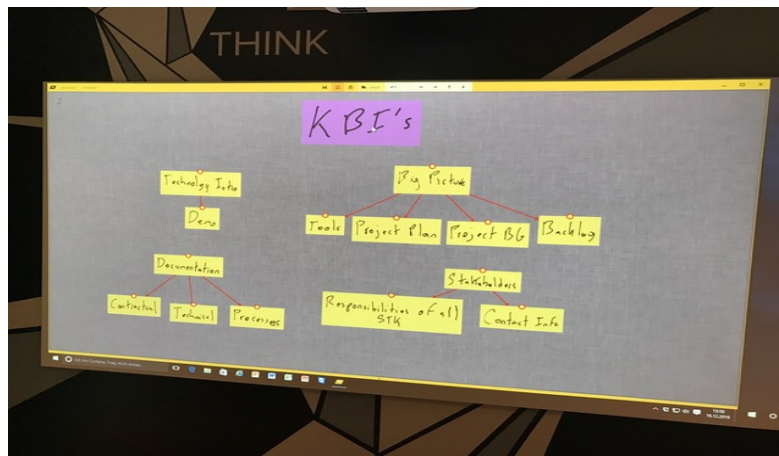


Figure 25. Two clusters of KBIs on the digital wall. Munich, 16.12.2016.

Because of the depth of data and information available within the cluster “Big Picture” (seven different sub-themes), the employees prioritised it as their first KF to be elaborated in the subsequent Featuring phase. To separate this KF from the deprioritised second one on technology, it was termed “KF1”. Mougin et al. (2015), building upon Nonaka and Takeuchi (1995), and Chevallard (1991) introduced a step-wise progression of first generating knowledge and then selecting it in a specific context, before. The approach explored in this thesis goes beyond a definition of stages though and combines clearly defined process-steps, adopted from Scrum, with specific and structured documents. These are topic-related, and hence flexible and dynamic, to manage the components of knowledge (i.e. data and information), and they are further detailed in the subsequent section.

6.2.1.5 Second Phase: Featuring

According to the conceptual framework of this thesis, the Featuring phase is about discussing the relevance of the KFs defined before (Aggregating phase). For participants of the KT process, Featuring means to focus on the

most important data and information considered important to achieve optimal KT. At the end of this phase a KFII - the most relevant topic - is to be defined. MX and TH explored 21 topics related to their KF1 ("Big Picture") and visualised its thematical bandwidth (Fig. 26). They identified aspects ranging from project management tools used to monitor progress within the FNC project (including details such as access passwords, or processes to run the tools) to the existing project plan, as well as an administrative cluster termed "Project Backlog". This cluster encompassed six aspects, such as payroll information tracking ABC's employee allocation, or data on travel expenses the company would bill within the project. MX and TH then considered the topics in the light of the KT task they had taken on, i.e. to prepare MX to manage the roadmap of the project (Section 6.2.1.4). Consequently, the two employees focussed on the area they considered most relevant for the KT process, prioritising a deep-dive on project management tools. During this phase of the discussion between MX and TH, the remaining participants mostly listened to the conversation and observed the interaction between their two colleagues. MX and TH finally turned to discussing the relevance of spreadsheets and activity trackers used within the project and what detail was relevant for MX.

Direct interaction within a KT process, such as the one between MX and TH, is at the core of a number of academic models of KT that were discussed in the literature review of this thesis (Table 3). The Scrum management and control practices applied within this research study are particularly helpful in initiating conversations among individuals or work groups - mainly because of their iterative character.

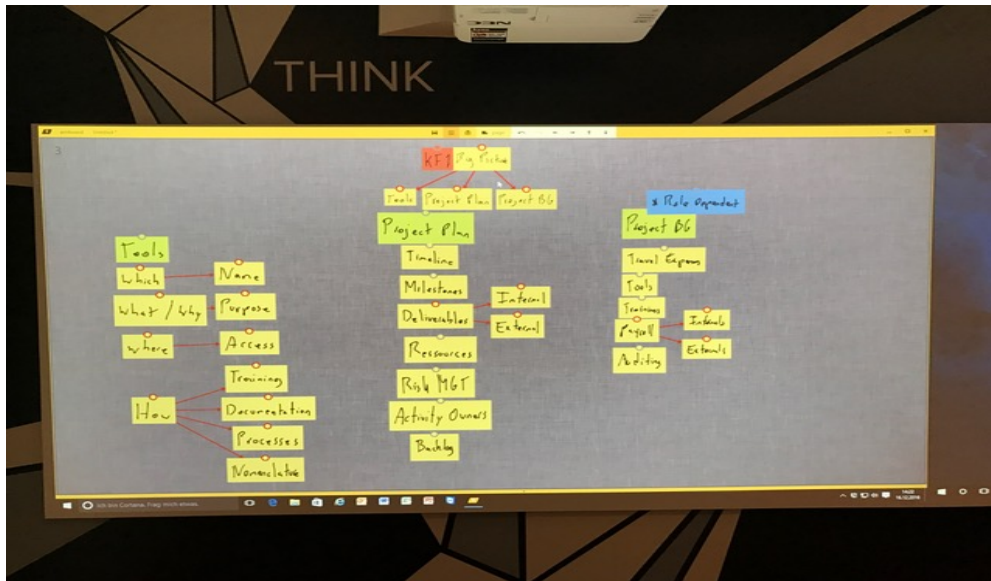


Figure 26. Range of Topics within Cluster “Big Picture”. Munich, 16.12.2016.

Daily Scrum (Section 2.6.2), for example, describes a particularly tight management procedure which is to monitor progress within a project, based on day-to-day communication and status updates among individuals and work groups. Iterations are also core to the conceptual framework of this thesis, enabling step-wise development of a process-oriented framework of knowledge transfer.

The researcher, after around 45 minutes into the Featuring stage, tried to explore its value for the KT process and specifically asked MX for her understanding of details related to project management tools. MX highlighted her need of more information before feeling comfortable to take on responsibility within the FNC project. Both MX and TH agreed that the topic *project manage tools* (shown as “Tools” in Fig. 26, far left) was their KFII and that this area should be explored further within the cycle. The work group

then decided to review the process performed so far and to discuss the next steps, as outlined in the following.

6.2.1.6 First Feedback

After completing the first two phases of the PAR-cycle, together lasting around four hours, the employees unanimously expressed their positive impression of a step-wise approach, i.e. to commence KT by breaking knowledge into its components of data and information. This approach is a tenet of the conceptual framework of this thesis (Section 2.7). NK, who had initially taken a critical stand on the concept and on the assumption that practices adopted from Scrum would improve KT (Section 6.2.1.2), gave positive feedback on the progress he had witnessed. He argued that the approach might help manage the complexity of KT in this specific case. All participants underscored that the KT framework to be developed at the firm would have to go beyond formalised management and control practices, such as the ones defined by Scrum. At this point in time, the team considered a clear process and a clear organisational structure crucial components of a future framework. The employees specifically referred to the researcher's role as *Organiser* (as defined in the conceptual framework) and discussed that optimal KT at ABC would require a similar role within a KT process. The role was defined as “moderating and guiding”, and in contrast to “owning and defining”, a process. The latter aspect reflects an organisational set-up different to the CKO-approach proposed by Liebowitz (1999), as outlined in the literature review, where an individual would oversee policies and ensure KM-implementations. The *Organiser* role defined by the PAR-cycle team of this inquiry will be further explained in the course of the study.

MX and TH also considered standardised digital documents, summarising key information, as potential supporting material for KT at the firm. This idea

was favoured by all participants of the PAR-cycle. Mougin et al. (2015) proposed a similar approach by defining *knowledge footprints* which they described as oral or written information to be used for knowledge transfer activities (Section 2.3.3.4). The work group at ABC went further though and decided that a clearly structured *Basic Document* should always be composed by the participants of a KT process, going forward. This document, later termed *Handbook*, should give an overview of key data and information related to a project, mainly: history of activities, processes, stakeholders, or specific process descriptions detailing how, for example, certain databases could be accessed and utilised.

The PAR-cycle team finally agreed that MX and TH should work on a first Handbook on project management tools within the FNC project, the key topic (i.e., the KFII) the two participants had prioritised at the end of the Featuring phase. The team then discussed that this work should be completed within the following ten working days.

6.2.1.7 Third Phase: Reviewing

On 5th January 2017, the team convened for the second meeting of PAR-cycle 1, commencing the Reviewing phase (Fig. 23) lasting for about four hours. Within the conceptual framework, this phase represents an assessment if successful KT is happening, or if adaptations to the KT process are required (Section 2.7). Reviewing has been adopted from Scrum management and control practices and combines *Sprint Execution* and *Sprint Review* (Section 2.6.2, Figure 14). Focus is on delivering, scrutinising and potentially changing and improving work results before a project stage approaches its approval, or progresses towards its release. At the end of this phase of the PAR-cycle, the participants will have defined their Potential Knowledge Increment (PKI), as presented in Figure 23. This means, the KT process has progressed and is approaching its final stage (Doing) - the

application of new knowledge. Reviewing usually requires more elaborated documentation comprising, for example, detailed data and information related to descriptions of processes or management tools. Hence, as agreed at the end of the previous Featuring phase, within ten working days MX and TH had created a preliminary version of the Handbook. The two participants interacted frequently, scheduled in-person meetings or phone calls and exchanged information using the web-based communication service Skype. Figure 27 presents the cover page, and the table of contents of the first version of the Handbook concerning key management tools employed within the FNC project. All of these tools were software-based applications run on desktop office computers.

Figure 27: Preliminary Handbook: Cover and Table of Contents (anonymised)

HANDBOOK 01/2016
GMBH
CLIENT: [REDACTED]

Project: Digital Document Management at [REDACTED]

Project Tools

Table of Contents

Content Management System	2
Name	2
Purpose	2
Where	2
How	2
SharePoint: First level folder in order to access all the project content	2
Official Deliverables	2
Project Wiki	2
Project Management Documents	2
Documents	2
Bug Tracking Tool	3
Name	3
Purpose	3
Where	3
How	3
Error Area	3
Assignee	3
Description	3
Workflow	3
Communication/Video-conferencing Tool	4
Name	4
Purpose	4
Where	4
How	4
Version Management Tool	5
Name	5
Purpose	5
Where	5
How	5
Project Management Tool	6
Name	6
Purpose	6
Where	6
How	6

(Source: ABC, 2017a)

The document was structured and, within dedicated chapters, provided detailed information on the following: the content management tool, the bug tracking tool (referring to software issues, termed *bugs* in the software development industry), the communication/video-conferencing tool, the version management tool (referring to different software versions deployed), and the overall project management tool. MX and TH then reviewed the content of the chapters and the degree of detail they should encompass, as outlined in the following section.

6.2.1.7.1 Detailing the Chapters

At this point, the researcher encouraged a discussion on the depth and the quality of information needed to explain the software applications in the most efficient way. The work group supported the idea of efficiency, and all employees proposed visualisations, such as screenshots of the tools in action. MX and TH had already built photos into the preliminary Handbook and took the task to optimise key visuals in updated versions to follow. As some of the tools employed (such as the overall project management application) were standardised software products, globally used across different companies and industries, the team decided to add links to educational videos available on the Internet whenever possible and considered helpful.

The initial chapter on the overall project management tool was structured, applying the following categories:

- Name of the tool
- Purpose
- Where to find and how to start the tool

- Responsible person at ABC
- Content generated and used within the project.

Figure 28 provides an excerpt of the chapter, comprising a screenshot of the project plan generated with the help of the project management tool. The excerpt has also been added to the Appendices (Appendices P; Q). The sentences used to explain details of the tool were concise, perspicuous and they described practical usage, such as in the following: “In order to add an activity to the project plan, is it required to do a left click on the computer mouse and then select ‘insert activity’.” (Appendix Q.)

MX and TH concluded that the existing version of the Handbook was sufficiently complementing the KT process and - as defined in the conceptual framework (Fig. 23) - signed it off as their Potential Knowledge Increment (PKI). All participants then decided that MX should try to apply her newly acquired knowledge within the FNC project. Consequently, MX and TH commenced the fourth phase, *Doing*.

Figure 28: Excerpt of Project Management Chapter (anonymised)



(Source: ABC, 2017a)

6.2.1.8 Fourth Phase: Doing

The fourth phase of the conceptual framework of this thesis is based on two final activities belonging to Scrum management and control practices: the inspect-and-adapt task termed *Sprint Retrospective*, and the go-live of a product, software component or project stage. *Doing* in this research study specifically means that participants of the KT process make use of a PKI in their respective environment, try to apply newly acquired knowledge - and reflect on the usability of the overall process to potentially adapt and optimise

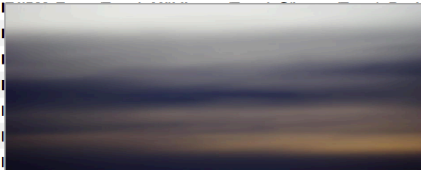
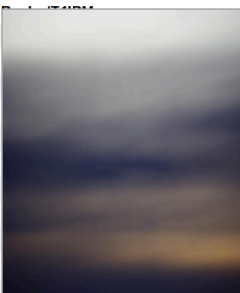
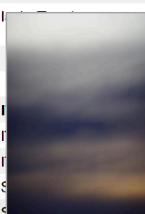

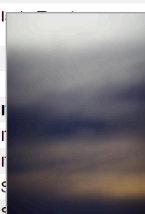
it in the future. The duration of this phase depends on the complexity of the data and information involved in the KT process, and on the task to be performed. It can last minutes or hours.

6.2.1.8.1 Creating the FNC Project Roadmap

MX, in the existing FNC case, seemed to be well prepared to access the project tools and to start managing the FNC roadmap - the exact objective defined at the beginning of the Aggregating phase (Section 6.2.1.4). It took MX around 90 minutes to create a first project roadmap in Microsoft Excel and Powerpoint format, comprising milestones and deadlines for the deliverables to come. MX's work was based on the data and information she had obtained from the tools used to manage the FNC project and which were described in the current version of the Handbook (the PKI).

Figure 29 presents an essential part of the original project plan of the project which MX created (in German language, own translation in the following). The roadmap gives an overview of key milestones of a first software release related to the overall FNC project: technical specifications, implementation of software components, testing procedures, infrastructure development to be executed on client-side, software operations, and specific aspects related to the migration of content to the new OpenText platform.

Figure 29: First original FNC Roadmap (anonymised)

#	Traits	Title	Status	% completed	Resources
0	📁🔍	DMS_Archiv_Projekplan_PL 20160111	🔴	88,48 %	
1	🔍	Release 1.0	🔴	89,42 %	
2	🔍	0. Meilensteine	✓	100,00 %	
3		0.1 Spezifikationen	✓	100,00 %	
4	🔍	Approval Feinspezifikation	✓	100,00 %	
5	🔍	Approval Migration concept	✓	100,00 %	
6	🔍	Approval SAP Spezifikation	✓	100,00 %	
7		0.2 Implementation	✓	100,00 %	
8		Implementation Content Migration Closed	✓	100,00 %	
9		Implementation Metadata Migration Closed	✓	100,00 %	
10	🔍	Implementation Open Text Closed	✓	100,00 %	
11		Implementation xECM for SAP Closed	✓	100,00 %	
12	🔍	0.3 Testing	✓	100,00 %	
13		Migration Test Closed	✓	100,00 %	
14		Open Text Test Closed	✓	100,00 %	
15		xECM für SAP TEST Closed	✓	100,00 %	
16		Open Text Test Closed	✓	100,00 %	
17		xECM für SAP TEST Closed	✓	100,00 %	
18		Closed	✓	100,00 %	
19		1 Closed	✓	100,00 %	
20		2 Closed	✓	100,00 %	
21		1. Infrastructure / Operations	✓	100,00 %	
22	🔍	1.1 A DEV	✓	100,00 %	
23		1.1.1 Regelbetrieb	✓	100,00 %	
24	🔍	Basis Installation SAP	✓	100,00 %	
25	🔍	Basis OT (DB, virt. Maschinen inkl. OS)	✓	100,00 %	
26	🔍	Installation/Konfiguration ArchiveServer	✓	100,00 %	
27	🔍	Installation/Konfiguration ContentServer	✓	100,00 %	
28	🔍	Installation/Konfiguration Project specific components	✓	100,00 %	
29	🔍	Installation/Konfiguration xECM (inkl. SAP-Int)	✓	100,00 %	
30	🔍	Entwicklungssystem Basis bereit	✓	100,00 %	
31	🔍	1.1.2 Migration Related	✓	100,00 %	
32	🔍	Document Pipeline (centOS)	✓	100,00 %	
33	🔍	Datenbank MetaData	✓	100,00 %	
34	🔍	Datenbank Content	✓	100,00 %	
35	🔍	Lesezugriff COI Database	✓	100,00 %	

(Source: ABC, 2017a)

The roadmap enabled MX to discuss specific software launch dates with the client which were added at a later point in time.

Both MX and TH had the impression that the KT process was successful. MX felt comfortable to report on the project status quo and to attend a first client

meeting in the week to follow. The entire work group shared the two participants' positive feedback on the process-oriented and Scrum-based approach to transfer knowledge. At the same time, a number of potential optimisations were discussed, such as:

1. The need to review the approach and its underlying process as it required considerable detailed work - e.g., the creation of the Handbook - and was time-consuming (two cycle-meetings and an additional phase of ten working days for MX to acquaint herself with project material).
2. More standardised documentation formats to expedite the creation of written material used within the KT process.
3. The introduction of mobile devices to avoid a complex set-up such as meetings in the firm's DTL using the digital visualisation wall.
4. Innovative ideas to spur employees' motivation to help establish a newly to be created framework of KT.

The team agreed that the above-mentioned aspects should be explored within the following PAR-cycles as only a preliminary status quo of the firm's future framework of KT had been achieved.

6.2.1.8.2 Client Feedback

In the week following the completion of the first PAR-cycle, TH introduced MX as a new project manager to the client of the FNC project. MX took on her new responsibility, managing the roadmap of the project and reporting on its progress. Five working days after her introduction, the researcher

approached the client proactively and asked for MX's performance. The client gave general positive feedback and mentioned that the consultant reported on the roadmap of the project in the expected manner. The overall expectation with regards to MX's performance as a new project manager was met. The researcher considered this feedback as a first indication that the new approach to KT at ABC was beneficial to the employee and the company, as well as to the client.

6.2.1.8.3 Power Issues, Confirmation Bias and Groupthink

During the first PAR-cycle, the researcher witnessed constructive team dynamics which led to concrete outputs (preliminary Handbook, FNC roadmap) in a relatively short period of time. It can be argued that the work group was approaching a stage of cooperation and results-orientation which Tuckman & Jensen (1977) termed Performing, as explained in Section 6.2.1.3. However, the researcher had continuously reflected on the results achieved and specifically took a critical stand on the outputs which were mainly created by the participants MX and TH. The intention throughout the cycle was to explore if confirmation bias among the two participants (or groupthink with respect to the entire PAR-cycle team) prevailed.

6.2.1.8.3.1 Critical Thinking and Review

Close to the end of the Reviewing phase, the researcher commenced and encouraged a discussion on the quality of the documentation material generated so far, to explore if it was helpful to optimise KT within the firm (Section 6.2.1.7.1). The entire work group was invited to discuss the topic in order for the researcher to elicit feedback from participants other than MX and TH. This led to an open discussion on a number of optimisations with respect to the documentation formats and the underlying KT-process

(Section 6.2.1.8.1). It was agreed that the optimisations and their usefulness to achieve optimal KT at ABC should be further explored during the PAR-cycles to follow.

Specifically, as both MX and TH were convinced that their KT-approach was successful and would result in successful project work for their client FNC, the researcher reached out to the firm's responsible manager to collect his view on the performance of ABC's consultant MX (Section 6.2.1.8.2). This mirrored the approach of employing proxy subjects to validate individuals' performance or behaviour (Section 3.7.2.2.3). As the client's representative provided positive feedback, the researcher concluded that the KT-process defined so far could be considered successful.

6.2.1.9 Summary and Framework Status quo

The outcome of the first PAR-cycle demonstrated an ongoing change process at ABC. Whilst the open-ended interviews had revealed the employees' strong motivation to create a better environment for, and a better process of, KT at the firm (Chapter 5), the two meetings of the cycle achieved considerable change in action:

1. The work group agreed on a process of KT, adopting practices and principles from Scrum.
2. A first tool (Handbook) to optimise KT was developed and defined as a crucial component to complement the future KT process at ABC.

At the same time, the cycle-meeting indicated that deviations from the Scrum management and control practices were needed to achieve a bespoke KT framework at the KIF. Although the work group confirmed the four Scrum-

based phases defined in the conceptual framework of this thesis (Aggregating, Featuring, Reviewing, Doing) as an enabler of KT at the firm, the following changes were agreed:

1. The work group decided that a Daily Scrum meeting (Section 6.2.1.5) as part of the Featuring phase was not necessary. Daily meetings to transfer knowledge were not considered realistic as consultants would probably not be able to make them part of their schedules. The participants proposed more flexible time windows, adapted to the KT tasks at hand. Also, planning KT meetings was seen as part of the responsibilities of the individuals involved in the process.

2. The participants noted that the Scrum management and control practices had to be complemented by a detailed, process-oriented documentation of data and information (the components of knowledge). This documentation should comprise written text, visualisations and links to multimedia material to specifically describe and explain complex aspects as comprehensively as possible.

All participants of the PAR-cycle concluded that further change at ABC was needed to enable seamless KT at the firm and that a number of aspects still had to be explored before a successful framework was achieved. Specifically, the first PAR-cycle only probed and documented KT between two individuals. If the approach was successful for groups of people, still had to be tested and was defined as a topic for the following cycles. Also, aspects related to organisational culture, company structure, people and values such as trust, and motivation - the pillars of a future framework as defined by the

participants within the open-ended interviews (Chapter 5) - still had to be scrutinised within the following PAR-cycles.

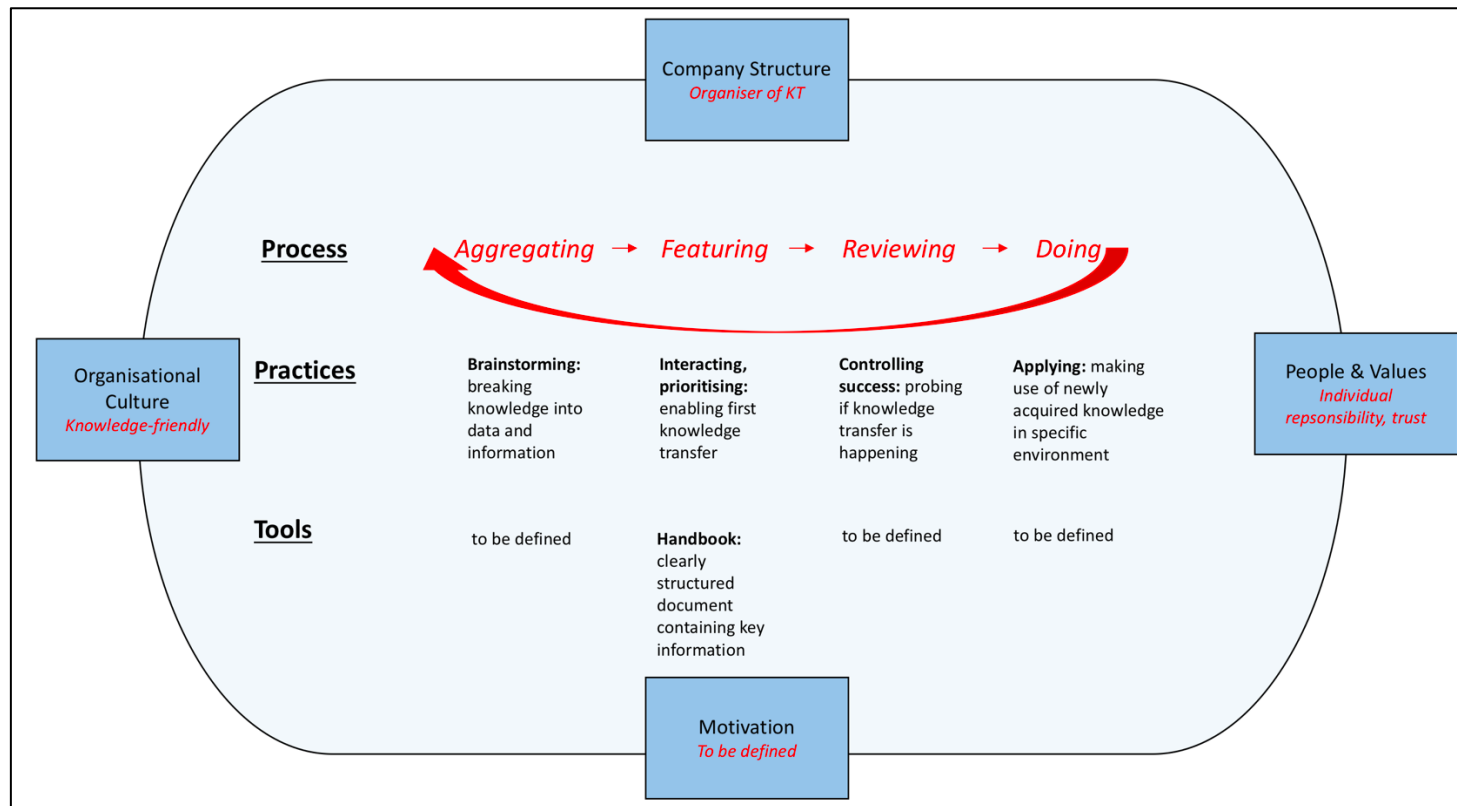
6.2.1.9.1 Framework Development

Incorporating the results of the first phase of the research (documentary analysis, non-participant observation and open-ended interviews) and the outcome of the first PAR-cycle, a first version of ABC's future process-oriented framework of KT can be established. Figure 30 presents the preliminary framework. Specifically, the four pillars of Organisational Culture, Company Structure, People & Values, and Motivation were further explored in the following three PAR-cycles. The pillars are termed *Anchors*, in the following. At this point in time, the framework was characterised by *Anchors*, underlying *Process*, *Practices*, and *Tools*:

Anchors

- Organisational Culture: The work group considered a knowledge-friendly company as crucial. A culture of knowledge sharing had to be established
- Company Structure: KT needed an organiser - an individual moderating KT activities, taking care of the IT infrastructure, as well as supporting the application of a seamless process of KT
- People and Values: Individual responsibility for KT and trust between the participants of a KT process was described as key
- Motivation: ABC had to find a way to motivate its employees to contribute to knowledge sharing and knowledge transfer at the firm. This aspect still had to be elaborated within the following PAR-cycles.

Figure 30: Preliminary Process-oriented Framework of KT



(Source: Author's editing)

Process

The first PAR-cycle demonstrated that a Scrum-based process following the four phases defined in the conceptual framework of this thesis (Aggregating, Featuring, Reviewing, Doing) was beneficial. The iterative character of the process (as defined by Scrum) was discussed and reviewed in the second PAR-cycle.

Practices

The practices applied could basically be described by the activities of brainstorming, interacting and prioritising, controlling success and applying (newly acquired knowledge). They were mainly adopted from Scrum but changed in the sense that they had to be flexible and adaptive to the knowledge transfer task at hand.

Tools

Clearly structured documentation was to complement the KT process. A first tool was developed: the Handbook. The work group discussed that potentially further documentation was necessary along the KT process; this was to be scrutinised in the following PAR-cycles. The Handbook would usually be developed in the Featuring Phase.

6.2.2 Cycle 2: Refinement

The second PAR-cycle commenced on 27th January 2017 and was followed by a further session on 23rd February. It can be argued that, at this point in time, the work group had achieved a phase of Performing as defined by Tuckman and Jensen (1977) and outlined in Section 6.2.1.3: the team was determined to improve the process probed in the first cycle and to further

define the details of a process-oriented KT framework for ABC. The participants decided to again follow the phases of Aggregating, Featuring, Reviewing, and Doing. The intent this time was to look for optimisations of the process steps and discuss the usability of the documentation material.

6.2.2.1 First Phase: Aggregating

The work group, again meeting in the company's DTL, opened the Aggregating phase by taking a closer look at the comprehensiveness of the Handbook, the Knowledge Increment (KI) (Fig. 23) of the first PAR-cycle. The participants unanimously valued that a detailed document had been achieved helping MX to take on a role as roadmap manager at client FNC. CE, an experienced manager at ABC who had taken on overall responsibility for the FNC project, demanded faster and more efficient access to the key information of the Handbook, though. She was aiming for two optimisations. Firstly, CE proposed that the Handbook should provide more links to multimedia material, such as videos or internal ABC databases, as well as to external client platforms (if available) to improve the comprehensibility of the information provided. Secondly, she argued, a cover document should provide a quick overview of the most relevant topics of the Handbook.

After twenty minutes into the Aggregating phase, the team commenced a lively discussion on CE's recommendations. In general, all participants agreed that multimedia content was crucial if the process of KT was to be accelerated. At the same time, the work group realised that creating another document (on top of the Handbook) was time-consuming and might hence impede seamless KT. The researcher argued though that generating documents was only time-consuming when starting a KT process on a specific topic from scratch - but was helpful, and time-saving, when reviewing the documents at a later point in time. The participants broadly followed this

thinking and agreed that a cover sheet (termed *Quick Guide*) should always complement a Handbook, in the future. Specifically, BX demanded that the Quick Guide should be concise and easily manageable within the future KT framework and its technical environment. Using, for example, mobile devices to manage knowledge and optimise KT was already highlighted by the employees (Section 6.2.1.8.1) and would require bespoke content and document formats. This aspect will be discussed in the analyses of the third and fourth cycle, in particular.

Employing detailed documentation to enable KT was described in the academic literature, before. Mougin et al. (2015), for example, proposed formalised explanatory collections of data and information - besides other activities - to achieve optimal transfer of knowledge (Section 2.3.3.4). Von Krogh, Ichijo and Nonaka (2000) recommended the aggregation of additional minutiae by creating maps of expertise available across a company to provide references to sources or individuals. The approach chosen by the PAR-cycle team within this research study went beyond procedures and practices of creating notes, maps, or specifications. The Handbook, as well as the Quick Guide, were considered integral standardised but flexible components of the process of Aggregating, Featuring, Reviewing, and Doing (abbreviated as AFRD, going forward). The PAR-cycle team defined the Handbook and the Quick Guide as adaptive KT components to be reviewed and optimised in an iterative manner when following the AFRD-process. Also, the team underscored the necessity of links to multimedia content to improve the comprehensibility of the data and information to be shared. Encouraged by the researcher, the work group decided that the Quick Guide was the Knowledge Feature (KF) of this phase of the PAR-cycle. The team then agreed to work on the format and the content of the Quick Guide for the FNC Handbook, as outlined in the subsequent section. 90 minutes after

commencing the Aggregating phase, the team started activities of the Featuring session.

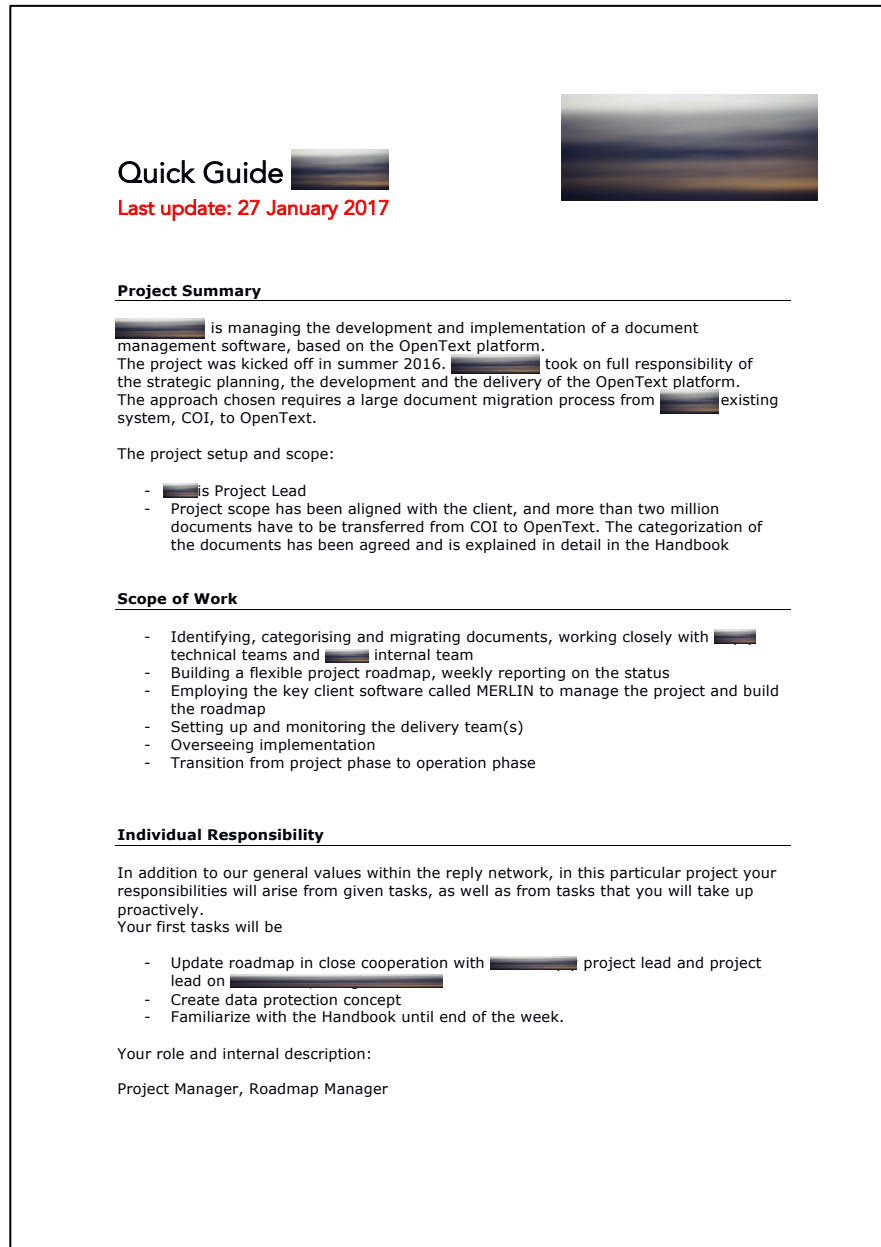
6.2.2.2 Second Phase: Featuring

All participants contributed to discussing the format and the content of a first version of the FNC Quick Guide, with MX and TH leading the conversation. It was clear to the team - and specifically to MX who had been introduced as new manager - that the Quick Guide would change over time, following the evolution of the Handbook. At this point in time, the Handbook only covered FNC project management tools, but it would be elaborated, depending on the knowledge to be transferred in the future. The PAR-cycle team decided that the Quick Guide should not comprise more than two pages in Microsoft Word format, and the following categories were agreed:

- Header - providing project title and information on the latest update
- Project summary - mainly providing data and general information on thematical bandwidth and setup
- Scope of work - detailing the project work and reporting on key project management aspects
- Individual responsibility - describing tasks expected from a consultant within the project
- Main contacts - giving an overview of key individuals involved in the project on the side of ABC, and on client side.

Figure 31 presents an excerpt of the FNC Quick Guide that was developed during the Aggregating phase, and a comprehensive version has been added to the Appendices (Appendices R; S).

Figure 31: Excerpt of FNC Quick Guide (anonymised)



(Source: ABC, 2017b)

After an hour into the Featuring phase, the researcher asked MX and TH to review the FNC Quick Guide in the subsequent phase of the cycle and to assess if it was helpful within the KT process. Specifically, MX was asked to assess if the document was beneficial to achieving the KT targets defined when the first PAR-cycle commenced (Section 6.2.1.4): a quick phase-in into the project, and her taking on responsibility for roadmap management work within FNC.

The team then decided the Quick Guide to be the Knowledge Feature II (KF II) (Fig. 23) of this phase of the PAR-cycle, and the next meeting date was scheduled for the 23rd of February 2017. The team planned to enter the Reviewing phase on that day and to achieve the Potential Knowledge Increment (PKI).

6.2.2.3 Third Phase: Reviewing

Commencing the third phase of the cycle, MX and TH argued that a combination of the key documents that had been developed (Quick Guide and Handbook) was beneficial to expediting the KT process - specifically, because the Quick Guide provided a focussed overview of sources of information and stakeholders within the project. The other participants shared the view of their colleagues, but they also highlighted a number of aspects, referring to the format of the documents (referred to as *tools* in the following) as well as to the KT process, that still had to be addressed to achieve significant optimisations, as outlined in the subsequent sections.

6.2.2.3.1 Format of Quick Guide and Handbook

The work group argued that the Quick Guide should be generated in Microsoft Word format such as the Handbook - thus it was scalable and could be displayed on different devices used by ABC employees, ranging from

desktop computers, notebooks, and iPads, to smartphones. Furthermore, the participants defined *searchability* as a key requirement of the content within the tools. This feature was related to software-based search capabilities within ABC's future KM system, or Internet search engines (if the content was meant to be published), and determined that the material could be quickly identified and provided to consultants.

The team proposed concise sentences and bullet points (such as in the case of the Handbook), giving the reader easy-to-understand and structured overviews. Quick Guide and Handbook were defined to be interlinked as intensely as possible, enabling readers to access further information immediately, if required.

6.2.2.3.2 Process and Depth of Information

The work group specifically pointed out that the KT process probed so far was only related to a specific case, involving two individuals. Even if the situation represented a typical task for consultants working at ABC, the employees accentuated that knowledge transfer between groups of people was similarly important and that larger projects would require even more explanatory documentation (potentially, beyond Quick Guide and Handbook). The researcher agreed and proposed that KT between small groups should be considered in the next cycle, exploring if the process could help achieve more extensive change across the firm. The team was aligned with the approach. Also, the researcher reminded the participants that the Handbook - so far - only focussed on project management tools for the FNC project. A number of further aspects, such as the client's concrete business needs and aspired business KPIs, or a documentation of company-internal processes which would change in the course of the project, had not yet been covered, at all. CE specifically picked up the researcher's point on business

needs and processes, and she commented on knowledge transfer related to large projects recommending the following approach:

1. When a KT process for a given project is performed for the first time, the participants should always create a *Fact Sheet* on the client, providing information on the business rationale related to the project. This would help consultants understand the objectives of the project better and focus their work on the most relevant aspects.
2. Specifically, large projects would require participants of a KT process to ensure that the agreed thematical bandwidth was covered. A respective *Checklist* should be created.

First, the other participants opposed the proposal (the researcher included) as the approach would require more time-consuming documentation. NK noted that the process might put client projects at risk, or even stall them, if consultants needed too much time to transfer knowledge, or if too many consultants were involved in the process. CE though argued that the additional tools would specifically be beneficial for individuals, or small groups of people, who had to be phased into projects within a very short period of time (e.g., only one or two days) - providing them a more comprehensive, but still concise and quick overview. Also, CE contended, the Check List might help build trust that all relevant information to be transferred were indeed covered.

After intense discussion on the pros and cons of further documentation for about 45 minutes, the work group took the following two decisions:

1. The Quick Guide was the Potential Knowledge Increment (PKI) of this phase of the PAR-cycle.
2. Fact Sheet and Checklist (termed tools in the following, as in the case of Quick Guide and Handbook) should be considered complementary support material, providing further depth of information. Format and content should be discussed in the third PAR- cycle and applied within a new client project.

Around three hours after the second cycle had commenced, the work group decided to enter the Doing phase.

6.2.2.4 Fourth Phase: Doing

Opening the fourth phase of the second PAR-cycle, the researcher proposed to not formally follow the process defined for this phase in the conceptual framework. The intent was to expedite the change process at ABC. The Doing phase - according to definition - partly is about completing final documentations, and thus a Knowledge Increment (KI) emerges (Section 2.7). The researcher contended though that the work group had already approved the format of the Quick Guide (the PKI) and agreed on structure and content for the FNC-specific version of the document. He encouraged the team to brainstorm on format and content of the Fact Sheet and the Checklist and to consider these tools as further KIs, as they were explicitly discussed in the Reviewing phase of the PAR-cycle and their usability confirmed. The employees broadly agreed on the approach but reiterated that the additional tools (Fact Sheet and Checklist) should be

developed further in the following cycle, based on a concrete KT example within a further client project. The work group agreed to test the process and tools in a different environment, at ABC's client MCB GmbH (MCB, name anonymised) in Cologne, Germany.

The PAR-cycle team decided to pursue the following progress within the third cycle:

1. Clear definition of all tools developed or discussed so far: Fact Sheet, Quick Guide, Handbook, and Checklist.
2. Detailed description and visualisation of the newly developed KT process for two individuals, or potentially small work groups.
3. Completion of the process-oriented wider framework of KT (termed *AFRD-framework* going forward, derived from the phases of Aggregating, Featuring, Reviewing, and Doing), specifically exploring aspects related to motivation and organisational culture.

6.2.2.5 Summary

In the course of the second PAR-cycle, the work group refined the KT practices and its complementary documentation. The team's focus was on providing or defining content for the Fact Sheet, Quick Guide, and the Checklist. The Quick Guide was already used within the FNC project and was considered a useful addition to the Handbook. At the same time, a number of aspects still had to be defined for the benefit of an entire process-oriented framework of KT, bespoke to ABC's needs. The third PAR-cycle, as

outlined in Section 6.2.3, was dedicated to further approaches completing the definition of the AFRD-Framework.

In terms of the methodology employed within the framework, the work group made further additions to the classic Scrum practices, after first adaptations had already been agreed (Section 6.2.1.9).

6.2.2.5.1 Further Deviations from Scrum

Documentation in Scrum is usually restricted to key data being visualised on paper stickers (Section 1.5), or screens (Section 6.2.1.4.2). Also, web-based tools such as Jira are often used to take note of activities and progress within Scrum-projects (Section 5.2.2.3.1). In the course of the second PAR-cycle, the work group at ABC turned to more detailed documentation and an interlinking of contents though - for the benefit of a seamless KT process. It can be argued that this approach represents a significant deviation from Scrum practices, and it goes beyond the documentation proposals from Mougín et al. (2015), or von Krogh, Ichijo, and Nonaka (2000), referred to in Section 6.2.2.1. The PAR-cycle team at ABC was very explicit with regards to the degree of detail expected from the content of the documents. Their structure was to be standardised but would remain flexible, dependent on the respective project or KT topic (Section 6.2.1.4.2).

6.2.2.5.2 Power Issues, Confirmation Bias and Groupthink

The work group's intent to optimise the newly developed tools and scrutinise the existing KT-process further (Section 6.2.2.3.2) characterised the second PAR-cycle. It can be argued that all participants were seeking to build the foundation of ABC's new KT-approach as fast as possible, develop the anchors that had been defined (organisational culture; company structure;

people and values, and motivation) and provide a first blueprint of the future framework they considered comprehensive (Section 6.2.2.6).

The researcher however took a critical stand on the progress, such as during the first cycle (Section 6.2.1.8.3.1), and specifically questioned if two of the key work results so far - the Quick Guide and the Handbook - were finally helpful within a future KT-process (Sections 6.2.2.1; 6.2.2.3). The participants now proposed a number of very detailed optimisations of the tools and delineated innovation scenarios as outlined in the subsequent section.

6.2.2.5.2.1 Creating Uniqueness

Different from the group dynamics witnessed at the end of the first cycle (Section 6.2.1.8.3.1), when the researcher encouraged a lively discussion on the quality of the work group's results by inviting less active participants to contribute to the discussion, now all participants provided concrete ideas. Those, for example, were related to the use of mobile devices and the searchability of the content developed. It can be argued that the work group was progressing within the stage of Performing (Section 6.2.1.3) as defined by Tuckman and Jensen (1977): the participants started to develop a clear future vision with respect to KT at the firm. Because of the liveliness of the discussion and the consideration of different perspectives offered by the team members, the researcher did not come to the conclusion that confirmation bias or groupthink might have influenced the decision-making process in a significant way.

The team also started to develop the Scrum procedures further, in order to cater for the specific KT-needs within the PAR-cycles, and at ABC in general (Section 6.2.2.5.1): e.g., more elaborated documentation was recommended. Thus, the team did not simply follow the Scrum rules but

critically assessed and shaped them to ultimately approach optimal KT at the firm. It is at this point, that the PAR-cycle team commenced creating the uniqueness of the KT-framework discussed in this thesis. The uniqueness of the approach will be further discussed in Chapter 7 and Chapter 8.

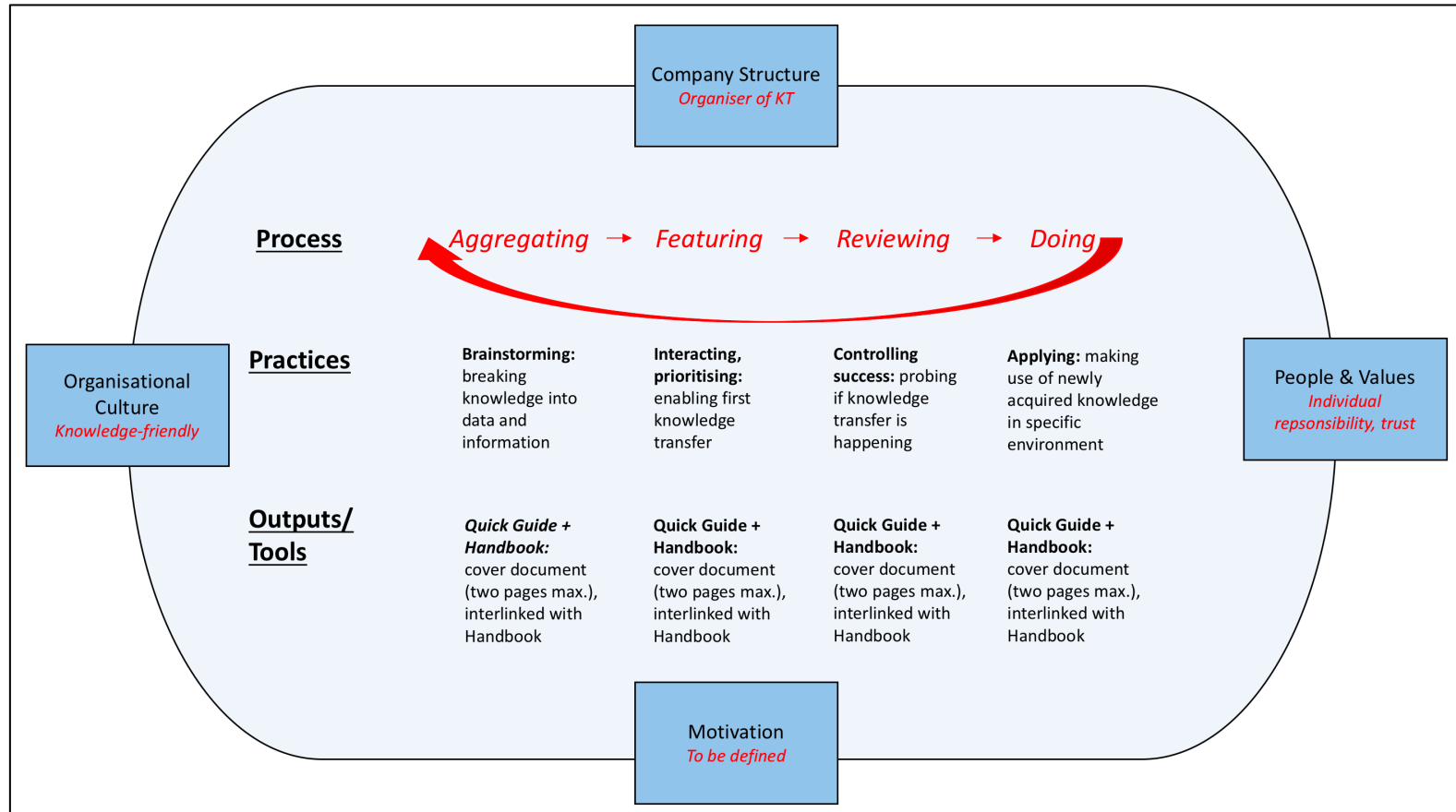
6.2.2.6 AFRD-Framework Development

Taking into account the change results achieved in the second cycle, a more detailed picture of the AFRD-Framework can be drawn. Specifically, one more tool was created and made part of the overall framework, the Quick Guide. Further tools, the Fact Sheet and the Checklist, were already discussed and aspects of their format, content and usability were covered in more detail within the subsequent third PAR-cycle. Figure 32 presents the status quo of the preliminary process-oriented framework of KT, now termed AFRD-framework. The key change, compared to the prior version (Figure 30), is described in the following:

1. The former section “Tools” is now titled “Outputs/Tools” to clarify that work groups will actively produce results within the process, i.e. content for the tools (or enablers).
2. The Quick Guide has become a further enabler in the Featuring phase of the process, i.e. a cover on top of the Handbook simplifying the navigation of key content. Quick Guide and Handbook will be used throughout the process. If a KT process starts from the ground up, Quick Guide and Handbook are not yet available for the Aggregating phase, hence the terms are presented in italics.

The two further tools the team already discussed, the Fact Sheet and the Checklist, were integrated into the framework, and allocated to the respective phases of the process, after the third PAR-cycle.

Figure 32: Preliminary AFRD-Framework



(Source: Author's editing)

6.2.3 Cycle 3: Completion

The third PAR-cycle comprised of three meetings, scheduled on 20th April 2017, 11th May 2017, and 1st June 2017. Focus of the cycle was on a refinement of the tools of the AFRD-framework, a review of the underlying KT process, and on the aspects of organisational culture and motivation. Furthermore, the newly developed AFRD-process was employed within a client project at MCB in Cologne, Germany. The work group had agreed on a different structure of the cycle. The first meeting did not follow the progression defined in the conceptual framework of this thesis (Aggregating, Featuring, Reviewing, Doing), but was dedicated to brainstorming on the development of the key components of the future framework of KT. During the second and the third meeting, the AFRD-process was practically probed. The employees used the tools developed, and they pursued KT across and between small work groups. It can be argued that after the third cycle, the team at ABC had reached a stage termed *Adjourning* by Tuckman and Jensen (1977): the participants were completing their tasks and felt good about their results. Transferred to the progression of the PAR-cycles: the work group completed the process of KT and finalised the specification of the AFRD-framework.

6.2.3.1 Tool Definition and Refinement

The PAR-cycle team opened the first meeting by discussing the format and the content of the two new tools considered to complement and improve the KT process: the Fact Sheet and the Checklist. It was agreed that both documents should be created in Microsoft Word, such as the Quick Guide and the Handbook. Thus, the tools could be displayed across the devices usually employed by ABC-consultants: desktop computers, notebooks or

smartphones and iPads (Section 6.2.2.3.1). In terms of the content, the work group defined the following with regards to the Fact Sheet:

1. Concise overview of key information on the client (e.g., number of employees, revenue, profit).
2. Data on competitors, and information if they are working on similar projects.
3. Business rationale of the project ABC is involved in.

The work group considered the Fact Sheet specifically useful during the first phase (Aggregating) of the KT process as it would provide information related to a client's business objectives. Thus, the employees argued, the tool would help understand value drivers for the client and prioritise main components of a project.

The team's discussion on the Checklist was focussed on two of its potential benefits: firstly, providing an overview of the thematical bandwidth of a given project (Section 6.2.2.3.2), and secondly summarising key processes on both a client's and ABC's side. Those processes could refer to systems (such as content management systems), or tools (e.g., project management software) employed and considered crucial to access key data or information. Consultant CE specifically argued that the Checklist could be used in the Reviewing phase of the KT process to monitor if the most relevant data and information had been used, or if gaps still had to be filled. The participants discussed this control function of the Checklist and agreed on its assumed usefulness - subject to its introduction and testing within the new client project at MCB, as indicated before (Section 6.2.2.4). A detailed description

of the project at MCB and how the tools helped transfer knowledge among ABC consultants, will be outlined in the following (Section 6.2.3.4 - Section 6.2.3.4.2.5.1).

The work group agreed that no further adaptations should be made to the formats of the remaining tools that had already been developed (Quick Guide and Handbook), but two further aspects were explored: usage of the four tools on mobile devices (smartphones and iPads), and the future KMS, or technology platform, that should be used to store data and information at the firm. Both topics are depicted in more detail in the subsequent two sections.

6.2.3.1.1 Mobile Readiness and Responsive Design

The PAR-cycle members had expressed a need for innovative technology to enable and improve KT at ABC throughout the research study. All participants favoured solutions for mobile devices to enable, and potentially expedite, knowledge transfer.

In their Mobile Added Values (MAV) model, Pousttchi, Turowski and Weizmann (2003) illustrate how mobile technology can facilitate knowledge sharing, the foundation of KT. The authors specifically describe that ubiquity, besides other mobile technology characteristics such as identifying functions or command and control capabilities, may help accelerate knowledge creation and transfer. Ubiquity, defined as a user's ability "to send and receive data anytime and anywhere" (Pousttchi et al., 2003, p. 419), can e.g. help resolve KT-restrictions related to an individual's geographical position, or availability in terms of timeslots. For consultants at ABC who spend most of their working time at clients' premises (Section 1.4.1), the ubiquity aspect can be considered crucial to enable KT between colleagues or work groups unavailable to meet at a certain location and at a given time.

It was clear to the PAR-cycle team that all new tools (Fact Sheet, Quick

Guide, Handbook, and Checklist) had to be mobile-ready. Specifically, the documents had to adapt themselves to different screen sizes and had to be searchable across all devices employed at ABC. The team confirmed a decision taken earlier (Section 6.2.3.1) according to which all tools were to be created in Microsoft Word format as the software is ready to be used on smartphones or iPads.

When discussing mobile readiness of the tools, the work group realised a number of implications. Two major challenges were accentuated:

1. Using mobile devices to perform KT would require a specific user interface (application), because displaying Word documents or visualisations on smartphones and iPads was only part of the KT process. The team argued that users should be able to leave and receive comments related to data, information, or processes. Hence, a dedicated functionality was to enable them to interact digitally with their colleagues.

2. Specifying an application for smartphones went beyond developing a KT process and a related framework at the firm. Also, such as the new tools (Fact Sheet, Quick Guide, Handbook, and Checklist), the application itself had to be available across different devices and scale on different screens (so-called responsive design). This required a follow-on discussion on the technical enablement of KT at the firm.

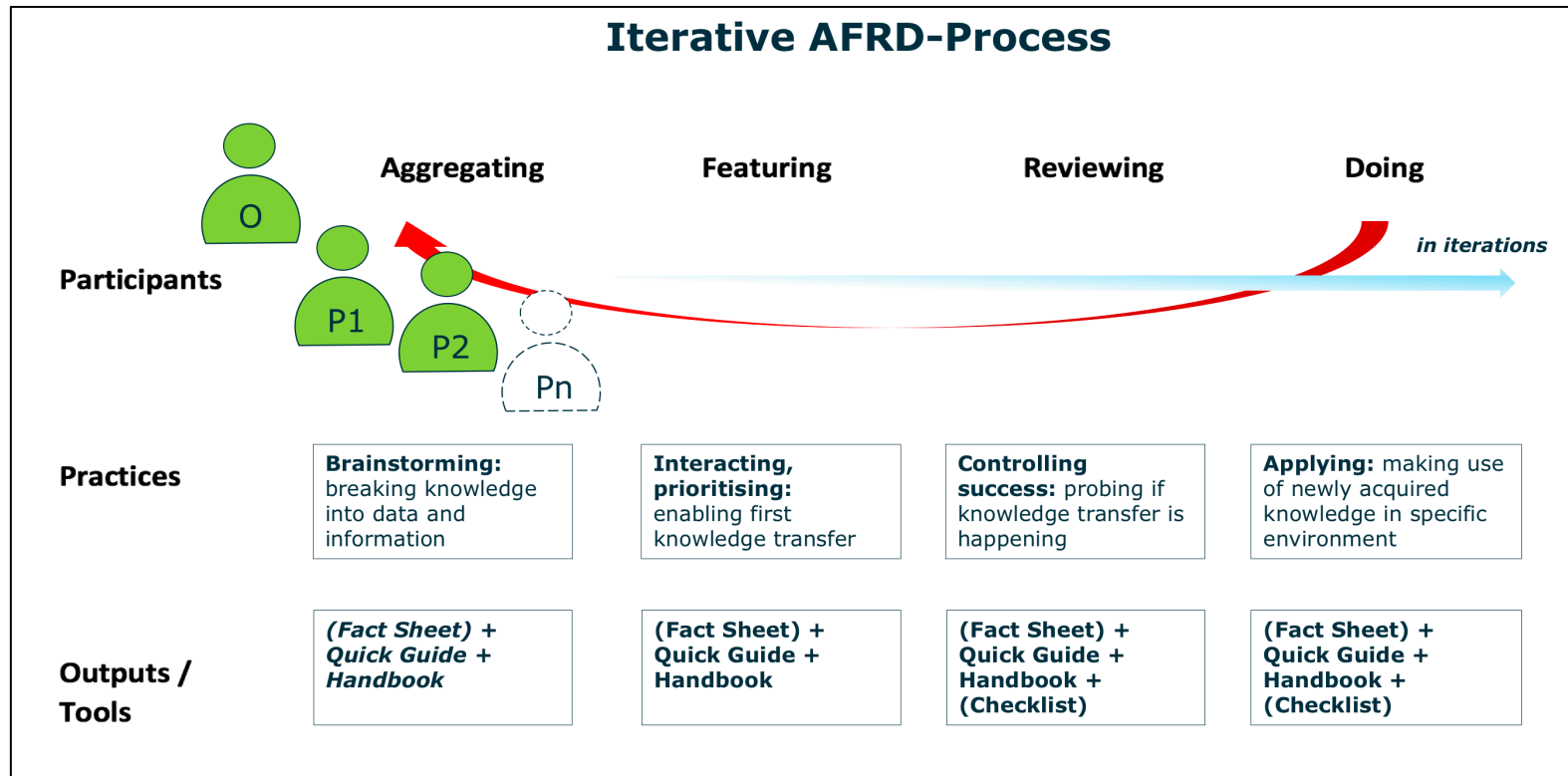
The PAR-cycle team decided to revert back to technical aspects and solutions within the new project at MCB and specifically within the fourth PAR-cycle on commercial utilisation of the AFRD-framework. The only technical solution the team agreed on at this point in time referred to the company's Dropbox which would remain the main source of all project-

related data and information used within the firm's KT activities. Although its structure had to be optimised and its usage across all employees of the firm had to be encouraged (Section 5.2.2.3.1), the Dropbox - as a web-based service - enabled all employees to access data and information from any device they employed, anytime and from anywhere.

6.2.3.2 Visualising the Process

The second activity the work group agreed on at the beginning of the third cycle comprised of a review, and a potential refinement, of the newly developed AFRD-process. After completing the discussion on mobile readiness and responsive design of the four tools (Fact Sheet, Quick Guide, Handbook, and Checklist), and after 90 minutes into the third cycle, the researcher encouraged the participants to visualise the KT process. The employees were to focus on individuals or small work groups involved in the process, their practices and the tools developed and employed in the future. The young consultant MX who had agreed to perform KT within the FNC project (Section 6.2.1.4) together with her colleague TH, volunteered to draw the AFRD-process on the digital wall. This board was already used during the first cycle session (Section 6.2.1.4.2) and enabled MX to react to other participants' remarks and make changes quickly. Figure 33 presents an enhanced and standardised version of the process including the complementing four tools, resulting from a discussion among all participants on its details, lasting around 60 minutes. The core components shown in Figure 33 had already been introduced in Section 6.2.1.9.1 (Figure 30), but the PAR-cycle team made a number of adaptations and clarifying remarks as listed in the following.

Figure 33: Enhanced Version of KT Process



(Source: Author's editing)

1. The AFRD-process developed is considered appropriate for KT between individuals: P1 and P2 in Figure 33, with O being the Organiser of KT. The process potentially works between small work groups (Pn), as well. The latter aspect was to be tested within the MCB project outlined in Section 6.2.3.4.

2. The AFRD-process is iterative in its character and should be applied as frequently as necessary and until consensus among the participants is achieved that transfer of knowledge is carried out.

3. The tools to be applied during the phases of the AFRD-process, and hence the outputs (or contents) to be generated, are crucial during knowledge transfer activities. Figure 33 presents two tools, Fact Sheet and Checklist, in brackets as they still had to be tested within the MCB project. In the Aggregating phase, when a KT process is started from the ground up, a populated Fact Sheet, Quick Guide or Handbook will not yet be available. Hence the terms are shown in italics.

4. The populated tools, stored in the company's Dropbox, will represent important material once individuals or work groups revert back to topics or projects at a later point in time.

5. The structure of digital folders within the company's Dropbox had to be optimised and duplications were to be deleted (Section 5.2.2.3.1; Figure 21). The work group agreed on one single digital folder per customer and project. As all documents were to be created in Word format they were searchable when using the Dropbox search capability - meeting a key requirement defined by the team, earlier.

Before turning to KT activities within the MCB project, the team decided to explore the aspects of organisational culture and individual motivation further, as agreed when the third cycle commenced (Section 6.2.3).

6.2.3.3 Organisational Culture and Motivation

Individual motivation to share knowledge in a company environment is key to successful KM and KT activities, as outlined in the literature review of this thesis (Chapter 2). Spurring employees' motivation related to KT is a complex undertaking, though. Davenport, De Long, and Beers (1998) argue that a change of motivational practices within a firm - beyond other factors - is specifically connected to organisational culture. The consultants at ABC had previously confirmed this standpoint in their open-ended interviews (Chapter 5). CE, MX and BX, in particular, described a culture of embracing knowledge creation, sharing and transfer as a desired environment at the firm. Encouraged by the researcher, the employees now entered a discussion on how further change within the company would lead to establishing a culture of knowledge sharing and transfer and, building on this, how bespoke motivational practices should be introduced at the firm.

6.2.3.3.1 Changes and new Principles

After around 90 minutes into their discussion, the PAR-cycle team defined a number of changes and principles to be introduced or established at ABC. The following provides the list of topics specifically related to organisational culture at the firm:

1. As knowledge sharing and transfer are the foundation of ABC as a KIF, these aspects become part of the firm's future vision and mission statements.

2. The senior management of the company reports on KM and KT activities across the firm in every bi-weekly company meeting for all employees. Information on KM and KT - such as optimisations of the the firm's Dropbox, successful KT initiatives, or employees outstandingly supporting KT - become as important as updates on basic KPIs such as revenue or EBT.

3. KT is part of every consultant's day-to-day work at ABC. The newly established AFRD-process is to be employed as a standard practice of KT.

4. The senior management of the company supports KT initiatives by establishing the role of an Organiser of KT as defined in the preliminary AFRD-framework (Figure 30). This role, and specifically the individual in his or her day-to-day practices, is to represent and promote the framework (the work group used the term *"live and breathe the framework"*).

The second and the third point on continuous communication and standard processes indicates organisational routines as prerequisites of KT. Swart and Kinnie (2003) considered these as success factors of KT at a KIF in the software industry (Section 5.2.2.2). At ABC, the participants of the PAR-cycles particularly accentuated the aspect of permanent communication with regards to KT in the future, which was missing in the past.

6.2.3.3.2 Motivational Practices

As concluded in Section 5.3.3.1, the employees at ABC expected something back, a reward from the firm, for sharing their specialist knowledge with their colleagues and, eventually, transferring it to their employer. A whole body of academic literature is concerned with individual motivation and its nexus with KT - as well as with its potential risks. Osterloh and Frey (2000), for example, point out that some types of motivation and organisational forms can have detrimental effects on KT. In their research, the authors specifically refer to monetary compensations which they consider inappropriate, because they “were perceived by the experimental subjects to be controlling and therefore tended to crowd out (...) motivation” (p. 542). In general, Osterloh and Frey consider environments that emphasise participation and personal relationships crucial for spurring individuals’ motivation to contribute to sharing and transferring knowledge. It can be argued though that those factors alone will not sufficiently enable KT in a given company, and they will not be the sole factors of motivating employees, as this research study has so far revealed.

The researcher commenced the PAR-cycle team’s discussion on motivational practices by explaining Osterloh and Frey’s findings with regards to monetary compensations and KT, and he encouraged the employees to comment on the authors’ standpoint and to think about potential alternative incentives. The young consultant BX, who had previously demonstrated his intention to thrive for change within ABC (Section 5.2.2.2), contended that employees at the firm “must be rewarded with knowledge to improve their capabilities” (participant BX, personal communication, December 16, 2016). He specified his thinking and argued that individual job qualifications, or development programmes, should be considered the right incentives to share and transfer knowledge - specifically

in the case of KWs. The other participants of the work group (the researcher included) agreed on BX's view. CE went further and proposed to introduce an initiative similar to *DEF Berries* which had been established at ABC's holding company (5.2.2.2), granting free educational courses at universities or private institutions to employees who attended internal development and networking events and helped build a project knowledge base. This proposal led the team to further specify future motivational practices at ABC, and after a brainstorming session on the attractiveness of certain measures, lasting around an hour, the participants decided on the following:

1. ABC introduces an incentive system for KT, called *ABC Berries*. Every employee shall be awarded educational programmes worth 2.000 EUR per year, if he or she are involved in at least five KT initiatives over a period of twelve months.

2. ABC's HR manager GC is to establish ABC Berries in close consultation with ABC's holding company, DEF, which considered DEF Berries a successful incentive programme. GC reaches out to each employee, exploring and reviewing individual preferences related to desired development programmes and university courses. A final list of options, after senior management approval, is then presented to the employees. (*This list was created by ABC's HR manager in the course of the third cycle and will be presented in Section 6.2.5.2).*

3. Senior management of ABC monitors execution of, and feedback on, the ABC Berries initiative in employee review meetings which were held every three months at the company. These meetings were to assess individuals' performance against their targets agreed at the beginning of a calendar year.

Also, employees would give management feedback on how they liked their jobs, what should be done differently, or how ABC could innovate. The ABC Berries initiative was to be made a fundamental part of the performance review meetings.

6.2.3.3.2.1 Potential Weakness and Mitigation

The work group was aware of the fact that it could only speak for itself when assessing the attractiveness of the ABC Berries initiative which it had defined. This was considered a potential weakness. GC, the firm's HR manager, was hence asked to collect feedback from all employees when reaching out to them to specify the list of course options, as agreed. The feedback was to be discussed and worked into the final version of the AFRD-framework. The team also decided to test and monitor the ABC Berries initiative between mid-July and the beginning of September 2017 across ABC, and the outcome will be depicted in Section 6.2.5.2.

It can be argued that the PAR-cycle team was seeking to embed the concept of motivation (i.e. motivation to share and transfer knowledge) into HR routines at the firm. In their research study on knowledge sharing in a software company, Swart and Kinnie (2003) witnessed a positive impact of HR and organisational routines on peoples' habits of sharing knowledge. Initiatives at the firm, for example, comprised of senior managers' attention to individual needs for development, or bespoke job rotation to reflect a culture of embracing and transferring knowledge across the KIF. Swart and Kinnie found that employees at the firm did not tend to hold information back, but they felt broadly motivated to share knowledge and - by doing so - developed their personal competencies as KWs. The researcher of this study felt encouraged to pursue and further develop a similar approach at ABC, as outlined in the following sections.

6.2.3.4 The MCB Project

The PAR-cycle team convened on 11th May 2017 for the second meeting of the third cycle. As agreed among the work group before, focus of this session was on three aspects:

1. Finalising the format of the two newly developed tools, the Fact Sheet and the Checklist.
2. Applying the AFRD-process within a new customer project for media company MCB in Cologne, Germany.
3. Testing if the process worked not only for two individuals (as demonstrated before), but also for small groups.

The participants decided that the finalisation of the tools should be performed during the respective phases of the AFRD-process (Fact Sheet during Aggregating, Checklist during Reviewing).

6.2.3.4.1 Digitising Customer Service

ABC was hired by MCB in summer 2016 to help build a new consumer service vision and to define a differentiating online experience, as well as its underlying process landscape. The company was one of Germany's leading broadband providers at the time ABC consultants started to work on a number of different projects at the firm. Internet access, television content and telephone services were among the product portfolio. MCB's senior leadership team aimed to specifically innovate in the area of digital services offered to existing private customers (consumers). E-commerce pure

players, such as Amazon or Ebay, were considered leaders in online customer services, and MCB decided to offer similar features on the Internet, in particular:

1. Online dashboards, for consumers to manage their account and their subscription scheme with MCB on their own.
2. “One-stop Customer Service”, defined as an omnichannel solution offering consumers access to any help or information they would require. Consumers would be able to access services online, via mobile devices, or via a telephone hotline, in the future.

MCB’s major plan was to utilise online capabilities to lower costs in the firm’s customer service unit. According to an internal benchmarking report, the broadband provider was lagging behind its main competitors in terms of customer service efficiency and had not invested in modern digital capabilities over the last five years.

Four ABC consultants were initially engaged at MCB, and a technical due diligence of the firm’s existing process landscape was one of the first projects initiated by ABC, resulting in a technical capability roadmap, customer experience recommendations and newly defined processes prioritising digital, web-based solutions.

6.2.3.4.2 The AFRD-process at MCB

The PAR-cycle team discussed and agreed that CE, who had taken on overall responsibility for the MCB project, as well as BX and NK, would apply the AFRD-process to perform KT practices over a period of two to three weeks. During this period, BX and NK were to be introduced into the project

as new consultants. They had to acquaint themselves with the process-related due diligence work that had been performed in the past, and - after applying the newly developed KT process - should be in a position to take on responsibility for the definition of web-based features at MCB. This work was key to the client's business targets, and BX and NK had to explore the complexity of future services in a relatively short period of time.

By choosing the set-up of three consultants, the work group specifically intended to understand if the AFRD-process would work for a small team of employees at ABC. This had not been tested before but reflected a typical scenario at the KIF. Clients often hired specialist teams that grew over time in terms of individuals involved, depending on the complexity of a project. The subsequent description and the interpretation of the KT process within the MCB project does not comprise of a detailed outline as in the prior FNC case. Focus will rather be on the key changes and results achieved, as well as on feedback and potential change recommendations provided by the participants.

6.2.3.4.2.1 Aggregating and Fact Sheet Development

CE, BX and NK commenced the Aggregating phase of the AFRD-process by gathering the key process-related topics of the MCB project. Also, they agreed to create the Fact Sheet, which was still to be developed in terms of its final format and content. The researcher assumed the role of Organiser of KT as in the previous cycle sessions. The remaining participants mainly witnessed the progress of knowledge transfer between their colleagues. They specifically contributed to discussions on change options within ABC, though. The results of those discussions are delineated in the following.

6.2.3.4.2.1.1 Documentation and Tools

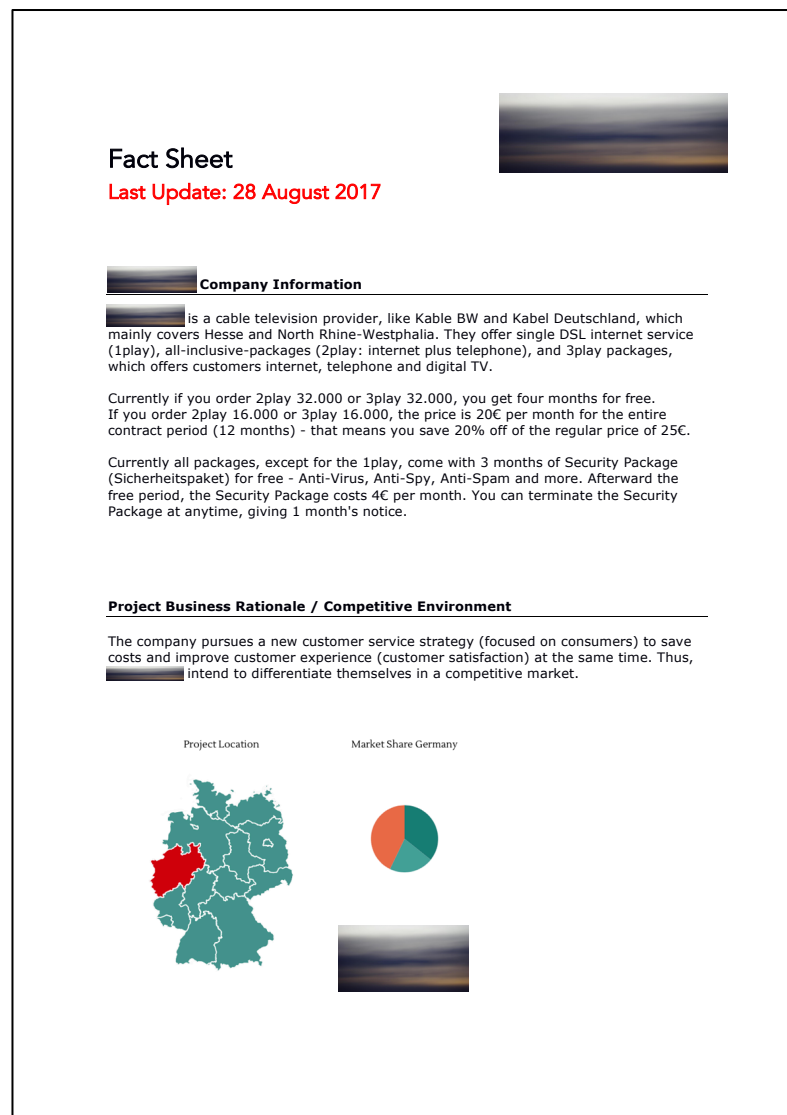
CE initially explained MCB's business rationale for establishing a new customer service vision (cost efficiencies and consumer satisfaction) as BX and NK, who had no professional experience related to broadband providers, specifically asked for the underlying KPIs of the project. The two consultants strived to understand the pursued impact of the new consumer-focussed strategy in detail before working on the firm's future service and process landscape. MCB in particular aimed to lower costs in customer operations by at least 20% and wanted to improve customer satisfaction, measured by employing the indicator Net Promotor Score (NPS). NPS measures the likelihood of customers to recommend a company, product or service to a friend or colleague.

At this point of the session, the work group reverted back to the previously discussed Fact Sheet as a tool, and its concept (Section 6.2.3.1). The researcher underscored that the document should provide a concise overview of key client information if available, competitors and on the business rationale. The participants then sketched first versions of the Fact Sheet on a whiteboard in the firm's DTL, gathered company data and information on MCB and defined the business rationale in the document. Figure 34 presents the original Fact Sheet for the MCB project as developed during the KT process and stored in ABC's company Dropbox. A version of the document in its original form has been added to the Appendices (Appendix T).

CE, BX and NK agreed to prioritise the 23 process-related topics they had gathered in the first part of the session, within the subsequent Featuring phase (following the process defined in the conceptual framework of this thesis). As no KT process had been performed for the MCB project before, neither a Handbook nor a Quick Guide was available at the beginning of the

Aggregating activities. Hence, the three participants decided to work on the Quick Guide and the Handbook within the next Featuring stage.

Figure 34: MCB Fact Sheet (anonymised)



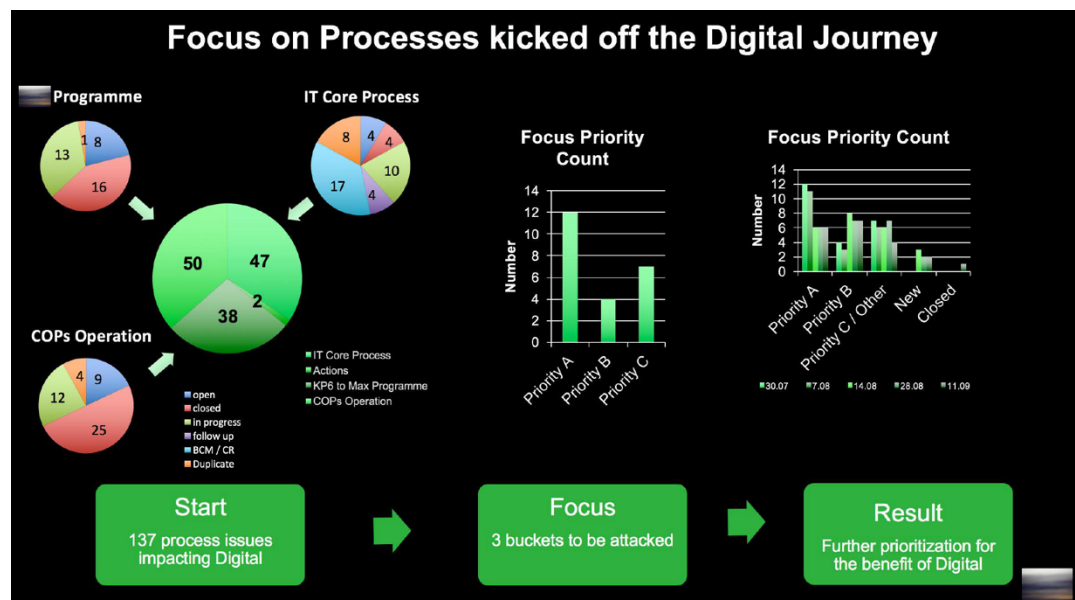
(Source: ABC, 2017c)

6.2.3.4.2.2 Second Phase: Featuring

Before CE, BX and NK commenced Featuring activities, the researcher asked the PAR-cycle team to review the previous Aggregating phase and to reflect on its duration of almost 120 minutes. As delineated in Section 6.2.1.8.1, the participants had realised a need to expedite the entire process of knowledge transfer, and the researcher questioned if the team had achieved progress in this respect. CE, BX and NK argued that the development of the Fact Sheet took longer than expected, mainly because its format had to be created first. Within future KT processes, populating the tool would require less time. In general, the work team considered the two hours needed to achieve results acceptable, taking the complexity of the project into account.

BX proposed to focus on the visualisation of content for the MCB project as often as possible, supporting and potentially accelerating the AFRD-process, going forward. He considered previous recommendations from the PAR-cycle team to accentuate multimedia content (Section 6.2.1.9), and BX specifically considered the data and information on processes as a foundation for graphics. All participants agreed. In the course of the session, CE decided to work on a visualisation of the process topic together with BX and NK. The three consultants used Microsoft Powerpoint software to present a detailed client process landscape in five different charts. Figure 35 presents an overview page which was made part of the Handbook for the MCB project, later on. The slide visualises the number of processes used across the company, i.e. in a separate project called “LMX Programme” (anonymised), within IT, or Customer Operations (COPs). Furthermore, a prioritisation of processes is shown and how this prioritisation changed over time within the course of the project.

Figure 35: Process Chart for MCB Project (anonymised)



(Source: ABC, 2017d)

The PAR-cycle team considered the visualisation approach useful and reiterated the need for well-prepared content to help progress KT at the company.

6.2.3.4.2.2.1 Depth of Documentation

It can be argued that the depth of documentation pursued by the work group at ABC significantly differentiates the newly developed KT approach from the frameworks and models scrutinised in the literature review of this thesis. The AFRD-process requires detailed and time-consuming documentation work leading to material that guides KT processes. This method goes beyond proposals from von Krogh, Ichijo and Nonaka (2000) to create maps of

expertise, or Orna's (1999) approach of establishing information policies governing information exchange within a corporation. The PAR-cycle team at ABC preferred detailed documentation of projects along a clearly structured process to enable KT at the firm. Before initiating this research study, the researcher had not expected that employees were willing to invest time and involve themselves in potentially long-winded practices to achieve optimal KT.

6.2.3.4.2.3 Next Steps

CE, BX and NK, after around three hours into the Featuring phase, decided to prepare the Handbook and the Quick Guide for the MCB project over the following five working days. The consultants agreed on two meeting dates (23rd May and 29th May 2017) and aimed to communicate among each other using the web-based service Skype, because they were assigned to project work at different locations. The PAR-cycle team agreed to meet again on 1st June to enter the Reviewing stage. The key tasks for the session comprised an assessment of the quality of the documentation, and the creation of the last tool complementing the AFRD-process, the Checklist.

6.2.3.4.2.4 Reviewing and Checklist Development

The Reviewing stage within the AFRD-process is about assessing if successful KT is happening, or if adaptations to the process have to be made. Usually, more elaborated documentation is produced in this phase (Section 2.7). When convening for the Reviewing session, the PAR-cycle team first focussed on the three tools that had been populated with content by the three consultants CE, BX, and NK: the MCB Fact Sheet, the Quick Guide, and the Handbook. The first page and the table of contents of the latter two original project documents have been added to the Appendices (Appendices U; V).

The researcher asked the consultants to report on their impression of the AFRD-process so far, if they thought that knowledge had been transferred and if the process should be improved, i.e. adapted to certain needs, or accelerated. Broadly, CE, BX, and NK gave positive feedback on the process and the complementing tools, and their main comments can be summarised as follows:

1. Working in a small team of three consultants was successful, and developing the content together with CE gave BX and NK the opportunity to acquaint themselves with data and information on business processes at MCB in an interactive manner.
2. New knowledge was generated within the process, and KT was happening between CE, BX and NK. The latter two consultants, being phased into the MCB project, were motivated to enter the Doing phase of the AFRD-process, applying their newly gained knowledge.
3. The consultants specifically considered their two web-based meetings via the Internet service Skype effective. Both meetings lasted for about an hour, and in these sessions the team agreed on the content required for the documents, and on the process of populating the tools. Also, the participants clarified questions related to specific business processes and their rationale, end-customer feedback on existing processes in customer operations, or KPIs MCB was pursuing.

The researcher had not expected that the consultants would consider working via Skype as helpful to progress KT activities. It can be argued that this feedback of the work group reflects the agile character of the AFRD-

process, i.e. its adaptiveness to different work or business environments. This aspect is rooted in the underlying Scrum-related practices, as outlined before. Scrum has an agile and adaptive approach at its core, i.e. it comprises of procedures ready to respond to fast changing environments (Section 2.6.1).

6.2.3.4.2.4.1 The Project Checklist

Before entering the Doing phase, the PAR-cycle team aimed to develop and test the Checklist as a potential further tool supporting knowledge transfer at ABC. In the course of their KT practices, CE, BX, and NK had performed a number of tasks related to the MCB project that were unique to internal client tools, or were resulting from applying the AFRD-process within the project. NK, a process specialist, hence picked up the prior discussion on the Checklist which was meant to provide an overview of the thematical bandwidth of a project and was considered helpful specifically in the Reviewing phase (Section 6.2.2.3.2), e.g. to help probe if key processes had been covered and crucial knowledge had been transferred. NK encouraged the entire team to create a first version of an MCB Checklist which was further optimised in the course of a discussion lasting around two hours. The young consultant MX volunteered to work on a first version, taking various inputs from the participants into account.

Figure 36 presents the first page of the original Checklist comprising of four pages. This document was employed within the KT process. A version in its original form has been added to the Appendices (Appendix W). CE, BX, and NK considered the document helpful, specifically because it summarised processes employed within the project management activities. The document presented in Figure 36 in particular explains how consultants could trigger projects at MCB on behalf of the client. This was important for BX and

NK as they were to define web-based features for the broadband provider, as agreed when the Aggregating phase commenced (Section 6.2.3.4.2.1). To perform their tasks, they had to initiate projects within the proprietary project management tool of the client.

Figure 36: First Page of MCB Checklist (anonymised)

CHECKLIST

Project Management System

Practice/Process Title	Create and write a project concept within <div>Project Management System</div>
Description	The page provides an overview of how to generate project concepts at <div>. The bottom of the page provides a process chart.</div>
Environment	<div><input type="checkbox"/> Intern</div> <div><input checked="" type="checkbox"/> Client</div>
Classification	<div><input checked="" type="checkbox"/> Content</div> <div><input type="checkbox"/> Organisational</div>

Checkpoints:

☐ Gather information from key stakeholders

☐ Structure the information with a focus on deliverables in the system templates

☐ Align with the Project Owner on

side via the Project Management System (templates provides buttons to contact project creator)

☐ Adjust in the case of feedback

☐ Sign off and send to Project Owner on

side. PO finally signing off and releasing budget

Process Flow:

Gather Information

Structure

Align with PO

Adjustments

Sign off and send to PO

Sign Off

(Source: ABC, 2017g)

6.2.3.4.2.4.2 The Four Tools

The researcher, at this point in time, asked the work group to provide an overview of all the tools and contents developed for the MCB project, and on how those would help transfer knowledge. The following list summarises the outcome of a discussion lasting for around 45 minutes:

1. Fact Sheet: Overview of client's business and competitive landscape, project KPIs and business rationale. Helps understand project vision and targets better and thus supports to prioritise knowledge components (data and information). Triggers interaction early in the KT process.
2. Quick Guide: Concise summary of the project status quo, the scope of work performed (and still to be performed), and individuals' responsibilities within the project. Thus, structuring areas of knowledge.
3. Handbook: Providing deep insight into areas of knowledge prioritised within the KT process, detailed presentation of data and information exploiting multimedia content. Providing bandwidth of knowledge to be shared and transferred.
4. Checklist: Summary of key practices and processes required to manage internal ABC- and client tools to access and publish information, manage projects and follow internal client approval procedures. Describing and/or visualising key practices to achieve KT.

BX and NK, after the team's discussion, felt comfortable to take on responsibility within the MCB project. The PAR-cycle team decided that CE should introduce the two consultants at MCB within the next two to three

days, and Friday, 23rd June 2017, was agreed as meeting date for the final PAR-cycle meeting (Section 6.2.4).

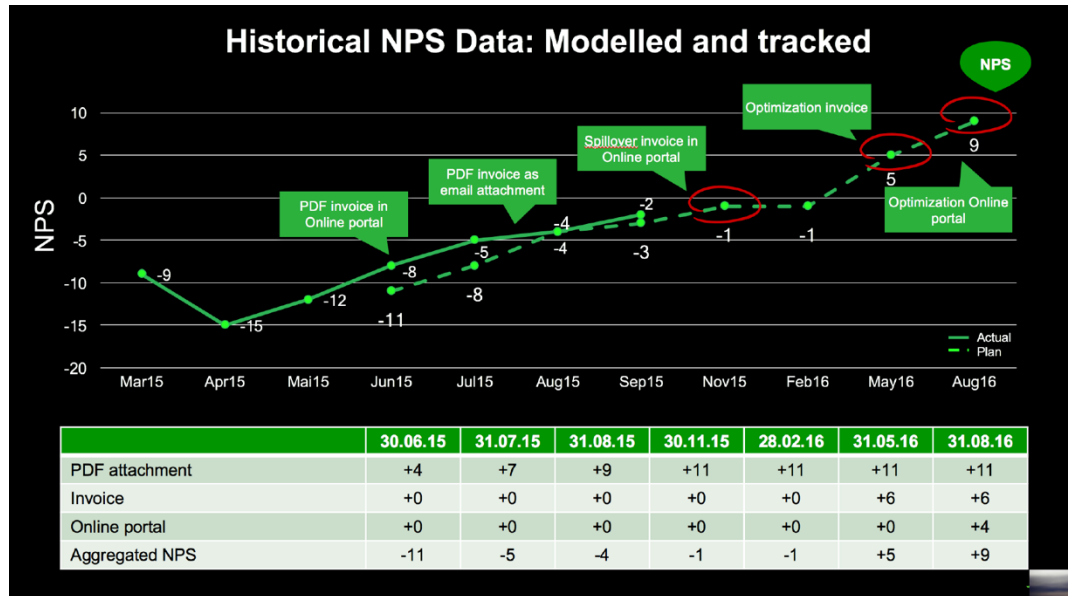
6.2.3.4.2.5 Fourth Phase: Doing

In the course of the week of Monday, 5th June 2017, CE introduced BX and NK as new project managers at MCB, focusing on the development of new web-based features in the area of COPs. Also, they were asked to look at the performance of existing features and their NPS (Section 6.2.3.4.2.1.1). Both BX and NK considered themselves well prepared for the tasks at hand. The consultants picked up their project-related work, performed a process due-diligence in the area of COPs, and they helped optimise an NPS measurement system monitoring customer feedback on existing products. One of BX's and NK's tasks was to generate a historical view of NPS data gathered for consumer-related products, such as:

- Attachments to emails in the software format *Adobe pdf*. This format was e.g. used for official digital communication MCB sent out to consumers
- Digital invoices
- The company's online portal where consumers could administer their account.

Figure 37 presents an official overview slide which BX and NK helped deliver during their assignment. For the first time, the client was provided an analysis of consumer feedback on the quality of three key digital products, measured over a significant period of time (18 months).

Figure 37: NPS Development at MCB (anonymised)



(Source: ABC, 2017h)

This documentation was to help the company make decisions with regards to its digital product strategy. For BX and NK, the analysis provided a starting point of strategic product recommendations which ABC made in the months to follow.

6.2.3.4.2.5.1 Further Improvements

Two weeks after BX and NK had been introduced as new consultants at MCB, the researcher set up a phone call with the two employees and asked for their experience at the company. Similar to MX within the FNC project (Section 6.2.1.4.1), the two consultants gave positive feedback on the AFRD-process and stated that it had helped them prepare for the agreed tasks

within the client project. BX and NK also gave input related to further improvements. These can be summarised as follows:

1. ABC employees should aim to further expedite the AFRD-process. Using the web-based communication channel Skype, e.g., enabled focussed communication across consultants at different locations and substituted meetings in the company's DTL which required time-consuming planning efforts.

2. The tools represent helpful documentation to enable KT, but using them on mobile devices (specifically, on smartphones) to display their content should be improved.

In an email message to the attendants of the PAR-cycles, two days ahead of the fourth and final session, the researcher proposed to discuss further optimisations of the AFRD-process and the tools. The team agreed.

6.2.4 Cycle 4: Commercial Utilisation

The final PAR-cycle on June 23rd 2017 in ABC's digital transformation lab was laid out in the form of a discussion round, led by the researcher of this study. The team proposed to focus on optimisations of the AFRD approach and on a potential commercial utilisation of the findings so far. The following topics were investigated in a three-hour meeting:

1. Technical solutions to enable the AFRD-process within an application for mobile devices, incorporating multiple (multimedia) content sources - thus

streamlining the process and further expediting KT between consultants at ABC.

2. Blueprint for a future commercial offering in the market of so-called *productivity applications*, helping users organise communication or planning processes on mobile devices.

3. Features reflecting and promoting the ABC Berries approach (Section 6.2.3.3.2) within the software application to be developed, such as a ranking of the most active consultants.

6.2.4.1 Platform, Application, and Motivation

The three previous cycle meetings had revealed the work group's intent to streamline the AFRD-process and to accelerate KT between individuals. This approach became apparent in the following decisions:

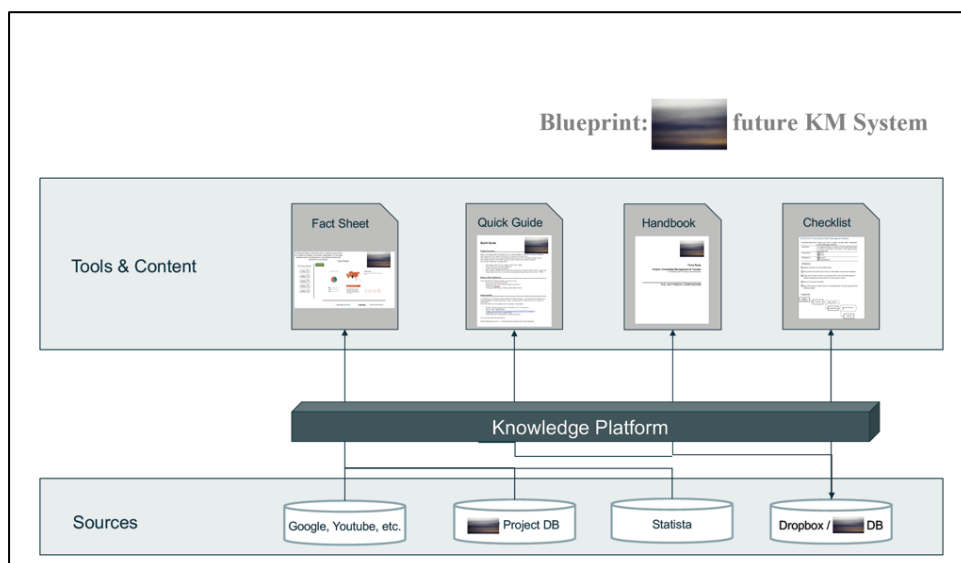
1. Daily Scrum meetings to help support personal interaction were not pursued, resulting in less complexity in the overall KT process.

2. Documentation developed towards concise general overviews, reflected by the following tools: Fact Sheet, Quick Guide, and Checklist.

3. Communication via the web-based service Skype was used to substitute in-person meetings which were difficult to organise because the consultants frequently worked from different locations and could not convene as a team.

Mainly for the before-mentioned reasons, the PAR-cycle team intended to develop a software platform as ABC's new KM system, utilising mobile devices to enable KT across the firm - and enabling employees to connect with each other, independent from their local availability. Figure 38 presents a first blueprint of ABC's future KM system. The work group aimed to create a software platform, termed *Knowledge Platform* (Figure 38, centre), pulling data and information from various sources on the Internet, such as search engine Google, video-service Youtube, research platform Statista, or internal project data bases, to specifically provide content for Fact Sheets.

Figure 38: ABC KM Platform Blueprint



(Source: Author's editing)

The other tools were to be connected through the Knowledge Platform with the company's Dropbox to automate document storage, and to pull documents for further content development.

A software application on top of the platform, incorporating tools and content, would provide a user-frontend and access to different features. The young consultant BX reminded the team of the planned ABC Berries initiative, and he proposed to introduce a feature ranking the most active KT contributors within ABC's system which might spur the motivation of employees to share and transfer knowledge. Such an approach has been applied in a number of companies across different industries and has been termed *gamification*. The term represents the idea to use elements of game design (e.g., rewards such as rankings, points, or badges) in non-game contexts to achieve desired behaviours. Gamification can be executed poorly though, for example if it tries to "manipulate users into doing things they don't want to do" (Paharia, 2012, p. 17). It can be argued that motivation to share and transfer knowledge will then be stifled.

Independent from an approach of engaging employees via gamification, the team realised that developing a feature-rich KM system would require months of planning, funding and development. The general view of the participants was that the company should assess benefits of the Knowledge Platform, define use cases and test if the system could even be offered to a wider audience through web-based application stores for the leading computer and smartphone operating systems, Windows, iOS, and Android. The employees contended that the solution might successfully compete with similar commercial mobile services, such as Slack, or Trello.

As outlined before, Pousttchi et al. (2003) described how mobile technology can facilitate knowledge sharing and thus support KT. But at this point in time it was unclear to the researcher which measurable impact a newly developed

Knowledge Platform would have on the change activities within ABC. Also, the company had not planned to extend its business model (consulting services) and offer software applications to customers. In the first place though, the development of a software system was not in the centre of this study. This point was openly discussed among the participants, and the work group agreed that a software project should be pursued further but was not an immediate requirement to optimise KT activities within the firm.

6.2.5 First Results

After completion of the fourth PAR-cycle, the researcher collected client feedback from MCB, and from ABC's HR manager GC who had been asked to develop the ABC Berries initiative in close cooperation with the firm's employees, as agreed in the course of the third PAR-cycle (Section 6.2.3.3.2). Furthermore, the researcher communicated ABC's approach to KT at a company meeting on 11 August 2017 and monitored developments between mid-August and the beginning of September 2017 at the firm. Key results and findings are summarised in the following.

6.2.5.1 MCB Feedback

Two weeks after BX and NK had been introduced as new project managers, the researcher reached out to HT (anonymised), MCB's Senior Vice President of Customer Operations. HT had hired ABC to help and support her team within the company's digitisation programme and was aware of BX's and NK's tasks within a number of different projects. In a phone call with the researcher, HT valued the work of the two ABC consultants and noted that she didn't have the impression the consultants needed a significant period of time to acquaint themselves with the tasks at hand. From

her perspective, the individuals were prepared to immediately take on responsibility at MCB.

The client's assessment was similar to the positive feedback the researcher was provided at FNC, for MX's work within her specific project (Section 6.2.1.8.2). It can be argued that the AFRD-process - in both client cases - helped the employees prepare for their tasks, KT was happening, and value on the side of the client was created. Most importantly for ABC, no time-consuming phase-in-stages were witnessed or reported. Unsuccessful phase-in periods were among the key issues of ABC when this research project was initiated at the firm (Sections 1.4.1; 6.2.1.4).

The researcher shared the clients' feedback with all participants of the PAR-cycle meetings in a final discussion round on the status quo of the AFRD-framework development (Section 6.2.5.4.). Before that meeting, the researcher scrutinised employee feedback on the ABC Berries approach (Section 6.2.5.2), and he conducted a company meeting to communicate change initiatives related to KT and individual development opportunities at the firm.

6.2.5.2 ABC Berries

Between the beginning of June and end of July 2017, ABC's HR manager GC had run interviews concerning ABC Berries with eleven out of the thirteen employees at the firm (i.e., except for the two board members, the researcher included, who were supportive), asking for their view on the Berries initiative. In an in-person meeting with the researcher on 28th July 2017, GC reported back to the researcher that the employees were in favour of ABC Berries and she presented the following list of development opportunities the ABC consultants were mainly looking for:

1. Educational courses on next-generation Internet technology, such as Internet of Things (IoT).
2. Courses and certifications related to agile project management.
3. Degrees offered by Online platforms such as Coursera, or Udacity, providing software coding knowledge (so called *Nanodegrees*).

The researcher shared this list with all participants of the PAR-cycles via email, and the team suggested to report on the list at a company meeting, as outlined in the subsequent section.

6.2.5.3 Change in Action

On Friday, 11th August 2017, ABC's employees convened for the company's usual summer get-together. Ten of the firm's 13 employees attended the meeting, the remaining consultants were involved in client activities or were on vacation. After an overview of the firm's performance over the year, the researcher and ABC board member unveiled the firm's intent to create a culture of knowledge sharing and promoted the ABC Berries approach. VG, CE, BX, and NK were presented as the consultants to drive the KT initiative within the company (termed *AFRD NOW!*), i.e. explain it in internal educational meetings and help individuals to learn apply the approach.

With regards to ABC Berries, employees were asked to raise their development needs by approaching HR, and their senior managers. The researcher specifically referred to the consultants' development proposals as discussed with the HR manager before. Employee feedback at the meeting

was generally positive, and individual development opportunities and career paths were discussed in separate meetings.

In the three weeks following the company's get-together, the researcher noted a number of developments at the company:

1. Five individual educational sessions for consultants willing to understand and learn to apply the process were performed.

2. Three AFRD-workshops preparing consultants for client project work were conducted.

3. Four employees approached HR and their senior managers to book development programmes within the ABC Berries approach.

4. A new ABC customer, machine engineering company GHI, decided to test the AFRD approach after the researcher had described the internal change activities related to KT at ABC. AFRD NOW! was explained to the board of GHI on 4th 2017 September by the researcher. Following the meeting, preparations to test the AFRD-process and scrutinise the AFRD-framework were initiated, such as a first discussion with the firm's Chief Digital Officer on the foundation and potential benefits of the approach. Further details will be provided in the subsequent Chapter 7.

6.2.5.3.1 Power Issues, Confirmation Bias and Groupthink

In the course of the third PAR-cycle the team dynamics developed further, and from the researcher's perspective the work group entered a stage termed Adjourning by Tuckman and Jensen (1977): the participants had completed the tasks defined, and they felt good about their results (Section

6.2.1.3). Transferred to the concrete situation at ABC, the PAR-cycle team approached a version of the newly developed AFRD-framework they considered comprehensive and helpful to achieve optimal KT. Furthermore, the consultants outlined future innovation scenarios with respect to KT at the firm, such as mobile applications available across different devices (e.g., smartphones or iPads) to expedite processes (Section 6.2.3.1.1). Those aspects were pursued further within the fourth PAR-cycle.

During the third cycle, the researcher concluded that the work group had developed a results-oriented critical and constructive assessment of potential changes at the company. Specifically, the AFRD-process was scrutinised, and the work group was looking for more evidence if the process could be extended from a one-to-one KT-situation, as performed in the first and second cycle, to small teams (Section 6.2.3.2). With regards to the motivational aspects to KT, the work group furthermore realised that it could only speak for itself when proposing the *ABC Berries* programme to award individuals involved in certain KT initiatives; hence, the participants decided to have the firm's HR manager reach out to all individuals and ask for their feedback, as a next step (Section 6.2.3.3.2).

It can be argued that the aforementioned team dynamics of critical, constructive progression to explore change was not significantly impacted by factors such as confirmation bias or groupthink. On the contrary, the team had become particularly critical and self-reflexive by constantly reviewing results and looking for feedback from the remaining employees of the firm. To help avoid impact on the objectivity of the work team's findings in the course of the third cycle, the researcher decided on additional measures during the second cycle-meeting, as outlined in the following.

6.2.5.3.1.1 Team Change and Proxy Subject

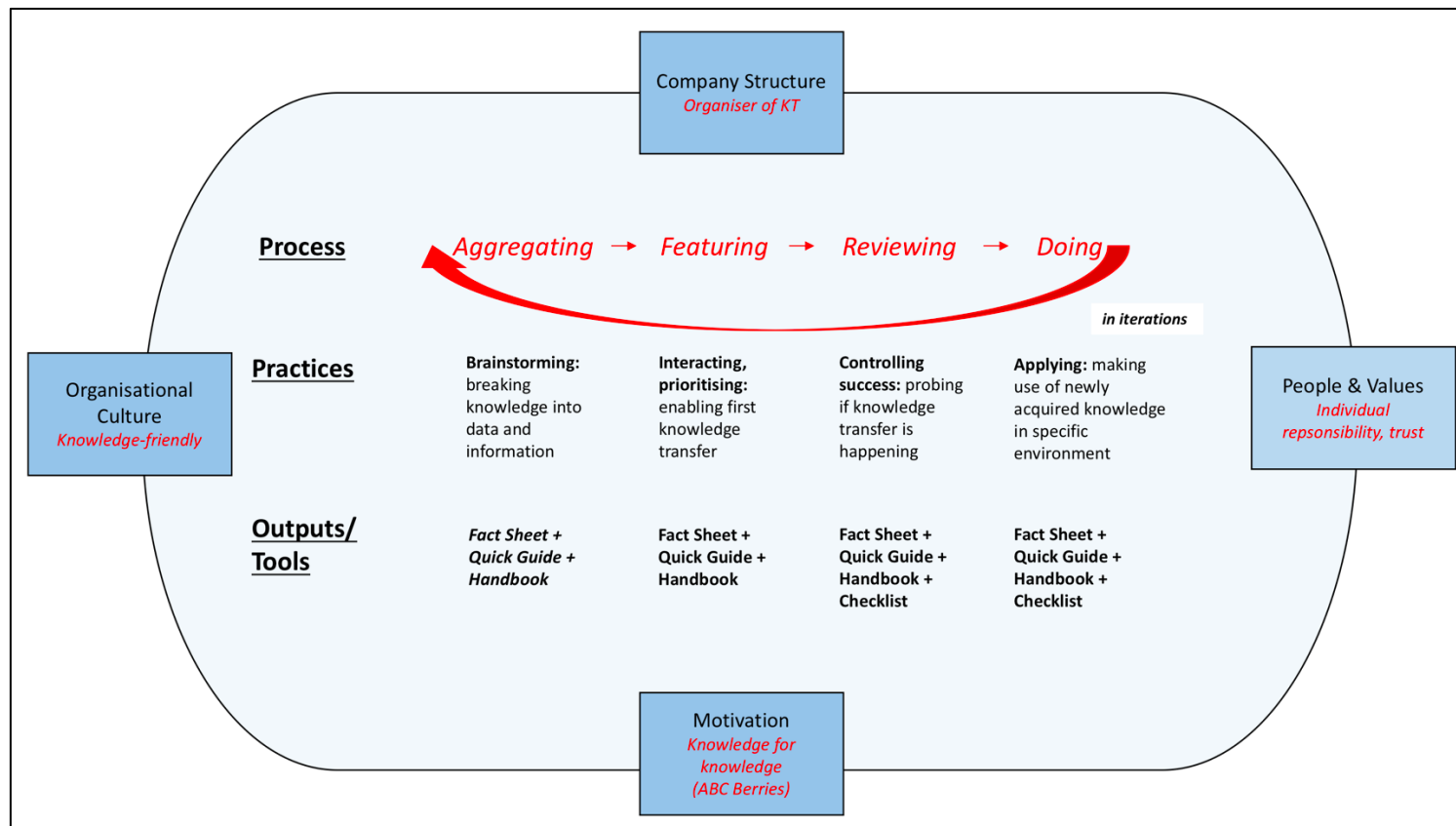
When the second meeting commenced on 11 May 2017 (Section 6.2.3.4), the researcher proposed to have a different team of participants apply the newly developed AFRD-process within a client project at media company MCB. The work group agreed on the approach, and CE, BX, and NK started the Aggregating phase. The researcher's intent was to collect new, and potentially disparate, perspectives from participants who had not yet applied the process in the course of the PAR-Cycles. By applying this approach, the potential influence from confirmation bias or groupthink was to be addressed. During the project at MCB, the consultants CE, BX, and NK gave positive feedback on the usability of the process steps and that they had helped them prepare for the agreed tasks, but they also critically reviewed the AFRD-approach and recommended several improvements (Section 6.2.3.4.2.5.1). For the researcher, the participants' feedback provided further indication that the AFRD-approach was beneficial to ABC's employees, the company itself, and potentially the client as well. The researcher then collected the client's feedback during a phone call to HT (anonymised), MCB's Senior Vice President of Customer Operations, who had hired ABC for the project. Such as within the project at client FCB (Section 6.2.1.8.3.1), HT was considered a proxy subject to reflect on the possible influence of social desirability (Section 3.7.2.2.3). As outlined before, HT valued the consultants' work, and her view of the individuals' performance was in line with their own perceptions. Hence, the researcher decided to progress with the work group meetings and to not reflect on potential impacts on the research findings further at that point in time.

6.2.5.4 AFRD-Framework Development

The PAR-cycle team convened again on Friday, 1st September 2017, for a further discussion session on the AFRD-framework. The participants took the change results achieved in the third cycle into account, reviewed recent developments related to KT at the firm - and further developed the visualisation of the AFRD-Framework. Figure 39 presents the final version the work group agreed upon, and the following additions were made since the completion of PAR-cycle #2:

1. The team added a text field ("in iterations") to the process level of the chart, such as in the process key visual (Figure 33), to underscore the iterative character of the process which was to be applied as often as required to achieve successful KT.
2. All four newly developed tools are now presented in the Outputs/Tools level of the chart. If a KT process is started from the ground up, no documents are yet available in the Aggregating phase and need to be created first. For this reason, the terms are shown in italics. When the AFRD-process is started and progresses, the Checklist will be most helpful in the Reviewing and Doing stages. To reduce complexity in the chart, the Checklist is only shown for those two phases. To clarify: If a process has more than one iteration, Checklists will be available, for example, for a renewed Aggregating phase and may be used for the phases to follow as well. The participants of the process will have to decide if they consider the existing Checklist helpful.
3. The motivational component (ABC Berries) was added and termed "Knowledge for knowledge".

Figure 39: AFRD-Framework



(Source: Author's editing)

The PAR-cycle team was satisfied with the progress achieved over a period of ten months within the company. The participants considered the framework bespoke to ABC's needs related to KT and highlighted that it would have to remain adaptive to ever-changing requirements in the area of digital transformation consulting, the market ABC was operating in.

6.3 Triangulation

As outlined in the previous sections of this chapter, the four PAR-cycles revealed key issues of ABC with respect to KT, when the research study at the company commenced:

- No formalised Processes
- Unclear responsibility with regards to KT
- Issues and opportunities related to trust (in people and processes), and individual motivation to contribute to KT
- Structural challenges, such as the role of an organiser of KT
- Need for a framework of KT (covering overall company culture, IT, and specific processes).

Those aspects confirm the key themes that became apparent within the documentary analysis and in the course of the researcher's observations at the company (Section 5.2.4.1 - Section 5.2.4.3), as well as during the open-ended interviews with the participants (Section 5.3.6).

From a triangulation standpoint, the following can be argued:

1. The analysis of data collected with the help of the different methods employed, consistently confirms the barriers to KT that existed when the research study commenced.
2. The major findings of this inquiry, the AFRD-framework and its underlying AFRD-process, address key results from the documentary analysis, observations and the open-ended interviews, as depicted in the previous sections on triangulation (Sections 5.2.4.3; 5.3.6). Specifically, this sixth chapter reveals the importance of organisational culture which Schein (2010) described as a crucial factor impacting a firm's strategy in the marketplace (Section 5.3.2.1). Organisational culture became apparent as a key theme in the participant interviews, and is shown as an instrumental component of the AFRD-framework (Figure 39).

Other findings resulting from the PAR-cycles go beyond the assessments inferred from documentary analysis, observations, and interviews: the team dynamics emerging from the Scrum-based process of individual interaction is unique to this study on KT, and it could not be found in the scientific literature analysed in the in-depth literature review (Chapter 2). The work group developed a specific results-oriented critical and constructive approach to potential changes at the company, which will be further discussed with respect to this study's contribution to knowledge in Chapter 8.

6.4 Conclusion to Chapter 6

The key learning points of the sixth chapter are as follows:

1. Four PAR-cycles on KT development at ABC conducted, analysed and interpreted.
2. AFRD-process of knowledge transfer defined, building upon and developing Scrum management and control practices to achieve optimal KT at ABC.
3. Aspects of validity and reliability of the research to be further explored and discussed (Chapter 7).

CHAPTER 7: TRUSTWORTHINESS OF THE STUDY

7.1. Introduction and Format of Chapter

As outlined in Chapter 4, the following criteria were applied to assess the quality of the findings of this inquiry: *credibility, dependability, transferability, and confirmability*. Guba (1981) described this approach as an examination of the *trustworthiness* of a research study. As outlined in Section 4.7, the author of this thesis aimed to follow a clearly defined process per criterion to specifically ensure and probe the validity and reliability of this study. The subsequent analysis is focussed on deviations from the initially planned approach (Chapter 4), i.e. on participant-feedback requiring modifications or further explanations related to the material gathered.

7.2. Credibility

Member validation was at the core of considering the credibility, or validity, of this research study. During a two-hour presentation session in the company's DTL on Friday, 29th September 2017, the researcher provided the PAR-cycle team with the following handouts (all sources referred to within the documents were anonymised):

- Data analysis templates of this inquiry (Appendices D - H)
- Data sheet per PAR-cycle (Appendix O: exemplary data sheet for PAR-cycle #1)
- Visualisation of the AFRD-framework (Figure 39).

The participants were also given handouts which the inquirer used to guide the discussion concerning feedback on the overall accuracy and quality of the data, and the visualisation of the AFRD-framework (Appendix X).

At the beginning of September 2017, the researcher had already sent interview-transcripts to the employees, including the related content from the anonymised coding sheets of this study (Appendices K; L). The material was transmitted within individual messages via the in-house email-system. (Appendix Y presents an exemplary email addressed to participant CE.) Within ten working days, all consultants approved the material by sending response emails back to the researcher. BX, in his answer, also referred to the AFRD-framework's potential future development steps, as pointed out in the following (Appendix Z).

In the course of the discussion session, the researcher specifically explained the newly developed framework, including its underlying process, and contended its agile character, i.e. that it had to be understood as interactive and adaptive. The PAR-cycle team agreed on this key aspect of the study, and in particular on the way the research results were achieved. The employees provided no detailed comments on the data and information discussed during the presentation session, and generally described the material as an acceptable summary and description of the research. However, after the session, participant CE approached the researcher and expressed her conviction that "the study results were documented in a very good and accurate way" (participant CE, personal communication, September 29, 2017).

In the course of the conversation, the PAR-cycle team discussed the future communication of the AFRD-framework within the firm: a comprehensive document, comprising exemplary populated tools (Fact Sheet, Quick Guide, Handbook, and Checklist), was to be handed out to all employees at ABC.

Thus, all consultants were to be supported to acquaint themselves with the KT approach.

Furthermore, the young consultant BX, who had mentioned in his email that he wanted to discuss “mobile applications” (Appendix Z), underscored during the team discussion that he saw significant potential for the AFRD-framework to evolve towards a successful productivity application for smartphones (Section 6.2.4). The researcher, at this point of the discussion, expressed that he valued the participants’ input, but asked to close the meeting as future development and innovation aspects concerning the AFRD-framework did not directly relate to the validity of this inquiry - other than reflecting the employees’ support of its key findings. The team unanimously agreed on the decision.

The aim of the member validation was to achieve agreement on the research process and its outcome among the participants - which was the case. The firm’s communication activities to support the framework will be further considered in Chapter 8 (Conclusion & Implications) of this thesis.

7.3 Dependability

Within this research, a number of steps and procedures were chosen to generally allow for a replication of the study. Thus, the foundation to dependability, or reliability, of the inquiry was established.

7.3.1 External Audit

As a first measure, an external audit related to the research process and its outcome was conducted. The audit comprised of the following two stages over a period of two weeks:

1. On Monday, 25th September 2017, an expert panel from Fresenius University of Applied Sciences in Munich, Germany, was provided all the material associated with the collection, analysis and interpretation of data (data analysis templates, coding sheets, data sheets) and were asked to review it (Section 4.1). For confidentiality reasons, any identifying information had been removed. The review allowed the participants to act as auditors, specifically probing if the researcher's methods and interpretations were dependable from their perspective (Thyer, 2001).

The university team, led by KM- and KT-practitioner and lecturer Daniel Helbig, comprised of ten selected students. They were experienced in generating new knowledge across small work groups as part of their education programme. The students were specifically experienced in business-related topics, such as marketing operations and governance structures. Process-related areas - such as value proposition design - were in focus of their current curriculum.

2. On Wednesday, 4th October 2017, the researcher presented the AFRD-framework to the university team within a two-hour session in ABC's DTL. Lecturer Daniel Helbig and his team asked detailed questions, mainly related to the PAR-cycle approach and the Scrum management and control practices employed. The team could thus verify if the researcher's procedures and conclusions could be considered reasonable.

Summarising the participants' feedback, it can be argued that the vast amount of material was assessed as reputable and replicable. The researcher was asked to provide minor explanations only, particularly related to the AFRD-process. This behaviour had been expected as the university team was admittedly aware of agile methods such as Scrum - but had not employed them within a KT process, before.

Overall, the researcher considered his analysis and interpretation of the findings dependable. As depicted in the preceding chapters, all stages of the research are described, explained and documented in detail in this thesis (Chapters 3 - 6), further enhancing the dependability of the inquiry as processes and decisions have been made transparent - and hence easier to reproduce for external auditors.

7.3.2 Applying the AFRD-process

Lecturer Helbig had prepared his team to potentially apply at least the initial stage of the AFRD-process during the meeting in October, if enough time was remaining after the researcher's presentation. As this was the case, all participants agreed to commence the Aggregating phase of the KT-process (Section 6.2.5.4; Fig. 39) and to decide on the way forward afterwards. The activities went beyond probing the research study's dependability and reflected the team's general interest in the proposed AFRD-framework and its underlying process. More detail is provided in the subsequent section on potential transferability of the research results to other business environments.

7.4 Transferability

As outlined in the methodology chapter, the inquiry is rooted in a participatory paradigm. This worldview allows for, and values, co-created findings and can be considered an extension of constructivism (Section 3.3.1.2.1.4). Constructivists, or interpretivists, critically debate transferability of qualitative research and argue that social phenomena need to be considered within their specific contexts; within different environments, they might lose their meaning (Remenyi, Williams, Money, & Swartz, 1998). Creswell (1998), for example, argues that a researcher should rather provide a "holistic picture"

(p. 15) enabling readers to take their own decisions related to the transferability of an inquiry. The rich documentation of processes, observations and findings within this thesis addresses Creswell's point. Also, the following approach supported the possible transferability of findings related to the AFRD-process and the newly developed framework:

1. The AFRD-process was introduced within a digitisation programme at ABC's client GHI. The machine engineering company decided to address the four anchors of the AFRD-framework (Figure 39): Company Structure, People & Values, Motivation, and Organisational Culture. ABC helped the firm achieve change in all those areas and commenced to establish the AFRD-process as the standard approach for KT, end of September 2017. In a personal conversation with the researcher on 28th September, GHI's Chief Digital Officer provided positive feedback on the usefulness and effectiveness of the process. This is a call for further research which will be required to assess the long-term impact of the AFRD-approach at the firm - the subsequent Chapter 8 elaborates on this point.

3. The university work group of lecturer Daniel Helbig (Section 7.3.1 - Section 7.3.2) scrutinised the AFRD-process. Knowledge related to a value proposition design process, which Daniel Helbig taught his students, was to be transferred between small work groups at the university. The first Aggregating phase started within the researcher's presentation meeting on 4th October 2017, and the team decided to employ the entire process over the following days. Five days after the meeting, Daniel Helbig, in a phone call with the researcher of this inquiry, gave positive feedback and reported that the work groups supported the AFRD-approach (process and wider

framework) and considered it useful to transfer knowledge between individuals or small groups.

In a final report on his team's work based on AFRD (excerpt provided as Appendix AA), the lecturer noted the following: "Albeit its artificial setup (...) the process worked effectively in transferring knowledge between the students. In comparison to the academic standard approach 'lecture and self-study' it was considered as *highly efficient*." (Helbig, 2017, p. 6.)

Based on the aforementioned practical experiences, it can be argued that the AFRD-process and the wider framework can be applied in different business environments to explore new KT-practices and their results. The researcher specifically considers the application of the AFRD-approach in different firms, and across different industries, as an area for further research studies that might hopefully provide evidence for its transferability.

7.5 Confirmability

A number of steps were taken to ensure that the findings of this inquiry reflect the experiences and inputs of the selected employees, rather than the prepossession of the researcher. The concrete measures to strengthen confirmability of this thesis are as follows:

1. The researcher, in the course of the PAR-cycles, took the role of an Organiser (Section 3.7.2.1). In this capacity, he enabled action-reflection iterations supported by all participants and took different views and ideas into consideration. For example, the depth of documentation with regards to the crucial four tools of the KT process (Fact Sheet, Quick Guide, Handbook, and Checklist) was inspired by the team's suggestions (Section 6.2.3.4.2.2.1). The researcher had initially assumed that less documentation, as usually to be witnessed within Scrum projects, was required.

2. The AFRD-framework and its inherent process were developed during PAR-cycles over a period of ten months. As specifically outlined in the previous Chapter 6, the entire work group at ABC defined the tenets of the framework within iterative cycles and developed and reviewed results together.

3. The political and ethical dimension of this inquiry was of particular concern to the researcher, as outlined in Section 3.7.3.1. Potential shortcomings in the study's research approach, specifically the fact that the researcher acted as a board member of the case study company, were - for example - mitigated by inviting (and not actively asking) participants to attend the PAR-cycles. Also, it was clear from the start that the company would not, for example, pursue organisational restructuring but rather efficiency gains in KM and KT to maintain its position in the marketplace and to potentially become more competitive.

4. A variety of methods - documentary analysis, non-participant observation, open-ended interviews, and PAR-cycles - were employed to explore answers to the research questions and to achieve triangulation.

7.6 Conclusion to Chapter 7

The key learning points of the seventh chapter are as follows:

1. Detailed processes applied to ensure validity and reliability of the research study, with member validation and external audit being at the core of the approach.
2. Holistic documentation and description of the entire research process and its findings allowing readers to take their own decisions related to the transferability of the inquiry.
3. Successful application of the AFRD-process and components of the wider framework within three different environments further supporting transferability of the inquiry.
4. PAR-Cycle approach supporting confirmability of the study.

CHAPTER 8: CONCLUSION AND IMPLICATIONS

8.1 Introduction and Format of Chapter

This chapter summarises and discusses how the findings of the inquiry answer the research questions. Specific focus is on the contribution of the study to the existing literature on KM and KT, and how it adds new knowledge to business practice within a KIF. The limitations of the research will be stated, and a reflective section on the research strategy concludes the discussion of results. The researcher finally gives an outlook on the next steps planned to further explore the potential transferability of the AFRD-process and the wider framework.

8.2 Purpose and Key Research Findings

The purpose of this inquiry was to find optimal ways for employees to impart their knowledge. Scrutiny of academic sources published over more than three decades (1982 - 2017) within the literature review revealed that existing frameworks and models of KM and KT cannot provide sufficient help to resolve the research problem (**What framework needs to be employed to enable optimal KT in a KIF?**). This led to the formation of the three research questions (Section 2.8) and, after a period of 18 months, to the major results - the AFRD-process and the AFRD-framework - as explained and visualised in Section 6.2.5.4 (Figure 39). The subsequent part of this chapter provides answers to the research questions, explains findings in depth and infers conclusions.

8.2.1 Requirement: Structured and organised Approach

The first research question sought to explore the status quo of KT at the case company ABC (**How is knowledge being transferred at case company ABC GmbH?**). Documentary analysis, non-participant observations and open-ended interviews with a selected team of employees revealed that the firm muddled through with regards to KM and KT at the time the research commenced (Section 5.2.1.1). The firm did not employ any of the frameworks or models discussed in the literature review of this thesis.

Data and information were stored within the company's Dropbox, a web-based service with little structure which was considered confusing by the majority of employees. KT occurred in an unstructured manner between individuals, but no elaborated processes were available. When consultants left a project, or the firm, a significant loss of knowledge, related to processes and overall project progress, occurred. This impacted the firm's business with clients: on average, phasing new consultants into a project, lasted up to four weeks (Section 6.2.1.4). Those phase-in stages were critical for ABC as they were often not accepted as payable working days by clients, and hence the company pursued to reduce the time needed to integrate consultants into existing projects.

By the end of 2016, ABC was at the beginning of a major change process with regards to KM and KT. No elaborated processes to support KT practices were available, and missing individual responsibility and trust were among the key barriers to intra-firm KT. A need for a new, holistic framework, bespoke to ABC, became apparent. The researcher felt encouraged to employ Scrum management and control practices within the course of the research study to help achieve change within a complex environment (Section 1.3) - and thus a structured and organised approach to KT. The approach was supported by the employees' motivation to contribute to

establishing sustainable practices and organisational routines to create a culture of aggregating, sharing and transferring knowledge.

8.2.2 Processes, Tools, and Organisational Culture

Elaborating on the description of barriers and enablers of KT within the literature review, the second research question examined impacts on KT in more detail (**What are the factors impacting KT?**). Open-ended interviews with five selected employees, and four PAR-cycles with these individuals, revealed the following key impacting factors at the case company:

1. Seamless processes, and tools for KT.
2. Organisational culture (company structure, individual responsibility, motivational practices).

8.2.2.1 Processes and Tools

ABC consultants demanded the creation of knowledge flows across the organisation, and modern and innovative tools to enable KT. Initially, the firm started to encourage employees to work together more closely, making use of the DTL and its visualisation technology (Section 6.2.1.4.2). In the course of the research study, the PAR-cycle team realised the need for a well-elaborated process of KT and discussed a thorough technology-foundation in the form of a web-based knowledge management platform, accessible via mobile devices (Sections 6.2.1.8.1; 6.2.4.1).

8.2.2.2 Organisational Culture

In this section, the term *organisational culture* clusters the aspects of company structure, individual responsibility, and motivational practices for reasons of conciseness. The selected employees at ABC considered organisational culture key to KT at the firm - and hence being either a major enabler or barrier.

Within the open-ended interviews, and specifically during the PAR-cycles, it became apparent that a role organising KT at the firm was crucial. Before the researcher had triggered the change process at ABC, no dedicated role taking care of processes, the development of a technical foundation, or policies related to the management of knowledge existed at the company (Section 5.2.2.1). The PAR-cycle team considered an organiser of KT as a major impacting factor which was specifically reflected during the first three action-reflection cycles when the researcher assumed a respective role. Specifically, ABC consultants demanded individual responsibility within the (future) KT approach at the KIF and agreed that transfer of knowledge could only work if a source of data and information was made transparent by their colleagues. Also, trust that knowledge captured within a KT process is accurate and that knowledge is used in an appropriate manner, was described as a prerequisite of KT. This requires the establishment of a culture of trust (Savage 1996; Davenport & Prusak, 1998; Bertels & Savage, 2000) and, in general, of knowledge-friendliness. The PAR-cycle team assigned a high priority to the latter aspect which is reflected in the wider AFRD-framework.

Apart from the aspects of a process-oriented organisation and trust, the work group at ABC defined (a change of) motivational practices as a major factor impacting on KT. Consultants revealed in their open-ended interviews that they were expecting a reward for their disposition to help transfer specialist

knowledge, which they perceived as their market value in the Knowledge Age. Hence, ABC decided to introduce an incentive system valuing individual support of KT by supporting developmental learning: employees were granted external development courses at universities or private institutions worth 2.000 EUR per year. The initiative, termed ABC Berries (Section 6.2.3.3.2), is also described as “Knowledge for Knowledge” in the AFRD-framework and was highly appreciated by the firm’s employees during its test phase, between mid-July and beginning of September 2017. As a consequence, the firm officially introduced ABC Berries as its key instrument of spurring motivation to contribute to KT, immediately after the trial.

8.2.3 Framework of Interaction and adaptive Iteration

The third research question set out to explore how ABC could sustainably change and optimise existing practices of KT - to achieve a bespoke and well-working solution for the firm (**How can knowledge transfer practices be changed to achieve optimal KT?**). Specifically, the four PAR-cycles performed over a period of ten months documented that ABC required a framework of interaction and adaptive iteration. The AFRD-process, foundation of the wider AFRD-framework (Figure 39), e.g. significantly reduced the time required for phase-in procedures (Section 8.2.1) by 50%, from four to two weeks. However, the PAR-cycle team learnt that a combination of individual practices and company-wide activities, going far beyond the definition and execution of a new process, was required to achieve optimal KT. This led to the development of the AFRD-framework characterised by the following components:

1. The process-oriented framework rests upon four anchors: Company Structure (Organiser of KT), People and Values (Individual Responsibility,

Trust), Motivation (Knowledge for Knowledge: ABC Berries), and overall Organisational Culture (Knowledge-friendly Company).

2. The iterative AFRD-process (Aggregating, Featuring, Reviewing, and Doing), is a crucial enabler of KT - structuring the approach, probing and monitoring if progress is achieved.

3. Practices of brainstorming, interacting and prioritising, controlling of success, and applying new knowledge achieve significant change related to KT.

4. Four tools (Fact Sheet, Quick Guide, Handbook, Checklist), complementing the process and practices, are crucial enablers of KT by providing a reservoir of data and information growing over time and being adapted to the progress of projects (if needed).

8.2.3.1 The Role of Scrum

This research study set out to probe within PAR-cycles if the Scrum management and control practices would help achieve optimised KT procedures at the case company ABC. Scrum was helpful in establishing a new, iterative process at the company. The approach supported interaction and transparency across a team of consultants - and helped integrate a stage of monitoring and control (Reviewing phase of the AFRD-process), enabling participants to assess the effectiveness of the approach. The PAR-cycle team, when developing the AFRD-process and the wider framework, finally

deviated significantly from some of the fundamentals of Scrum though, specifically related to the following areas:

1. Daily Scrum meetings were not pursued further (Section 6.2.1.9) as the consultants were seeking to accelerate the entire process of KT.
2. In contrast to Scrum, favouring minimum formal documentation, comprehensive documents and tools were introduced to complement KT: Fact Sheet, Quick Guide, Handbook, Checklist. This resulted in a time-consuming approach (Section 6.2.3.4.2.5.1).

Overall, the PAR-cycle team valued that Scrum, because of its agile character, helped define a KT process at the company adaptive to different projects and situations in terms of: depth of documentations, time invested, or communication channels employed (the firm's DTL or a web-based communications tool such as Skype).

8.2.3.2 Key Advantages and Limitations of the Framework

The following list summarises the key advantages and limitations of the AFRD-framework and its underlying AFRD-process:

Advantages

- Introducing a novel process helping achieve optimal KT
- Reducing the time required for phase-in stages at ABC by 50%
- Prompting consultants to challenge and change existing procedures within the company

- Supporting employee interaction and transparency within KT processes, thus creating an atmosphere of knowledge-friendliness at the company
- Providing a prompt for the company's leadership team to think about wider implications of KT for the firm, and to trigger the establishment of a new organisational culture.

Limitations

- Time required to perform KT based on the AFRD-process (two weeks)
- Time-consuming documentation needs when applying the four newly developed tools (Fact Sheet, Quick Guide, Handbook, Checklist).

8.3 Limitations of the Research

This research study has been conducted in a KIF in the area of digital transformation consulting. Its key findings have been validated within three different projects related to business and organisational transformation by the PAR-cycle team. Focus was on KT between individuals and across small work groups. The approach can raise questions of whether the research is transferable between different projects from KIF environments, and different work teams. These questions were anticipated and addressed in the following way:

1. Discussion of the AFRD-framework with KM- and KT-practitioner and lecturer Daniel Helbig from the Fresenius University of Applied Science who believed the process and the wider framework would be transferable, specifically because of the adaptive and iterative character accentuating control of progress.

2. Workshop and audit round with Helbig's group of ten selected students, successfully applying the AFRD-process within a different environment and regarding a different project (value proposition design) as described in Chapter 7.

3. Introduction of the AFRD-framework at ABC's client GHI, a machine engineering company, from the ground up (Section 6.2.5.3).

It is however noted that the transferability of the research results needs to be further explored over a longer period of time to probe their sustainable value for KT initiatives. This aspect will be referred to in Section 8.6. Other limitations of the study can be associated with the choice of literature, as depicted in Section 1.8. The researcher took a broad range of academic literature into consideration though, to cover and discuss key strands published over more than three decades (between 1982 and 2017).

8.4 Research Contributions

To make an original contribution to knowledge is a crucial requirement for any academic research project, and this includes theoretical as well as managerial contributions. In the following, contributions of the present study to the theoretical debate about KT frameworks and models are depicted. Also, this section illustrates how the thesis adds new knowledge to the management practice of KT.

8.4.1 Contribution to the Theoretical Debate

The analysis of this study's contribution to the theoretical debate follows the same structure employed for the literature review (Chapter 2; Figure 2), and the following three key themes will be discussed in detail:

- KM and KT frameworks and models
- Barriers and enablers, and
- Processes.

In the subsequent sections, it will specifically be argued how this study can help close the gaps with respect to the aforementioned topics that were revealed in the literature discussion.

8.4.1.1 KM and KT Frameworks and Models

Existing frameworks and models of KM and KT are not useful to support the implementation of knowledge transfer activities in KIFs. This is one of the key findings of the literature review of this thesis (Chapter 2). The individual approaches do not provide holistic execution plans combining tacit/explicit knowledge conversion in knowledge-intensive environments, barriers and enablers, as well as processes, but they rather concentrate on single aspects in depth (Spraggon & Bodolica, 2012). The frameworks proposed by Skyrme and Avidon (1997a, 1997b) and Davenport et al. (1998), for example, both highlight the importance of structural factors, but fall short on providing coherent output-focussed steps towards a KM or KT roadmap for a given company. Ahmed and Ahsan (2014) do realise that coordinated steps and underlying processes are required to implement successful initiatives to manage knowledge - but their approach remains technology-focussed and

does not comprehensively consider the complexity of the topic, as discussed in the literature review (Section 2.3.2.1).

Here, the newly developed AFRD-framework makes a contribution to the debate on successful KT activities and their implementation in a KIF. The framework is unique in its combination of a holistic approach and a strong process-oriented progression plan, involving diverse competencies across a firm (Figure 39): the AFRD-anchors (organisational culture, company structure, people and values, and motivation) are intertwined with a clearly defined process focussed on execution. The AFRD-process which is adaptive and open to change, and in this sense can be considered a flexible or agile process, was developed within PAR-cycle iterations and has become a bespoke solution for ABC - initiated by its own key employees involved in KT activities. The subsequent sections on barriers and enablers, as well as processes, elaborate on the distinct team dynamics which evolved in the course of the cycles and helped infer the key findings of this study.

Building upon an output-focussed, adaptive process to achieve optimal KT in a KIF is a new contribution to the debate on KM and KT frameworks and models. There is general paucity in the existing scientific literature with respect to the need for adaptive frameworks in KT, although agility in processes and flexibility are a major tenet of the ever faster changing environment of the Knowledge Age (Calabrese, 2006). The contribution from Karlsen, Hagman and Pedersen (2011) who applied Scrum to exchange information within projects related to the development of information systems can be considered an exception - but the authors did not create a wider framework and did not develop the approach further to achieve an adaptive and iterative change environment.

8.4.1.2 Barriers and Enablers

The various analyses of barriers and enablers discussed in the literature review (Section 2.4), provide a broad overview of factors impacting intra-firm KT. Ichijo, von Krogh and Nonaka (1998) specifically mention mindset, communication, structure, relationships (interaction between employees) and human resources management as key barriers to, or enablers of, KT. This thesis specifically makes a contribution to the debate on enablers of knowledge transfer by introducing Scrum-principles and their underlying iterative process which represent the following significant factors: organised teamwork based on trust; control, adaptation and review in iterations; and process-based results-orientation (Section 2.7; Figure 16). This thesis has revealed that the combination of Scrum-principles and their development along the newly developed AFRD-process (Sections 6.2.1.9; 6.2.2.5.1) led to the desired result of achieving optimal KT at ABC. In general, adopting Scrum practices to achieve successful KT in a KIF is a unique approach.

It can be argued that Scrum-based practices support the working style of consultants in the Knowledge Age, which is specifically characterised by constant innovation and team work of individuals from different backgrounds (e.g., educational or cultural), in the following way: by offering tools such as paper stickers or digital message boards (Section 1.5), individual contributions can be discussed transparently among a team of professionals with the intent to find quick solutions to business problems. The four PAR-cycles at ABC revealed that the participants were motivated to constantly seek for ways to achieve optimal KT. The researcher did not have the impression that the individuals felt being scrutinised by their team members, or being under pressure to defend themselves during team discussions (Chapter 6). The researcher contends that the newly developed AFRD-process (which evolved from Scrum) accentuated individual competence at

ABC, and that the emotional impact of personal face to face interactions was less important in the process of finding solutions.

Specifically during the third PAR-cycle, a team dynamics of critical, constructive progression to explore solutions to existing intra-firm KT issues emerged (Section 6.2.5.3.1). It can be argued that the iterative character of constantly improving results achieved, which is inherent to Scrum, not only resulted in the team's development of a stepwise improving KT-approach, but specifically in structural and cultural change at ABC. This is reflected in the firm's key decisions to establish the role of an Organiser of KT, as well as the motivational programme ABC Berries (Section 6.2.3.3.1 - Section 6.2.3.3.2). With respect to developing organisational structure and culture, the AFRD-approach contrasts prominent proposals such as the eight-stage process of creating major change provided by Kotter (1996): AFRD emerged from teamwork-based PAR-cycles triggering constructive change dynamics in a KIF and is opposed to a prescriptive top-down blueprint of change such as Kotter's. The AFRD-framework mirrors results-orientation and the accentuation of organisational culture proposed by Kotter, but it is laid out to be adaptive to changing environments and open to change related to the depth of its process steps. In this sense, AFRD might provide a new significant instrument of organisational change that has been probed in a KIF-environment at ABC. However, it is to be noted that this study sought to provide a framework to achieve optimal KT at ABC, and organisational culture was not at the core of the key research problem to be explored. Changes related to company structure and organisational culture were a result of the research study, emerging from a significantly new way of performing KT. Change aspects related to AFRD are considered an area for further research, as suggested in Section 8.5

8.4.1.3 Processes

Seamless processes are instrumental to successful intra-firm KT. This is a key result of the in-depth literature review of this thesis (Chapter 2). Ho et al. (2014) described processes as “the most efficient method to ‘transform’ (...) private knowledge of individuals or groups into valuable intellectual assets” (p. 736). In an attempt to provide a dedicated plan of KM, Orna (1999) introduced process-based information policies for firms to master the management of their internal knowledge. Sveiby (2001) went further and proposed to build internal as well as external communication and relationship structures. However, the majority of existing process-related approaches to KT can be considered inflexible and nonadaptive to changing environments (Section 2.5.1), which are typical for KIFs. It can be argued that the taxonomy of KT processes provided by Spraggon and Bodolica (2012) is an exception as it propagates the need for distinct solutions, depending on the given environment. But the approach remains a general blueprint of KT and may not help practitioners manage KT in their specific business situation (Section 2.5.1). Here, this thesis makes a contribution to knowledge by providing a newly developed, action- and output-oriented process emanating from Scrum. The AFRD-process has been developed within iterations and successfully employed at ABC to achieve optimal KT at the KIF. As outlined in Chapter 6, the process is highly flexible with respect to its complementing tools (Fact Sheet, Quick Guide, Handbook, Checklist) as their content can be adapted and updated, depending on the respective project and a practitioner’s (or team’s) needs in a given situation.

This process-oriented progression of KT goes beyond the definition of knowledge footprints and knowledge objects introduced by Mougin et al. (2015), as outlined in Section 2.3.3.4: AFRD specifically defines format and structure of the data and information to be transferred and thus defines

procedural progress in detail. Consequently, output-oriented tools are provided to help practitioners along their distinct KT-journey. Chapter 6 reveals that those tools were instrumental for successful KT at ABC. Mougin et al. (2015) rather provide a general description of knowledge fragments to be transferred step by step. This approach leaves room for the interpretation of KT-steps, and their underlying data and information, and hence can be considered a risk to achieving successful transfer of knowledge.

Other KT-models, such as the spiral model of knowledge conversion (SECI) provided by Nonaka and Takeuchi (1995), build on the assumption that no barriers exist within the knowledge conversion process (Section 2.3.3). The AFRD-process is based on the opposite assumption. AFRD focusses on principles adopted from Scrum - such as continuous interaction of individuals as well as review and iteration - to help manage the key barriers to KT, e.g. non-transparent communication or non-established personal relationships (Section 2.4.1). Applying those principles, which are actually rooted in cooperative software development practices (Section 1.3), as well as making them part of a dedicated KT-process, is a novel approach differentiating the AFRD-process from existing proposal to achieve optimal KT.

The researcher contends that the AFRD-process, and specifically its iterative character adopted from Scrum, has created highly efficient team dynamics based on critical and self-reflexive behaviour of the participants (Section 6.2.5.3.1). This behaviour developed over the period of four bespoke PAR-cycles at ABC. In this respect, AFRD can be considered a unique stage-based model of team development achieved at a KIF. The AFRD-approach describes process-steps similar to Tuckman and Jensen's (1977) five stages of team development explained in Section 6.2.1.3, and the author specifically considers this aspect as part of the suggestions for further research (Section 8.5).

8.4.2 Contribution to Management Practice

This research sets out a clearly defined process, complemented by practical, adaptive tools (Fact Sheet, Quick Guide, Handbook, Checklist). As noted in the literature review of this thesis, existing frameworks or models of KT did not support practitioners in creating step-wise approaches, applying helpful tools, or building a dedicated implementation plan to sustainably change KM and KT procedures. On the contrary, the AFRD-process developed within this research study has been explained in detail and documented using photographs and tables; the tools have been added to the Appendices. The ABC PAR-cycle team, further employees, and the expert panel from the Fresenius University of Applied Sciences probing the AFRD-approach found the documentation helpful and useful (Chapter 7). It is anticipated that this material will aid other practitioners to adopt the AFRD-framework and its key underlying AFRD-process.

8.5 Suggestions for further Research

As outlined in the previous sections, various aspects instrumental to successful KT could not be covered within this thesis - mainly because of its given focus, and the existing resource constraints. Specifically, findings emerging from the four PAR-cycles can be considered calls for further research within the following areas:

1. Individual leadership. A number of previous KT-inquiries considered leadership provided by senior management crucial to achieve positive results within knowledge transfer processes (Skyrme & Avidon, 1997; Davenport et al., 1998; Heisig, 2009). The definition of leadership oftentimes remains unclear though in those studies and leaves room for interpretation. On the contrary, the AFRD-framework proposes a clearly defined active role for a

senior manager at ABC (the Organiser-role), who takes on accountability for KT and leads respective activities within the company. Further research might explore how a role such as this is perceived in different company environments, and if the Organiser role is a challenge to existing KT-leadership models described in the management literature, such as the CKO-role proposed by Liebowitz (1999) as described in Section 2.3.2.

2. Team dynamics. Constructive team dynamics at ABC specifically became apparent in the course of the third PAR-cycle. It can be argued that the progression of teamwork witnessed during the meetings bears similarities with Tuckman and Jensen's (1977) five stages of team development. Further research might explore if the team dynamics at ABC were a unique event or if similar developments can, for example, be found in completely different business environments and situations. Also, the AFRD-approach could be compared to other scientific studies concerned with teamwork or interaction of individuals in learning situations - to either confirm its impact or develop it further. As indicated in Section 8.4.1.3, this research study did not explore team dynamics from the level of the individual participant, but rather focussed on the dynamics of a team of professionals aiming for a company's success in KT, reflecting a working style of the Knowledge Age (Chapter 1; Calabrese, 2006). It can be argued that the newly developed AFRD-process, and the AFRD-framework, offered the participants at ABC an equal platform to express themselves with regards to KT, and to respect individual contributions. How individuals act, how they feel and how this impacts team dynamics in the course of the AFRD-process, might be an area for further research - specifically for researchers from other scientific disciplines, such as psychology.

3. Practical framework development. The benefits of the AFRD-framework for practitioners at ABC have specifically been outlined in Chapter 6. The unique flexible tools (Fact Sheet, Quick Guide, Handbook, Checklist) are helpful to plan KT activities, track their progress and make adjustments to the format data and information to be transferred in an agile manner. Further research studies might explore if product innovation, such as applications for smartphones that were proposed by the PAR-cycle team, can further optimise the AFRD-process in terms of efficiency or acceptance (particularly with younger participants who are generally used to work with mobile devices in their work environments). This might have an impact on the structure and presentation of the tools in smaller formats (i.e. on mobile screens). Those bespoke formats might have to be developed to sustain the usability of the tools.

As described in Chapter 6, some participants employed Internet-based communication applications such as Skype to exchange data and information within the course of the AFRD-process - here, an integration of such a service into mobile applications might be probed to potentially make their use more convenient.

8.6 Reflection on the Research Strategy

The design of this research study, its methodology and key strategy are explicitly described and summarised in Chapter 3. Figure 18 visualises the major stages of the research approach. Adopting a participatory paradigm helped the researcher in three ways:

1. The discussion of (and reflection on) theses inferred during the PAR-cycles was encouraged.

2. Different participant perspectives led to constant improvement of intermediate results achieved.

3. Consequently, the development of a holistic solution for ABC was enabled, covering diverse aspects ranging from organisational culture to individual motivation - supported by the employees who would employ the framework.

Moreover, taking the open-ended interviews into consideration, which were held before the first PAR-cycle commenced, it can be argued that the participatory paradigm was instrumental in investigating “multiple contradictory, but equally valid accounts” (Onwuegbuzie, Johnson & Collins, 2009, p. 122), with regards to the status quo and the future concept of KT at the case company.

A case study approach was chosen and has been completed after reflecting on a comparison of common research approaches provided by Creswell (2013), as shown in Table 10, and after studying further management literature. From the research completed over a period of 18 months, it is believed that only a case study could provide the necessary in-depth understanding of existing KT-issues, and help develop a new process and a new framework, in close cooperation with the employees involved in everyday KT activities.

Overall, from the researcher’s perspective, the methodology and strategy chosen have guided the study in the direction initially anticipated. This is a call for further research studies using action-reflection cycles to achieve progress or significant change related to intra-firm KT.

8.7 Next Steps

The immediate next steps for the researcher will be to achieve long-term results related to the AFRD-framework. Specifically, findings from the introduction of the framework at the case company, and at a client of ABC, will be reviewed. In more detail, the steps are as follows:

1. ABC's senior management will be asked to review the AFRD-framework at the end of calendar year 2017, i.e. three months after its implementation at the firm, to decide on potential changes or adaptations of the approach.
2. The researcher will review the results achieved at machine engineering company GHI to learn from findings at the firm and to potentially further optimise the AFRD-framework.
3. Led by the researcher (and board member at ABC), internal technology and product meetings at the case company will be initiated to commence the development process of a commercial platform as outlined in Section 6.2.4.1.
4. A contribution for a scientific journal will be conducted to help communicate the AFRD-framework and the AFRD-process, to initiate discussion of the approach, and to call for further research in the area.

8.8 Conclusion to Chapter 8

The key learning points of the eighth chapter are as follows:

1. Advantages of the AFRD-framework and the AFRD-process

- Introducing a novel process helping achieve optimal KT
- Reducing the time required for phase-in stages at ABC by 50%
- Prompting consultants to challenge and change existing procedures within the company
- Supporting employee interaction and transparency within KT processes, thus creating an atmosphere of knowledge-friendliness at the company
- Providing a prompt for the company's leadership team to think about wider implications of KT for the firm, and to trigger the establishment of a new organisational culture.

2. Limitations of the approach

- Time required to perform KT based on the AFRD-process (two weeks)
- Time-consuming documentation needs when applying the four newly developed tools (Fact Sheet, Quick Guide, Handbook, Checklist).

3. Contribution to Knowledge

- KM and KT frameworks and models: this study proffers a unique new framework, combining a holistic approach with a strong process-oriented progression plan, involving diverse competencies across a KIF

- Barriers and Enablers: the development of Scrum-principles along the newly developed AFRD-process resulted in a strong KT-enabler at ABC
- Processes: the newly developed AFRD-process triggered output-oriented team dynamics and supported individual motivation at a KIF.

4. Contribution to Practice

- Adaptive tools (Fact Sheet, Quick Guide, Handbook, Checklist) and detailed process-definitions aid practitioners to build an implementation plan of KT in their respective company environment.

CHAPTER 9: REFLECTIVE DIARY

9.1 My Decision on Doctoral Studies

I was employed at a global telecoms operator in 2007, when I first got in touch with a topic that I had heard of before but knew only very little about: knowledge transfer (KT). As the company's Head of Online, I was asked to set up an e-commerce programme growing the company's Internet share of tariff and handset sales across a footprint of eighteen operating companies (OpCos), in Europe and Asia. Colleagues in the OpCos had lots of experience regarding the maturity of e-commerce in their markets, the specific technical capabilities in place at their companies to run an online business, and the impact of marketing activities and campaigns on online sales. I was told by the company's group strategy director that this collective experience had been documented and gathered in a database system called "Platinum" (anonymised). Hence, he advised, I should simply access the database to get an overview of the global state of the business and build my strategic plan. But Platinum was only a simple data gathering platform, consisting of a confusing user interface where employees could leave information on projects - but did not. This was the first time I encountered the topic of knowledge management and knowledge transfer and issues related with it. Information in Platinum was either outdated or not usable as it was sometimes stored in documents that could not be opened on a computer, or fragmented and again not usable as the context was not clear to the reader. Platinum had not been used frequently across the OpCos and was an end-of-life platform. It was costly and had no visible impact on the firm's business. Knowledge existed within the teams in the OpCos and Platinum was not helpful exploring it. Thus, I learnt what it meant to gather information from a number of teams across a large geographical footprint without being able to

have access to usable data or information: days and months of tedious documentation work were to follow.

I learnt that knowledge can rest within teams, elevating a company to the level of a knowing organisation. Knowledge may support decision-making in an organisation, and initially Platinum was set up for exactly this reason - but failed because of the lack of appropriate processes to enable KT. Even if Platinum did not help me roll out the telecom company's e-commerce programme, Platinum initially triggered my interest in the field of knowledge, its management and transfer between individuals and work groups. Over the years, I acquainted myself more and more with the complexities of knowledge and KT, and I saw a number of companies where KT was not applied in a way that it supported the business. This is the key reason why I decided to do professional research in the area. I intend to develop solutions making KT easy to implement and - most importantly - making KT a bottom line contributor.

9.1.1 Looking for deeper Understanding

After a number of years as an executive in huge corporate environments, I felt tired with resolving day-to-day operational issues to mainly support short-term business decisions. I wanted to obtain a deeper understanding of the challenges I encountered every day, some of them related to KT as described above, and I wanted to assume a long-term strategic perspective to propose sustainable business decisions. To do so and to gain the necessary skills, I decided to graduate as an MBA in 2010. During my MBA studies, I realised that the school's approach to business strategy and to resolving business problems was quite based on numbers and spreadsheets. Today, I would term the overall approach positivistic. At that time, I did not reflect on this. I accepted the style, I accepted the philosophy.

But what remained was a feeling that something was missing. I understood that a positivistic approach could help solve problems. But the more complex the problems became, the more I saw constraints of a positivistic approach. Finally, a lecture from Prof Helmut Willke on KM and KT at my business school opened my eyes to different forms of knowledge, and in particular to the fact that knowledge may be constructed and its generation be influenced by an individual's environment. Willke states that knowledge is based on experience of the individual, or - as he supports systems theory - based on experience of an organisation, and on interactive communication (Willke, 2007). Looking back today, it was basically Willke's lecture in 2011 that triggered my ongoing thinking about the nature of being and reality and the origin of knowledge. This was the time when I first thought about starting a research project in the area of KT. I was basically searching the web for institutions and universities that could help me do that – and finally applied for attendance of the DBA programme at the University of Gloucestershire.

9.2 The Modules

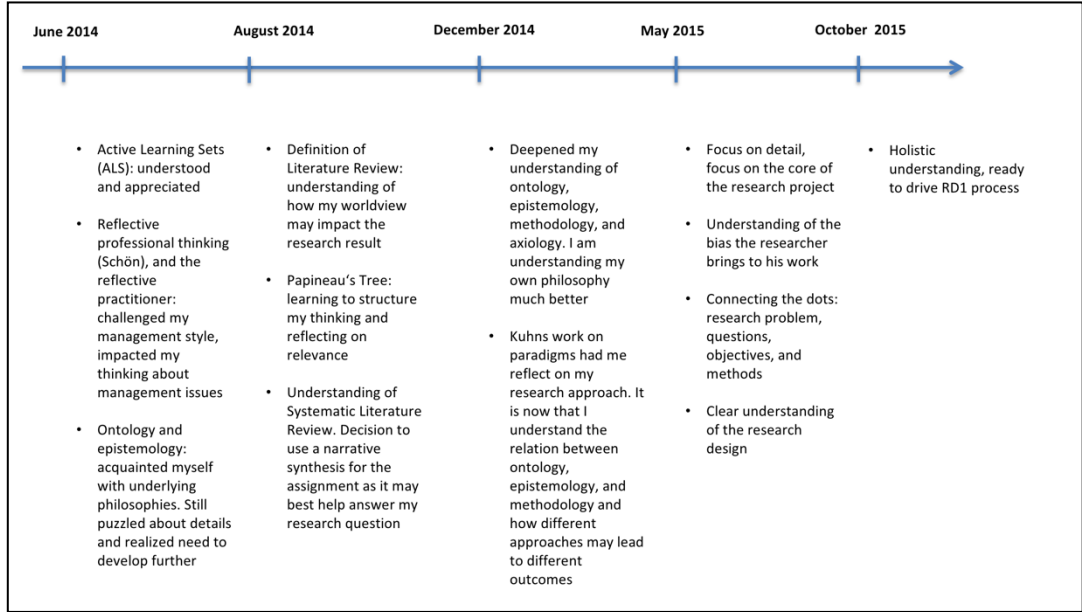
The four taught modules of the DBA programme (DB8001 - DB8004) helped me understand qualitative research in detail and reflect on my ontological and epistemological position. Looking back today, in December 2017, I can openly say that I would not have been able to conduct an inquiry based on action research, infer relevant conclusions and finally present this thesis, without the experience of the modules.

Not only did I develop my skills as a researcher over the previous three years. I also witnessed my personal development. I have become more critical of news I read on the web, watch on TV or listen to on the radio. I believe, at some point in time I started to ask more solution-oriented questions at work, and I was becoming more self-confident when taking decisions. It is this self-

confidence which let me conduct the research study, write the thesis - and finally hand it in for review at the University of Gloucestershire.

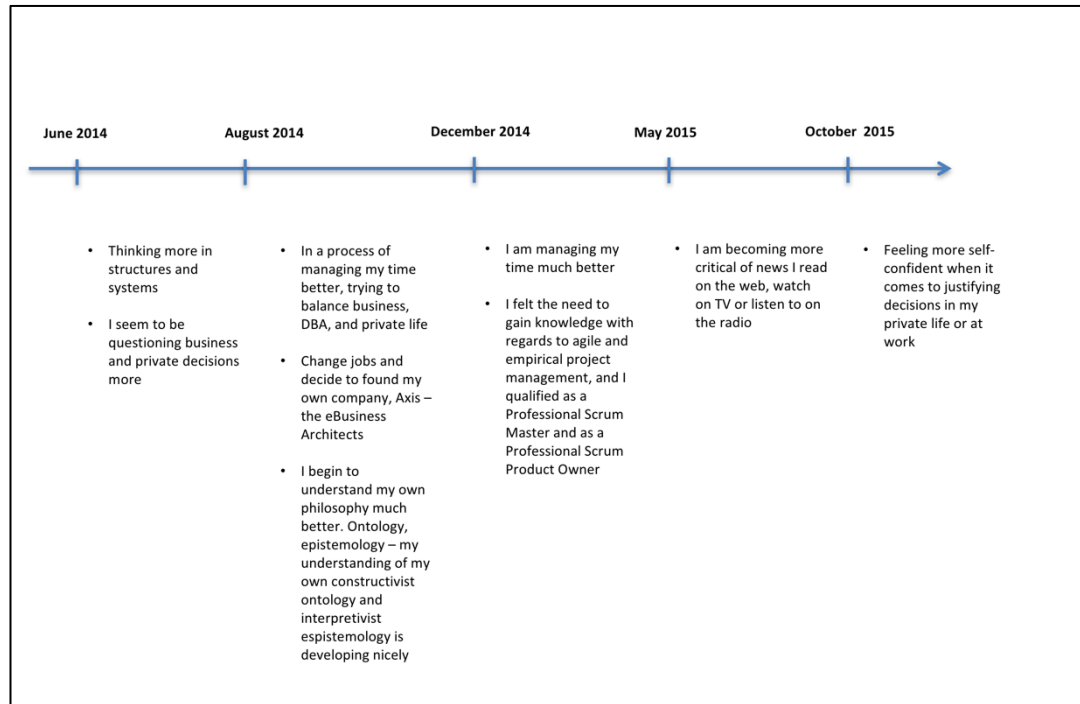
I considered two timeline visualisations which I prepared for the DB8004 summative as relevant to document my development as a researcher, as well as my personal development: Figure 40 and Figure 41. The latter presents diary entries which refer to my personal log for the DBA. I commenced writing it on the first day of my DBA attendance, in summer 2014.

Figure 40: Development as a Researcher



(Source: Author's visualisation)

Figure 41: Personal Development



(Source: Author's visualisation)

9.3 Looking back and looking ahead

I embarked on a remarkable journey when I decided to apply for the DBA programme at the University of Gloucestershire. I never thought that my initial idea to work on a KT research topic would lead to a qualitative research project on knowledge transfer in a knowledge-intensive firm. When I started my development journey, I had no clear understanding of ontology, epistemology, or research paradigms. Looking back, I have the impression that I did not know anything about professional research.

These days though, I feel well prepared to defend my thesis. I want to say thank you to my family, and especially to my daughter Marie and my wife Yasmin, for their support and for their understanding that working on a DBA dissertation is time-consuming, needs focus - and, in my case, meant less time for the beloved ones.

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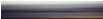

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APPENDICES

Appendix A: Email from DEF Chairman to Employees




Betreff: Weihnachten 2016
Datum: Freitag, 23. Dezember 2016 um 12:37:58 Mitteleuropäische Normalzeit
Von: 
An:  All DE
Anlagen: image001.png


Sehr geehrte Damen und Herren,

2016 war ein bedeutendes Jahr – geprägt von großen Veränderungen. In den letzten sechs Monaten wurden die Grundlagen für eine neue Welt geschaffen, die sich von der Welt unterscheidet, wie wir sie aus den vergangenen Jahren kannten und die schnell Gestalt annehmen wird.


Die Vorherrschaft der Technologie dehnt sich weiter aus und erstreckt sich nun über den traditionellen IKT-Bereich hinaus bis in jeden Winkel unseres Alltagslebens hinein. Ein Beispiel dafür ist, dass für Generationen junger Menschen das erste Auto als Fortbewegungsmittel die Erfüllung ihres Wunsches nach Freiheit und Unabhängigkeit verkörperte, wogegen heute der Wunsch nach „ständiger Vernetzung“ in den Vordergrund gerückt ist: Jugendliche wollen mithilfe moderner Medien und per Datenübertragung virtuell überall sein sowie Erfahrungen, Inhalte, ihre Ziele und Gedanken in Echtzeit austauschen. Die Grenzen zwischen physischer und digitaler Welt, zwischen realen und virtuellen Umgebungen sind endgültig wie unwiederbringlich verschwunden.

Diese neue Welt stellt für  eine große Herausforderung dar, und es ist an uns, diese gemeinsam anzunehmen und zu bewältigen. Zugleich liegt hier auch eine große Chance: Wir sind ein Vorreiter im Technologiebereich. Themen, mit denen sich viele erst jetzt beschäftigen, wie beispielsweise Industrie 4.0, Cloud Computing, Machine Learning, Merged Reality oder Data Science, sind bei uns bereits in strukturierten Angeboten umgesetzt. Diese bringen wir auf den Markt und arbeiten seit Langem gemeinsam mit unseren Kunden daran.

Mehr als je zuvor kommt es darauf an, nicht stehen zu bleiben. Wir müssen die nächsten technologischen Neuerungen erkennen und interpretieren – insbesondere mit Blick auf die Entwicklung von Algorithmen und die Verarbeitung von Daten: Es gilt, diese in geschäftsrelevante Informationen umzuwandeln, zur Automatisierung von Prozessen und Entscheidungen einzusetzen und mit ihrer Hilfe Objekte und Dienstleistungen „intelligent“ zu machen.

 hat die Kraft, die Entschlossenheit und die Geschwindigkeit, die nötig sind, um neue Räume zu entwickeln und zu besetzen, aber noch entscheidender sind der Teamgeist, das unablässige Streben nach Innovation und die Qualität unserer Dienstleistungen.

Ich wünsche Ihnen und Ihren Lieben ein frohes Weihnachtsfest und ein gutes neues Jahr.



Page 1 of 1

(Source: DEF, anonymised)

Appendix B: Introduction to the Research, Part 1

Topic of the Research Study

The research project is about managing knowledge and transferring knowledge between individuals or work groups. Knowledge Management (KM) and Knowledge Transfer (KT) are key in the Knowledge Age. Managing Knowledge is particularly critical to Knowledge Intensive Firms (KIFs) such as ABC GmbH.

I will lead interviews with you individually on KM and KT at ABC, and you will be invited to attend meetings (action-reflection cycles) in the company's Digital Transformation Lab where we as a team try to achieve optimal KT practices.

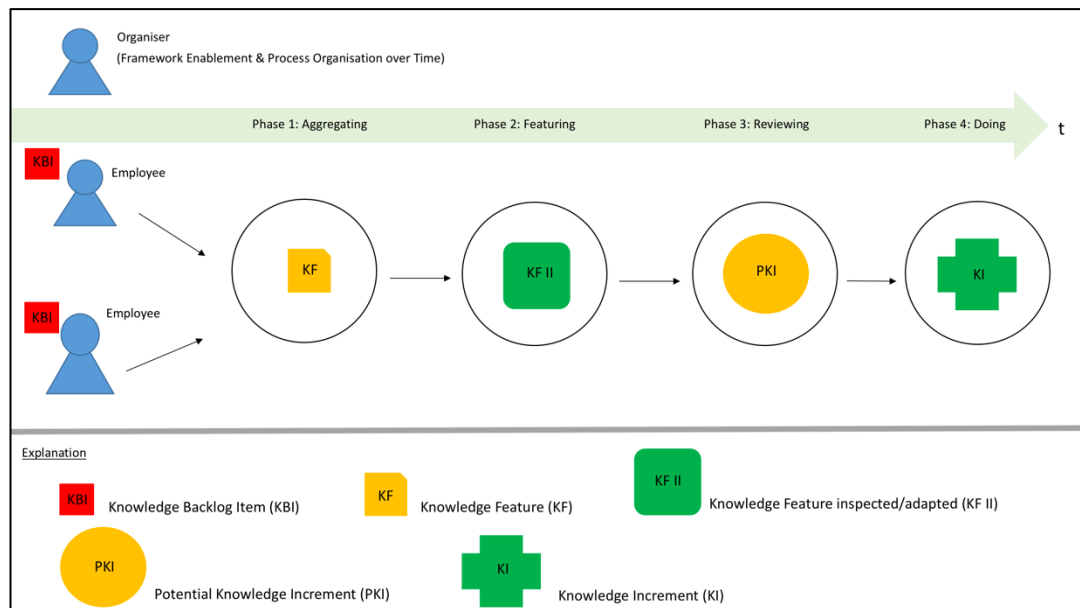
Within the interviews, the following aspects will be discussed:

- 1) existing processes underpinning KT at ABC;
- 2) factors affecting KT, focusing on the impact of management processes, including organisational structuring and information technology;
- 3) how KT practices can be changed.

Please, find on the next page a conceptual framework which will be explained ahead of the action-reflection cycles.

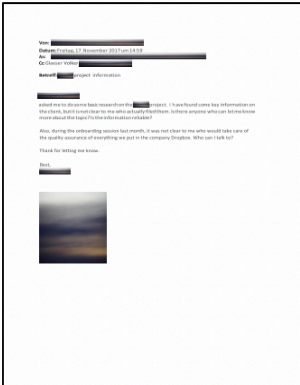
Appendix C: Introduction to the Research, Part 2

Below, the conceptual framework of this research study is visualised. The four phases of the meetings (action-reflection cycles) are explained. Further explanation will be provided ahead of the meetings.



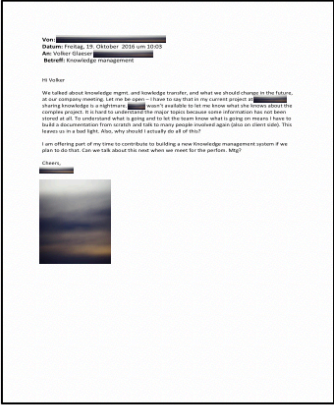
(Source: Author's editing)

Appendix D: Data Analysis Template #1, Part 1

Data Analysis Template #1, Part 1	
Date: 5 DEC 2016 Location: MUNICH, ABC-HEADQUARTER Time: 09:30 AM - 11:15 AM	
<div>Descriptive Notes</div> <div>Emails</div> <p>Collecting an email from new employee MX who approached me directly with respect to KM/KT-issues (email #1). She describes that neither responsibility for KM/KT, nor quality assurance seems to be clear. MX questions if the information (and the process) can be considered reliable. The anonymised email #1 from employee MX has also been added to the Appendix (Appendix I).</p> <div></div> <p>Screenshot of anonymised email from employee, approaching me directly to report on KM- and KT-Issues (Appendix I)</p>	<div>Analysis and Reflective Notes</div> <div>Email #1 (Appendix I)</div> <div>Key themes and supporting quotes</div> <div>Responsibility for KM/KT not clear</div> <p>"I have found some information on the client, but it is not clear to me who actually filed them. Is there anyone who can let me know more about the topic?"</p> <p>"(...) It was not clear to me who would take care of the quality assurance of everything we put in the company Dropbox. Who can I talk to?"</p> <div>Missing trust with respect to KT-process</div> <p>"Is the information reliable?"</p> <p>Employee sees different KM- and KT-related issues. Trust in the information she can find in the company's current crucial KM-tool, the web-based service Dropbox, seems to be very low. Company has not yet actively triggered change within the organisation.</p>

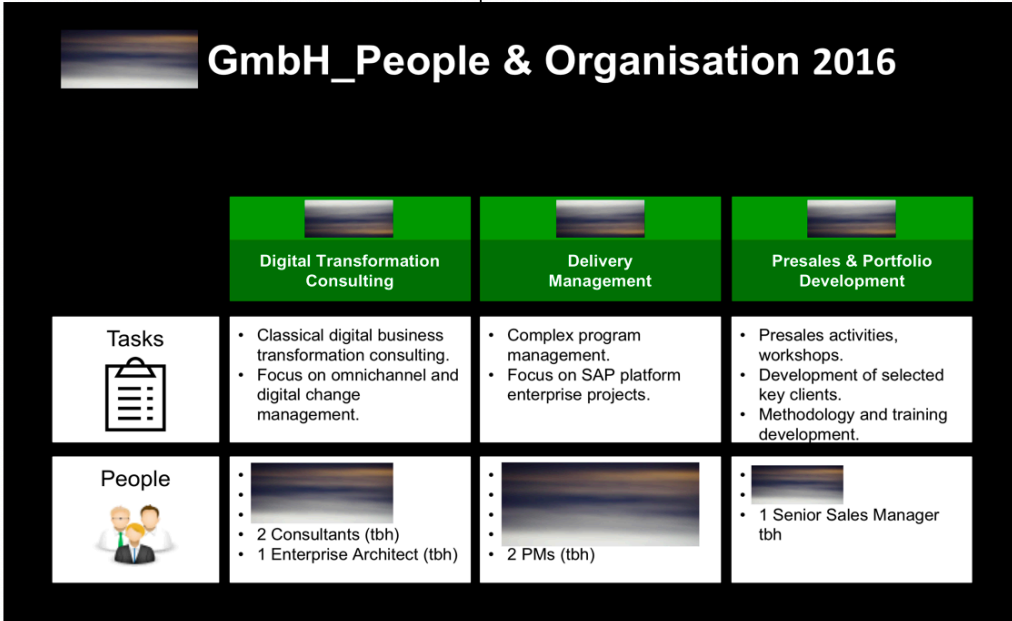
(Source: Author's editing)

Appendix E: Data Analysis Template #1, Part 2

Data Analysis Template #1, Part 2	
<div>Descriptive Notes</div> <div>Emails</div> <div>Email from newly joint employee BX on the issues around managing and sharing knowledge at ABC. BX mentions that some key information on a client project are not stored in the company's Dropbox, at all. BX pretends that his predecessor did not share information, and he utters frustration. At the same time, the employee is offering support to establish a new KM-system (referring to a topic mentioned at a company meeting). A print-out of the email has been added to the Appendix (Appendix J).</div> <div></div> <div>Screenshot of anonymised email from employee AW (Appendix J)</div>	<div>Analysis and Reflective Notes</div> <div>Email #2 (Appendix J)</div> <div>Key themes and supporting quotes</div> <div>No formalised processes in place</div> <div>"It is hard to understand the major topics because some information has not been stored at all."</div> <div>Responsibility for KM/KT not clarified</div> <div>"(...) I have to build a documentation from scratch (...)."</div> <div>Motivation to achieve change in KT</div> <div>"I am offering part of my time to contribute to building a new Knowledge management system."</div> <div>This email might reflect aspects of the company's culture. Knowledge sharing among employees seems to be poor, and BX is frustrated with the KT-process as he experienced it. However, the employee remains motivated to contribute to change.</div> <div>Key themes in Emails #1 and #2</div> <div>Responsibility for KM/KT not clear</div> <div>Motivation to achieve change in KT</div> <div>No formalised processes in place</div> <div>Missing trust with respect to KT process</div>

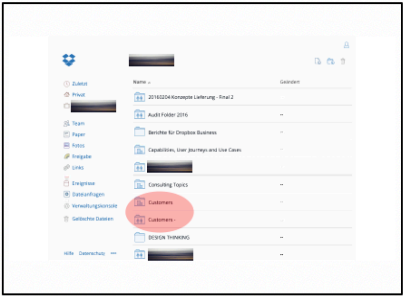
(Source: Author's editing)

Appendix F: Data Analysis Template #2

Data Analysis Template #2														
<p>Date: 6 DEC 2016 Location: MUNICH, ABC-HEADQUARTER Time: 09:30 AM - 10:15 AM</p>														
<p>Descriptive Notes</p> <p>Company presentation_01, organisation chart</p> <p>Company organisation chart for 2016 (anonymised) gives an overview of business units and individual responsibilities. KM or KT as topics for managers to care about are not specifically mentioned.</p>	<p>Reflective Notes</p> <p>Although the company defines itself as a KIF, KM or KT do not seem to be important priorities for the three business unit heads. Accountability for KM and KT is not reflected in an organisational role.</p>													
 <p>GmbH_People & Organisation 2016</p> <table border="1"> <thead> <tr> <th></th> <th>Digital Transformation Consulting</th> <th>Delivery Management</th> <th>Presales & Portfolio Development</th> </tr> </thead> <tbody> <tr> <td>Tasks</td> <td> <ul style="list-style-type: none"> Classical digital business transformation consulting. Focus on omnichannel and digital change management. </td> <td> <ul style="list-style-type: none"> Complex program management. Focus on SAP platform enterprise projects. </td> <td> <ul style="list-style-type: none"> Presales activities, workshops. Development of selected key clients. Methodology and training development. </td> </tr> <tr> <td>People</td> <td> <ul style="list-style-type: none"> 2 Consultants (tbh) 1 Enterprise Architect (tbh) </td> <td> <ul style="list-style-type: none"> 2 PMs (tbh) </td> <td> <ul style="list-style-type: none"> 1 Senior Sales Manager tbh </td> </tr> </tbody> </table>				Digital Transformation Consulting	Delivery Management	Presales & Portfolio Development	Tasks	<ul style="list-style-type: none"> Classical digital business transformation consulting. Focus on omnichannel and digital change management. 	<ul style="list-style-type: none"> Complex program management. Focus on SAP platform enterprise projects. 	<ul style="list-style-type: none"> Presales activities, workshops. Development of selected key clients. Methodology and training development. 	People	<ul style="list-style-type: none"> 2 Consultants (tbh) 1 Enterprise Architect (tbh) 	<ul style="list-style-type: none"> 2 PMs (tbh) 	<ul style="list-style-type: none"> 1 Senior Sales Manager tbh
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<p>Company organisation chart</p>														

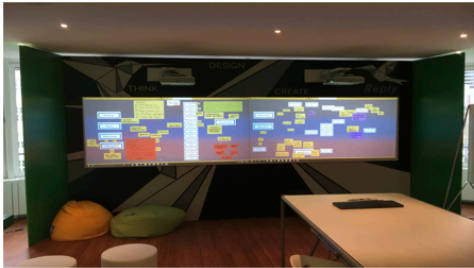
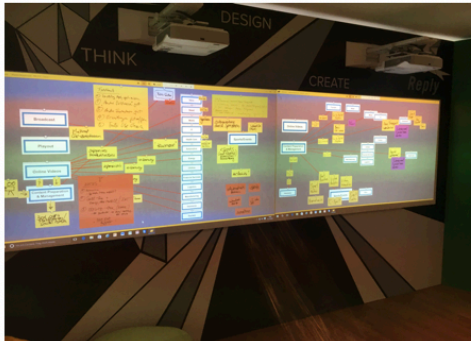
(Source: ABC; author's editing)

Appendix G: Data Analysis Template #3, Part 1

Data Analysis Template #3, Part 1	
<div>Date: 12 DEC 2016 Location: MUNICH, ABC-HEADQUARTER Time: 8 AM - 10:30 AM</div>	
<div><div>Descriptive Notes</div><div><div>Dropbox</div><div>Reviewing structure of company dropbox. Numerous folders, structure not clear to me. Some folders seem to refer to client projects, others seem to hold ABC-specific data and information. One duplication: two separate "Customers"-folders have been established, both containing further folders populated with data and information concerning clients of ABC.</div><div></div><div>Screenshot of Company Dropbox (anonymised)</div><div>Within client-specific folders, all kinds of data and information have been stored: images, excel files, Powerpoint presentations, Word documents.</div></div></div>	<div><div>Reflective Notes</div><div>Finding the right information on a client-specific project is probably a time-consuming effort.</div><div>No hierarchy, no structure of data and information on clients. New employees may have issues acquainting themselves with clients or specific projects because of missing structure and, hence, inefficient communication processes.</div></div>

(Source: Author's editing)

Appendix H: Data Analysis Template #3, Part 2

Data Analysis Template #3, Part 2	
<div>Descriptive Notes</div> <div>Digital Transformation Lab</div> <div>Visiting ABC's digital transformation lab where employees can use a huge screen ("digital visualisation wall") and work with clients on projects.</div> <div>Different key visuals have been stored on the desktop of the computer powering the screen, obviously results of internal meetings: notes on a company's performance; innovation ideas, and one visual on legal aspects regarding e-commerce policies across different countries.</div> <div></div> <div>Photo of "digital visualisation wall" at ABC</div> <div></div> <div>Closer look at key visuals displayed on the the screen</div>	<div>Reflective Notes</div> <div>Consultants started to acquaint themselves with a new tool/process of sharing information. It will be important to organise the knowledge flow. This first step of giving visibility to data and information has the potential to create a new organisational culture of sharing at ABC.</div>

(Source: Author's editing)

Appendix I: Email #1 from Employee MX (anonymised)

Von: [REDACTED]

Datum: Freitag, 17. November 2017 um 14:59

An: [REDACTED]

Cc: Glaeser Volker [REDACTED]

Betreff: [REDACTED] project information

[REDACTED]

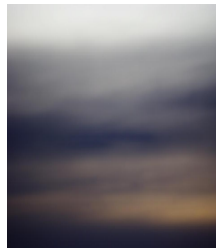
asked me to do some basic research on the [REDACTED] project. I have found some key information on the client, but it is not clear to me who actually filed them. Is there anyone who can let me know more about the topic? Is the information reliable?

Also, during the onboarding session last month, it was not clear to me who would take care of the quality assurance of everything we put in the company Dropbox. Who can I talk to?

Thank for letting me know.

Best,

[REDACTED]



(Source: ABC GmbH, 2017)

Appendix J: Email #2 from Employee BX (anonymised)

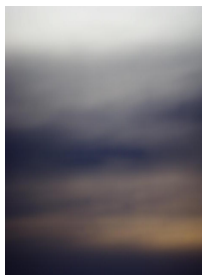
Von: [REDACTED]
Datum: Freitag, 19. Oktober 2016 um 10:03
An: Volker Glaeser [REDACTED]
Betreff: Knowledge management

Hi Volker

We talked about knowledge mgmt. and knowledge transfer, and what we should change in the future, at our company meeting. Let me be open – I have to say that in my current project at [REDACTED] sharing knowledge is a nightmare. [REDACTED] wasn't available to let me know what she knows about the complex project. It is hard to understand the major topics because some information has not been stored at all. To understand what is going on and to let the team know what is going on means I have to build a documentation from scratch and talk to many people involved again (also on client side). This leaves us in a bad light. Also, why should I actually do all of this?

I am offering part of my time to contribute to building a new Knowledge management system if we plan to do that. Can we talk about this next when we meet for the perform. Mtg?

Cheers,
[REDACTED]



(Source: ABC GmbH, 2017)

Appendix K: Coding Sheet, Part 1

CODING / Interviews led on 16th December 2016				
<p>Questions asked to participants:</p> <p>Q1: How would you describe the way we manage and transfer knowledge in the company today?</p> <p>Q2: What do you think are the factors impacting KT?</p> <p>Q3: What do you think, how could our working procedures with regards to KT be changed?</p> <p>Q4: How would you describe your motivation to share knowledge with the company?</p> <p>Q5: What was your main reason to join ABC?</p>				
SUBTHEMES				
MX	TH	NK	BX	CE
<p>Q1:</p> <p>Unstructured KM and KT</p> <p>No guidelines available on how KM and KT should be executed</p> <p>Q2:</p> <p>Communication across employees poor</p> <p>Q3:</p> <p>Human factor is important - dedicated people need to explain how to perform KM and KT</p> <p>A structured process is needed to avoid misunderstandings</p> <p>Recommendation to build a project library, potentially based on web-based services</p> <p>Q4:</p> <p>Part of the job is to share knowledge</p> <p>Give and take with regard to knowledge: growth, more skills</p> <p>Q5:</p> <p>Access to senior management of the company is foundation to learn</p>	<p>Q1:</p> <p>Only basic document management system in place, web-based service (Dropbox)</p> <p>Missing information in Dropbox, no standardisation</p> <p>In Dropbox, lots of dated information</p> <p>Information is not well managed, knowledge after project closure is not shared</p> <p>Q2:</p> <p>No responsibility for KM tool assigned</p> <p>Framework to manage data and information needs to be established</p> <p>Q3:</p> <p>Company has to share knowledge within the DEF network to be able to compete in the marketplace</p> <p>Building a framework for KM and KT means to involve the people, the projects, the right processes</p> <p>Q4:</p> <p>At ABC, employees can develop as consultants by sharing knowledge with the company</p> <p>Motivation to share knowledge is to grow with the company</p> <p>Q5:</p> <p>I joined ABC because it is an innovative environment</p>	<p>Q1:</p> <p>Knowledge is not really documented, even if it is within the team</p> <p>Knowledge transfer happens between individuals, and people educate themselves</p> <p>Q2 / Q3:</p> <p>"Anchor" for specific topics required, and interactive dialogue is important</p> <p>Q4:</p> <p>Sharing knowledge means give and take</p> <p>Sharing means enhancing team capabilities, as well as individual capabilities</p> <p>Q5:</p> <p>"Personal factor" influenced decision to join ABC</p> <p>ABC is quite goal-driven, and focused</p>	<p>Q1:</p> <p>Transferring knowledge depends on individuals and if they are helpful</p> <p>Q2:</p> <p>Moderator needed to help people share their knowledge and explain the big picture</p> <p>Q3:</p> <p>A network is needed where people can upload and share documents</p> <p>Implicit knowledge sharing should be supported by "mentoring" (person to work with) and rewarding</p> <p>Q4:</p> <p>Transferring knowledge means getting a reward</p> <p>Reward means ability to achieve a certification, for example - money is not important</p> <p>Q5:</p> <p>At ABC, consultants get involved in challenging projects</p> <p>Nobody is being tied up in a hierarchical big consulting firm</p> <p>At ABC, you are valued as an individual</p>	<p>Q1:</p> <p>Unstructured KM and KT</p> <p>Q2:</p> <p>A specific structure is needed to share and transfer knowledge, folders in Dropbox not sufficient</p> <p>Extended fact sheets are not sufficient, easy way to document and access information is important</p> <p>Q3:</p> <p>Sharing, transferring knowledge has to be part of the culture of knowledge workers</p> <p>Q4:</p> <p>No expectation to be rewarded for knowledge sharing</p> <p>Q5:</p> <p>ABC is in the middle of a competitive landscape - this was the main reason for joining</p>
PRIMARY THEMES				
<p>1.) Guidelines, structured and updated tools and processes for KM or KT not in place (5 out of 5 interviewees)</p> <p>2.) Motivation to share knowledge is to grow with the company (5 out of 5 interviewees)</p> <p>3.) Direct access to senior management, values and innovative environment reasons for joining ABC (5 out of 5 interviewees)</p> <p>4.) Responsibility for KM and KT is crucial (potential role in the organisational chart) (4 out of 5 interviewees)</p> <p>5.) Framework (people, systems and processes) needed to enable KM and KT (4 out of 5 interviewees)</p> <p>6.) Knowledge sharing across employees poor and needs to be improved to enable KM and KT (3 out of 5 interviewees)</p>				

Appendix L: Coding Sheet, Part 2

PRIMARY THEMES AND SUBTHEMES AND SUPPORTING QUOTES FROM INTERVIEWS (SELECTED)

Cluster 1: Process, Technology, and People (primary themes 1 + 5)

Primary theme 5: Framework (people, systems and processes) needed to enable KM and KT (4/5)

Subtheme: A structured process is needed to avoid misunderstandings

"I think it is important to create a structured process which is binding for every project and every employee at ABC." (MX)

Subtheme: Building a framework for KM and KT means to involve the people, the projects, the right processes

"We have to brainstorm, and then we need to identify the information we want to exchange among each other. We have to look for ways to communicate seamlessly in a transparent way. This is how we can make knowledge transfer happen – within a certain framework." (TH)

Subtheme: A network is needed where people can upload and share documents

"We need a network where people find documents, where people can upload documents, start discussions, form groups for a certain subject. (...) Where people maybe show photos and contact dates (sic: data) (...)." (BX)

Cluster 2: Company Structure and Organisational Culture (primary themes 4 + 6)

Primary theme 4: Responsibility for KM and KT is crucial (4/5)

Subtheme: Human factor is important - dedicated people need to explain how to perform KM and KT

"Let me call it the human factor. Somebody who knows the knowledge management system in detail, who can help to find the right data and information and share it. This would be important. A person you can trust and would connect people." (MX)

Subtheme: Moderator needed to help people share their knowledge and explain the big picture

"Someone needs to organise the way we impart our knowledge. And this person needs to explain the big picture of knowledge management and knowledge transfer - it's about the future of the company, everybody's job." (BX)

Subtheme: Sharing, transferring knowledge has to be part of the culture of knowledge workers

"The culture of the company has to support knowledge sharing and then transfer will happen." (CE)

Subtheme: Transferring knowledge depends on individuals and if they are helpful

"I feel that we pretty much transfer knowledge face to face, from person to person. For example, if BD sees that I am working on a topic that I have not worked on before, she will provide me some paperwork, some documentation about the topic, and then I will just educate myself (...)" (NK)

Cluster 3: Motivation (primary themes 2 + 3)

Primary theme 2: Motivation to share knowledge is to grow with the company (5 out of 5 interviewees)

Subtheme: At ABC, employees can develop as consultants by sharing knowledge with the company

"Sharing knowledge means help the company grow. And if the company grows, then this is an opportunity for me to develop and improve as a consultant." (TH)

Subtheme: Transferring knowledge means getting a reward

"You share your knowledge with others, you get rewarded for it – this is how it should work." (BX)

Primary theme 3: Direct access to senior management, values and innovative environment reasons for joining ABC (5 out of 5 interviewees)

Subtheme: At ABC, you are valued as an individual

"I joined ABC, because it is a start-up environment. Also, you are valued as a person, as an individual. You are actually not just a number, but a name with a person behind that name, for the company. This makes ABC a comfortable work environment." (BX)

Appendix M: Exemplary Interview Transcript, NK, 16.12.2016

I: Interviewer

E: Employee

I: How would you describe the way we manage and transfer knowledge in the company today?

E: I feel that we pretty much transfer knowledge face to face, from person to person. For example, if CE sees that I am working on a topic that I have not worked on before, she will provide me some paperwork, some documentation about the topic, and then I will just educate myself on the topic, read about it, study it. I can always come back to her and ask questions.

I: What do you think are the factors impacting KT?

E: The factors? I think that topics really change very dynamically because knowledge really grows when we do stuff, and as we are in an environment of digital transformation. The knowledge that we might have from university, from books, might be outdated at the time that we are using it. So, I am really happy that we have the environment, that we have the team here that has the knowledge from the day to day work, and that really improves and adds up all the information. Then I think that it's not really documented and written - but we still have the knowledge, and in the day to day work with CE and also BX on my project, we really have the people that know the daily business and can really hand on some of the knowledge. We are working together, things are based on trust when we share knowledge. So, that really is a big factor.

I: What do you think, how could our working procedures with regards to KT be changed?

E: Maybe, if you had something like anchors for special topics, where you have documents that get updated on a frequent basis and then you have an interactive dialogue where you can give some queries and feedback on topics. So, if you don't understand the document fully and you can contact the person who created the document, who is the owner of the knowledge, then he or she can add some information if something has changed or something is unclear.

Appendix N: Exemplary Interview Transcript, Part 2

I: How would you describe your motivation to share knowledge with the company?

E: I think sharing knowledge is a give and take action. So, if I get knowledge, transferred from another person, I am really happy because that will not only enhance my capabilities but also the team capabilities. If I have some knowledge that I would think is worth sharing, I would also try to transfer it. This will improve the competencies of the entire team. So, I think if everyone contributes to knowledge sharing and knowledge transfer in that way, then we will be successful as a company in the knowledge industry. I expect everybody to contribute to this kind of system.

I: What was your main reason to join ABC?

E: ABC, for me, was an option that I really did not consider in the beginning because I was not aware of the company. The brand is not really known yet in the market, but after I did some research and after the first interview and the discussion I had with CE, I really felt that this is a different kind of set-up. ABC is very special and focussed on the strengths of its people. Also, we are very goal-driven. So, a very small but focussed team, and when I saw the infrastructure which is behind ABC, so the whole DEF* network, I was impressed. I really felt that the network is an efficient way of having information and competencies bundled or clustered in specific units. Much better than having a big company where knowledge needs to be shared across a huge and complex organisation.

I: Thank you for the interview.

Appendix O: Data Sheet, Cycle #1

Cycle #1 Notes after Meeting #2 05JAN17	Phase 1 (Aggregating)	Phase 2 (Featuring)	Phase 3 (Reviewing)	Phase 4 (Doing)
Participants	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT	Organiser and selected team of employees at ABC GmbH (six participants overall). The Organiser (researcher) organises the process over time and hence enables the framework of KT
Activities	Organiser and employees agree on first typical use case: assignment of new project manager to company's most complex project (FNC). TH to transfer knowledge to MX. MX and TH gather KBIs and agree on KFs	Detailling of components of KF1. TH provides detailed information on KF1, tries to understand MX's situation as a new project member assigned to project FNC. Both participants reorder the components of KF1, based on their mutual understanding of their relevance. Agreement on component "Tools" as KFII. "Tools" refers to services used to enable KM	SG and LW review a document with explanations on the KFII which SG has prepared. Both participants agree that a number of adaptations need to be done: more detailed explanations of tools for KM needed. SG optimises document and specifically adds more structure to a chapter on the web-based service Dropbox. SG and LW agree on the optimised document as PKI, also termed Basic Document on tools	MX officially being assigned to FNC project. MX starting to use KM-tools providing access to project information on project server. TH available for support, e.g. answering specific questions MX may have. MX successfully using KM-tools, reviews project roadmaps and plans for upcoming meetings with client. First meeting with client, MX reporting on project status. Positive client feedback
Interactions	MX and TH agree on clusters of topics and define those as KBIs. Both move from clusters to more detail after intense discussion on the importance of certain KBIs. General observation: employees discuss relevance of KBIs, iteratively	Organiser recommends that MX tries to walk through the components of KF1 to reflect on her understanding of the details. MX requests more detailed information from TH regarding most of the components. TH tries to provide ever more specific information	During the ten working days agreed for MX to acquaint herself with the KF1, MX and TH had separate in-person meetings and communicated via Skype to discuss content and context. Concentrated communication between MX and TH on details of PKI. Organiser challenges PKI in terms of relevance. MX and TH defend relevance of PKI. Agreement among MX, TH, and Organiser	Only little interaction among participants. MX seems able to use KM-tools appropriately and has access to key information of FNC project. Organiser and TH asking MX if she feels well prepared and if she has the impression that KT has been successful. MX giving positive feedback, has impression that KT has been successful. Successful interaction with client (see above). PKI, based on process, considered KI
Output	List of KBIs and final KFs. Prioritised list of KFs. KFs and their components. Photos documenting KBIs and KFs	KFII and its components. Photos documenting KF1 and KFII	Comprehensive Basic Document on tools used to support KM and KT at ABC. PKI agreed among MX, TH, and Organiser. Photos documenting adaptations to KFII and PKI	MX able to use key project KM-tools. MX having access to project roadmap and detailed project feature lists. MX feels well prepared to attend first client meetings and to report on project status. Successful client meeting (see above)
Prevailing Scrum Principles	Key Scrum principles applied (Section 2.6.2, Figure 13): organised teamwork based on trust, reduction of complexity, planned process, results-orientation	Key Scrum principles applied (Section 2.6.2, Figure 13): review, results-orientation, organised teamwork based on trust	Key Scrum principles applied (Section 2.6.2, Figure 13): organised teamwork, transparent process, adaptations and review in iterations	Key Scrum principles applied (Section 2.6.2, Figure 13): organised teamwork, transparent process
Agreed Next Process Steps	Prioritising KF "Big Picture". Agreement of Organiser and employees to move to the next phase and to elaborate on this KF which is called "KF1", going forward	Agreement among participants that MX needs ten working days to acquaint herself with details provided, before moving to Phase 3 (Reviewing). New meeting date set for 5 JAN 2017	Agreement among participants that MX should apply newly acquired knowledge within the FNC project	Participants consider KT process successful. A number of optimisations have been discussed though, adaptations to current process recommended. Optimisations, questions on trust and motivation to be addressed in Cycle #2

Appendix P: Excerpt of preliminary Handbook (anonymised), Part 1

Project Management Tool

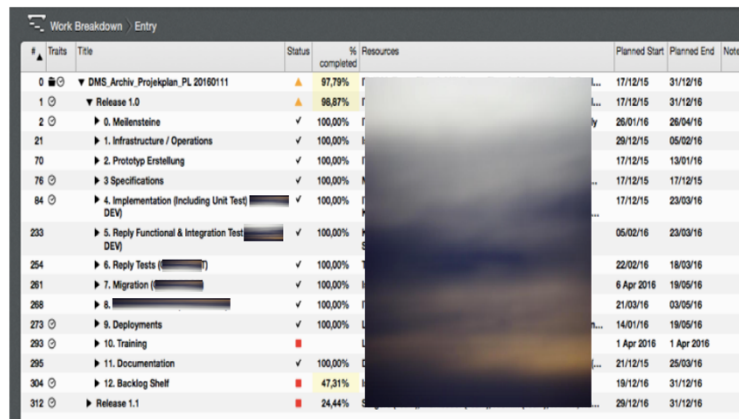
Name: Merlin

Purpose: Tool to manage the project plan

Where: You can access the tool downloading the client and access the project once you have been invited by the responsible member of the PMO

Responsible: [REDACTED]

How: The project plan was divided into the following segments:



#	Traits	Title	Status	% completed	Resources	Planned Start	Planned End	Notes
0	▼	DMS_Archiv_Projektplan_PL 20160111		97,79%		17/12/15	31/12/16	
1	▼	Release 1.0		98,87%		17/12/15	31/12/16	
2	▶	6. Meilensteine	✓	100,00%		26/01/16	26/04/16	
21	▶	1. Infrastructure / Operations	✓	100,00%		29/12/15	05/02/16	
70	▶	2. Prototyp Erstellung	✓	100,00%		17/12/15	13/01/16	
76	▶	3 Specifications	✓	100,00%		17/12/15	17/12/15	
84	▶	4. Implementation (including Unit Test DEV)	✓	100,00%		17/12/15	23/03/16	
233	▶	5. Reply Functional & Integration Test DEV	✓	100,00%		05/02/16	23/03/16	
254	▶	6. Reply Tests ()	✓	100,00%		22/02/16	18/03/16	
261	▶	7. Migration ()	✓	100,00%		6 Apr 2016	19/05/16	
268	▶	8. ()	✓	100,00%		21/03/16	03/05/16	
273	▶	9. Deployments	✓	100,00%		14/01/16	19/05/16	
293	▶	10. Training				1 Apr 2016	1 Apr 2016	
295	▶	11. Documentation	✓	100,00%		21/12/15	25/03/16	
304	▶	12. Backlog Shelf		47,31%		19/12/16	31/12/16	
312	▶	Release 1.1		24,44%		29/12/16	31/12/16	

Figure 2 - Project Plan

The logic behind it was to organise it in sequential order, starting from the completeness of the infrastructure and finishing with the deployments to the TEST & PROD environments.

Inside of each section, further levels of activities were listed. For example, in the implementation section, it was divided in the 4 main areas of the project and one level further, it was divided in the activities to be done in each of the areas:

(Source: ABC, 2017a)

Appendix Q: Excerpt of preliminary Handbook (anonymised), Part 2

84	4. Implementation (Including Unit Test) DEV	✓	100,00%
85	4.1 Migration	✓	100,00%
86	4.1.1 Implementation Content Migration SAP/Hintergrund	✓	100,00%
119	4.1.2 Implementation Metada Migration	✓	100,00%
180	4.2 Open Text	✓	100,00%
198	4.3 xECM für SAP	✓	100,00%

Figure 3 - Implementation areas

85	4.1 Migration	✓	100,00%
86	4.1.1 Implementation Content Migration SAP/Hintergrund	✓	100,00%
87	Infrastructure	✓	100,00%
88	[MS] Bereitstellung MigrationDB (Metadata)	✓	100,00%
89	[MS] Bereitstellung MigrationDB (Content)	✓	100,00%
90	Lecare: Testexport	✓	100,00%
91	Zugriff auf Lecare	✓	100,00%
92	Zugriff auf Testsystem COI Datei System steht bereit	✓	100,00%
93	Konfiguration MigrationDB (Content)	✓	100,00%
94	Überführung in den Archivserver	✓	100,00%
95	Identifikation der zu migrierenden Dokumente (Identification of the documents to be migrated)	✓	100,00%
96	Ermittlung der Dateiattribute (Determine the file attributes)	✓	100,00%
97	Reservierung der Open Text docID (Reservation of the Open Text docID)	✓	100,00%
98	Auslesen der Dokumente	✓	100,00%
101	Auslesen Annotationen (Read annotations)	✓	100,00%
102	Überführung Annotationen in Notizen (Transfer annotations in Notes)	✓	100,00%
103	Ablegen auf Archivserver	✓	100,00%
104	Verifizieren der migrierten Dokumente	✓	100,00%
105	Unit Test	✓	100,00%
106	Dokumentation	✓	100,00%
107	Verknüpfung mittels SAP Archivlink	✓	100,00%
108	Ermittlung der VBELN auf Basis BusinesspartnerID und Belegdatum	✓	100,00%
109	Ermittlung der VBELN auf Basis Rechnungsnummer	✓	100,00%
110	Pflegen der SAP Archivlink Tabellen	✓	100,00%
111	Unit Test	✓	100,00%
112	Dokumentation	✓	100,00%
113	Rückmeldung Metadata Migration	✓	100,00%
114	Pflegen der Migrationsdatenbank	✓	100,00%
115	Unit Test	✓	100,00%
116	Dokumentation	✓	100,00%
117	Abschluss der Migration	✓	100,00%
118	Protokollierung in der Datenbank	✓	100,00%

Figure 4 - Content Migration Activities

In order to create an activity, is required to do a left click and then select "insert activity". Then it fills up the name, the responsible resource and the starting and finish date (if known) of the activity. If you want to place the activity in another area of the project plan, it can be done through drag-and-drop.

(Source: ABC, 2017a)

Appendix R: FNC Quick Guide, Part 1

Quick Guide

Last update: 27 January 2017

Project Summary

██████████ is managing the development and implementation of a document management software, based on the OpenText platform. The project was kicked off in summer 2016. ██████████ took on full responsibility of the strategic planning, the development and the delivery of the OpenText platform. The approach chosen requires a large document migration process from ██████████ existing system, COI, to OpenText.

The project setup and scope:

- ██████████ is Project Lead
- Project scope has been aligned with the client, and more than two million documents have to be transferred from COI to OpenText. The categorization of the documents has been agreed and is explained in detail in the Handbook

Scope of Work

- Identifying, categorising and migrating documents, working closely with ██████████ technical teams and ██████████ internal team
- Building a flexible project roadmap, weekly reporting on the status
- Employing the key client software called MERLIN to manage the project and build the roadmap
- Setting up and monitoring the delivery team(s)
- Overseeing implementation
- Transition from project phase to operation phase

Individual Responsibility

In addition to our general values within the reply network, in this particular project your responsibilities will arise from given tasks, as well as from tasks that you will take up proactively.

Your first tasks will be

- Update roadmap in close cooperation with ██████████ project lead and project lead on ██████████
- Create data protection concept
- Familiarize with the Handbook until end of the week.

Your role and internal description:

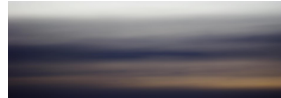
Project Manager, Roadmap Manager

(Source: ABC, 2017b)

Appendix T: MCB Fact Sheet (anonymised)

Fact Sheet

Last Update: 28 August 2017



Company Information

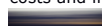
is a cable television provider, like Kable BW and Kabel Deutschland, which mainly covers Hesse and North Rhine-Westphalia. They offer single DSL internet service (1play), all-inclusive-packages (2play: internet plus telephone), and 3play packages, which offers customers internet, telephone and digital TV.

Currently if you order 2play 32.000 or 3play 32.000, you get four months for free. If you order 2play 16.000 or 3play 16.000, the price is 20€ per month for the entire contract period (12 months) - that means you save 20% off of the regular price of 25€.

Currently all packages, except for the 1play, come with 3 months of Security Package (Sicherheitspaket) for free - Anti-Virus, Anti-Spy, Anti-Spam and more. Afterward the free period, the Security Package costs 4€ per month. You can terminate the Security Package at anytime, giving 1 month's notice.

Project Business Rationale / Competitive Environment

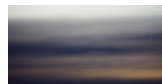
The company pursues a new customer service strategy (focused on consumers) to save costs and improve customer experience (customer satisfaction) at the same time. Thus, intend to differentiate themselves in a competitive market.



Project Location

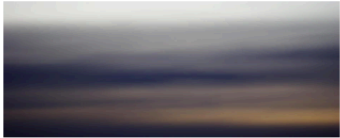
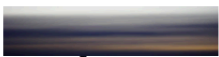


Market Share Germany



(Source: ABC, 2017c)

Appendix U: First Page of MCB Quick Guide (anonymised)



Quick Guide

Last Update: 28 August 2017

Project Summary

██████████ is managing the development and implementation of an Omni-Channel Platform, that Customer Care Agents will use for all customer Interactions. The Project was initially up and kicked off early 2016 with a different Project Team. The Chosen Vendor ██████████ was not able to deliver the agreed solution. The Project setup changed when ██████████ came on board:

- ██████████ took over as Project Lead
- Team structure has been adjusted
- Project scope has been aligned
- New Vendor (PEGA) has been assigned to present a POC based on two Use Cases (both derived from a worked out Business Requirement Document = BRD)

Scope of Work

The following are yet to be covered:

- Writing and aligning Concepts
- Setting up and monitoring the delivery team(s)
- Implement RollOut
- Transition from Project Phase to Operation Phase

Responsibility

In addition to our general values within the ██████████ network, in this particular Project your responsibilities will arise from given tasks, as well as from tasks that you will take up proactively. Your first tasks will be (please see Checklists, if available):

- Create Testing Concept (link to Checklist)
- Get to know PEGA (<https://www.pega.com/de/services/pega-academy>)
Credentials are in your E-Mail Inbox
- Familiarise with the Handbook

Your role and internal description:

Project Manager // Data Protection Expert and Project Manager.

(Source: ABC, 2017e)

Appendix V: Table of Contents, MCB Handbook

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(Source: ABC, 2017f)

Appendix W: First Page of MCB Cecklist (anonymised)

CHECKLIST

Project Management System

Practice/Process Title	Create and write a project concept within Project Management System
Description	The page provides an overview of how to generate project concepts at . The bottom of the page provides a process chart.
Environment	<input type="checkbox"/> Intern <input checked="" type="checkbox"/> Client
Classification	<input checked="" type="checkbox"/> Content <input type="checkbox"/> Organisational

Checkpoints:

- ☐ Gather information from key stakeholders
- ☐ Structure the information with a focus on deliverables in the system templates
- ☐ Align with the Project Owner on side via the Project Management System (templates provides buttons to contact project creator)
- ☐ Adjust in the case of feedback
- ☐ Sign off and send to Project Owner on side. PO finally signing off and releasing budget

Process Flow:

```
graph LR; A[Gather Information] --> B[Structure]; B --> C{{Align with PO}}; C --> D[Adjustments]; D --> E{{Sign off and send to PO}}; E --> F[Sign Off];
```

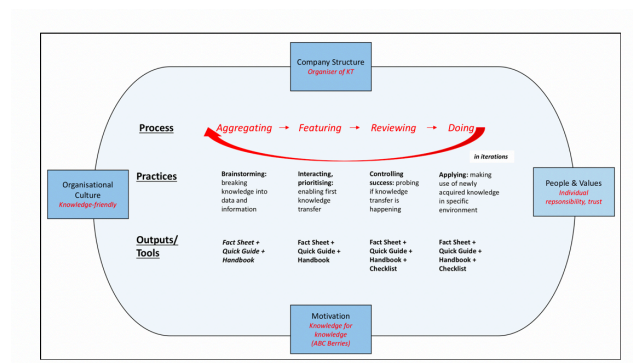
(Source: ABC, 2017g)

Appendix X: Member Validation – Discussion Handout

Munich, 27 September 2017
Participants: PAR-Cycle Team, incl. VG

AFRD-Framework and AFRD-Process: Member Validation

- 1.) Please review the analysis templates of this study and provide your feedback on the key data and information, their overall correctness and quality.
- 2.) Please review the PAR-cycle sheets and specifically provide your view on the key data collected, specifically on the correctness of the descriptions of progress achieved.
- 3.) Please discuss the visualisation of the AFRD-framework below. Does it match your understanding of the KT-environment and its underlying process which we have defined over the last ten months?



(Source ABC, 2017i)

Appendix Y: Exemplary Email to Participant CE

Von: Glaeser Volker <V.Glaeser@[REDACTED]>
Datum: Freitag, 1. September 2017 um 16:13
An: [REDACTED]
Betreff: Validation

Dear [REDACTED]

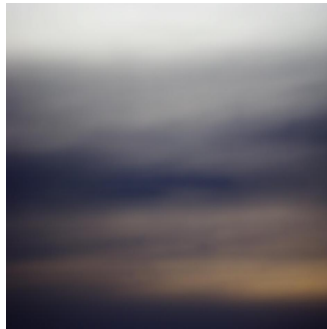
As discussed during our last meeting, we are now entering the member validation phase of the study.

Pls, find attached the transcript of our interview, including the related coding sheet. I would like you to provide me with your feedback on the correctness of the information in the attached documents within the next ten working days. You can do this via email, or we can schedule a personal meeting. I leave this up to you.

By the end of this month, we will also have a team meeting focussing on the validation of the study and our findings. During that meeting, I will share data analysis templates covering my observations within our company, and during the PAR-cycle meetings, with you to collect your feedback on the AFRD-framework.

Thank you again for your contribution.

Best,
Volker.



(Source: ABC GmbH, 2017)

Appendix Z: Response Email from Participant BX

Von: [REDACTED]
Datum: Montag, 18. September 2017 um 16:13
An: Glaeser Volker <V.Glaeser@[REDACTED]>
Betreff: RE: Validation

Hi Volker,

Thank you for the interview material.

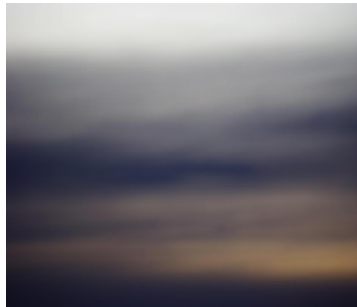
I am OK with the transcript and the subthemes and primary themes of the Excel sheet. They reflect what I actually said.

When we convene for our next meeting, I would also like to talk about innovation topics like mobile applications for knowledge transfer.

I look forward to our meeting.

Ciao,

[REDACTED]



(Source: ABC GmbH, 2017)

Appendix AA: Expert Panel Conclusion

Daniel Helbig

Systemic Consulting and Coaching

Conclusion

Albeit its artificial setup and the influence of several hardly reproducible factors the process worked effectively in transferring knowledge between the students. In comparison to the academic standard approach "lecture and self-study" it was considered as *highly efficient*. As most of the attending master students are already working part-time or are on their way to succeed their parents in the family business, their oral assessment that this process would be of great help in real business scenarios can be given weight.

Although one strength of the process is its variability concerning the *pre-knowledge* it must be considered consciously. Furthermore, its strong agile nature will create disturbance in e.g. traditionally *sequenced business* such as mechanical engineering. *Commitment and dedication* of the participants can be considered as two soft factors which contributed severely to the success of this validation and must not be neglected when applied to real cases.

(Source: Helbig, 2017)