MASTER

Cultivating communities of practice as key enablers for knowledge sharing in scaled agile organization

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Award date:
2017

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Cultivating Communities of Practice as key enablers for Knowledge Sharing in a Scaled Agile Organization

by

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in partial fulfilment of the requirements for the degree of

Master of Science
in Innovation Management

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Acknowledgements

By writing this thesis, I conclude my time as a student at the Eindhoven University of Technology and will make a start in the ‘grown up’ world. My study has been a seven year journey that took me many places. From training eight times a week as a rower on national level, to climbing a volcano in Java, or leading a 600-headed-association on a daily base for a year, and everything in between. Words fail to describe how much I have enjoyed this part of my life, and although I am saddened that this comes to an end, I am sure that many other doors will open. For now, I am really grateful for the opportunities that I have had due to the TU/e.

Firstly, I would like to express my appreciation for my company supervisor, Nore Goffings, who always remained positive and helped with insightful suggestions for the study. Furthermore, I really enjoyed my time at a large corporate bank and I think this experience will definitely prove to be useful for me in my further working life.

Also, I would like to thank both my supervisors from the TU/e. Firstly, my first supervisor, Josette Gevers. Often, I left our meetings with more questions than answers, but you challenged me in the right way so that I was able to dive deeper into the subject and eventually gain valuable new insights. Moreover, I really appreciate that you left me free to set my own schedule which allowed me to develop myself on more levels than just academical. Secondly, my second supervisor, Duygu Keskin. Your feedback on the process was really helpful and hands-on. I believe that your help has greatly improved the quality of my thesis and unquestionably led to better results.

Over the course of this thesis I met many interesting and passionate people from the ABN AMRO. I would like to thank them for their help and interest in this thesis. Not only did these interviews give me new insights regarding this topic, they showed me many valuable and interesting topics and developments in the financial world.

On a more personal level, I would like to express my gratitude to everyone who has supported me during my study! Especially my parents who have always supported me in studying and all the things I could do next to it, even though I not always seemed like all the extracurricular were all that relevant. And last but not least, I would like to thank my girlfriend, although maybe an apology might be more appropriate for all the times we missed out due to thesis stress and a busy schedule.

Geert Buth,
Utrecht, October 2017
In a world that is becoming increasingly complex, and where customer demands may vary on a daily base, there is an inherent need for a more dynamic and flexible way of working. Hence, the Agile way of working was introduced as an attempt to cope with the volatile world of today and to be able to react faster. However, as the Agile way of working was originally developed for small companies, scaling this practice may be troublesome. Especially with regards to knowledge management. Henceforth, Communities of Practice (CoP) are introduced to enhance knowledge sharing, organizational and process development and development. Since ABN AMRO is currently transitioning to the Agile way of working, we decided to investigate the value of Communities of Practice for ABN AMRO and under what circumstances they can best grow. A literature review was conducted in order to explore the challenges in knowledge management for scaled agile organizations, and to find the key success factors for CoPs. Moreover, four cases of CoPs within the ABN AMRO were studied in order to learn from the practical experience of those who have initiated –or participate in– such a community. From literature and from practice, nine final design principles were derived that were used to guide the development of a tool that helps the employees of ABN AMRO setting up their own CoP within the bank.
Management Summary

This study, commissioned by ABN AMRO, focused on how to retain knowledge in an agile organization. The study set out to develop a tool based on a set of design principles that were both grounded in literature as in practice. The main research question formulated in cooperation with the ABN AMRO is:

*How can knowledge management be optimised in a scaled agile environment through the application of communities of practice?*

For answering this question, nine design principles were synthesized from practice and theory. Subsequently these principles served as a point of departure for building a tool to help employees of the ABN AMRO setting up their own community of practice.

Methodology

A design oriented approach was utilized in order to provide an answer to the above question. This approach differs from the traditional explanatory approach by asking the question ‘will it work better?’ rather than ‘is this proposition valid or true?’, thus aiming to develop knowledge applicable in real life and solving a business problem. This thesis presents a set of design principles that follow the CIMO logic. These design principles were constructed using three steps.

Firstly, a literature review was conducted regarding knowledge management in large software engineering companies and the challenges that relate to the agile way of working. Thereafter, the concept of Communities of Practice (CoP) and its relation to knowledge management was investigated. From this literature review, a set of theoretical design principles was formulated. Secondly, four case studies were conducted to retrieve practical experience from communities that had already started to form as a Community of Practice (or Triangle in ABN AMRO terminology) in the bank. From this information, a set of empirical design principles was formulated. Thirdly, and lastly, a set of final design principles was synthesized from both the theoretical and empirical principles. Subsequently these principles provided the contents and building blocks for a toolkit that was developed in three iterations.

Results

The literature review resulted in a clear overview of the challenges of knowledge management in software engineering and how these relate to the agile way of working. Furthermore, the concept of Communities of Practice was elaborated, investigating the organizational value of the communities and what circumstances allow them to flourish. This literature review resulted in a set of eleven theoretical design principles.
The case study focussed on four separate cases within the ABN AMRO of Communities of Practice, all in approximately the same development stage. The analysis of these cases gave insights in the main problems experienced by the employees of ABN AMRO and possible solutions relating to the initiation of setting up a Community of Practice. From this analysis, nine empirical design principles were synthesized that provided practical solutions. Finally, a set of nine final design principles, grounded in both theory and practice, was formulated that can be applied in multiple contexts (see table 5.2). Collectively, these design principles answer the main research question.

During the case interviews and spending a substantial amount of time on the site, several requirements were formulated for the design. Taking these boundaries into account, the final set of design principles were used to design a toolkit to inform and to encourage all employees of ABN AMRO to start their own Triangle with the intent to share knowledge and discuss the latest developments within their field of interest. The toolkit entails a quick start guide for growing your own Triangle and three posters to attract attention and spark the employees interest. The whole toolkit was presented an Agile awareness event called the Agile Summer School. The quick start guide can be found in appendix 1.

Limitations and Contributions

There are several concerns that impair the findings of this thesis. Firstly, only successful studies and their success factors were studied. Less successful, or failing communities were not taken into account. Secondly, the empirical results were mostly qualitative in nature and therefore dependant on the interpretation of the researcher. On top of that, the code strings were not checked by a third party. This could lead to biased outcome. Thirdly, the results were solely based upon a case study within one company. This all decreases the reliability and validity of this study since the results may be biased due to the perception of the researcher.

The contributions of this study are both theoretical and practical. The theoretical contributions are an overview of all the challenges that scaled agile organisations face, and how CoPs contribute to solving these challenges.
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1

Introduction

“Digital Banking is only 1% finished”
– David Brear, Keynote Speaker @ Beyond Banking

Agile software development was introduced as a reaction against the traditional methodologies, also known as rigorous or plan driven methodologies (Schwaber and Beedle, 2001). Agile methodologies advocate iterative and incremental software development, in which the customer requirements and product capabilities are refined iteratively. As agile methodologies have gained popularity and are becoming more mainstream in both small and large organizations, their limitations become apparent. The agile methods were originally created to support small software teams with highly experienced developers who cooperate in a single room which rely heavily on face-to-face communication, consequently limiting the maximum practical size of the development teams and the extent to which knowledge sharing occurs over teams (Cockburn and Highsmith, 2001).

The agile methodologies are intended to be practised by small teams of highly experienced people, building, small, non-critical systems with highly volatile requirements in an organization with a high degree of acceptance of uncertainty (Boehm and Turner, 2003).

Yet, despite the fact that agile is intended for small teams, agile development is increasingly adopted in large organizations running big software development projects deploying multiple teams distributed over several geographical locations (Lindvall et al., 2004). Adopting agile in this large scale context introduces multiple new challenges for the practitioners to be overcome. Among others; the inter-team coordination, effective knowledge sharing between teams, design without a defined architecture or properly defined requirements, as well as the usual challenges of distributed teams (Leffingwell, 2007).

Despite the challenges inherent to scaling agile, companies report having implemented agile in large projects with success (Sutherland and Frohman, 2011; Paasivaara, Durasiewicz, and Lassenius, 2008). Although a few case studies report on adopting agile methods in project that involve multiple teams in several geographical locations, the majority of these case studies involve only a few teams (usually less that thirty developers).

Practitioner literature, mostly authored by consultants, advices on implementing large scale agile (Cohn, 2009). However, academic studies on agile methodologies in a large scale organizations are scarce, and in particular the research on which scaling practices actually provide value, in what context and how to implement them successfully (Paasivaara and Lassenius, 2014).

One of the practices recommended by the practitioner research is the introduction of Communities of Practice (CoP) to enhance knowledge sharing, organizational and process development, and coordination (Larman and Vodde, 2010).
Although CoPs have been described extensively in literature (Wenger, McDermott, and Snyder, 2002; McDermott, 1999a), there is very little research on CoPs in the context of a scaled agile organization.

1.1 ABN AMRO Group N.V.

This thesis will consider a case study within ABN AMRO, therefore ABN AMRO will be shortly introduced. Being the third-largest bank in the Netherlands at the moment of writing, the bank is the result of a merger of the ABN (Algemene Nederlandse Bank) and AMRO (itself a result of a merger of the Amsterdamsche Bank and the Rotterdamsche Bank in the 1960’s) in 1991. The ABN AMRO bank currently has offices in 15 countries with over 32,000 employees, most of whom are placed within the Netherlands with only 5000 in other countries. The bank operations include a private banking division which focuses primarily on high-net-worth clients in 14 countries, as well as commercial and merchant banking operations that play a major role in energy, commodities and transportation markets and brokerage, clearing and custody.

The ABN AMRO acknowledges that in order to keep up with the volatile market of today the bank needs to change. Therefore the bank has introduced the TOPS2020 IT program, its main goals being:

- To become more agile and anticipate more quickly to changes in the market
- To lower ‘time to market’ and to bring new services to customers more quickly
- To structurally lower cost

Adequate knowledge management is essential in achieving these goals. All IT employees must be able to share their knowledge. However, on top of the shift to agile, the ABN AMRO employees experience knowledge sharing as a burden on top of their daily work. In a company-wide employee satisfaction survey in March 2017 the employees scored the question "I can easily find the information I need for my daily work" a 3.49/5, which scores well below the company wide average employee satisfaction rate of 3.88/5. This is in line with the findings of Gammelgaard and Ritter (2005) who finds that the challenge of transitioning to agile is inevitably linked with making the right knowledge available at the right moment in time, especially in distributed organizations.

Considering the above, ABN AMRO has proposed the following research question, which is still to be refined in chapter:

What is the minimum viable product for Knowledge Management in an Agile organization?

The research question will be answered using design science methodology which will utilize a case-based approach. Furthermore, the following deliverables will be included:

1. Annual Report 2015 ABN AMRO Group N.V.
2. Our Company. ABN AMRO. Retrieved 25-04-17
3. The E-SAT Teambarometer is a company-wide survey designed to benchmark employee satisfaction in the TOPS IT departments over 2605 employees and is conducted semi-annual
• An in-depth view of the challenges of Knowledge Management in a scaled agile organization

• A set of design propositions that indicate how to mitigate these challenges in terms of context, interventions, generative mechanisms and outcomes

• A tool that is alpha tested
Problem Description

“If I had an hour to solve a problem I’d spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.”

– Albert Einstein

This chapter will elaborate on the current situation at ABN AMRO and how they tailored the agile way of working to suit their specific needs. Although the bank uses SCRUM as an umbrella term, the bank introduced their own terminology and customizations.

2.1 Current Situation

In May 2013 the bank introduced the TOPS 2020 IT program with its main goals being: increasing agility, decreasing time to market and lowering IT costs. This will be achieved by standardization, reuse and rationalization of ABN AMRO’s IT landscape. Adequate knowledge management is essential to achieve these goals. Key in successful knowledge management lies in the fact that knowledge must be easy to find, easy to understand and easy to maintain.

Henceforth, the bank started a knowledge management program in September 2015 in the IT department to create the necessary prerequisites to facilitate knowledge sharing. Among others, the concrete actions undertake include the creation of a knowledge management strategy, processes were designed and rolled out. Furthermore, the IBM Connections platform was chosen as a platform for publishing and sharing knowledge over the organization. Connections is a Web 2.0 enterprise social software application to provide social networking tools for ABN AMRO employees and people associated. It supports inter- and intra-team collaboration through file sharing, blogging, wiki pages, etc.

Nevertheless, only providing an infrastructure for knowledge sharing is not sufficient. Apart from providing for technology and process, knowledge management requires a new way of working, and together with the shift to agile, ABN AMRO employees experience knowledge sharing as a burden on top of their daily job. Therefore the bank has taken extra measures for ensuring knowledge is efficiently disseminated throughout the company. However, in order to fully comprehend this measures it must be explained what agile entails for ABN AMRO to be agile.

2.1.1 Agile for ABN AMRO

At its core the Agile Software Development (ASD) entails self-organizing teams whose members are not only collocated, but also work at a pace that sustains their creativity and productivity. It also encourages practices that facilitate change in
the requirements in each iteration of the process, and active end-user involvement is encouraged through frequent feedback and small releases (Williams and Cockburn, 2003).

For ABN AMRO the agile way of working entails small multidisciplinary teams who cooperate intensively on a daily base. Each and every team has its own short- and long-term goals and in order to achieve these goals, each team needs to have all the expertise present in the team. The project teams work towards concrete solutions for the end-user or customer using so called sprint, which take 2 weeks. At the end of each sprint, the teams need to present a deliverable to the end-user or customer so that feedback can be given and implemented the next sprint. By actively involving the customer in the development process, the end-product is continuously being aligned with the customer requirements. Figure 2.1 gives us a visualization of the processes of ABN AMRO’s agile way of working and below a brief summary of the relevant jargon for this thesis is given.

**Scrum Team** The team consists of a Product Owner, a Scrum Master, and the development team. Scrum Teams deliver products iteratively and incrementally, thereby maximizing opportunities for feedback. Incremental deliveries of ‘done’ products ensure a potentially useful version of working product is always available (or in other words; the Minimum Viable Product).

**Product Owner** The Product Owner is responsible for maximizing the value of the product and the work of the development team. The product owner is also responsible for managing the Product Backlog.

**Scrum Masters** This person is responsible for ensuring Scrum is understood and enacted. Scrum Masters do this by ensuring that the Scrum Team adheres to the Scrum theory, practices, and rules. The Scrum Leader has a mostly facilitating role and acts as a servant-leader for the team. The Scrum Master helps those outside the team to understand which of their interactions with the Scrum Team are help and which are not, and how to change these interactions to maximize the value created by the Scrum Team.
2.1. Current Situation

**Product Backlog** This is an ordered list of everything that might be needed in the product and is the single source of requirements for any changes to be made to the product.

**Sprint Backlog** The Sprint Backlog is the set of Product Backlog items selected for the Sprint, including a plan for delivering the product increment and realizing the Sprint Goal. It is forecast by the Development Team about what functionality will be in the next increment and the work needed to deliver that functionality into a ‘done’ increment.

**User Story** User stories are the primary means of expressing a needed functionality. They largely replace the traditional requirements specification. User stories are value centric, meaning that they focus on the user, not on the system, as the subject of interest. User stories come in the form: As a ... I can ... so that ..., this form compels the developers to adopt an end-user perspective.

**Sprint Retrospective** This is the last event in a sprint before it starts over. During a sprint retrospective the team discusses the just-concluded sprint and determines what could be changed that might improve productivity in the next sprint.

2.1.2 Scaled Agile

Due to the fact that Agile Software Development is originally developed for small scale companies and intra-team developing, a certain structure needs to be maintained in order to guarantee project success in a scaled environment. Furthermore, bringing together all expertises in one multidisciplinary team is not always possible, so teams need to cooperate. For those reasons the ABN AMRO has chosen the architecture as depicted in figure 2.2 to structure the agile teams in a scaled environment.

![Figure 2.2: Scaled Agile for ABN AMRO](image)

The ABN AMRO opted for a visual structure with the following elements: **Grids, Blocks, Circles and Triangles**, each representing a specific group.

**Blocks:** A multidisciplinary team called a block is the base of the whole structure. The team consists of broadly skilled employees working together on one project, called a **user story**.

**Grids:** A collection of blocks within one business line with a clear and demarcated end-to-end customer responsibility is called a Grid. Each grid has its own category they are working on, which is named an **epic**.
**Circle:** A group of employees within the same grid who have a certain set of skills in common is called a circle. An example of this could be a community of marketeers or testers. Participation in these circles is on an individual level and is organised by the senior employees.

**Triangles:** A community of employees from different blocks and separate grids who share a concern of passion for something they do and learn how to do it better as they interact regularly. Triangles should form from employees initiative and participation in triangles is completely voluntary. Examples of Triangles currently operating within ABN AMRO are: ScrumMaster Triangle, Data Visualisation Triangle, and Knowledge Management Triangle.

The Triangles as described above are a form of Communities of Practice in ABN AMRO terminology, and the bank has just started implementing the above structure. This gives us the unique chance to study the application of Communities of Practice in a practical scenario. Therefore, the research goal and research questions are formulated with this knowledge in mind. The following paragraphs will further motivate the research goals and questions.

### 2.2 Research Goal and Question

In this section of the research question as proposed by ABN AMRO is given, thereafter a method for the derivation of the final problem statement is given. Subsequently, a final problem statement is proposed which is accompanied by the research questions and the sub-questions.

#### 2.2.1 Research Goal

The main research goal of the study presented in this paper is to investigate how a large globally distributed software development organization is able to ensure knowledge is disseminated throughout the company so it does not get lost over time. Special light will be shed on the role of Communities of Practice within this process, as ABN AMRO has just started implementing Communities of Practice (CoP) in the form of circles and triangles.

#### 2.2.2 Research Questions

Agile methods are developed for small teams and small scale companies (Beck et al., 2001), and therefore the application to large organization is considered to be very challenging in terms of project management (Lindvall et al., 2004). Especially when it comes to knowledge sharing over teams. Several authors have pointed out that agile methods facilitate knowledge sharing within the team, but offer little explicit support for inter-team knowledge sharing (Chau, Maurer, and Melnik, 2003; Holz, Melnik, and Schaaf, 2003; Melnik and Maurer, 2004; Karlsen, Hagman, and Pedersen, 2011). Kettunen and Laanti (2008) acknowledge that in agile methods the free flow of knowledge is assumed, but no special emphasis is given to organizational management. Furthermore, Santos, Goldman, and Souza (2015) recognise that Communities of Practice could be an enabler of knowledge sharing in a scaled agile organization, but do not offer any practical recommendations.
Organizational research has studied communication and coordination in large organizations for a long time and approach from this field can also be applicable in the field of software engineering (Kähkönen and Abrahamsson, 2003). For organizations working in dynamic markets, the conditions may be similar as intended for agile software development. For those kind of organizations, self-organizing communities that surpassed official regulations proved to be the key-enablers for successful knowledge sharing. These communities are called Communities of Practice (Brown and Duguid, 1991; Lave and Wenger, 1991).

Within ABN AMRO there are multiple practices of knowledge management implemented, such as a company wide wiki\footnote{IBM Connections} and a agile training program\footnote{The Topolis 2020 program} and Communities of Practice are now being stimulated in the form of triangles and circles. Having this in mind, in cooperation with the IT Office Knowledge Management Team, the following research question is formulated:

*How can knowledge management be optimised in a scaled agile environment through the application of communities of practice?*

In order to answer the above question we must answer the first sub-questions that aims to find what the main challenges are for scaled agile organizations regarding implementing knowledge management.

**Q1:** What are the challenges for implementing knowledge management in a scaled agile organization?

Once the main challenges have been identified, one must find what the benefits are to implementing CoPs in the organization are, thus the following questions is formulated;

**Q2:** What are the benefits of communities of practice in an organization?

After this question is answered, the next step is to find out what characterizes successful CoPs in scaled agile organizations and how organizations can leverage those success-factors, leading to the following question;

**Q3:** What are the key success factors of successful communities of practice?

If this question is answered and all the requirements are known, the last question for the design can be answered. The questions entails the design of a roadmap for implementing Communities of Practice which will be designed by the use of theory-based principles and empirical principles;

**Q4:** How should Communities of Practice be established within ABN AMRO?
3

Theoretical Background

""No one knows everything, everyone knows something, all knowledge resides in networks.""

First, this chapter will go deeper into the theory behind knowledge sharing. Knowledge management and its relation to software engineering will be briefly discussed. Secondly, agile software engineering and the challenges with regard to knowledge sharing over teams will be explained and what possible actions are undertaken to mitigate these challenges. Following that, Communities of Practice as a key enabler for knowledge sharing in a scaled agile are discussed. Lastly, an overview of the challenges and success factors for the communities is given, these will serve as input for the theoretical design principles.

3.1 Knowledge management

Knowledge as a resource has remarkable properties. Unlike other resources, the value of knowledge increases instead of decreases when used (Shapiro and Varian, 1999). Subsequently, knowledge management faces the challenge of managing something that becomes increasingly valuable for the people and the company as it is used more (Adler, 2001).

Nonaka and Takeuchi (1995) make the distinction between implicit (tacit) and explicit knowledge. Explicit knowledge is stored in books, software products and documents; implicit knowledge is stored in the minds of people in the form of memory, skills or experience. Spender (1996) classifies it further by distinguishing implicit, explicit, individual and collective knowledge. It is common belief that both implicit and explicit knowledge are both important, but implicit knowledge is more difficult to manage (Aurum et al., 2003). But in practice, organisations deal with two fundamental and opposing strategies (Hansen, Nohria, and Tierney, 1999):

1. Codification: Is concerned with explicit knowledge, where the knowledge is carefully codified and stored in databases, where it can be used easily by anyone in the company through person-to-document contacts

2. Personalization: Is concerned with tacit knowledge, where knowledge is closely tied to the person who developed it and is hared mainly through person-to-person contacts

The codification strategy is based on managing explicit, codified knowledge, which is typically stored in databases. Such a strategy requires substantial amounts
of resources for development and maintenance. The personalization strategy on the other hand is primarily concerned with tacit knowledge at the company. The strategy entails developing networks to link people to share tacit knowledge, both over individual and organizational level (Polanyi, 1967). Many companies have started to realize that personalization strategies are important to promote learning from experience (Mestad et al., 2007). Such experiential learning differs from traditional learning in the sense that it is relevant to the daily work and that is happens ‘just in time’. Reflection is crucial experiential learning, through reflection in and on action (Raelin, 1998). However, in software engineering most research has been on supporting the codification strategy in large companies through technology (Dingsøyr and Conradi, 2002).

Davenport and Prusak (1998) define knowledge management as ‘a method that simplifies the process of sharing, distributing, creating, capturing and understanding the company’s knowledge’. As the company grows and accumulates more knowledge, it becomes harder to find where the knowledge resides. However, if a company is able to manage their knowledge appropriately, it can increase performance while simultaneously decreasing time and development costs (Rus, Lindvall, and Sinha, 2002).

Earl (2001) classifies work in knowledge management into schools. The schools are broadly categorized as technocratic, economic and behavioural. The technocratic schools are 1) the systems school, which focusses on technology for knowledge sharing and knowledge repositories; 2) the cartographic school, which focuses on knowledge maps and creating knowledge directories; and 3) the engineering school, which focuses on processes and knowledge flows in organizations.

Knowledge management exists at a minimum out of four basis processes, which are defined by Alavi and L. (2001) as follows: 1) Creating Knowledge; 2) Storing and Retrieving Knowledge; 3) Sharing Knowledge; 4) Applying Knowledge. This study will primarily focus on the transfer of knowledge and thus will further elaborate on this. According to Gupta and Dwivedi (2015) knowledge sharing can be conceptualized in terms of five elements: 1) Perceived value of the source unit’s knowledge, 2) Motivational disposition of the source (i.e. willingness to share knowledge), 3) existence and richness of transmission channels, 4) Motivational disposition of the receiving unit (i.e. willingness to receive knowledge), 5) Absorptive capacity of the receiving unit.

The knowledge transfer channels can either be formal, informal, or personal (Holtham and Courtney, 1998). Informal meetings include unscheduled meetings, informal seminars, or coffee conversations, and although these may be effective for socialization, they fail to preclude organisation wide dissemination (Holtham and Courtney, 1998). Informal channels are more effective in small organisations as opposed to larger organisation, but yet these methods do not guarantee correct transfer of knowledge (Fahey and Prusak, 1998). Formal methods (e.g. training session, planned meetings, plant tours) ensure organisation wide dissemination and correct knowledge transfer, yet fail to foster creativity. Personal channels (e.g. apprenticeships) are effective for transfer highly context specific knowledge, where more impersonal channels (e.g. knowledge repositories) are more effective when knowledge can be generalized (Fahey and Prusak, 1998).
3.1.1 Knowledge management in Software Engineering

In the collaborative and knowledge-intensive process that is software development, the need for blending and interweaving of diverse knowledge is high (Robillard, 1999). As software projects grow bigger and become more complex, individual knowledge has to be shared and leveraged at a project and organization level. Bennis and Ward Biederman (1998) phrased it like “none of us is as smart as all of us”. This complements the software industry initiatives like the Capability Maturity Model (Paulk et al., 1993), which attempts to establish software processes that are independent of individual software engineers.

Yet, there is little consensus among researchers on how to efficiently manage knowledge in software engineering. However, the way in which knowledge is managed in software engineering is inherently related to the software development approach itself. Whereas a traditional (or plan-based) approach mainly relies on managing and documenting explicit knowledge, a more agile approach focusses on managing tacit knowledge (Nerur and Balijepally, 2007) through personalisation strategies.

However, research in knowledge management in software engineering suggests using a concept called the Experience Factory (Basili, Caldiera, and Rombach, 1994). This concept advocates the reusing of previous experiences and a centralised team to be responsible for the maintenance of a centralised knowledge base. The recycling of previous knowledge ensures continuous learning on both team and organization level, yet it does not address on how to address tacit knowledge in an Agile setting (Lesser and Prusak, 2000).

3.2 Agile

The fundamentals of the Agile Way of Working originated from the software development industry where its characteristics were described in the Agile Manifesto (Beck et al., 2001). The Agile Manifesto signified a change of pace in IT development, and is often described as a reaction against the bureaucracy of the traditional methods (Ågerfalk and Fitzgerald, 2006). The authors Beck et al. (2001) describe this fundamental change as follows:

"In order to succeed in the new economy, to move aggressively into the era of e-business, e-commerce, and the web, companies have to rid themselves of the Dilbert manifestations of make-work and arcane policies. This freedom from the inanities of corporate life attracts proponents of Agile Methodologies, and scares the begeebers (you can’t use the work ‘shit’ in a professional paper) out of traditionalists. Quite frankly, the Agile approaches scare corporate bureaucrats—at least those that are happy pushing process for process’s sake versus trying to do the best for the ‘customer’ and deliver something timely and tangible and ‘as promised’—because they run out of places to hide”, p. 1

The conventional software approach require a Tayloristic\(^1\) mindset in which software development is considered to be a static process and people are assigned specific roles at prespecified stages in the process, inevitably shifting the focus from individuals and their creative abilities to the processes themselves (Chau, Maurer, and Melnik, 2003). It follows that in the turbulent world of today, this approach no longer suffices. That is where Agile mindset appears.

\(^1\)traditional, plan-driven or task-based
The Agile Way of Working includes four values:

1. Individuals and interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan

These four values are manifested in twelve principles: (1) highest priority is customer satisfaction, (2) welcome changing requirements, (3) frequent delivery of software, (4) business people and developers cooperate daily, (5) build projects around motivated people, (6) face-to-face conversation is best, (7) progress is measured by working software, (8) sustainable development pace, (9) continuous attention to technical excellence, (10) simplicity, (11) self-organizing team, and (12) regular reflection and adaption.

To summarize, the manifesto describes a number of practices which promote a lean mindset, only focusing on activities that deliver direct value to the end-user. Furthermore, it entails self-organizing teams whose members are not only co-located, but also work at a pace that sustains their creativity and productivity (Cockburn and Highsmith, 2001). On top of that, the manifesto encourages practices that facilitate changes in the requirements in each iteration of the process. The requirements are updated according to the needs of the end-user, who is actively involved in the development process, thus stimulating feedback and evaluation throughout the project.

In current literature we find many lists illustrating the differences between the traditional and agile methodologies (Chau, Maurer, and Melnik, 2003; Dybå and Dingsøyr, 2009; Turner and Jain, 2002). Table 3.1 shows the main differences in terms of perspective on software development (Dybå and Dingsøyr, 2009). The difference most relevant to this paper is the way in which knowledge viewed and the strategy inherent to the knowledge perspective.

From a knowledge management perspective, the focus of agile methodologies is on sharing tacit knowledge within the team. According to Cummings (2004), knowledge sharing is the provision of task information and know-how to a person, so that (s)he can collaborate with others to solve problems or develop new ideas. Knowledge sharing can either occur through tools and repositories (codification strategy) or face-to-face communication (personalization strategy). The agile methodologies regard intra-team knowledge sharing as crucial for project success and simulate a natural environment to emphasize face-to-face conversations and discourages documentation (Cockburn and Highsmith, 2001). Thus, agile methods are in line with the personalization strategy.

### 3.2.1 Traditional and Agile Knowledge Sharing

Traditional software development approaches advocate strong conformance to up-front requirements and up-front systems design. In order ensure project and product compliance in turbulent environments, knowledge of all possible requirements is meticulously captured in documents and then addressed. This emphasis on using documentation is reinforced by practices such as ‘document what you do’ and ‘do what has been documented’ (Paulk et al., 1993). Consequently, this approach promotes labour division and specialization, which results in long chains of knowledge transfer.
### TABLE 3.1: Traditional and agile perspectives on software development (Dybå and Dingsøyr, 2009)

<table>
<thead>
<tr>
<th></th>
<th>Traditional View</th>
<th>Agile View</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design process</strong></td>
<td>Deliberate and formal, linear sequence of steps, separate formulation and</td>
<td>Emergent, iterative and exploratory, knowing in action inseparable, beyond formal rules</td>
</tr>
<tr>
<td></td>
<td>implementation, rule-driven</td>
<td></td>
</tr>
<tr>
<td><strong>Goal</strong></td>
<td>Optimization</td>
<td>Adaptation, flexibility</td>
</tr>
<tr>
<td><strong>Problem-solving</strong></td>
<td>Selection of the best means to accomplish a given end through well-planned,</td>
<td>Learning through experimentation and introspection, constantly re-framing the problem and its solution</td>
</tr>
<tr>
<td><strong>process</strong></td>
<td>formalized activities</td>
<td></td>
</tr>
<tr>
<td><strong>View of the</strong></td>
<td>Stable, predictable</td>
<td>Turbulent, difficult to predict</td>
</tr>
<tr>
<td><strong>environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of learning</strong></td>
<td>Single-loop/adaptive</td>
<td>Double-loop/generative</td>
</tr>
<tr>
<td><strong>Key</strong></td>
<td>Control and direction</td>
<td>Collaboration and communication; integrates different worldviews</td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
<td>Avoid conflicts</td>
<td>Embraces conflicts and dialectics</td>
</tr>
<tr>
<td></td>
<td>Formalizes Innovation</td>
<td>Encourages exploration and creativity</td>
</tr>
<tr>
<td></td>
<td>Manager is controller</td>
<td>Manager is facilitator</td>
</tr>
<tr>
<td></td>
<td>Design precedes implementation</td>
<td>Design and implementation are inseparable and evolve iteratively</td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>Technical/functional</td>
<td>Substantial</td>
</tr>
<tr>
<td><strong>Theoretical and/or</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>philosophical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>roots</strong></td>
<td>Logical Positivism, scientific method</td>
<td>Action, learning</td>
</tr>
</tbody>
</table>

Many intermediaries are involved and the original content diminishes as it passed down the chain (Melnik and Maurer, 2004). To illustrate this, consider a chain of six players as shown in figure 3.1: Customer → Analyst → Architect → Designer → Lead Developer → Developer. If we assume that at every knowledge transfer there is a 5% mutation, at the end of the chain only 77% of the original information gets correctly to the developer. Similarly, in case of a 10% mutation only a mere 59% of the information is delivered correctly. Keil and Carmel (1995) made similar observations in their exploratory study of 31 software development teams.

On top of that, since people on the one end of the chain (developer) do not know what people on the other end (end-user) of the chain exactly want, over-documentation tends to be the norm. This results in excessive amounts of documentation that has no actual value and thus relevant knowledge may get lost in the abundance of information (Hajjdiab and Taleb, 2011).

In contrast to the more conventional methods, agile methods consider individuals and interactions as crucial factors of project success. All agile methods support continual realignment and refinement of development in accordance
with the needs and expectations of the customer. In others words, Agile considers knowledge sharing as a highly social process, unlike the traditional methods. (Melnik and Maurer, 2004) describe this contrast respectively knowledge-as-relationships versus knowledge-as-objects.

As illustrated by figure 3.1, the knowledge chain in the Agile setting is significantly shorter due to the active involvement of the end-user in the development process. Melnik and Maurer (2004) refer to this as ‘high velocity knowledge sharing’. In this setting, the whole development team cooperates in the same location with the customer. This form of co-located knowledge sharing takes the form of pair programming, pair rotation, on-site customers, daily Scrum meetings, cross-functional teams, and daily project retrospectives (Schwaber and Beedle, 2001).

### 3.2.2 Knowledge Management Challenges in an Agile Setting

To foster dynamic knowledge sharing and improve productivity and coordination in software development teams, the agile approach focuses on sharing tacit knowledge within the team through personalization strategies. Multiple researchers have pointed out measures that facilitate knowledge sharing within a team, such as pair programming, rotation and cross-functional teams (Chau, Maurer, and Melnik, 2003; Holz, Melnik, and Schaal, 2003; Karlsen, Hagman, and Pedersen, 2011). Although the free flow of information in the form of tacit knowledge is supported, there is no explicit support for organizational knowledge management in Agile methods (Kettunen and Laanti, 2008). Conboy and Duarte (2010) confirm in their study that there are no recommended mechanisms of communication of knowledge among agile teams.

Even Agile leader Kent Beck acknowledges that relying on pure tacit, undocumented knowledge that only supports intra-team learning is not workable (Ågerfalk and Fitzgerald, 2006). On the other hand, even on large projects there are subparts with requirements volatile enough to make it worthwhile to focus on tacit knowledge as opposed to documentation, but there is a need for some sort of support for inter-team learning. Kavitha and Ahmed (2011) have identified several challenges that are inherently related to the emphasis on the personalization strategy utilized by agile methodologies:

- Experts find themselves spending much time in repeatedly answering the same questions
- Members find themselves in situations where they that they have had a certain problem before, but cannot remember its solution
3.3 Communities Of Practice

- Knowledge is lost as soon as experienced developers leave the project or company
- Informal communication cannot serve as a record
- Less support for reusability
- Less contribution to organizational knowledge

The two latent challenges that can be derived from the challenges as formulated by Kavitha and Ahmed (2011) is the transfer of implicit knowledge to explicit knowledge, as well as the transfer of explicit knowledge from individuals to groups within the organization (Levy and Hazzan, 2009).

Thus, excessive focus on the product and on the delivery of value to customers, lack of knowledge sharing practices, or time pressure can make inter-team knowledge sharing difficult and may even lead to teams repeat past mistakes (Karlsen, Hagman, and Pedersen, 2011). In others words, agile methods may hinder the effective creation and sustenance of organizational knowledge (Karlsen, Hagman, and Pedersen, 2011; Bjørnson and Dingsøyr, 2008; Kähkönen and Abrahamsson, 2003; Chau, Maurer, and Melnik, 2003).

3.3 Communities Of Practice

In software engineering most research has been conduct on implementing codification strategies within large organizations through supporting technologies (Dingsøyr and Conradi, 2002). However, surprisingly little research has been conducted on personalization strategies in these companies (Mestad et al., 2007). A good example of a personalization strategy, which is also applied in organizations that deal with similar dynamic markets as agile software engineering, are communities of practice (Brown and Duguid, 1991).

Communities of Practice (CoP) was developed as a concept to overcome the limitations that are imposed by working in teams. Mcdermott (1999a) argues that teams are great for solving problems within functional silos, but may create some other type of silo. There is a risk of teams becoming isolated from each other and start working separate islands. They reinvent tools, analyses or approaches already explored by other teams. They waste time searching for information their colleagues already have. In other words; when teams have little contact with other teams, they can get into the habit of rejecting outside ideas and lose their ability to generate new ideas (Mcdermott, 1999a).

CoPs can be defined as "groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger, McDermott, and Snyder, 2002). The CoPs differ from normal business units in the sense that their main goal is knowledge-creation and that there are no formal connections between them. They are usually loosely connected, self-managed, and informal. According to Wenger, McDermott, and Snyder (2002) a community can be defined as a CoP once there are three characteristics which are developed in parallel (see figure3.3):

1. **Domain:** A CoP is not merely a club of friends or a network of connections between people. A CoP should have an identity that is defined by a shared domain of interest. Hence, membership implies commitment to the domain and subsequently a shared competence.
3. Theoretical Background

2. **Community**: In pursuit of the common interest in their domain, members form a community by engaging in joint activities and by sharing information they help each other. Relationships with each other, enables the community to learn from one another and a strong connections encourages willingness to share ideas, expose one’s ignorance or ask difficult questions.

3. **Practice**: The last requirement is that the members are practitioners, and that they develop a shared repertoire of resources that can include stores, tools, experiences, best practices, etc. These kind of interactions need to be developed over time. Informal conversation (e.g. developers or testers) help people share and develop a set of cases and stories that have become (unconsciously) a shared repertoire for their practice.

CoPs are everywhere and they have been around even before organizations acknowledged the concept, although unofficial. CoPs transcend the traditional organizational boundaries and therefore may be hard to recognize. However, Thompson (2005) formulated a set of indicators using Wenger’s research to identify a CoP in his research in a internet consulting division of a company, which can be found in appendix D.

Although there are many sort of communities present in an organization, not every community qualifies as a CoP. Similarly, not every practice that is recognised gives rise to a community. The terms community and practice coined together refer to a very specific type of social structure with a very specific purpose. In order to elucidate upon what is so distinctive about CoPs as knowledge structures, contrast with more familiar structures is provided in table 3.2.

### 3.3.1 The Organizational Value of Communities of Practice

From the perspective of a large software development organization, the concept of CoPs are interesting as it offers many benefits. There are multiple dimensions in large and complex organizations, and the formal organizational dimensions can only reflect one of them (Bosch, 2001). According to Mcdermott (1999b) CoPs act as a mechanism for capturing and sharing tacit knowledge by letting people from different departments discuss common interests. CoPs act as a vehicle that address the rising complexities in software engineering and allows for a global organization to operate as a unified, integrated entity while positively impacting
3.3. Communities Of Practice

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Who belongs?</th>
<th>Boundaries</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communities of Practice</td>
<td>Create, expand and exchange organizational knowledge</td>
<td>Self-selection based on expertise or passion of on a topic</td>
<td>Fuzzy</td>
</tr>
<tr>
<td>Formal departments</td>
<td>to deliver a product or service</td>
<td>Everyone reporting manager</td>
<td>Clear</td>
</tr>
<tr>
<td>Operational team</td>
<td>Taking care of an ongoing operation or process</td>
<td>Membership assigned by management</td>
<td>Clear</td>
</tr>
<tr>
<td>Project team</td>
<td>To accomplish prespecified task</td>
<td>People with direct role in the project</td>
<td>Clear</td>
</tr>
<tr>
<td>Community of Interest</td>
<td>To be informed</td>
<td>All interested</td>
<td>Fuzzy</td>
</tr>
<tr>
<td>Informal networks</td>
<td>To receive and pass on information</td>
<td>Friends and acquaintances</td>
<td>Undefined</td>
</tr>
</tbody>
</table>

the level of performance (Resnick and Meija, 2007). These communities have the potential to increase organizational performance by stimulating contribution of individual members on their own terms. More specifically, Resnick (2006) lists the following benefits for organizations provided by the communities:

- CoPs enable the development and dissemination of comprehensive repositories of dynamic knowledge. One of the main benefits of a CoP is the associated knowledge base that is created simultaneous with the community. Members can share technical content, relevant knowledge or intellectual capital that can be reused by others. Each of these can be evaluated for quality and be tagged by the repository accordingly. Dissemination can be managed according to each member’s requirements.

- CoPs facilitate the development of a common language that reinforces the initial connections establish within the specific domain. Geographically dispersed teams often face the challenge of a different terminology and local jargon for the same profession. CoP facilitates the communication required to understand each other, allowing members to understand the content created in different regions.

- CoPs can be used to identify best practices and disseminate them throughout the organizations. As practitioners develop better methods and best practices, they can be communicated and debated among the included professional community. Due to the fact that the CoPs are strictly limited to company employees and authorized outsiders, there is little risk of revealing confidential information so that the deliberation can be conducted freely. Once best practice has been identified and validated, the dispersion across
3. Theoretical Background

the organization is relatively easy due to the wide variety of the backgrounds in the community

- CoPs increase the learning curve of new employees since newly acquired employees can gain access to best practice descriptions, contact other individuals addressing similar challenges, and identify internal practice-oriented mentors.

- Specific subject matter experts can be identified and subjected to reputation management. The content contributed to the community is validated through the whole community and the author is credited for the contribution.

- Cross-functional and cross-organizational collaboration can be fostered, building a safe environment for brainstorming and testing new ideas.

- The matching process of the right person to the right project can be improved.

Thus, CoPs can cover the dimension of tacit knowledge that organizational structures can not. In order to achieve this, within the organization there should be multiple overlapping communities that transcend the team boundaries (Mcdermott, 1999b). To conclude, many organizations report reduced problems related to a lack of communications and time savings by ‘working smarter’ (Wenger, Mcdermott, and Snyder, 2002).

3.3.2 Development stages of Communities of Practice

Communities of practice grow, evolve and die according to the organizational needs. Literature has identified five stages of development that each CoP goes through, namely: potential coalescing, maturing, stewardship, and transformation (Wenger, Mcdermott, and Snyder, 2002).

In the potential stage there is no community of any sort, only a group of interested people that start networking around a topic of joint interest. The biggest challenge for evolving into a real community of practice is finding enough common ground between member to let them see the potential value of a CoP. At this stage it is important to have an active and passionate community coordinator.

Once the community is born, it enters the coalescing stage. In this phase the community is still particularly fragile. As the community tries to find a rhythm after the initial spike of interest and energy, reality may set in. After initial interest, people’s energy for the community may decline sharply, prioritizing other commitments over the community. Therefore the coordinator is still crucial and his main challenge is to incubate the community and deliver immediate value to the members and organization.

At the maturing stage, the community has delivered value to both the members and the organization, thus proving its worth. The focus shifts to clarifying the focus, role and boundaries of the CoP. The activities become more focused and systematic about establishing standards for recurring problems and routine operations, finding gaps in the organizational knowledge. The CoP may require some additional resources from the organization.

As the CoP has matured, it enters the stewardship stage. This stage is predominantly occupied with maintaining momentum and keeping the CoP going. Hereafter the community enters the transformation phase, in which the CoP either has outlived its usefulness and ceases to exist, or transforms in some other structure, such as a club or become institutionalized, e.g. as a department.
3.3. Communities Of Practice

3.3.3 Success factors for Cultivating Communities of Practice

Although CoPs are fundamentally informal and self-organizing, they benefit from cultivation (Wenger, McDermott, and Snyder, 2002; Wenger, 1998; Lintern, Diedrich, and Serfaty, 2002). Research regarding CoPs suggests that although CoPs cannot be artificially created, they can be nurtured and given artificial opportunities. Wenger and Snyder (2000) draw the analogy between a CoP and a garden:

“You can not tug a cornstalk to make it grow faster or taller, and you shouldn’t yank a marigold out of the ground to see if it has roots. You can, however, till the soil, pull out weeds, add water during dry spells, and ensure that your plants have the proper nutrients. And while you may welcome the wildflowers that blooms without any cultivation, you may get even more sanctification from those vegetables and flowers you started from seed”, p. 143

Thus there appears to be some kind of managerial paradox in which the community must be left untouched in order to reap their benefits. However, although the emergence of successful CoPs cannot be dictated, their development can be affected. Wenger suggests (2000) that an organization interested harvesting the potential benefits of a CoP, should ‘shepherd’ rather than create them. The author also presents seven principles for cultivating CoPs, listed in table 3.3.

Paasivaara and Lassenius (2014) found a supportive atmosphere to be the main success factor for building a CoP. The authors identified three elements contributing towards building supportive atmosphere for CoPs: openness of participation, participation valued by the organization, and managers and coaches support in building. In addition, infrastructure support, including e.g. wikis and video conference facilities for distributed CoPs, is needed. The authors found in their case study in Ericsson, a telecommunication company, that initially people in the organization did not understand why they should partake in the CoP meetings, and what the meetings were supposed to accomplish. The first CoPs were formed by management and the coaches, and only after a while the rest of the organization started to understand how to create and utilize CoPs. In line with these findings, (Akhavan, Marzieh, and Mirjafari, 2015) found that managers can provide a suitable base to shape CoPs and help them emerge and to enhance them. However, they also identified some crucial factors for increasing the likelihood of CoP success. The first latent factor is ‘strategy and goals’, which entails that formulating clear objectives and strategy contributes to the likelihood of success for the community. The second factor is ‘organization’, which relates to the structure and level of communication within the community. The authors argue that the level of communication among members of the CoP is an important factor on their effectiveness in organizations. This relates to the use of electronic tools in enhancing communication and the interaction between newer and older members in the CoPs (Akhavan et al., 2015; Chang et al., 2004). Thus, a CoP cannot be kept alive artificially, but the conditions for growing one can be provided. Through formulating clear objectives, a proper organisational structure and a supportive atmosphere, organizations can increase the likelihood for success. These findings in the case study in Ericsson match well with the principles listed in table 3.3 from Wenger et al. (2002).
Table 3.3: Principles for cultivating Communities of Practice
(Wenger et al., 2002)

<table>
<thead>
<tr>
<th>CoP cultivation principle</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design for Evolution</td>
<td>Expect the community to grow and evolve on its own</td>
</tr>
<tr>
<td>2. Open a dialog between inside and outside perspectives</td>
<td>Help the community members understand what the community could achieve</td>
</tr>
<tr>
<td>3. Invite different levels of participation</td>
<td>Allow for different activity levels and motivations of participants</td>
</tr>
<tr>
<td>4. Develop both public and private community spaces</td>
<td>Both ‘formal’ meetings, as well as one-one-one networking is needed</td>
</tr>
<tr>
<td>5. Focus on value</td>
<td>Encourage members to be explicit about the value of the community</td>
</tr>
<tr>
<td>6. Combine familiarity and excitement</td>
<td>Have a ‘routine’ program, but also include novel experiences, e.g. invited speakers</td>
</tr>
<tr>
<td>7. Create a rhythm for the community</td>
<td>Find a suitable rhythm for the regular meetings</td>
</tr>
</tbody>
</table>

3.3.4 The Limitations of Communities of Practice

Although CoPs seem to offer mainly advantages, there are some disadvantages and limitations that must be understood. Firstly, because CoPs are so loosely defined and hard to identify them when a problem needs to be solved, it is hard put a CoP to practice (Botha, 2008). Another issue which could arise is the problem of transferring and combining knowledge across the firm. Due to the close ties to ‘doing’ and the cultural elements, this may require innovative solutions. An example could be using a temporary cross functional project team that can leverage knowledge from different areas, apply it, learn it, and redistribute it over the separate communities again (Botha, 2008).

Kerno (2008) reports multiple challenges for CoPs. The first challenge he identifies is the availability of time in which to engage in the activities that are necessary. The author states that an increase in work demand goes at the expense of the effectiveness of the CoP. Secondly, CoPs are less likely to succeed in organizational hierarchies. If the individuals within a CoP are more concerned with maintaining and adhering to the organizational chart and its hierarchical ordering, than with maximizing organizational performance, then CoPs are not likely to produce any substantive benefits (Kerno, 2008). The last challenge to be recognised by the author is that organizations in Western societies are less likely to be successful at capitalizing CoPs than their Eastern counterparts, because of historic and socio-cultural differences that create relative disadvantages. The Western self is more oriented toward the ego and thrives on debating argumentation, the Eastern societies are more orientated toward the group and value resolving contradictions and harmony (Leung et al., 2011).

2Europe, Australia, Canada, US
3China, Japan, South-Korea
Methodology

“The test arena is our life situation, not a laboratory”
– Warfield (1994), p.8

Whereas the previous chapters provided the context of ABN AMRO and the theoretical background this chapter will explain the methodology that is used to execute this study. First, a description of the design science methodology is provided, as design science research is notably different from explanatory research, which is more common in social sciences. Secondly, the method for the literature review will be elaborated, followed by an explanation of the extraction of the theoretical design propositions from the literature review. Thirdly, the methods used to execute multiple case studies is given, after which an explanation of the extraction of the empirical design propositions from the observations in the cases. Thereafter, an explanation is given of the process of synthesis of the theoretical and empirical design propositions in a final set of design propositions that is grounded in both research and practice. To conclude, quality criteria and the testing procedure will be discussed briefly.

4.1 Design Context

The organization science has long been criticized for a lack of application in the practical world (Van Aken, 2004). The scientific efforts predominantly focuses on describing and evaluating recent development in organizational practice produced by the practitioners (Kaminska-Labbé and Sachs, 2006). By merely emphasizing the question of theoretical relevance, the added value of such approaches in organization design remains doubtful.

Inspired by Simon’s (1981) Sciences of the Artificial a new trend in organization science emerged, namely Design Science. This new approach differs from previous treatments of organizations science by asking the question ‘will it work better?’ rather than ‘is this proposition valid or true?’ (Jelinek et al., 2008). In other words, design science aims to develop knowledge applicable in solving real-life problems, unlike explanatory science which aims to describe, explain and predict.

Design science aims to bridge the worlds of theoretical knowledge and practical relevance through the use of design principles (Romme and Endenburg, 2006) and propositions specific to certain situations, conditions, and context (Jelinek et al., 2008). It accepts the fact that a minor input variation can lead to an enormous fluctuation in output, thereby avoiding the pitfalls of claimed scientific omniscience. Rather, design science suggests that set of well chosen design principles offers a much more resilient and viable solution (Eisenhardt and Sull, 2001). To further illustrate the differences between explanatory and design science, table 4.1 summarizes the difference.
TABLE 4.1: Differences between explanatory research and design science research, adapted from Van Aken et al. (2012)

<table>
<thead>
<tr>
<th>Driver</th>
<th>Explanatory research Strategies</th>
<th>Design Science Research Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perspective</td>
<td>Theoretical problems</td>
<td>Field problems</td>
</tr>
<tr>
<td>Interested</td>
<td>To understand, quest for truth</td>
<td>To improve human conditions</td>
</tr>
<tr>
<td>Justification</td>
<td>In the world as is</td>
<td>In the world to be</td>
</tr>
<tr>
<td>The research product</td>
<td>On the basis of descriptive and explanatory validity</td>
<td>On the basis of descriptive and pragmatic validity</td>
</tr>
<tr>
<td>The research product</td>
<td>The causal model</td>
<td>The design proposition</td>
</tr>
</tbody>
</table>

This study formulates design principles in two separate ways. Firstly, a set of design principles based upon scholarly knowledge is formulated (i.e. theoretical design principles). Secondly, a set of design principles is developed based upon practice (i.e. empirical design principles). Consequently, the synthesis of these principles will result in a set of final design principles grounded in both practitioner and research knowledge. These design principles are representations of (re) designed practices, involving actions in the virtual world such as drawings, models, narratives, etc. These virtual actions are more context specific than the design principles and can be tested in practice directly.

In the overall context of entrepreneurship and innovation, design processes tend to be as much emergent as deliberate in nature (Weick, 2004). The emergent dimension serves to respond to and account for the unique nature of the local setting, whereas the deliberate dimension serves to build a body of knowledge that cuts across multiple setting (see figure 4.1). The explanatory (or scholarly) body of knowledge draws mainly upon causal propositions and empirical studies testing these propositions. Alternatively, the more practical stage, (see figure 4.1) draws on effectual knowledge that is inherently creative (Sarasvathy, 2001).

![Figure 4.1: The research-Design-Development cycle from a Science-based Design perspective, based on Van Burg et al. (2008)](image)

4.2 Research Approach

This master thesis will adopt the approach of Van Burg et al. (2008) with some minor adaptations. Figure 4.2 depicts the design approach. As can be seen, the
final design principles are developed from theoretical principles (grounded in literature) and empirical design principles (derived from four case studies). These principles will be applied to the setting of ABN AMRO, followed by a reflection on the results, in the discussion and conclusion section. This discussion will also provide for recommendations for further research that could enhance the development of design principles in the future.

**Figure 4.2: The thesis design science approach**

In chapter 6, the design and implementation of the tool for ABN AMRO, a set of design activities have to be performed, which together form the regulative cycle as initially proposed by Van Strien (1997). However, in this study the regulative cycle as described by Aken, Berends, and Bij (2012) is applied. An overview of the cycle can be seen in figure 4.3. The regulative cycle developed by van Aken et al. (2012) contains the following five steps: (1) Problem definition, (2) Analysis and Diagnosis, (3) Design, (4) Intervention, and (5) Evaluation. The main goal of this cycle is to test whether a proposed solution will endure in real life and is capable of solving the business problem.

**Problem Definition:** This is the initial problem as proposed by ABN AMRO and agreed upon by both the university supervisor and the researcher. If the stakeholders cannot not reach consensus on the proposed problem definition, the regulative cycle is not suitable for the particular situation and a different approach must be used (Aken, Berends, and Bij, 2012). If the stakeholders do reach consensus, the next stage commences.

**Analysis and Diagnosis** In the analysis and diagnosis phase, this thesis makes use of the *Empirical Cycle* (De Groot, 1969) as a sub-part of the regulative cycle. Although the empirical cycle is usually applied in explanatory science, and its goal is to explain rather than provide prescriptive knowledge, this study applies the empirical cycle to enhance the diagnosis phase of the regulative cycle. I.e. the two cycles are used complementary and the adoption of the empirical cycle in the regulative cycle will enhance the likelihood of success. Figure 4.3 shows the system as a whole.

**Design** A plan is be constructed, in which the both the end and the means are formulated, to eventually reach an improved end-state of the situation and to overcome the problems as described in the diagnosis phase. Aken, Berends, and Bij (2012) suggests the use of field tested and grounded theory rules, which are also known as design propositions. These propositions will be formulated using the CIMO format developed by (Denyer, Tranfield, and Aken, 2008). The paragraph below elaborates on this type of reasoning. For
the construction of the design propositions, Van Burg et al. (2008) proposed a method (see figure 4.1).

**Intervention** In this phase the proposed design is brought into practice and implemented in the organisation.

**Evaluation** Once the design is implemented, it must be evaluated in order to check if it produced the desired outcomes. If needed, adjustments will be made and the regulative cycle will start all over.

![Figure 4.3: The Empirical cycle as a sub-part of the regulative cycle, adapted from van Aken et al. (2008)](image)

In organization and management it is important to resist taking a mechanistic view, such as might be the case in prescriptions of a certain drug by a doctor to a patient, or a civil engineer calculating the maximum load of a bridge. In these fields, prescriptive knowledge is often described as ‘if A, then B’ (IO-logic). The volatile nature of design science calls for a more appropriate type of reasoning. Hence Denyer, Tranfield, and Aken (2008) introduce the notion design proposition following ‘CIMO’-logic.

CIMO-logic stems from the works of Bunge who developed the following logic of prescriptive knowledge: “if you want to achieve outcome O in context C, then use intervention type I.” Denyer, Tranfield, and Aken (2008) extend on this logic by taking into account what kind of generative mechanisms are triggered to produce the desired outcome of the intervention. CIMO logic takes the following form: in this class of problematic contexts (C), use this interventions (I) type to invoke these generative mechanisms (M), to deliver these outcomes (O). Although the meaning of the CIMO acronym may seem clear cut, for general completeness of this study appendix provides the more elaborate definitions. Actually applying the principles to ABN AMRO will be used to enter the implementation phase in the regulative cycle. Closing the regulative cycle lies outside the scope of this thesis, since implementing the design covers a longer period than the writing of this master thesis.

The knowledge (in the form of design principles) that is generated from this process can be applied to design solutions in similar problem settings, and thus

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1Input, Output logic
contributing to theory development and completing the regulative cycle. However, given the size of the master thesis and the fact that the evaluation phase will not be completed, the application of the principles in other cases than ABN AMRO will not take place and the cycle will not be completed.

### 4.2.1 Analytic Approach

Overall, there are two general approaches (Yin, 2009), the first being analysis based upon theoretical propositions and the second being analysis based on a descriptive framework. Both Yin (2009) and Van Aken et al. (2012) suggest using the latter strategy if relevant frameworks can be found.

This thesis has derived a framework from literature and initial interviews with key stakeholders. Although this framework has provided some initial guidance, flexibility from the researcher is still required as some some themes or relationships may reveal themselves during the research process. Eisenhardt (1989) refers to this as ‘controlled opportunism’, which should guide data collection in order to make use of unexpected and coincidental findings.

The predominant mode of analysis in this research is pattern-matching. In this mode of analysis, empirically based patterns are found through data collection and are compared to the predicted patterns (Yin, 2009). If certain certain observation tend to repeat themselves, it can be said that there is a pattern. Furthermore, if these patterns match over multiple cases, the internal reliability is increased. Although the actual comparison between the predicted and actual pattern has no quantitative criteria, therefore discretion of the researcher is required Trochim (1989).

### 4.2.2 Design Approach

Since this project is aimed at improving an existing business problem, it does not stop after a valid and reliable analysis have been made. It enters the next step in the regulative cycle, namely the design phase.

The outcome of the diagnosis can be used to provide specifications (i.e. design requirements) for the design of a solution. The design activity differs fundamentally preceding analysis and diagnosis phase, due to the fact that validity and reliability are no longer of interest since it aims to ‘improve reality’ rather than to explain it. In this particular case however, ‘improving reality’ does not cover the subject, since there is no predecessor. An important aspect in the design phase is the concept of equifinality meaning that “in a system there are many different ways of achieving the desired state.”

At the beginning of the design phase, several different design solutions will be proposed to the lead stakeholders of the project. The different will be evaluated on impact and feasibility and eventually the most favourable will be elaborated.

The design process will consists of several basic iterations, which are synthesis-evaluation iterations. In reality, the design process is not that linear, but for the sake of convenience, multiple milestones will serve as synthesis-evaluation iterations. The essence of these iterations consists of two steps:

1. one synthesis in the immaterial world of communication, with drawings and texts of the design to be realized
2. an evaluation of the expected performance of the design against the specifications on paper
4. Methodology

Figure 4.4: The key activities in designing: synthesis-evaluation iterations (loop 1) and specification-design iterations (loop 2), which are started if the answer to question S (‘change specifications?’) is ‘yes’ (Van Aken et al., 2012)

If the evaluation does not produce the desired results, a new or adapted synthesis is made and re-evaluated (Loop 1 in figure 4.4). If this iteration may fail to produce a satisfactory solution, a second type of iteration is started: specification-design iterations (Loop 2 in figure 4.4).

4.3 Literature Review: Theoretical Design Principles

In order to derive design principles from the literature and from the case studies, a literature review and a research synthesis have been developed. The objective for this literature review is twofold. First, it enables the analyses of the problem at a deeper lever, positioning it at the diagnosis phase of the regulative cycle (figure 4.3). Secondly, the literature review allows for the construction of theory-based design principles, this is the execution of the right side of the model by Van Burg et al. (2008), as depicted in figure 4.1. This means that the literature review can be positioned at the design phase of the regulative cycle. The scope of the literature review was set to gather insights on the challenges of knowledge management in agile organizations.

The literature review forms the basis of this process by going deeper into possible solutions and practices offered for ensuring knowledge management in organisation.

4.4 Case study: Empirical Design Principles

In addition to the theoretical design principles, empirical design principles are formed. A unique strength of using case studies is to deal with a wide range of data sources according to Yin (2009). Combining multiple data resources fosters data triangulation, which increases the quality of the data by enhancing construct validity through multiple measurements of the same phenomenon (Yin, 2009). On top of that, according to Yeung (1995) case studies are a popular research tool, particularly in business and management, where a phenomena is studied in its natural setting.

For the construction of the empirical design principles, the unit of analysis needs to be considered. The unit of analysis is the ‘who’ or ‘what’ being studied (Yin, 2009). Since this thesis compares several communities, the unit of analysis are the communities of practice itself. This this thesis focuses on four specific cases, the motivation for these specific cases is further elaborated in section 4.8.
This is the execution of the left side of the model by Van Burg et al. (2008), as depicted in figure [4.1] thus positioning it in the design phase of the regulative cycle. According to Blumberg, Cooper, and Schindler (2008) semi-structured interviews are the best choice for the development of empirical data. They address a theme set with open questions, providing flexibility for the interviewees to express views freely. Furthermore, they allow for the comparison of similar events, for which reason the interviews were conducted along a case study protocol.

4.4.1 Definition of Success

Extrapolating the design principles as independent variables from the cases, calls for the need of a dependent variable, namely the definition of success for a CoP. Although there is no real consensus on the definition of success for communities of practice, the literature usually distinguishes two forms of success (Wenger, McDermott, and Snyder, 2002; APQC, 2001). The first measure of success relates to the actual impact of the community within the organization. It encompasses; the achievement of the initial goals and objectives, the value provided to the organization, and the long term benefits to its members (Lesser and Everest, 2001; Cothrel and Williams, 1999). The second measure of success is the general health of the community, which refers to the process by which the results were obtained. This includes the member satisfaction, and level of activity within the community (APQC, 2001; Wenger, 2001).

This research makes use of the latter perspective on success, the general health of the community, albeit somewhat adapted. This perspective has been adopted since this is a cross-sectional study and only measures the performance of the CoPs at a certain moment in time, where as using overall impact of the CoP on the organization would require a longitudinal study. This thesis builds upon the success factors as described in section 3.3.3 for defining success. However, it recognises that the exact definition of success is hard to capture and measure. All these factors do contribute to the likelihood of success, but do not guarantee it.

4.4.2 Data collection

The derivation of empirical principles was done using the method of Yin (2009). The author proposed that the evidence from case studies can be derived from six sources, namely: documents, archival records, interviews, direct observations, participant-observations, and physical artifacts. In order to ensure triangulation and confirm the validity of the process, this study has made use of three separate evidence sources. The description and motivation for each source is given below:

Interviews

According to Yin (2009) interviews are a key source of case study information. However, in order to prevent too much rigidity in the process, the interview should appear to be guided conversations rather than structured queries (Rubin and Rubin, 1995). Therefore this thesis will make use of focused interviews (Kahn, 1991), in which the questions will be open-ended, but the interview will follow a certain set of dimensions that are interesting for the case study. For each dimension a set of questions is formulated that collectively answer provide and clear perspective of the dimension.
The first step is conducting a pilot case study interview in order to help refine the data collection and validate the questions (Yin, 2009). This pilot acts as a point of departure for the further interviews. The pilot interview is conducted with the initiator of the ScrumMaster Triangle\(^2\). This case is a suitable candidate for a pilot interview, since it is the earliest and biggest community of such kind within the ABN AMRO. They have encountered various challenges and therefore can provide an excellent case to verify all the questions. The final case study protocol can be found in appendix C.

The second step is selecting the cases and interviewees. The process of selecting the cases is described in section 4.8. The interviewees were selected based upon their attendance in community meetings and activity on the online platform can contacted via the company supervisor (for the complete list, see appendix A). Furthermore, for each case multiple interviews were conducted with employees from different organizational roles and hierarchical levels. This ensures a broad range of perspectives, and theoretical saturation (Guba and Lincoln, 1989). Each interview was tape-recorded (with permission of the interviewee) and subsequently transcribed using the qualitative data analysis software tool \textit{Atlas.ti}. The answers were compared and if there were any significant discrepancies in the outcomes, more interviews were conducted. A more elaborate description of the coding can be found in section 4.4.3.

### Documentation

Documentation offers a helpful source of information according to Yin (2009). The most important advantage is that it may provide information that organization members have partly or completely forgotten. Furthermore, corporate documentation is often a more reliable source of information than the opinion of an organization member. However, one must bear in mind that information is often written with a specific purpose and therefore can be misleading, and that no additional information can be asked to clarify issues (Yin, 2009).

The first source of documentation is the company-wide intranet, which offers a rich source of information for this thesis. To illustrate, each triangle has its own page on the intranet which acts as a knowledge repository for storing agendas, schedules and announcements. These documents provide a valuable insight in the inner workings and the level of activity in the community. The second source is a company-wide survey that is conducted semi-annual. Although the main goal of the survey is to measure employee satisfaction, there is a series of questions that relate to the Agile awareness and new structure of ABN AMRO. Moreover, the survey allows for open commentary from the employees, which offers a valuable insights into the wishes of the employees. Since the survey is conducted semi-annual, it allows for trend observation among the employees, consequently providing for a valuable source of information.

### Direct Observations

The final method of data collection is direct observation. During this research the researcher spends substantial time on site, hereby getting involved in the daily operation of the firm and experience the insider’s perspective of the organization. The researcher becomes to some extent a member of the organization, joining meetings, lunch-breaks and even some operational activities. This provides

\(^2\)Mike Ligt
the researcher with the opportunity to collect contextual information and impressions in addition to the interviews and documentation (Yin, 2009).

On top of that, meetings for the Triangles are attended and notes are taken where possible. To illustrate, the researcher attended a Knowledge Session on the 2nd of July which featured an interactive Q&A session and a strategic session of the Block-Chain Triangle on the 29th of July.

### 4.4.3 Analysis

The design principles are derived via open coding using the qualitative software analysis tool *Atlas.ti*. For each case the characteristics and practices were compared and analysed, in order to see if any of these interventions could be linked to a success factors as described in the literature.

The first step into representing the data is to code the theoretically meaningful events; in this case the interventions indicated or performed by the community—or individual within the community—to increase the likelihood of a successful outcome. Examples are the willingness to formulate a vision for the community, the extent to which the community is open to outsiders and flexibility of hierarchical levels. In order to be taken into account, the interventions should be mentioned frequently over multiple cases, so that a claim of generality can be made.

The second step for this thesis is categorising the codes to into separate themes, namely culture, strategy, structure and operations. This was done to see if the codes would cover all themes required for an organizational culture. The theoretical framework stems from the work of Schein (1985), and was further refined by Dauber, Fink, and Yolles (2012). Section 6.3.2 elaborates on this framework and how it is related to the development of the first prototype. Appendix F shows the coding scheme, explains all the individual codes and indicates the frequency.

### 4.5 Synthesis

Both the theoretical and empirical design principles were derived using the CIMO logic. This allowed for clustering the propositions and directly comparing them with each other. The design principles that were found in both literature and practice increase the validity of the interventions in successfully implementing Communities of Practice, while single theoretical or empirical propositions only enhance the understanding of the scientific or practice side.

The synthesis is done based upon the study of Van Burg et al. (2008). The propositions were grouped in order to observe any overlap in the interventions. If so, the overlapping elements would be combined so that the remaining propositions would be grounded in both literature and practice.

### 4.6 Design Testing

Once the actual design is constructed, it is validated and tested through two methods: a design structure matrix and expert reviews. These two were chosen because they are complementary to each other. The design structure matrix

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3The further coding scheme for the qualitative data analysis software tool *ATLAS.ti* can be found at: [https://tinyurl.com/Coding-G-Buth](https://tinyurl.com/Coding-G-Buth)
allows for the detection of potential conflicts between the initial design parameters, while the expert interviews allow for the detection of potential problems in the process.

Due to the scope of this thesis actual implementation during the intervention phase is omitted, also meaning that the learning and evaluation phase is not performed either. Instead, in order to realize a feedback iteration loop, an alpha testing is that testing and further development are done by the originator of the rule instead of beta-testing through third parties (Aken, Berends, and Bij, 2012).

Design Structure Matrix

A Design Structure Matrix (DSM) is a simple tool to perform both the analysis and the management of complex systems. It allows the user to model, visualize, and analyse the dependencies (Eppinger and Browning, 2012). The main goal of the DSM is to investigate potential conflicts in the parameters. According to Baldwin and Clark (2000) if one of the design parameters is subject to small changes, this could influence other parameters and negatively impact the value of the final design.

The DSM allows for the hierarchical relationships and interdependencies of the design parameters to be formally mapped. This process is initiated by first listing all the parameters and then where the supposed relationships are. Once the relationships are spotted, each parameter is tested individually to check if other parameters in relationship to it change as well. If any conflicts arise, design restriction can be imposed or the parameter boundaries should be altered.

Expert Interviews

For the purpose of testing the proposed design, this study makes use of expert reviews. Molich and Nielsen (1990) created a method for usability testing called the Heuristic Evaluation. However, the heuristics would not be able to cover every nuance and as a result this thesis will make use of experts who are already familiar in the field of interest and therefore do not need a specific set of heuristics. This type of testing is called ‘informal expert review’, it is based upon rules of thumb and general experience (Nielsen, 1995). These interviews shed light on potential problems that may occur in the initial design.

The biggest challenges lies with finding the right experts to provide appropriate feedback. In order to do so, some requirements were determined. Firstly, the expert has to be knowledgeable in the field of expertise. Secondly, due to the fact that the solution design is context specific, the expert has to be familiar with ABN AMRO’s setting. And thirdly, the expert has to be a potential user. The following people satisfy these requirements: (1) The Education & Knowledge Management Team (E&KM), who tested design for usability during a weekly deepdive. (2) Bart Raessens, corporate strategy consultant, also responsible for hosting strategic sessions in Triangles. And lastly, (3) Jarno Zange, team leader of the E&KM, and Joàn Pastoor-Stevens, Learning and Development Specialist.

4.7 Quality Criteria

This section will elaborate on the criteria for quality assurance and the measures taken to establish sufficient quality. The criteria most important to research are controllability, reliability, and validity (Aken, Berends, and Bij, 2012; Yin, 2009).
4.7. Quality Criteria

4.7.1 Controllability

The controllability refers to the extent to which method of this research is described. Reproducibility is a good measurement for the controllability by a third party. This study aims to increase controllability by clearly documenting the research methodology, the data extraction and data analysis.

4.7.2 Reliability

Reliability refers to the extent to which the study can be replicated with the same findings (Yin, 2009). Due to the use of semi-structured interviews it may be troublesome to replicate the study. However, in order to mitigate uncertainty, a structured way of documenting the research design and datasets is applied.

Furthermore, there is always a risk of biases from the interpretation of the researcher. Aken, Berends, and Bij (2012) makes the distinction between hot and cold biases. Hot biases refer to the influence of interest, motivation, and emotions of the researcher on the results. Cold biases refer to the subjective influences that have a cognitive origin and no personal motivation.

This study attempts to eliminate these biases in two ways. Firstly, by making use of case study protocol (see appendix C). A case study protocol is used to get standardization in the research project Yin (2009). Secondly, the technique of triangulation is used to acquire the same information from multiple sources Yin (2009). This study makes used of the methods as proposed by Plsek, Bibby, and Whitby (2007) to derive empirical design propositions.

4.7.3 Validity

Validity is the end product of reliability and consists of three aspects, namely construct validity, internal validity and external validity (Yin, 2009; Rowley, 2002). The validity measures whether the knowledge that should be acquired, is also developed.

Firstly, construct validity refers to the appropriate and accurate measurement of key constructs. In other words, the extent to which a research procedure leads to an accurate observation of reality (Yin, 2009). To illustrate; if an instrument wants to measure job satisfaction but only asks for the attitude of employees towards management, it has a low construct validity (Aken, Berends, and Bij, 2012). Yin (2009) suggests using multiple sources of evidence, thus establishing a chain of events. Furthermore, the draft case study report will be reviewed by key informants.

Secondly, the internal validity refers to the adequacy and completeness of suggested relationships. Internal validity can be covered by viewing a problem from multiple angles (Van Aken, 2004). In this case study, internal validity will be ensured by studying multiple cases and search for common patterns.

Lastly, the external validity is concerned with the generalizability of this research results beyond the case studies. The generalizability of the results depends on the research approach (Yin, 2009). According to Aken, Berends, and Bij (2012) generalizability is less important in business problem solving projects. Yet, to ensure external validity a cases study protocol is developed and the cases are carefully selected so that they produce similar results (Rowley, 2002). Furthermore, an internal pilot alpha testing was used to increase generalizability.
4.8 Case selection

Selecting the right cases is one of the most fundamental tasks of the case study researcher as the case selection and case analysis are irrefutably intertwined. Yet despite the evident importance, the question of case selection has received little attention. Thus, choosing the right cases from a small sample remains challenging (Seawright and Gerring, 2008). In the absence of formal treatments, scholars often lean on pragmatic considerations such as time, money, expertise, and access. Although these reasons are legitimate, they lack a methodological justification. Fortunately, Gerring (2007) provides us with a methodological justification.

This thesis makes use of the typical method, which focuses on cases that exemplify a stable, cross-case relationship. These cases may also be considered representative cases. This method is chosen so that the causal mechanisms at work in a general cross-case relationship can be explored (Gerring, 2007). If the theory suggests a specific causal pathway, a pattern-matching investigation is performed in which the case is judged to whether it validates the causal mechanisms.

The selected cases all show the same typical phenomena which allows for the exploration of causal mechanisms in the emergence of a successful community. The cases found suitable for the case study are:

- ScrumMaster Triangle
- Block-Chain Triangle
- Developers Triangle
- Data Visualization Triangle

Table 5.1 shows the specific characteristics.
Results

This chapter will discuss and report on the results obtained from the literature review and the case studies, both described in chapter 4. The goal of this chapter is to formulate principles that will serve as building blocks for the final solution design.

This chapter is constructed as follows: first, each design principle is supported with evidence from literature and formulated. Thereafter, the cases are described and the empirical design principles are formulated based upon the evidence from the case study.

5.1 Theoretical Design Principles

The design principles derived from literature serve two causes. Firstly, to provide practitioners with a guideline in the challenges and success factors for implementing CoPs as a tool for knowledge management. Secondly, to serve as building blocks for the final design. The design principles were constructed from literature using the CIMO logic as described in chapter 4.

Theoretical design principle 1

If a scaled agile organization wants to implement successful communities of practice (C) it should share all results and approve of making mistakes (I) which encourages an open and transparent culture (M) and therefore improves the likelihood of a successful community of practice (O).

According to research by Ruikar, Koskela, and Sexton (2009) it is important to keep encouraging cross-boundary knowledge sharing. From their case study it has become evident that the motivation, or lack thereof, is a factor that can weaken the fabric of a community which relies on the willingness on the individuals to share knowledge. In line with the findings of Geiger and Antonacopoulou (2007), the authors found that the successful communities were self-organising and voluntary participation was actively encouraged. They also found that employees participate in the CoPs for two reasons, being:

1. To need to find answers to questions and get help and guidance from peers (i.e. active and collective learning)

2. The organisational culture which encourages participation, disapproves repeat mistakes and supports active learning

Together, these factors drive members to join a community. The practice of learning from one another’s mistake and in turn sharing your experience is mutually
beneficial to the ‘giver’ and the ‘taker’. Scarso and Bolisani (2008) describe it as knowledge flows that are bi-directional and CoP members have to play a dual role of both the knowledge contributor (source) and the user (recipient).

However, to achieve the bi-directional knowledge sharing and participation in CoPs, the organisation must overcome an individual barrier which is defined as ‘information hoarding’ or ‘knowledge as an individual’s private assets and competitive advantage’ mentality (McLure, 2000). Another potential barrier identified was that new employees were afraid to contribute to the community as they did not believe they had ‘earned the right’ to post on a company-wide system accompanied with a ‘fear to lose face’ (Ardichvili and Page, 2002).

### Theoretical design principle 2

*If a scaled agile organization wants to implement communities of practice (C) it should send out a proper agenda beforehand (I) which will encourage participants to join the meetings (M) and therefore improves the likelihood of a successful community of practice (O)*

In their case study in a telecommunication organization, Paasivaara and Lassennius (2014) found that having a proper agenda for every CoP meeting was highly appreciated. The agenda should be sent in the CoP invitation to everybody in the organization and also be placed on the CoP’s wiki page. The agenda serves as an important source of information for the participants for deciding whether to attend the meeting or not. On top of that, it prevents the participants to be disappointed with the contents of the meeting and be discouraged for future attendance.

A good agenda ensures that something is really happening in the CoP and participants are sure they really gain something from participating in the meeting. In addition, a good agenda ensures individual participation in the meeting. In other words, by including interesting and important discussion topics or decisions, it was more probable that an individual would decide to participate in the meeting. Furthermore, the agenda should be open for participants to include their own topics to emphasize the open nature of a CoP.

Lastly, the authors note that, besides having an agenda, a CoP leader or facilitator should lead the discussion and provide for time-management to keep discussion going nowhere and taking up valuable time.

### Theoretical design principle 3

*If a scaled agile organization wants to implement communities of practice (C) it should provide for the technical infrastructure (I) which facilitates participation and communication in the community (M) and therefore improve knowledge transfer over the teams (O)*

Although CoPs work best when they are allowed to develop naturally as autonomous entities that are not governed through a company’s chain of command (Wenger, 1998), there are ways to promote the development of CoPs. The most effective method to create a CoP is to create the technological infrastructure that allows a geographically dispersed, time-limited group of professionals to interact...
5.1. Theoretical Design Principles

...easily and to develop their own organizational culture and management policies in an open source fashion.

Having links in the organization’s internal wiki, with links to each CoP wiki page greatly enhances the chance for success. Furthermore, the information on the wiki should be open to see and edit to everyone to create transparency. Important to CoP success is the content of the wiki page. The wiki page should at least have meeting agendas and minutes from the previous meeting, and preferably the latest up-to-date information.

Hoadley and Kilner (2005) describe four techniques for applying technology in transforming CoPs into knowledge-building communities. Firstly, the technological infrastructure should be able to link people who have similar practices. Secondly, providing some sort of shared repository of information for the community. Thirdly, the technological infrastructure should support a tool that allows for discussion. And lastly, the technological infrastructure should provide awareness in the organization.

**Theoretical design principle 4**

If a scaled agile organization wants to implement communities of practice (C) it should encourage the community to work in company time (I) which motivates employees to join a community of practice (M) and therefore improves knowledge transfer over the teams (O).

One of the biggest challenges confronting CoPs is the availability of time in which to engage in the activities that a necessary for them to be effective (Kerno, 2008). Organizations of today must deal with ever increasing complexity, and intensifying competition as globalization and its accompanying forces (Roberts, 2006). As this acceleration of complexity continuous, it is likely that the conditions necessary for CoPs to demonstrate their value to the organizations erode and are less like likely to be present.

Kerno (2008) argues in his research that as the increased work demands further constrain the time available for participants within a given organization, they will be likely to do so at the expense of the effectiveness of the communities itself.

**Theoretical design principle 5**

If a scaled agile organization wants to implement communities of practice (C) a project coordinator who takes all the initiative should be appointed (I) so that employees are stimulated to contribute to the group (M) and thereby improving the likelihood of a successful community of practice (O).

Communities of practice work best when they are allowed to develop naturally as autonomous, self-governing entities that are not managed through the company’s chain of command (Wenger, 1998). However, Cox (2009) brings nuance to this view by stating that fostering CoPs can be achieved by assigning a coordinator. This entails that there is some form of light-handed management, which is busy behind the scenes, i.e. joining people up and facilitating useful contacts. Resnick and Meija (2007) state that it is not management that dictate the emergence of a successful CoP, but rather demands effective leadership.
A number of studies have found that one of the most important factors for a successful community is the vitality of its leadership (Oldenburg, 1999). The community coordinator is a member who helps the community to focus on its domain, maintain relationships and develop its practice. Furthermore, Wenger, McDermott, and Snyder (2002) identified the following requirements for a CoP coordinator:

1. **Time:** A common cause of failure is that the coordinator simply does not make time to perform the role, therefore there should be time specially allocated for this

2. **Networking skills:** The coordinator should have the ability to connect to people and involve them into the community

3. **Technical knowledge:** When the coordinators do not have the technical knowledge or the background to understand the issues, it is difficult for them to take initiative

If a company appoints a coordinator or leader, preferably it should be someone who is involved with the community from the early stages from the core group (see figure 5.1) to recruit, interview, and persuade potential community members to join and to ask sponsors for support. By doing this, the relationship between members is created and their community-development role is established (Wenger, McDermott, and Snyder, 2002).

**Theoretical design principle 6**

> If a scaled agile organization wants to implement communities of practice (C) it should recognise different levels of participation within the community of practice (I) so that participants always feel a sense of belonging (M) which improves the likelihood of a successful community of practice (O)

Employees in a CoP join the community for different reasons, examples could be: for the opportunity to improve their skills, for personal connections, or because the community directly provides values. Therefore people who join the community have different levels of interest, and thus the level of participation will also differ. However, as opposed to common belief, not all members are required to participate equally in the community (Mcdermott, 1999a).

Mcdermott (1999a) recognises three levels of community participation through which the members move (see figure 5.1). The first is a small core group of people who actively participate in discussions, or debate in the public community forum. This group is the heart of the community as they take on community projects, identify topics for the community to address, and move the community along its learning agenda. This group is usually rather small. The second group is the active group, and these are the members who regularly attend meetings and occasionally participate in the community forums, but without the intensity of the core group. The last group, which is also the biggest, is the peripheral group. They rarely participate in group discussions or debates. In a traditional meeting or team passiveness would be discouraged, but in a CoP this peripheral group is essential for the community. Although it might seem they do not contribute to the community, the people on the sideline are often not as passive as they seem. Community members can move through these levels as the boundaries for the
5.1. Theoretical Design Principles

Levels are fluid (Lave and Wenger, 1991). Key to good community management is that people feel a sense of belonging, the desire to belong to a group (McMillan, 1996), so that they perform better. This can be reached by accepting that members can move freely through the levels and feel like a full member at every level. Rather than force participation, successful CoPs ‘build benches’ for those on the side.

Theoretical design principle 7

If a scaled agile organization wants to implement communities of practice (C) it should implement some form of reputation management (I) which leads to a recognised status among among peers and motivates employees (M), thus improving the likelihood of a successful community of practice (O).

Especially in the early stages, when the value of participation in the community may be low, there is a need for some sort of incentive to contribute to the community. Study has shown that financial rewards in the domain of practice are not useful, and can even be detrimental to the intrinsic motivation for contributing (Cabrera and Cabrera, 2002). Instead, members of the CoP are motivated by the professional recognition and the desire to learn and share to contribute to the community (Resnick and Meija, 2007).

Wenger, McDermott, and Snyder (2002) point out that the process of building a CoP must give practitioners a chance to gain a reputation as a contributor to the community’s practice. In addition, there must also a process in which the community validates and endorses the new submissions as accepted communal knowledge. To illustrate the authors give the example of Xerox, where all the tips in the technician repair database prominently carry the name of the contributor and are explicitly endorsed and validated by reputable experts.
Theoretical design principle 8

*If a scaled agile organization wants to implement communities of practice (C) it should identify and leverage premature and potential communities and specify the domain scope accordingly (I) which drives initial community members in both numbers and commitment (M) and therefore improves the likelihood of a successful community of practice (O)*

CoPs should be not be created inside a vacuum and should be cultivated and nurtured as early as possible in the design cycle. One way is to manage this “is to identify existing communities and networks, rather than starting from scratch” (Hearn and White, 2009, p.4). The challenge for organization is to identify such groups and help them come together and connect (Wenger and Snyder, 2000). Utilising existing networks can help to drive the initial community members in numbers.

Another important aspect of the first step is to consider the community domain focus from the starting point. Having the community focus on too broad domain of interest will have a negative impact as members will struggle to recognise their core skills within the CoP. Members are looking to learn and share experiences with others with similar experiences or problems, and having a large scope will prevent members from connecting with the community. A case study in a large telecommunications organization found that changing generic umbrella terms for the domain scope into target specific areas of expertise, leads to an increase in member contribution (Paasivaara and Lassenius, 2014).

Theoretical design principle 9

*If a scaled agile organization wants to implement communities of practice (C) it should maintain a suitable rhythm for the meetings (I) which allows the participants to settle but not get bored (M) and therefore improves the likelihood of a successful community of practice (O)*

Finding a suitable rhythm for the CoP meetings is considered to be a key success factor for a successful CoP. There is no right or wrong for a certain rhythm, however going too fast the community may stop participating because they are overwhelmed, or going too slow causes the community to feel sluggish (Wenger, McDermott, and Snyder, 2002).

Paasivaara and Lassenius (2014) found in their study that coordinators saw it as their responsibility to take care of that there are a suitable number of interesting topics on the agenda for every meeting. Also, they would rather cancel a meeting that frustrate the participants with a poor agenda. To illustrate, a CoP in their study noted that CoPs should not meet too often, rather they felt that it is important to have a good agenda and a proper number of interested people, instead of organizing meeting where people could get bored.
Theoretical design principle 10

If a scaled agile organization wants to implement communities of practice (C) it should appoint a knowledge broker (I) which ensures that the community is always up to date regarding developments in their domain (M) and therefore improves the likelihood of a successful community of practice (O).

CoPs are a means for members to develop shared knowledge regarding working practices and best practices. The members can greatly benefit from the community by acting as a mentor, or adding to the shared domain of community learning. However, the members cannot have all the latest up to date knowledge of new techniques, practices or processes, and are therefore not able to discuss and utilize this. On top of that, most members will have little time to research this, henceforth an the organization should consider recruiting an individual as a ‘knowledge broker’ for the CoP (Sheil, 2005).

Knowledge brokers provide the community with access to the latest research evidence, help the community assess the research, and evaluate methods. The knowledge broker should be someone who has been introduced in the community group and should have the skills and time to carry out the research on behalf of the community. Examples of types of research and information a knowledge broker might contribute are new legislation, latest performance tools, usability studies and customer research.

Theoretical design principle 11

If a scaled agile organization wants to implement communities of practice (C) diverse member from different departments and expertises for the communities should be recruited while communicating the required commitment upfront (I) which stimulates debate and avoids uninvolved participants (M) and therefore improves the likelihood of a successful community of practice (O).

The primary function of the CoPs is to serve as a vehicle for its participants. The community is characterised by mutual learning, shared practice and joint exploration of ideas. However, in order to achieve these ideas, the CoP must attract the right members. It is essential to ensure that the founding members of the community share a common desire to contribute and nurture the potential future participants. The so called ‘early adopters’ should be willing to work on the frontline of the community (Sheil, 2005).

To ensure a great diversity of opinion and stimulate debate, the core members preferably should not share the same professional background. Although it can be attempted to persuade and target desirable early members, it is essential that participants are committed and enthusiastic about being a member of the community. Furthermore, they should recognise the value that the community offers to their own sense of identity. Thus, when recruiting initial members, the commitment expected of members should be clearly outlined beforehand.
5. Results

5.2 Empirical Design principles

This part of the thesis provides for the empirical design principles, which are derived from four different cases. The process of coding and analysing the interviews is described in this section [14.3]. First, the individual cases are described, secondly the process of analysing the interviews is explained and to conclude, the design principles are given.

5.2.1 The Case Studies

From the ABN AMRO, four cases were selected to include in the case study. The cases were selected based upon representativeness, meaning that each case had to exemplify a stable, cross-case analysis so that the casual mechanisms could be investigated (Gerring, 2007).

As explained in chapter [4] for every case multiple interviews will be conducted from different organizational and hierarchical levels, to ensure a broad range of perspectives (see appendix [A]). Each interview was conducted using a case study protocol, simultaneously providing direction but not confining it (see appendix [C]. For general overview, table [5.1] provides us with the specific case characteristics of each case.

ScrumMaster Triangle

The ScrumMaster triangle was initiated 3 years ago as a initiative by the FastForward program[1]. The ScrumMaster triangle is a community that represents the interests of the Scrum Masters (see figure [2.1]) within the ABN AMRO.

The Scrum Master Triangle is formed with Single Point of Contact representation from each business line, or Grid (see figure [2.2]). This means that every business line has a Single Point Of Contact (SPOC) that serves as a coordinator or focal point of information concerning an activity or program. In practice, SPOCs are often used when information is time-sensitive and accuracy is important. The ScrumMaster Triangle has a very clear structure with strict lines and predefined roles. The visualization of the structure can be found in appendix [E]. The triangle has very specific rhythm for every level in the community. The whole triangle meets quarterly, with the main objective of knowledge sharing. On the SPOC level the community meets weekly and the goal is to share strategic best practices that are applicable for all the grids. On the grid level, the Scrum Masters meet bi-weekly.

The community’s main goal is to share and transfer knowledge over the ScrumMasters, and they try to achieve this by covering two levels, namely (1) operational and (2) strategically. On an operational level, the knowledge sharing occurs within the grid and is concerned with role specific knowledge. On a more strategic level, it is mainly the SPOCs who share the knowledge in the form of best practices that are applicable to all the members. Furthermore, the community also consolidates on a strategic level, especially when engaging in large transactions. An example of this would be the acquisition of the new agile software dashboard **JIRA**.

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1The FastForward is a program which facilitates the transition to the agile way of working for ABN AMRO. The FastForward program elaborates on governance and structure, and stimulates a culture that facilitates an agile way of working. It advocates a culture that emphasizes trust, learning by doing and taking responsibilities.
The triangle is fairly successful, however the biggest impediment at the mo-
ment is the fact that the triangle was initiated from the expertise, rather than
from awareness. That is to say, the community was started top-down instead of
bottom-up. So, from a theoretical perspective the ScrumMaster triangle is closer
to a circle than to a triangle. This top-down approach inevitably leads to a sit-
uation where there is a very active core group, but the followers show a lack of
input. Another bottleneck for the ScrumMaster Triangle is a lack of trust within
the community. The interviewees report that all knowledge regarding the oper-
ational affairs is shared, however the affairs that require to show vulnerability
(e.g. seeking experience and problem solving) are not sufficiently shared. Re-
portedly the culture in the community assumes that ‘knowledge is power’ and
sharing your specific knowledge works in your disadvantage, while the consen-
sus should be ‘sharing is power’.

Block-Chain Triangle

The block-chain triangle is one of the most successful triangles within the ABN
AMRO. It was initiated approximately 3 years ago and thus was already a com-

munity before the terms of circles or triangles were introduced. The Block-Chain
Triangle predominantly discusses the new block-chain technology and what its
implications will be for the bank.

The community consists of approximately 20-25 people who are all interested
in the block-chain technology outside their actual work. The community strives
to have at least one member of all business lines in their community, so that all
interests of all departments are served. To illustrate, the block-chain triangle also
has a member from the legal department, who is seemingly unrelated to any tech-
nology, to comment on the legal implications of block-chain technology. Further-
more, the community does not recognise any formal levels of participation, but
there is an unofficial distinction between the core group and peripheral group
through the level of contribution. New members are recruited via the network of
the current members.

The triangle is has an organic structure in which there is no specific leader.
However, there is a coordinator who sends out an agenda with interesting topics
the day before. Would there be a lack of interesting topics, the meeting is short-
ened or postponed until the agenda can be filled. This ensures that the meet-
ing is always sufficiently interesting. The main goal of the triangle is to spread
awareness and to share knowledge related to the block-chain technology. The
technology is a possible disruptor in the financial world as one of the features
could serve to cut out the banks as a third party in financial transactions. Knowl-
edge is not specifically documented in a knowledge repository, and the wiki is
hardly used. For communication and announcements, there is a mailinglist and
an online communication platform called Slack.

The members indicate that the community is doing very well, and that not
much could be improved. They contribute this to the approachable and open
atmosphere within the Triangle. Furthermore, the coordinator sets a strict agenda
and acts as a timekeeper.

Slack is a cloud-based collaboration platform for teams that acts as an agenda, communication
tool and knowledge repository.
Developers Triangle

The developers triangle was originally named the developers tribe, a term derived Spotify Agile method, but later renamed to suit ABN AMRO’s terminology. The community is relatively young as it was set up in the third quarter of 2016, and the community is still in the coalescing stage. A small group of approximately 10 developers who have a common interest in the same domain periodically meet up, however, the community is still fragile. There is no consistent rhythm yet as the community tries to meet up at least once a month and a smaller core group meets up more often (e.g. weekly).

The main goal of the community is discussing new technologies that may be relevant to the bank. An example of this could be preparing the internal IT system of the ABN AMRO for the new PSD2 guidelines imposed by the EU, so that the system will not be overloaded. The participants report that the community gives developers with ideas a stage to proclaim and sell their ideas. The members predominantly use the community to grow confidence and strengthen their argumentation.

At the moment, the community has no specific structure and the agenda is filled ad-hoc with subjects that are relevant at that specific moment. The speakers and presenters are all from within the triangle therefore the agenda can be filled ad-hoc.

Although the triangle does not receive any formal support from the bank, the CIO Office and Innovation Centre act as sponsors. This means that they take initiative for meetings and spark the community to come alive. In principle the community has an open nature, but in practice new members can only join and contribute anything of value if they are experienced developers, since the knowledge is relatively high-level.

Data Visualization Triangle

The data visualization triangle was initiated with the goal to create a platform for sharing knowledge regarding data visualization. The community was created approximately 2 years ago and the name was updated last year to conform the ABN AMRO terminology. The data visualization triangle is the least active triangle with only one meeting every 3 months and multiple infrequent meetings scattered throughout the year. Furthermore, the triangle has approximately 100 members, of which most are non-active and only a fraction is active.

The triangle was initiated via the use of a pilot which was conducted over a small group. After the initial success, the community slowed down and is now early mature phase. The community has no formal structure, apart from one coordinator who is driving force behind the organization. Would the coordinator stop for some reason, the community would most likely perish in a scaled agile organization.
### Table 5.1: The specific case characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ScrumMaster Triangle</th>
<th>Block-Chain Triangle</th>
<th>Developers Triangle</th>
<th>Data Visualization Triangle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>± 100</td>
<td>20 - 25</td>
<td>10 - 12</td>
<td>± 100</td>
</tr>
<tr>
<td>Age</td>
<td>± 3 years</td>
<td>± 3 years</td>
<td>± 9 months</td>
<td>± 2 years</td>
</tr>
<tr>
<td>Domain</td>
<td>Professional</td>
<td>Block-chain technology</td>
<td>Emergent technologies</td>
<td>Data visualization</td>
</tr>
<tr>
<td>Starting Point</td>
<td>Top-down</td>
<td>Bottom-up</td>
<td>Bottom-up</td>
<td>Bottom-up</td>
</tr>
<tr>
<td>Basis of membership</td>
<td>Role-based</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Basis of cohesion</td>
<td>Professional</td>
<td>Interest</td>
<td>Interest</td>
<td>Interest</td>
</tr>
<tr>
<td>Rhythm</td>
<td>Level-dependent</td>
<td>Weekly</td>
<td>Monthly</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Wiki</td>
<td>Very active</td>
<td>not-active</td>
<td>not-active</td>
<td>active</td>
</tr>
<tr>
<td>Coordinator</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Managerial support</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Development stage</td>
<td>Coalescing</td>
<td>Maturing</td>
<td>Coalescing</td>
<td>Maturing</td>
</tr>
</tbody>
</table>

#### Empirical design principle 1

If a scaled agile organization wants to implement communities of practice (C) it should teach fundamentals and raise awareness of Triangles (I) so that the communities’ existence is further legitimized throughout the whole organization (M) and therefore increase the likelihood of success of the community of practice (O).

In all studied cases within the ABN AMRO, there was a clear lack of awareness regarding the communities. The majority of the interviewee’s could not indicate the distinction between a triangle and a circle, which are the main concepts of the transition to way of working. The initiator of the ScrumMaster triangle indicated that “We skipped the ‘awareness’ phase and started implementing the triangle right away, so now you notice that employees are less engaged than they should be”. Therefore, employees should be aware and recognise the advantages of CoPs.

Education and awareness-building activities are of utmost importance, due to the fact that the evolutionary design processes depend on highly informed and educated participants. In line with that, an interviewee from the developers tribe indicated “even more important is that triangles enhance one another. So one triangle is not a success, but a series of triangles working together is! Management must start promoting these communities more actively”.

Lastly, it will be particularly important to coach certain roles within the community, as they are critical success factors. The abilities and skills of the coordinator are of vital importance to the community, especially in the beginning. Therefore it would be wise to provide the coordinator with a shared experience and language to talk about their challenges and building trust among other coordinators. Examples of topics in the trainings or workshops could include: What are triangles and circles and what are they intended to do? What benefits do they
produce—for members, teams, customers, and the organization? What are examples of successful triangles? What roles are important, and what skills and time commitment do these require?

**Empirical design principle 2**

> If a scaled agile organization wants to implement communities of practice (C) it should orchestrate activities in both public and private spaces (I) which gives insight into each other’s personal motives thereby strengthening the relationships within the community (M) and in turn increases the likelihood of success of the community of practice (O)

Communities are much more than only a calendar of their events. By having interactions with other group members that is not task-related, group members get to know each other better on a personal level and gain insight into each other’s personal motives. Hence, the community should avoid focussing too much on either the public or private space. The public spaces refer to the events where all members can join –meetings, website– and the private spaces refer to the one-on-one networking activities –phone-call, mail exchange or problem-solving conversation. Every form of private space strengthens the relationship within the community (Mcdermott, 1999c).

The data visualization triangle primarily depends mainly on the public spaces, such as meetings and workshops and seldom has private space meetings. Moreover, the triangle is the least active triangle, which can be attributed to the large interruption between the meetings and the lack of private space in the community. The other cases tend to promote both public and private space, to illustrate an interviewee from the block-chain triangle stated "all members in the triangle are involved via a weekly meeting and during lunch or coffee-moments".

The key in designing CoPs is to recognise that public and private dimensions are interrelated. Communities should orchestrate activities in both public and private spaces so that the strength of individual relationships is used to enrich events and events are used to strengthen individual relationships (Oldenburg, 1999).

**Empirical design principle 3**

> If a scaled agile organization wants to implement communities of practice (C) it should recognise different levels of participation and knowledge (I) which stimulates people to be engaged even if they are less knowledgeable (M) and in turn increases the likelihood of success of the community of practice (O)

Good community architecture requires that there many different levels of participation. This phenomena of different levels of participation can be observed in all the triangles which were subject to the case study.

In the data visualization triangle and developers triangle the people reckoned there to be a small core group of between 10-30% of the total group. However, these groups were not formally recognised as the core group, but were just more active. An interviewee stated "there is an active core with a huge shell of sleeping people around it".

In two of the studied cases, there is a formal level recognition. In the Scrum-Master triangle there is the role of a Single Point of Contact (SPOC) whose task
entails representing the Scrum masters’ interest from a specific service line and re-
porting best practices to them (see also: appendix E). In the block-chain triangle they
have not assigned any official roles, but they made a preliminary distinction
based upon the innovation horizon, which goes as follows:

1. Horizon 1: Process innovation, typically less than one year (H1)
2. Horizon 2: Long term process innovation, typically longer than one year
   (H2)
3. Horizon 3: Radical innovation, more than 2 years (H3)

The horizons are a method of distinguishing certain innovative projects, and de-
termining who is best suited to work on the projects. For the block-chain triangle,
the H3 people are the core team, the H2 people the leads, and the H3 people the
outsiders. The block-chain triangle reports in a strategic session that this distinc-
tion leads to everyone being engaged and the less knowledgeable people to be
more prone to actively participate and move across the levels.

Although a structure with various levels of participation often goes smoothly,
one must be aware that if the levels of participation are a distinction that comes
from the outside and are imposed, it becomes troublesome. Another red flag is
when there is no movement across the levels, so the community must be proactive
in inviting people in (Wenger, McDermott, and Snyder, 2002).

**Empirical design principle 4**

\[
\text{If a scaled agile organization wants to implement communities of practice (C) there}
\text{should be an interesting and complete agenda for every meeting (I) which engages}
\text{employees in the community (M) and in turn increases the likelihood of success of the}
\text{community of practice (O).}
\]

A proper agenda should be communicated towards the community before the
meeting occurs. This practice serves several purposes. Firstly, it ensures that
something is actually happening. Secondly, it makes sure that people can pre-
pare and contribute to the conversation as they can prepare beforehand. And
lastly, members can decide whether to attend the meeting or not.

In the block-chain triangle the agenda is sent out to all the members in ad-
vance and an interviewee responded that "the reigns are kept tight and if the
agenda cannot be filled, the meeting is postponed or shortened". This practice
ensures that there is an interesting schedule for the participants. An interviewee
from the developers triangle "there is no problem in filling the agenda for every
meeting, so the meetings are well-visited".

Lastly, during a strategic session of the block-chain triangle, which is in many
aspects to most successful triangle, to determine the future of the triangle, it was
stated multiple times that the agenda should be sent out well in advance. This
is done so that "layman know beforehand whether they can contribute to the
meeting and do not go home with a useless feeling, also the core team (experts)
can prepare a periodic deep-dive to expand on a certain topic".
5. Results

Empirical design principle 5

If a scaled agile organization wants to implement communities of practice (C) it should provide one umbrella online platform for file sharing (I) so that all participants can share and find relevant knowledge (M) and in turn increases the likelihood of success of the community of practice (O).

Although some research (Wenger, McDermott, and Snyder, 2002) suggests that a technological infrastructure is not an essential precondition for launching CoPs, all the studied cases within the ABN AMRO do report that they are dependent on technological applications for their existence.

The ABN AMRO offers Connections3 however this is not deemed sufficient by the members. Members from both the developers triangle and block-chain triangle report that "connections is a worthless platform, there are much better alternatives" and "the wiki page is not used, Connections is not convenient system. The only way to efficiently reach all the members is via whatsapp or via slack".

In the triangles studied within the ABN AMRO, the following features of online facilities were found to be most important:

- A home page to assert their existence and describe their domain and activities
- A repository for documents, best practices, and standards
- A good search engine to find things in their knowledge base
- Community management tools, mostly for the coordinator who wants to know who is participating actively, how much traffic there is, and what documents need updating

All the communities pursue the use of one all-embracing online platform so that people will be more likely to participate in the online community (Wenger, 2001). To illustrate, the block-chain triangle explicitly announced publicly to "only make use of one social media platform, as long as no confidential information is shared it doesn’t make a difference which one".

Empirical design principle 6

If a scaled agile organization wants to implement communities of practice (C) it should appoint dedicated group facilitators and educate them accordingly (I) so that the community is pointed towards organizational goals (M) and in turn increases the likelihood of success of the community of practice (O).

The only triangle without an explicit coordinator is the developers tribe, all the others have an explicit coordinator. There seems to be a strong link between the activities undertaken by the triangle and the commitment of the coordinator. One of the initiators of the data visualisation tribe notes that “Unless you put a lot of effort in the community (as a coordinator), there is not much activity. Even though you have a lot of enthusiastic people, still nothing happens. What can you do about it? Is is a lack of time, or something else?”

3IBM Connections is a Web 2.0 enterprise social software application developed by IBM to provide online social networking tools for people associated with a company.
Both the ScrumMaster triangle and the block-chain triangle have coordinators which have allocated some of their working time specifically for managing the community and setting up an agenda. However, although they are referred to as ‘coordinators’ they do not recognise themselves as such, citing an interviewee

I am more a process or structure guardian, rather than a coordinator. My job is ensuring that the agenda is filled with interesting and relevant topics. I used to check if the people who had to present had prepared themselves properly, but I don’t do that anymore. Furthermore, the role of the chairman is crucial; sometimes you have to cut off the discussion when it goes too much in depth, but some others times you have to let it go if the discussion is going somewhere useful. It’s hard to make that decision.

Thus, the community needs a dedicated coordinator –or facilitator– who understand group dynamics and the community development and has a large network for recruitment. Furthermore it is important to train and coach a community coordinator since they are on the main success factors of a community. A coordinator should have a combination of conventional management skills and interpersonal skills, and skills in ‘corporate community building’ (Sheil, 2005). These trainings could cover a range of issues such as time-keeping, setting up kick-off events, or managing an agenda.

**Empirical design principle 7**

If a scaled agile organization wants to implement communities of practice (C) it should recruit via their own network and make use of a taster internship for new members (I) so that their input will depend on intrinsic motivation (M) and in turn increases the likelihood of success of the community of practice (O)

The studied communities mostly are very light-handed in their demand for commitment, unless someone has been assigned a specific role. In the ScrumMaster triangle all the SPOC are expected to represent all the other scrum masters in the business line by proposing relevant agenda items and best practices. However, this is a part of their job description.

In case of the block-chain triangle, members have no commitment whatsoever. They are not expected to actively participate in the community, but it is appreciated. However, in order to minimize the ‘free rider’ effect, they have implemented a taster internship for potential members. This allows for potential members to get a taste of the community and make conscious choice before really committing themselves to the community.

Furthermore, new members are recruited organically, that is to say that new members are not explicitly recruited. An interviewee from the developers triangle reported: “We hope that once we get bigger, it will be more easy to attract new members for us”. The same holds up for the data visualization triangle, citing an interviewee: “Most members have joined via the network of existing members and via our events and trainings”. However, once a person is a full member, his/her input is fully dependent on their own intrinsic motivation.

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4Single-Point-of-Contact role
Empirical design principle 8

If a scaled agile organization wants to implement communities of practice (C) it should host a strategic kick off where all the members can contribute to the vision and thereafter construct a mission statement (I) so that everyone is aware of the goal and identity of the community (M) and in turn increases the likelihood of success of the community of practice (O).

All the cases report that a triangle is a good way for sharing knowledge, but also recognise that each community needs a more specific goal and vision. As most triangles in the ABN AMRO are still in a premature phase, they have not developed a formal document stating their vision. The block-chain triangle is the only triangle which is actively thinking about the mission and strategy. The community organised a strategic session hosted by an employee from the Corporate Strategy department in order to answer the question: ‘Where do we want to go as a community and what is it exactly that we want?’ This session outlined the value of the triangle for the organization as a whole and the value for the individual members.

Furthermore, the ScrumMaster triangle will be hosting a kick-off meeting where all the members are expected to formulate a short- and long-term goal on what they want to achieve with the triangle. From this an overall strategy will be formulated.

Another advantage is that having a mission helps in building a case for management. Because communities depend on support and funding of the organization, having a well-researched and convincing proposal enhances the likelihood of success. The proposal should describe the potential value of the community for the whole organization, the individual members and the strategic goal.

5.3 Synthesis of Final Design principles

In this section the final set of design propositions is presented. Based upon the method of Van Burg et al. (2008), the final set of design propositions is synthesized from the theoretical and empirical design principles. The main question to be answered from this was ‘How should Communities of Practice be established within ABN AMRO?’. The final set of design principles will be used a building blocks for the final design. Figure 5.2 shows the first step of the comparison and provides an overview of which design principles overlap or intersect. In the table, the intersection that indicate an overlap or intersection are marked grey. The both the context and outcome are similar for all propositions and state: ‘If a scaled agile organization want to implement CoPs the following interventions are helpful..’, and ‘...increases the likelihood of success of the CoP’.

The final set of design propositions is shown in table 5.2. The process of synthesizing these final propositions was based upon the method of Van Burg et al. (2008), which was explained in chapter 4. A more elaborate view of the process of synthesizing the design principles can be found in appendix G.1.

The theoretical design principles 4 and 7, as well as empirical design principle 2, did not overlap with any other proposition, and therefore were omitted in the list of final design principles. However, the principles in itself contain valuable insights with regards to setting up CoPs, and therefore will not completely be dismissed but recur in the section of managerial implications.
5.3. Synthesis of Final Design principles

<table>
<thead>
<tr>
<th>Empirical Design principles</th>
<th>Theoretical Design principles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TDP 1</td>
</tr>
<tr>
<td>EDP 1</td>
<td></td>
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<tr>
<td>EDP 2</td>
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<td>EDP 6</td>
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<td>EDP 7</td>
<td></td>
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<tr>
<td>EDP 8</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5.2:** The comparison of theoretical and empirical design principles

**Table 5.2:** Overview of the final design principles

<table>
<thead>
<tr>
<th>FDP If a scaled organization wants to implement CoPs, the following interventions are helpful.</th>
<th>In order to increase the probability of success via the following mechanisms.</th>
<th>Which are embedded in the following underlying theory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The community must encourage an open and transparent culture which stimulates active involvement in the community</td>
<td>The open culture ensures participants are intrinsically motivated to contribute to the community and creates a welcoming atmosphere</td>
<td>Individual motivation is the fabric of a community (Ruikar, Koskela, and Sexton, 2009) Participants are afraid to loose face in the community of the culture is wrong (Ardichvili and Page, 2002)</td>
</tr>
<tr>
<td>2 The community must provide for an interesting and relevant agenda</td>
<td>So that participants know whether the meeting is going to be relevant for them and ensures that something is actually happening</td>
<td>Having a suitable agenda was key success-factor in a multi-case study (Paasivaara and Lassennius, 2014)</td>
</tr>
<tr>
<td>3 The community should have a open access online platform as a data repository and online meeting place</td>
<td>It allows for distributed and time-limited teams to cooperate in an orderly fashion</td>
<td>Key success-factor (Wenger, McDermott, and Snyder, 2002) Create institutional memory (Chang et al., 2004)</td>
</tr>
<tr>
<td>4 The community should appoint all the appropriate roles needed for their success and educate these people accordingly</td>
<td>Light-handed management helps the community focus on their domain, maintain relationships and develop on its practice</td>
<td>Key success-factor (Cox, 2009) Effective leadership (Resnick and Meija, 2007)</td>
</tr>
<tr>
<td>5 The community should recognise multiple participations levels with fluid boundaries</td>
<td>So that participants can move freely through the levels and feel like a full member at every level</td>
<td>Not all members need to contribute actively (Mcdermott, 1999a) key success-factor (Jeon, Kim, and Koh, 2011)</td>
</tr>
</tbody>
</table>
5. Results

6. The community should host a kick-off session where the domain and scope of the community is determined and the strategic intent to be examined

So that participants will be able to recognise their skill set in the community and feel personally connected with the community, which leads to increased individual contribution.

A case study indicated that a narrow domain scope increased member contribution (Paasivaara and Lassenius, 2014)

Key success-factor (Akhavan, Ramezan, and Moghaddam, 2013)

7. Start from existing premature communities

So that communities can leverage the existing resources and do not have to start from scratch.

Identify premature networks (Hearn and White, 2009)

Challenge for the company is to identify them (Wenger and Snyder, 2000)

8. The community should maintain a suitable rhythm

So that the members stay interested as the agenda is always full but not get bored as it is too often.

Too fast makes the community feel overwhelming, too slow makes it sluggish (Wenger, McDermott, and Snyder, 2002)

9. The community should recruit from different departments and use a taster internships

So that there is a wide variety of members and members know what they are getting into.

Key success-factor (Sheil, 2005)
6

Design

“Design is not just what it looks like and feels like. Design is how it works”

– Steve Jobs

This chapter describes the procedure in designing a tool for implementing triangles within ABN AMRO. The problem solving method as proposed by Aken, Berends, and Bij (2012) was applied to develop the tool. In this method, several boundaries are set to ensure that the design does not interfere with the goals of the organization. According to the authors these boundaries are best indicated as design requirements.

6.1 Design Requirements

Van Aken (2004) suggested that the design has to fulfil several requirements and that if these requirements would be overlooked, it would lead to justification problems of the solution. Van Aken suggests the following requirements: functional requirements (the solutions should solve the identified problem), user requirements (specific demands from the viewpoint of the users, so that they are willing and capable of implementing the solution), boundary requirements (the requirements that have to be met unconditionally. For example: laws, ethics, or company policy), and finally design restrictions (restrictions that denote the preferred solution space of the tool).

The users of the design solution are all the employees from all hierarchical levels of ABN AMRO. However, requirements are formulated from the perspective of the general user rather than top management, since the design cannot make any changes at management level.

The design requirements were constructed during the interviews, internal discussions while spending substantial time on the site, and lastly a brainstorm with the most important stakeholders.

Functional Requirements:

- The design should help the employees of ABN AMRO in recognising the importance of the triangles
- The design should offer the employees guidelines in setting up a triangle
- The design should not impose any obligations or commitments to the employees in the process of setting up a triangle
- The design should generate as much exposure as possible
- The design should provide for bottom-up interventions

User Requirements:
6. Design

- The design must be easy to grasp
- The design should be directive
- The design must be concise

**Boundary requirements:**
- The design should support the agile transition of ABN AMRO

**Design restrictions:**
- The design should be ready to presentable to ABN AMRO by the 27th of July
- The design should be cost-neutral, i.e. not require any extra effort from the employees

6.2 Design Solutions

The final design for ABN AMRO has to satisfy the above requirements, yet these requirements can be satisfied in multiple ways. Several options were contemplated which will be described briefly below:

**Closed training workshop:** A training workshop is a type of interactive training where participants carry out a number of training activities rather than passively listen to a lecture or presentation. The training workshop would be aimed towards educating the importance and awareness of the triangles within the ABN AMRO. Furthermore, it should provide some guidelines on setting up such a community. Advantages include that users are usually very motivated and a series of workshops can build on one another. Disadvantages include the fact that workshops are expensive and time consuming (Atherton, 1975).

**Seminar:** A seminar is a form of instruction, which can either take place at an academic institution or is offered by a commercial organization. Its main function is to bring together small groups of people on a regular base, focussing each time on a particular subject, in which every participant is requested to participate. In much senses it is similar to a training workshop, but it differs in the fact that it is much less interactive.

**Quick Start Guide** This solution design entails a shortened manual that provides the user (employees of ABN AMRO) with a concise step-based approach with the goal to make the user familiar with the product as soon as possible. It focusses on the most common instructions, often accompanied with easy to understand illustrations. The appearance of a quick start guide can range from a single A4 sheet to folder card or booklet.

All of the above options were considered during a discussion with the Education & Knowledge Management team of the ABN AMRO and after a brainstorm the last option of the quick start guide was selected for several reasons. Firstly, the solution has to generate as much exposure as possible, and the quick start guide offers the possibility to be introduced at the Agile Summer School. This an initiative to promote the transition to the Agile way of working for ABN AMRO. It allows for a wide spread dissemination of the design throughout the whole company. The real strength of the triangles lies with the fact that everyone in the company is aware of the advantages of such a community and how to set
it up. The event will take place on the 27th of July and the 30th of August. The event will host an array of speakers and parallel to that a marketplace in which a multitude of initiatives regarding the agile transition will be promoted.

Secondly, the quick start guide aligns very well with the user requirements. A quick start guide does not impose anything, but is concise and straightforward, and is easy to grasp. This is also in line with the vision of the E&KM Team, which is ‘enhancing IT knowledge and getting smarter together by applying effective teaching aids, offering knowledge management and educational programs, and improving innovation and change management’.

Thirdly, a quick start guide is very cost-effective and can make a lot of impact if it gets to the right employees. With the help of the Agile Summer School, the guide can reach a lot of employees within the ABN AMRO.

To conclude, the quick start guide was chosen as the most viable design solution since it aligns best with the specified requirements. Furthermore, the guide can act as a content provider for the seminar or for the workshops for the future.

### 6.3 Concept Solution

This section describes the development of the quick start guide. Although the design process was by no means a linear or straightforward path, for the sake of convenience and simplicity, three milestones in the form of prototypes have been indicated.

For every prototype, first the development process is described after which the testing process is explained, and (if applicable) the validation is described.

#### 6.3.1 Validation of Research Results

The first step in the development of the tool was the validation of results of both the literature and practice. This was done by presenting the challenges and success factors and the final design principles in a deep dive at the weekly team meeting and the intermediate results where already validated during the case interviews. Regarding the team meeting, the team consists of mainly management consultants from the Education & Knowledge Management team. The interviewees are all actively involved with setting up or participating in triangles. This audience synchronizes with the target audience since they are often responsible for coordinating in communities and there were deemed appropriate for the validation of the research results.

The team indicated that all the principles were helpful in setting up a community within the organization, albeit indicating that the material as such was too much dry matter and not actionable enough. The final design should spark one’s imagination and that the terminology of the design should be informal.

During the interviews it became evident that the practitioners often found it troublesome to take the first step into initiating a community. Moreover, at first they were not aware of the fact that they could even set up a triangle. They indicated that they needed more guidance and tips for setting up triangles which was a clear signal that the development of a tool would be very helpful for the ABN AMRO.

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1. in-depth exploration of a certain subject
6.3.2 Concept solution 1

The challenge is to develop a tool with the aforementioned design principles. This section will elaborate further on the specifics of the design process of the final artifact.

Session with first supervisor

Once it was decided that the final solution should be a quick start guide which was to be presented at the Agile Summer School, the content of the guide had to be created. The first brainstorm regarding the content was with the supervisor from ABN AMRO. During this brainstorm the design principles as stated above were leading for providing content.

The final conclusion from the brainstorm was that the quick start guide had to be introduced at the Agile Summer School in an interactive and notable manner, in order to be noted by the employees. Therefore, we choose to divide the final solution design in four parts, namely:

1. A Trigger poster (triggering the employee’s attention to come and have a look at the module)
2. A Question poster (probing the employees for the interest in joining or setting a CoP)
3. A Content poster (a quick and clear overview with the most important steps to setting up a CoP)
4. The Quick Start Guide (a more in-depth explanation of the guidelines)

Henceforth, the above parts as a whole will be referred to as the *toolkit*, and the separate parts will be referred to as described above. The results of the brainstorm are shown in figure 6.1 depicting a premature form of the design. Although the sketch may be difficult to read, it represents a stall in the marketplace and it will be located next to the ABN AMRO’s educational showpiece *Topolis*.

---

**Figure 6.1:** Representation of the first feedback session with the first supervisor from ABN AMRO
Development of the first prototype

The toolkit will build upon the organizational culture model as proposed by Schein (1985) and further refined by Dauber, Fink, and Yolles (2012). The reason for building upon this framework is to ensure that all factors needed for building a community are taken into account in the solution design. The authors define a configuration model of the organizational culture that reflects internal processes of an organization, linking organizational culture, strategy, structure, and operational systematically each other. The authors reason that all domains – strategy, structure, and operations – are indirectly affected by culture, and vice versa.

Schein (1985) reasons that if one wants to decipher an organization’s culture, one must dig below the organization’s surface and uncover the basic underlying assumptions, which are the core of the organization. Therefore he provided a tool – a formal definition of organizational culture – that emphasizes how culture work. In the hierarchical order established by Schein it appears that the impact of organizational culture on operations unfolds through strategy (i.e., espoused values). The design has to represent all dimensions of the model as established by Schein. The culture refers to underlying assumptions, or unconscious, taken-for-granted beliefs and perceptions. The strategy refers to the espoused beliefs and values, such as goals, philosophies or strategies. Lastly, the structure and operations respectively refer to the visible structures (operationalization) and processes within the community (patterns of behaviour).

For the sake of clarity, the final design principles have been categorized according to the configuration model by Dauber et al. (2012) and can be found in appendix G.2. The authors acknowledge that the model should be complemented with the ‘external environment’ since communities are embedded in various contexts. However, however this is of no concern to the design since the final design can only influence internal environment.

Testing the first prototype

The initial quick start guide was presented during the weekly team meeting in order to gather feedback and improve the design. The guide was a minimum viable product, meaning that it had just enough features to satisfy end-users and to provide feedback for future development. As stated before, the toolkit consists of 4 parts that will be printed on A1 format and presented during the Agile Summer School. The first prototype however, only consists of the quick start guide itself (a booklet of A4 format). Appendix H.1 shows the first version of the artifact.

The overall feedback was that the toolkit was not yet applicable in practical setting for two reasons. Firstly, the design of the tool is very much similar to the ABN AMRO’s branding, and therefore very similar to other learning material provided by the team. The feedback indicated that tool would just blend in with the other materials, without making the desired impact. Secondly, the amount of information was too much at once, leaving the audience overwhelmed with information and unable to process it.

Yet, the team also indicated that the tool was a good beginning which clearly filled a knowledge gap within the ABN AMRO. They also noted that it was important to raise awareness regarding triangles, since the concept is one of the most important building blocks for the transition to the Agile way of working for ABN AMRO, nonetheless there is no explicit module on these communities. Furthermore, the addition of the benefits for ABN AMRO and its employees (from
literature) is very valuable as it can be used by employees to justify their activity in a Triangle to their manager.

6.3.3 Concept solution 2

The feedback from the previous meeting was implemented in the second prototype which is presented in appendix H.2. Once again, this prototype is minimum viable product and mainly serves to validate the new style and to gather feedback.

Development of the second prototype

During a brainstorm with the company supervisor, we choose to apply the analogy suggested by Wenger, McDermott, and Snyder (2002). In their study they state that CoPs should not be second-guessed or over-managed, which leads to some to believe that CoPs cannot be cultivated. However, they state that cultivating CoPs is much like having a garden.

A plant does its own growing (...) you cannot pull the stem, leaves, or petals to make a plant grow faster. However, you can do much to encourage healthy plants: till the soil, supply water, secure the right amount of sun exposure, and protect them from pests and weeds

In the same sense plans can be cultivated within a garden, triangles can be cultivated within the ABN AMRO. A lot can be done, but it cannot be dictated. Henceforth the design adopted the analogy of a plant, where each intervention acted as a catalyst for the growth of the community.

The initiation of a triangle was broken down into five easy steps, which should be undertaken when starting up a community. This incorporates the feedback that the information was overwhelming and too much at once. The five steps collectively represent the final design principles. Table 6.1 offers an overview of how the design principles link to the five steps. These steps offer enough information to get started, but do not confine the initiator to any prespecified pattern. The steps are by no means obligatory, but rather provide guidelines to the subtleties of setting up a community within the ABN AMRO.

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
<th>Final Design Principle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Establish starting point</td>
<td>FDP 7: Start from existing communities</td>
</tr>
<tr>
<td>2</td>
<td>Define purpose</td>
<td>FDP 6: Host a strategic kick-off</td>
</tr>
<tr>
<td>3</td>
<td>Determine member identity</td>
<td>FDP 9: Recruit from different dept.</td>
</tr>
<tr>
<td>4</td>
<td>Appoint roles</td>
<td>FDP 4: Appoint roles within the community; FDP 5: Recognize participation levels</td>
</tr>
<tr>
<td>5</td>
<td>Determine way of working</td>
<td>FDP 1: Encourage open and transparent culture; FDP 2: Communicate appropriate agenda; FDP 3: Central open access knowledge repository; FDP 8: Maintain suitable rhythm</td>
</tr>
</tbody>
</table>
Testing the second prototype

The further validate the improved design of the artifact, the toolkit was presented to the coordinator\(^2\) of the Agile Summer School and to the teamleader of the Education & Knowledge Management Team\(^3\). The reasoning behind the analogy of the plant and the toolkit was explained extensively. Thereafter they browsed through the material of the toolkit for starting up a Triangle.

The feedback was that the toolkit offered valuable information, but should be more hands-on, meaning that it should address the employees more directly and replace scientific jargon with more informal language. An example of the feedback is the life cycle of a Triangle, which describes the stages of a Triangle using scientific jargon, such as ‘potential, coalescing, maturing, stewardship, transformation’. As a result of the feedback this was changed to the more informal ‘committing, starting up, operating, maturing, transformation’. Also, many of the texts were rephrased to address the employees more directly and encourage them to take action, rather than addressing no one in particular.

Furthermore, the second prototype excluded the concept of Circles in the design, as the research was primarily focussed on setting up Triangles. However, we agreed that for the sake of completeness and clarity, the design should also include the definition of a Circle and how it is distinguishable from a Triangle. Henceforth, a page with information about a Circles and Triangles and how they relate to each other was added in the brochure. Moreover, the posters were adapted to suit the initiation of both Circles and Triangles.

6.3.4 Concept solution 3

In appendix\([^\text{I}]\) the final design of the toolkit is presented. As stated in section 6.3.2 the design consists of four parts; the content poster, the trigger poster, the question poster and a quick start guide. All the feedback from previous sections was incorporated.

Development of the third prototype

The development of the third and final prototype is predominantly focussed on the style and content of the design. No major changes were made to the overall form.

The main difference is a further refinement of the style, thus making the toolkit notably different from the ABN AMRO corporate branding. Due to the Agile transition, the ABN AMRO is going through a turbulent period. This shift to the Agile way of working is accompanied with an abundance of information, consequently employees may easily get lost in a ‘sea of information’. Therefore the design had to be refreshing and easy to grasp. As can be seen in appendix\([^\text{II}]\) the design is cheerful, but with a serious overall tone. Furthermore, the analogy of the growing plant and the 5 steps of setting up a Triangle or Circle is a recurrent element in the design. The quick start guide further elaborates upon the five steps and the analogy of the growing plant. Although the quick start guide front-page features the same cheerful style as the posters, the contents have adopted the ABN AMRO corporate branding which suits the message better.

\(^2\)Joan Pastoor-Stevens
\(^3\)Jarno Zange
Lastly, whereas the previous designs primarily focused on setting up Triangles, the final design also incorporates Circles. Also, a section describing the differences between a Triangle and Circle has been adopted in the start-up guide.

Validating the third prototype

The toolkit was presented to a consultant of the Corporate Strategy team, who also hosted the strategic session as described in Empirical Design Principle 8. During this session questions were raised such as ‘Where do we want to go as a Triangle?’ and ‘What can we get out of it as an organization and as an individual?’.

It was the first time that this person had seen the tool, and he was positively surprised by the result delivered. More specifically, he was very fond of the analogy of using a growing plant to describe the growth of a community.

However, as we walked through the materials, he noted several things. Firstly, he stated that ‘The challenges described in the phases of a natural life cycle of a Triangle are too general and are applicable in many situations’. Nonetheless here a trade-off is needed. Making the tool more context-specific would entail that the guide can only be used in specific business lines or communities, whereas a more general tool can be applied throughout the whole of ABN AMRO. Secondly, he stated that challenges merely state their presence but do not offer real solutions. Once again, providing solutions would make the tool too context-specific. Lastly, he stated that the tool will not make any impact unless the tool is widespread throughout the ABN AMRO. It should be crystal-clear what is the added value of Triangles and Circles for the ABN AMRO and for the individual members. With that as a starting point, exposure should be generated so that employees are willing to join multiple Triangles, which will lead to enhancing effects.

6.4 Implementing the tool

Although Van Aken et al. (2004) states that the implementation phase is often beyond the scope of the project as performed by the student. However, this research has taken the first steps in implementing the tool and raising awareness.

In order ensure the success of the tool, it is crucial for as many as possible employees to be aware of the toolkit. To ensure this widespread dissemination over the whole company, the Agile Summer School was chosen as an event to introduce the tool.

6.4.1 Agile Summer School

The Agile Summer School is a sequel to the Agile Experience. Yet, whereas the Agile Experience’s focus was to promote ‘awareness and inspiration’, the Agile Summer School will revolve around ‘knowledge and skills’ regarding the Agile transition. The Agile Summer School will take place on the 27th of July and the 30th of August on the headquarters at the Gustav Mahlerlaan.

The Agile Summer School will host an array of keynote speakers and parallel to that a marketplace will take place to promote multiple initiatives to promote the Agile way of working, the Agile environment and personal development. The Summer School’s target audience is everyone who is going to work in new structure in Grids, so in other words; everyone. For the specific workshops employees

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4Bart Raessens
had to subscribe and for the marketplace no subscription was required.

The overall goals of the Agile Summer School are:

1. Improving the knowledge and skills regarding the Agile way of working
2. Provide employees within grids with more clarity regarding their own learnings needs and preferences and encourage them to think about their own responsibility
3. Assessing the learning needs of employees within grids
4. Fast Forward, being responsible for the Agile transition, gets more insights in which providers can play a role in their further learning offers

The two Agile Summer School-days on the 27th of July and the 30th of August featured respectively 1000 and 1500 registrations. For the first event, the marketplace featured a question poster where employees where challenged to write down which Triangle they would like to see, or whether they are already in one. The second event replaced this question poster with a demo in which questions could be asked. Figure 6.2 shows an impression of the first Agile Summer School and figure J.1 shows a map of the marketplace.

### 6.4.2 Practical implementation

As noted by the consultant when validating the third and final prototype (section 6.3.4) the success of the tool highly depends on the level of exposure and degree of adoption of the tool.

During the event the tool gained a lot of exposure as the events were attended by approximately 2500 employees. On top of that, the Agile Summer School was featured on the frontpage of the internet, indirectly reaching the all employees of the ABN AMRO (see appendix J.2). Furthermore, the FastForward team, responsible for the Agile Transition decided to adopt the tool in their training curriculum, thus ensuring that the gained knowledge does not get lost over time.

![Figure 6.2: The presentation at the Agile Summer School on the 27th of July](image)
7

Discussion and conclusion

“A conclusion is the place where you got tired thinking”
– Henry Martin Fischer

This study set out to investigate how a large globally distributed software development organization is able to ensure knowledge is disseminated throughout the company. As such, this chapter will present the findings, limitations and directions for future research.

7.1 Findings

This research builds upon a case study of conducted within the ABN AMRO to answer the following research questions which has been formulated in cooperation with the IT Office Knowledge Management Team: How can knowledge management be optimised in a scaled agile environment through the application of communities of practice? In order to answer this question, four sub-questions have been posed, that together provide an answer to this question.

1. What are the challenges for implementing knowledge management in scaled agile organizations?

Starting point for this thesis has been the notion that Agile methodologies are originally developed for small teams and small scale companies (Beck et al., 2001) and the application in larger settings is considered troublesome in terms of project management (Lindvall et al., 2004), and in particular with regard to knowledge sharing over teams. Although much research has been conducted on this topic, no practical recommendations have been offered (Santos, Goldman, and Souza, 2015). Many of the challenges are related to the fact that the agile approach focuses on sharing tacit knowledge within the team (intra-team) through personalization strategies, but offers no explicit support the sharing of knowledge over teams (inter-team) (Kettunen and Laanti, 2008; Conboy et al., 2010).

Kavitha and Ahmed (2011) identified a number of challenges (see section 3.2.2) that are inherently related to the emphasis on personalization strategy. They all reveal that tacit knowledge is volatile and gets lost as employees switch teams or leave the company. The two latent challenge that can be derived from these challenges is the transfer of implicit knowledge to explicit knowledge, as well as the transfer of explicit knowledge from individuals to groups (Levy and Hazzan, 2009).

2. What are the benefits of communities of practice in an organization?

Communities of Practice (CoP) is a group of people who share a craft or profession and learn how to do it better as they interact regularly. They differ from normal business units as their main goal is knowledge creation and that are no
formal connections between the people. Mostly these CoPs are bottom-up, self-
managed and loosely connected (Wenger, McDermott, and Snyder, 2002).

CoP is an interesting concept to large software development organizations as they offer a great variety of benefits. According to (Mcdermott, 1999b) CoPs act as a mechanism for capturing and sharing tacit knowledge by letting people from different departments discuss common interests. This leads to a quick spread of best practices throughout the organization, it decreases the learning curve of new employees, and stimulates pools of knowledge. Thus, CoPs have the potential to increase organizational performance by stimulating contribution of individual members on their own terms. Resnick (2006) adds upon this by listing several benefits that add to the organizational value of CoPs. (see 3.3.1).

3. What are the key success factors of successful communities of practice? Although CoPs are fundamentally informal, self-organizing, and must be left untouched to reap their benefits (Wenger and Snyder, 2000), successful CoPs can be guided to some extent. Paasivaara and Lassenius (2014) found openness of participation, valued participation by the organization, and managerial support to be the three key elements for a supportive atmosphere for building CoPs. Akhavan et al. (2015) recognise strategy and goals, and the organization itself to be two main factors for success. Through formulating clear objectives, open communication and a supportive atmosphere, organizations can increase the likelihood for success.

These factors are reflected in the form of 9 design principles which are synthesized from 11 theoretical design principles and 8 empirical design principles. These design principles can be found in table 5.2 and form the building blocks for the final design which has been used to final answer.

4. How should communities of practice be established within the ABN AMRO? In parallel to the research, the study aimed to design a tool with the main objective to promote awareness regarding CoPs and provide employees with a help for setting up a CoP. The tool was designed using the formerly mentioned design principles as a point of departure. Furthermore, the tool was based on the organizational configuration model as proposed by Schein (1985). The design had to represent the values as established by Schein, being: culture, strategy, structure and operations.

In total, three iterations were made to arrive at the final product. The Triangle quick-start guide was presented at the Agile Summer School, an initiative by the ABN AMRO to promote their new agile way of working. During this event the guide received many positive reactions and the FastForward team decided to incorporate the quick-start guide into their training curriculum.

7.2 Managerial Implications

The major contribution of this thesis is a set of 9 design principles that promote practices that can be used to foster CoPs within scaled agile organizations. However, several earlier principles were omitted from the final design principles, since these principles concerned top-down interventions, and therefore did not adhere to the users. Yet these principles contain valuable insights for management.

Firstly, according to theoretical design principle 4, employees should be allotted company time to dedicate specifically to the development of the community in the organization. Time constraints will go at the expense of the community and, although impact cannot directly be measured, thereby eroding company
performance. Secondly, theoretical design principle 7 states that CoP contribution can also be incentivized by implementing a form of reputation management. This has two advantages: it allows for the identification of expertise and it motivates members through professional recognition. And lastly, empirical design principle 2 states that a community should be designed such that public and private dimensions are interrelated, meaning that community members should also meet outside the official meetings and discuss relevant matters in personal time. To conclude, even though it may be hard to manage CoPs and to see their direct impact, their influence is unmistakeably positive and therefore worth the effort. Although these three design principles are not grounded in both practice and research, they can provide for possible interventions as they have proven themselves useful in either theory or practice.

7.3 Limitations and recommendations for future research

There are several limitations and concerns that impair the findings of this thesis. These limitations are discussed next, after which recommendations for future research are given.

One of the main limitations is related to the internal validity of study. Firstly, this research was focussed on identifying what a successful CoP is supposed to be, yet no attention was given to what an unsuccessful CoP is. How do the key success factors relate to the factors that contribute to the failure of a CoP, and what are these factors? Secondly, only the CoPs that protruded within the ABN AMRO were selected for study, whereas the less present CoPs were omitted. This might lead to biased results since only the most successful CoPs were included in the case study. Thirdly, although the interviews provided quite some insights, the results are of a mostly qualitative nature and heavily depend on the interpretation by the researcher. Moreover, the code strings were not checked by another party, subsequently increasing the likelihood of a biased outcome. Another limitation is related to the external validity. Even though Van Aken et al. (2012) state that generalizability is of less importance in business problem solving projects, the design propositions are based solely on observations within the ABN AMRO. This might decrease the generalizability of the design propositions.

Future research should aim to investigate the success of CoPs over multiple organizations in a longitudinal study. As explained in 4.4.1 this study assesses the performance and success of CoPs at a certain moment in time, whereas success should be measured over time and is related to the impact of a community within the organization.
## Appendix A

### List of Interviewees

Table A.1: List of interviewees from within the ABN AMRO

<table>
<thead>
<tr>
<th>Name</th>
<th>Role in Triangle</th>
<th>Function in ABN AMRO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ScrumMaster Triangle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mike Smit</td>
<td>Initiator</td>
<td>Agile Coach, Senior Scrum Master and agile trainer</td>
</tr>
<tr>
<td>Peter Breukels</td>
<td>Initiator</td>
<td>Center Of Expertise, Agile consultant</td>
</tr>
<tr>
<td>Rob Pepels</td>
<td>SPOC</td>
<td>ScrumMaster, Developer</td>
</tr>
<tr>
<td>Brigitte Ligt</td>
<td>SPOC</td>
<td>Developer</td>
</tr>
<tr>
<td><strong>Developers Triangle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phung Do</td>
<td>Participant</td>
<td>Developer</td>
</tr>
<tr>
<td>Jean-Paul van Deursen</td>
<td>Participant</td>
<td>Developer</td>
</tr>
<tr>
<td><strong>Block-chain Triangle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marjan van der Plas</td>
<td>Coordinator</td>
<td>Center of Expertise, Innovation Manager</td>
</tr>
<tr>
<td>Rick Steenbergen</td>
<td>Participant</td>
<td>Technology expert</td>
</tr>
<tr>
<td>Lex Dekkers</td>
<td>Participant</td>
<td>Innovation Manager</td>
</tr>
<tr>
<td><strong>Data Visualization Triangle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ben De Jong</td>
<td>Initiator</td>
<td>Management Information, data visualization</td>
</tr>
</tbody>
</table>
## Appendix B

### CIMO logic

**Table B.1: CIMO logic defined (based on Denyer et al., 2008, p.397)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C Context</td>
<td>The context entails the field problem that is being addressed by the design problem and its background in both endo- and exogenous factors, and the nature of the human actors that influence the change. The exogenous factors include among others: market position, competition or industry specifics; and the endogenous factors include: technology, organizational design, stability, organizational knowledge. The human actors interacting with design intervention are defined by their competences, experience or power.</td>
</tr>
<tr>
<td>I Intervention</td>
<td>These are the specific actions that can be undertaken (e.g. by managers) to modify behaviour or to deliver the expected outcome. Examples of this include: leadership style, planning, control systems, training, performance management. It must be noted that not merely the nature of the intervention must be examined, but also how it is implemented</td>
</tr>
<tr>
<td>M Mechanism</td>
<td>The organizational phenomena that in a certain context will triggered by the intervention. To illustrate, a mechanism would be the causal chain of effects of empowering the employees. Employee empowerment provides the opportunity to contribute beyond the operational task, thus increasing responsibility and employee participation, which all in turn of long term potential benefits for the company</td>
</tr>
<tr>
<td>O Outcome</td>
<td>The results of the intervention in a either quantitative or qualitative form. Examples of this include: performance improvement, cost reduction, increased customer satisfaction.</td>
</tr>
</tbody>
</table>
Appendix C

Case Study Protocol

Questions

1. Background
   - What is your role, background and experience at ABN AMRO?
   - Of which Triangles do you have experience?

2. Triangle specific
   - How big is the triangle?
   - When was the triangle initiated? When did you join the triangle?
   - How often is there a meeting?
   - How is the Triangle structured in terms of leadership?
   - Who is allowed in the community?

3. Triangle initiation (only for initiators)
   - Why was the Triangle initiated?
   - How did you start building the triangle?
   - How did you support this process?
   - Was there a planning process and how did it work?
   - What was the biggest challenge to be overcome in this process? How would you improve this?

4. Triangle participation
   - Do you participate in more Triangles? If so, which ones? Did the previous triangles disappear, and why?
   - Tell me about the triangle you are currently participating in: What is the purpose, what happens in the triangle, who are the participants and what is your general feeling? Any positive or negative experiences?
   - How are participants involved in the community?
   - Is the Triangle successful? Why? What does make a triangle well-functioning?
   - What does make a Triangle unsuccessful?
   - Can you tell me the difference between a Triangle and a Circle?
   - Wiki: How is the wiki used in the Triangle you are participating in? What kind of information can be found on the wiki page?
   - How are new members involved in the Triangle? How are they recruited?
• How would you improve the Triangle you are participating in? How would you improve the culture/support for building a Triangle?

5. Managerial commitment

• Is there any top-down incentive to actively participate in a Triangle?
• What does it entail and how could it be improved?
• If not, why not and how could this be implemented?
Appendix D

Indicators of Community of Practice

TABLE D.1: Wenger’s indicators that a community of practice has formed (p.125)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sustained Mutual relationships – harmonious of conflictual</td>
</tr>
<tr>
<td>2</td>
<td>Shared ways of engaging in doing things together</td>
</tr>
<tr>
<td>3</td>
<td>The rapid flow of information and propagation of innovation</td>
</tr>
<tr>
<td>4</td>
<td>Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process</td>
</tr>
<tr>
<td>5</td>
<td>Very quick setup of a problem to be discussed</td>
</tr>
<tr>
<td>6</td>
<td>Substantial overlap in participants’ description of who belongs</td>
</tr>
<tr>
<td>7</td>
<td>Knowing what others know, what they can do, and how they can contribute to an enterprise</td>
</tr>
<tr>
<td>8</td>
<td>Mutually defining identities</td>
</tr>
<tr>
<td>9</td>
<td>The ability to assess the appropriateness of actions and products</td>
</tr>
<tr>
<td>10</td>
<td>Specific tools, representations, and other artifacts</td>
</tr>
<tr>
<td>11</td>
<td>Local lore, shares stories, inside jokes, knowing laughter</td>
</tr>
<tr>
<td>12</td>
<td>Jargon and shortcuts to communication as well as the ease of producing new ones</td>
</tr>
<tr>
<td>13</td>
<td>Certain styles recognised as displaying membership</td>
</tr>
<tr>
<td>14</td>
<td>Shared discourse reflecting a certain perspective on the world</td>
</tr>
</tbody>
</table>
Appendix E

Structure ScrumMaster Triangle

FiguRe E.1: The structure of the ScrumMaster Triangle as decided per the 21th October by the ScrumMaster Alliance
## Appendix F

### Coding scheme

**Table F.1**: The coding scheme makes distinction of four different themes

<table>
<thead>
<tr>
<th>Theme: Culture</th>
<th>Code</th>
<th>Description</th>
<th>Example</th>
<th>Freq.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>The amount of commitment the community demands from their members</td>
<td>&quot;Verder is community totaal vrijblijvend. Het afzeggen kan gewoon, tenzij je natuurlijk een presentatie hebt. Er is geen presentie lijst omd en er wordt niet verwacht dat je actief bijdraagt&quot;</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Awareness</td>
<td>The extent to which employees are aware of the importance of triangles and the existence of other triangles</td>
<td>&quot;Nog belangrijker triangles versterken elkaar, dus één triangle an sich is niet een succes, maar er moeten meer triangles komen en management moet het ook actief gaan promoten&quot;</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Theme: Strategy</td>
<td>Vision</td>
<td>The extent to which the members are willing to create vision and strive after it</td>
<td>&quot;ik zou graag willen werken aan een visie voor de data-visualization triangle die we kunnen uitdragen naar de hele bank en waar we naar toe kunnen werken, maar eerst moeten triangles breder gedragen worden binnen de bank&quot;</td>
<td>4</td>
</tr>
<tr>
<td>Theme: Structure</td>
<td>Coordinator</td>
<td>The extent to which the community has an explicit coordinator or expresses the wish for one</td>
<td>&quot;Als je niet heel actief aan de community trekt, dan gebeurt er eigenlijk niet zoveel. En als je dan eindelijk mensen hebt die enthousiast zijn, dan doen die niks?&quot;</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Technological infrastructure</td>
<td>The extent to which the community expresses the wish for a technical infrastructure or feature</td>
<td>&quot;We gebruiken momenteel Connections alleen als opslag systeem voor onze documenten, maar de echte communicatie gaat via Slack of via Whatsapp. Wel zouden we graag naar één systeem toe willen&quot;</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Participation levels</td>
<td>The extent to which the community applies different levels of participation in the community</td>
<td>&quot;Ongeveer 33% is actief, de rest is echter minder actief&quot; en &quot;alhoewel niet iedereen actief hoeft te zijn, streven wij hier wel naar om zo toch een zo actief mogelijke community te hebben!&quot;</td>
<td>7</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
<td>Example</td>
<td>Freq.</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td><strong>Agenda</strong></td>
<td>The extent to which a community has a strict agenda and timekeeping or expresses the desire for one</td>
<td>&quot;We hebben 1x per twee maanden een meeting met de hele community, de agenda wordt dan ad hoc opgevuld, maar dat gaat eigenlijk altijd goed&quot; and &quot;de agenda wordt altijd van te voren gecommuniceerd en strak aangehouden. Mocht de agenda niet goed gevuld zijn, dan wordt de meeting ook niet langer gemaakt dan nodig&quot;</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Private Space</strong></td>
<td>The private space refers to the number of private one-to-one contact moments a members has within the confinement of the community</td>
<td>&quot;We proberen iedereen er actief bij betrokken te houden, enerzijds door een wekelijks overleg en anderzijds door persoonlijk contact en samen koffie te drinken&quot;</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Public Space</strong></td>
<td>The public space refers to the extent to which the community has events where all members can join</td>
<td>&quot;Elk kwartaal is er een grote meeting waarbij alles wordt doorsproken, onderling zijn er maar sporadische contactmomenten, dit is eigenlijk echt te weinig&quot;</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>
Appendix G

Synthesis

G.1 Synthesis of design principles

**THEORETICAL DESIGN PRINCIPLES**
- TDP 1: Open and transparent culture
- TDP 2: Communicate a proper agenda
- TDP 3: Provide for the technological infrastructure
- TDP 4: Encourage to work in company time on community
- TDP 5: Appoint a coordinator
- TDP 6: Recognise participation levels
- TDP 7: Implement reputation management
- TDP 8: Identify communities and specify domain accordingly
- TDP 9: Maintain a suitable rhythm
- TDP 10: Appoint a knowledge broker
- TDP 11: Recruit members from different departments

**EMPIRICAL DESIGN PRINCIPLES**
- EDP 1: Raise awareness regarding Triangles
- EDP 2: Orchestrate activities in public and private space
- EDP 3: Recognise participation levels
- EDP 4: Provide for an interesting and relevant agenda
- EDP 5: Provide the technological infrastructure
- EDP 6: Appoint and educate group facilitators
- EDP 7: Recruit via own network and make use of internship
- EDP 8: Host a strategic kick-off for a mission statement

**FINAL DESIGN PRINCIPLES**
- FDP 1: Encourage an open culture and fail-friendly culture to ensure that employees contribute to the community
- FDP 2: Communicate and provide for an interesting and relevant agenda
- FDP 3: Have a central open access online platform as a data repository and online meeting place
- FDP 4: Appoint the appropriate roles within the community
- FDP 5: Recognise participation levels so that participants will not feel left out
- FDP 6: Host a kick-off where the domain of the community is determined and which activities are undertaken
- FDP 7: Start from existing communities
- FDP 8: Maintain a suitable rhythm for the community
- FDP 9: Recruit from different department with taster internship

**Figure G.1:** Synthesis of the design principles – each final design principles follows from at least one or two theoretical, or empirical design proposition
G.2 Organizational culture model

![Diagram of Organizational Culture Model]

**Figure G.2**: The internal environment of the organizational culture model as proposed by Dauber et al. (2012) complemented with the final design principles.
Appendix H

Prototypes

H.1 First iteration

Figure H.1: The design of prototype 1
H.2 Second iteration

“Everything you give attention and nurture, grows and evolves”

Setting up a Triangle within the ABN AMRO

Figure H.2: The design of prototype 2
Appendix I

Final Design

I.1 Trigger poster

*Figure I.1: The trigger poster intended to spark employee’s interest and trigger them into getting them actively involved regarding the subject, printed on A1 format*
I.2 Question poster

FIGURE I.2: The questions poster is intended to be interactive and engage in conversations. It may well be that employees already have initiated some form of a triangle or circle, which they can indicate on this poster, printed on A1 format.
A Quick Start on growing your Circle or Triangle

Circles and Triangles are needed to retain knowledge and experience within the ABN AMRO. These communities provide you the opportunity to deepen your expertise or passion within the organization! Circles and Triangles are easy to start, but hard to do right. Like a garden, they flourish when you give them attention, and fade when you ignore them. Therefore we provide you with several tips and tricks for growing your community.

1. Establish a starting point
2. Define the purpose of the community
3. Determine who will join the community
4. Appoint the appropriate roles
5. Determine your way of working

Figure I.3: The content poster intended to provide hands-on steps into setting up a triangle. A flyer will provide a further in-depth view on these steps, printed on A1 format.
I.4 Quick start guide

**Quick Start Guide: What to expect?**

This Quick Start Guide is intended for all ABN AMRO employees interested in setting up a Triangle or Circle. It aims to provide guidelines and a helping hand in setting up or ‘growing’ your Triangle or Circle.

Read further to find out:
- What is a Triangle and a Circle?
- How to set up and grow your Triangle or Circle?
- What challenges to overcome?
- What is the added value?
- What is your role in your Triangle or Circle?
- How actively are you involved?
- What is your way of working?

---

**What is a Triangle and a Circle exactly?**

Both Triangle and Circles can be defined as “a group of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis”. The key concept behind these communities is to share knowledge on an ongoing bases, so that the sum of the whole is greater than the sum of its parts.

A **Triangle** is a community of professionals from different blocks and grids with similar interests, for example professionals interested in Blockchain. It is your own initiative to participate in a Triangle. All employees that are interested or even passionate about the subject, are free to join the Triangle, in order to share knowledge or gain knowledge from the others.

A **Circle** is a group professionals from different blocks, who have unique knowledge, skills and competences in common. This means that skill or competence driven knowledge is shared in a Circle. For example, you can think of a circle of Marketeers.

---

**What does a Triangle or Circle consist of?**

Every Triangle or Circle has three fundamental elements: a domain of knowledge; a community of people who care about the domain; and the shared practice that they are developing to be effective in the domain. Each community is a unique combination of these elements.

**Domain:** This is the area of interest that binds everyone in the community together. Without commitment to a domain, a Triangle or Circle would just be a group of friends.

**Community:** A Triangle or Circle is not just a website, database, or collection of best practices. It's a group of people who interact, learn together, build relationships, and in that process grow together and develop a sense of belonging and mutual commitment.

**Practice:** The joint purpose of all the members and this is where you add value for ABN AMRO. Over time, practical knowledge is accumulated, which helps in the ability to act individually and collectively.

All these elements come together in a ‘sweet spot’ where knowledge is formed and new ideas are generated.

---

[Diagram: Triangle and Circle elements]

- **Domain:** Our area of interest
- **Community:** This is what binds us
- **Practice:** Our joint purpose
- **The Sweet Spot:**
How to set up and grow your Triangle or Circle?

1. Establish a starting point
   Determine a narrow starting point for the community! Research shows that having a too broad domain of interest has a negative impact on member participation as people cannot recognize their skills in the community.

2. Define the purpose
   The key question here is ‘What is the value for the organization and for the members?’. Formulating a vision statement could help you answer these questions.

3. Determine who is going to join the community
   Ask yourself ‘Who will my community serve?’ and ‘Who are my stakeholders?’ Explicitly stating your stakeholders will help a great deal in setting up the community.

4. Appoint the appropriate roles
   There are a number of roles in the community (read about it on pg. 9), maybe not all appropriate for your Triangle or Circle, but some are essential.

5. Determine your way of working
   What way of working will you follow? Make sure that you set an appropriate rhythm for the community and ensure that members also see each other outside the official gatherings.

What challenges to overcome?

Like other living things, Triangles and Circles are not born in their final state, but go through a natural cycle of birth, growth, and death. The development of a Triangle or Circle is never smooth. It frequently involves difficult transitions and learning it the hard way.

In general 5 phases can be distinguished. Although these phases give you a direction, don’t take them too literal! Some communities go through one stage rapidly, while others spend more time in the same stage. Some skip a stage and go back later to solve unresolved issues.

Still, having a sense of stages and the dilemmas coming with them, helps you to foresee problems you are likely to face, understand the changing need of the community and take appropriate action.

Plot your community in the stages below!
How actively are you involved?

People participate in Triangles or Circles for different reasons – some because the community directly provides value, some for personal connection. However, since all members have different levels of interest, it is unrealistic to expect that everyone participates equally. So, in general we recognize the following groups:

Outside group: The biggest group, but rarely participate for different reasons. A lack of time, or they come for learning. However, often they are not as passive as they seem.

Active group: These members attend regularly and participate actively, but without the intensity of the core group.

Core group: The heart of the community, a small group that actively debates, identifies topics and sets the agenda.

The key to good community participation and a healthy degree of movement between levels is to design community activities that allow participants at all levels to feel like full members. Rather than force participation, success communities ‘build benches’ for those on the sideline and ‘build a fire’ in the center of the community that draws people to its heat.

What roles do I need?

These five roles can be useful for setting up your Triangle or Circle! Not all roles are necessary. Some grow naturally, some people may take up more than one role:

- **Coordinator:** Research has shown that the most important success-factor in a community is the vitality of its leadership; however, there are some pitfalls the coordinator has to take into account! (See below)
- **Administrator:** Manages the technical and administrative aspects of the community.
- **Facilitator:** Sometimes referred to as ‘social artists’, they invite everyone in the discussion by making technical information interesting to layman and drawing members into discussion.
- **Contributor:** Adds content in the form of discussion, and materials that advance the mission of the Triangle or Circle.
- **Lurker:** Views, uses, and spreads the content through the whole organization, but does not contribute any content to the community.

Beware of these pitfalls

1. **Time.** Not making enough time for the task is on of the most common causes for failure. Too easily let other things take priority over community work.
2. **Networking skills.** The coordinator should be able to connect with everyone, thus making, thus making people comfortable in the community and recruiting new members.
3. **Technical knowledge.** The coordinator should have the background to understand technical issues and to move the community forward.

What is your way of working?

Setting up a Triangle or Circle does not mean that you should focus on writing out the exact plans and determining the exact structure. Rather you should recognize the importance of passion, relationships, and voluntary activities within the community. But how do you design a Triangle or Circle so that everyone is involved?

There is no right or wrong way of working for a community, but there are some things you should keep in mind:

**Triangles or Circles often exist already.** The communities build upon on already existing personal networks and are very dynamic. They are never finished and come in many forms, depending on their stage. So maybe you are already in one? Look around you and perhaps you recognize one.

**Take a suitable rhythm.** Make sure that you host regular community events, keeping all the members engaged. But keep the right pace, too often and the community may feel overwhelming, too slow and the community feels sluggish. Creating milestones, breaking up the regular rhythm keeps everyone interested!

**Keep the right balance.** Triangles and Circles are much more than a calendar of their events, the heart of a community is the web of relationships. Combine both familiar and exciting events so that people have the time to connect, but still remain interested.

So what are you waiting for? Let’s get started!

Are you further interested in this topic? You can find more information and the concept version of my thesis at the following link for connections:

https://tinyurl.com/TrianglesandCirclesGuide

or use this QR code:

References:


Appendix J

Agile Summer School

**Figure J.1:** Agile Summer School map

**Figure J.2:** Frontpage of intranet, 04-08-2017
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