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# Facilitating Cross Project Knowledge Transfer through Team Meetings

A CASE STUDY AT RIJKSWATERSTAAT'S LOCK PROGRAM
MASTER THESIS

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# Abstract

This paper aims to research the knowledge transfer structures in the Lock Program of Rijkswaterstaat. Knowledge transfer is difficult in the field of project management. This is mostly because of the nature of projects. Projects are often strictly defined in terms of time, scope and budget. In projects knowledge is produced at high pace but often cannot be transferred beyond the context of its application. A program might offer structures to facilitate this more strategic goal of knowledge transfer. The Lock Program has various structures in place to facilitate knowledge transfer. These structures primarily take on the form of group meetings. These meetings facilitate the accumulation, articulation and codification of knowledge (Zollo & Winter, 2014). Since codified knowledge is easier to transfer, these structures facilitate knowledge transfer. Knowledge transfer itself is influenced by four factors identified by Zhao et al. (2015): project team context, project task context, relationship and team capacity. This research was conducted with the help of 11 semi structured interviews. To make sure the group was representative the Interviewees were semi randomly selected. The results seem to indicate that project task context (time and project similarity) seem to influence knowledge transfer both in relation to the structural dimension as well as the personal dimensions. This paper recommends to continue with and keep on facilitating knowledge transfer through group meetings. Because knowledge still has difficulty to climb the ladder of codification it is recommended to invest more energy in the articulation of knowledge through more interactive and inclusive group meetings. Secondly it is recommended that after a project phase closes, lessons are immediately discussed and stored. It was observed that as time progresses project's drift apart. By capturing these lessons immediately after a phase closes, these captured lessons could diminish the observed drift.

# Acknowledgements

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# 1 Introduction

Due to population pressures and increasing demand for mobility infrastructure networks (waterways and roads) are increasingly under pressure. Also other factors such as climate change and socio spatial changes need to be accommodated. Water infrastructure networks are in need of renewal since a lot of those networks have been built in the '30 of the previous century. Planners need to incorporate both the expected demand of the future as well as adapt to external changes (Willems et al. 2015). One of the ways to adapt is a process of learning. Learning can be seen as a relative permanent change of behavior or perception due to experiences gained over time. Organizations needs to continually adapt in responds to their surroundings in order to survive. The planning of infrastructure is mostly done my governmental organizations. These governmental organization need to learn and adapt to expected demand in the future as well as external changes.

Rijkswaterstaat (RWS) is a governmental organization of the Dutch Ministry for Infrastructure and Environment and is currently, among other projects and programs, in the process of building and refitting 6 locks to future standards. These six projects include: new lock Limmel, extension of the lock Eefde, 3e kolk Beatrix lock, IJmond, Afsluitdijk (Closure Dike) and the project at Terneuzen. All the projects will be built by means of a DBFM (design, build, finance and maintain) contract, except the Terneuzen project. These six projects are in a program: "the Lock Program". This program aims to standardize contract preparation and gain efficiency in the work of people and resources (Rijksoverheid, 2013). These projects will be executed in consecutive steps. Within the program one does not want the reinvent the wheel six times over. The director-general of RWS, Jan Hendrik Dronkers, stated:

> *"Too often, we are tempted to reinvent the wheel. This applies not only for clients, but also for market and knowledge institutes in general. We pay too little attention to what is learned in other projects and forget to exchange our experiences, combining purposes of projects in a smart way and joining forces" (Bouwend Nederland, 2014).*

Clearly there is a need for more efficient and effective knowledge transfer procedures. However, literature suggests that knowledge transfer cross projects is not an easy process, where multiple barriers are involved (Schilling & Kluge, 2009) (Bakker, et al., 2011).  This thesis will begin with a short introduction of the Lock Program. Then we will introduce some theoretical concepts linked to project management and knowledge transfer. These concepts will be explored at length in the theoretical framework. After the theoretical framework the methods of the thesis will be discussed. In the results we will explore the knowledge transfer structures of the lock program. Lastly the conclusion, recommendations and the discussion will follow.

## 1.1    Introduction to the Lock Program

This section will give a short explanation of the structure of the Lock Program. The Lock Program consists of the network director; who is the internal client. He is responsible for administrative affairs, scope deviation and plan studies. Next is the program director who has two primary tasks: (1) he is managing client for the realization phase, starting from contract preparation, both towards the market as well as steering the project team. The program director also tests scope deviation on feasibility. Secondly he is the coordinator of the DBFM Lock Program. He differs from a portfolio manager, because he needs to achieve specific goals of the program. Next is the program team, this team consists of the project managers and the program director (and his advisors) of the different Lock projects (see also figure 1 below). Next is the primus inter pares (PIP). The primary role of the PIP  is to give the different projects an impulse in efficient knowledge transfer. Furthermore his role consists of the monitoring and promotion of the uniformity between projects, to monitor the knowledge retention through strategic use of capacity and uniform products, to

identify and address any bottlenecks. In the next section we will explore these different management roles in depth.

## 1.2    RWS As Project Based Organization (PBO)

A PBO can be described as: "*the PBO is one in which the project is the primary unit for production organization, innovation, and competition*" and could be present in both public and private organizations (Hobday, 2000). Within a PBO, project managers often have direct control of business functions and enjoy high status within the company. Because of the temporary nature of projects the PBO is more reconfigurable and inherently more flexible than large integrated, hierarchical organizations (Hobday, 2000). This flexibility also comes at a price, knowledge transfer becomes problematic due to the temporariness of the organization, with teams forming and disbanding when the project is done. It is because of this that knowledge is hard to pin down, let alone transfer to the next project. Projects might be more flexible, but they still have an internal working model dividing roles and responsibilities.

Within the Lock Program each project is arranged with the IPM model: integrated project management. At the head of each project is the project manager. Below him is the manager project control. Below project control are the area, technical and contract manager. This model is meant to improve uniformity and standardization within the organization. Uniformity and standardization are necessary for an efficient deployment of personnel across departments. Second this approach is expected to increase directing capabilities of projects and third; it is a uniform and professional way of operation towards market parties. The project manager is responsible for the achievement of projects goals in terms of time and money. He or she is accountable to the internal client within RWS. The project manager steers the project team, he guards and connects mutual interfaces and lastly he connects and reinforces the team and team spirit.  The project manager is assisted by the manager of project control. It is about project control in terms of time, budget and risk control. This manager is also responsible for the documentation and progress rapports. The stakeholeder manager is responsible for the area in which physical infrastructure is planned. This primarily concerns navigating multiple procedures and permits and the installation or the diverting of cables. He is also responsible for matters of real estate, environmental, archaeological and explosive ordinances. The technical manager is responsible for the technological input  of the project. He is responsible for the functional and  technical specifications that need to be incorporated in the physical infrastructure.

Figure 1 – Lock Program Structure with single project

He is responsible for the technical input in the formulation of the system, process and product tests at the time of realization. It is clear that with both the stakeholder manager (needs, requirements and constraints

from environment) and contract management ( translation to contract) internal cooperation is instrumental so that the external constructor has the correct information on the specific demands of the lock he needs to build. So information and knowledge transfer between IPM roles is a vital part of the process (Rijkswaterstaat, 2006).

## 1.3    The Lock Program & Knowledge Transfer

Within the Lock Program of RWS, there is a need for the sharing of knowledge. According to RWS documents the sharing of knowledge is one of the foundations of the lock program's existence (Rijkswaterstaat a, 2014). It is important to use the power of cooperation between different locks projects to prevent making the same mistake twice or as is often stated: "reinventing the wheel twice".  Work processes will be more efficient due to a more efficient way of sharing knowledge; positive effects are expected on capacity, planning quality and finance. Presently not all knowledge is transferred between projects of the lock program. Mistakes get repeated and similar processes are developed, efficiency and quality are more likely suffer because of this. Knowledge transfer process is usually unstructured and not according to IPM (Integral project management) disciplines.  Knowledge exchange happens voluntary, coincidental, implicit and unconscious. Time is seen as an important factor for knowledge transfer, it is hard to make time for the transfer of knowledge. The goal is to share knowledge and new sub products between projects. Mistakes are made just once or "building block" are made just once and do not get reinvented twice. "Lessons learned" are examples for other projects and programs, also the image as knowledge sharing program is seen as an important goal (Rijkswaterstaat 2014a).

The problems are identified in four categories: people, the material/system, information and methods/process (Rijkswaterstaat 2014a). People are more focused on their own project then on the sharing between projects. Each person works on his or her own project, not on program level. RWS is primarily a project organization. New issues or development are seen as projects. Also the geographical location seems to be a problem, because projects are situated in different locations. Knowledge sharing between projects is voluntary based, people are not being addressed based on knowledge sharing. Also the project manager is primarily directing the projects. Knowledge sharing is not always something that everybody wants to do: knowledge is power. Sometimes even someone's position is depending on it. People do not always grant some else knowledge, and lastly in this category, it is observed that inventing the wheel is "more fun". However, this could also point towards a form of power; power is the ability to shape and define reality (Flyvbjerg, 2003). In the material/information category the primary problem is that knowledge supply and demand are not always linked between projects. It is not always clear which lessons were learned, and if they were with whom and in which project this information resides. The third category; method/process is about the infrastructure of knowledge sharing. Knowledge transfer is often unorganized and on an ad-hoc basis. Knowledge transfer is already organized in the PIPs, however they do not steer sufficiently on knowledge sharing. In the last category machine/ system there is no physical space were knowledge can be shared (Rijkswaterstaat, 2014a).

The Lock Program has introduced multiple measures to counter these problems. These measures include a "physical" room where program meetings are held. The PIP team also deliberates in this place. One of the communication methods involve an A0 board, where project are visualized and its position in the program. The focus is on "lessons learned" and focusses on tips, do's and don'ts about transferable practices, but also about worst practices. There are special "after lunch" and "lock specials" to facilitate knowledge sharing between projects and program. To further facilitate the lessons learned between project and within the program, these meetings need to be more "attractive", with subjects that mean something. The PIP's are the pushers of knowledge transfer, and decide on the agenda within those meetings. The retaining of knowledge is done by sending these presentations of these meetings around (Rijkswaterstaat a, 2014).

In an evaluation done in 2013 a number of key points were identified that needed improvement. Within the goal of the program more improvements need to be made in inter alia category learning and cooperation. Within the strategy of the program more attention needs to be paid to program information and communication. These improvements were grouped, this resulted in 6 keys objectives: (1) experience more together, (2) sharing knowledge more structurally, (3) better capacity coordination, (4) administrator more central, (5) better control and management and (6) clarify program strategy to employees (Roles, products, management, etc.) (Rijkswaterstaat b, 2014). As was indicated in the introduction the facilitation of group discussions is an important step in learning and transferring knowledge. This thesis will primarily focus on the first and second objective. Will we now introduce some of the more theoretical concepts of project management and knowledge transfer.

## 1.4    Project Management and Knowledge Transfer

As we have seen RWS can be described as a PBO. These organizations implement strategical goals in the form of projects. Various definitions of a project exist but they often involve most of the following elements: a project can be seen as a temporary organization with the goal of achieving relatively unique activities or tasks with predetermined parameters of quality, time and money (Ferns, 1991; Dutton, et al. 2014; Glasbergen & Driessen, 2005). On the one hand a project is ideal for learning because of its uniqueness. On the other hand because of its temporariness and uniqueness it makes knowledge or lessons learned increasingly difficult to transfer to other project, who each have their own unique and specific context (Almeida & Soares, 2014; Bakker, et al. 2011). A program is meant to achieve strategic goals and integration through multiple projects. However, a program is more that multi-project management; it aims to achieve goals that project could not have achieved separately (Lycett, et al., 2004). Lycett et al. (2004, p. 291) argues that knowledge transfer or sharing between projects should be the cornerstone of effective program management:

> *"Indeed, an effective means of transferring learning from experience on projects has been noted as one of the key factors leading to consistently successful projects" and that "knowledge and information sharing between projects should be a cornerstone of effective program management."*

Knowledge transfer is thus an important aspect of program management. However barriers arise in the transfer of knowledge not only because of the nature of projects but also because of the different types of knowledge. There are roughly two types of knowledge: tacit and explicit. Tacit knowledge is personal, rooted in action and hard to share and often gained to experience. Explicit knowledge on the other hand is easily "codifiable", or to put into documents (Polanyi, 1967 in Dutton, et al. 2014). Explicit knowledge is easy to share because of the fact it can be codified, and send by the press of a button. Tacit knowledge on the other hand is hard to put into documents, to "codify". Transfer of such knowledge is inherently difficult, but not impossible. Taking the post-modernist perspective that knowledge is socially constructed, knowledge can be shared and transferred. Although not through documents and such but through a social process of face-to-face meetings, in that way knowledge is co-constructed and shared among a group of people. The modernist perspectives views knowledge in a far more technical way; with a sender a medium and receiver.

It has been observed that knowledge transfer takes the road of least resistance (Reagans & McEvily, 2003). This road, or channel, needs to facilitate the specifics of knowledge that is being transferred. According to Zollo & Winter (2014) knowledge roughly undergoes three stages: knowledge accumulation, articulation and codification. In the accumulation stage knowledge and experiences are gathered. Experience based learning is often local and is closely related to existing routines. The knowledge gathered in a situation such as this inhibits a certain amount of procedural rationality, it lacks conscious processes i.e. largely automatic. Actors learn passively (Prencipe & Tell, 2001). In the knowledge articulation phase knowledge is articulated.

Important collective learning happens when individuals express their beliefs and opinions and participate in productive confrontations and challenge each other's viewpoints (Zollo and Winter 2014). Knowledge codification is an extension of articulation. Codification allows for the externalization of knowledge, in linguistic and symbolic means (Prencipe & Tell, 2001), and thus eases the transfer of knowledge. Although it is an extension of knowledge articulation, it is also a considerable step beyond articulation since individuals or groups codify their understanding of performance implications of internal routines in written tools (Prencipe & Tell, 2001). In the literature group meetings and communities of practice are seen as pivotal to share and articulate knowledge (Kramer et al. 2004; Pan & Wang 2010; Enberg 2012; Schindler & Eppler 2003). Lave and Wenger argue that learning, understanding and interpreting involve a great deal that is not explicit or explicable, developed and framed in a crucial communal context. Learning is best understood in the context of the community: in communities of practice (Brown & Duguid, 1991).

Zhao et al. (2015) made a framework for cross project knowledge transfer. They identified 4 factors that influence knowledge transfer between projects. The first factor is project task context and the focus of this dimension is the teams perceived time urgency and task similarity between the source and the recipient project. The second dimension is the project team context, this refers to the team's knowledge management systems (organizational structures and mechanisms) by both the source and the recipient project team. The project team's capability refers to the source team's capability to transfer knowledge and the recipient team's absorptive capacity to decode the information. The fourth dimension is the teams' relationship (Zhao, et al., 2015). The argument of this paper is that the project team context is now replaced by the program. In Zhao et al. (2015) each of the projects develop their own structures of knowledge transfer. In case of RWS this is now done by the program. The program thus creates structures for the accumulation, articulation and codification of knowledge. Codified knowledge is easier to transfer.

Knowledge transfer has often been neglected from the program management literature (Lycett, et al., 2004). This paper would like to contribute to the knowledge transfer literature by examining the underlying mechanisms that lay at the root of knowledge transfer in the Lock Program. This thesis wants to contribute to program management literature how knowledge transfer can be facilitated in a program. This is notjust relevant for RWS but for all PBO's who are looking for ways to learn and adapt. This entails a qualitative approach, asking how certain aspect of knowledge transfer work within a project organization.

The main question and sub-questions are:

**How can knowledge transfer be facilitated between different project teams within the Lock Program of Rijkswaterstaat to improve project performance?**

-        What are current knowledge transfer procedures and how do they perform?

-        What factors are hindering knowledge transfer?

-        Which factors need to be improved to facilitate knowledge transfer?

This thesis will begin with an in-depth exploration of the relevant concepts; explaining and combining various approaches to form the conceptual model. The methodology will explain how this thesis will operationalize my research question. Next result will be discussed. Following the results we conclude and recommend on the knowledge transfer procedures in the Lock Program. Lastly we will discuss some of the implications of this thesis.

# 2 Theoretical Framework

In this chapter we will discuss various concepts attributes to knowledge transfer. First we will discuss organization learning in relation to knowledge transfer.

According to Szulanski (2000) there has been a lot of attention towards organizational learning. Although there are various definitions of organizational learning, often it means the process of improving actions through better knowledge and understanding (Fiol & Lyles, 1985). Argyris (2003) mentions that learning occurs when understanding, insight and explanations are connected with action, and that learning always implies effectiveness; was what intended actually produced?  One of the outcomes of this attention to learning and knowledge is that the mere possession of knowledge somewhere in the organization does not automatically mean that other parts of the organization can benefit from that knowledge. To a large degree this is because of knowledge transfer (Szulanski, 2000). Knowledge transfer can be defined as: "*the formal and informal mechanisms for sharing, integrating, interpreting and applying know-what, know-how, and know-why embedded in individuals and groups (….)*" (Almeida & Soares, 2014, p. 772).  So knowledge transfer is an important process of organizational learning. As was discussed in the introduction RWS is a project based organization.  Projects face unique challenges when it comes to knowledge transfer.

Projects are now often chosen by an organization as flexible and reliable structures for development and production of their goods and services. Various definitions of a project exist but they often involve most of the following elements: a project can be seen as a temporary organization with the goal of achieving relatively unique activities or tasks with predetermined parameters of quality, time and money (Ferns, 1991; Dutton, et al. 2014; Glasbergen & Driessen, 2005). On the one hand a project is ideal for learning because of its uniqueness. On the other hand because of its temporariness and uniqueness it makes knowledge or lessons learned increasingly difficult to transfer to other project, who each have their own unique and specific context (Almeida & Soares, 2014; Bakker, et al. 2011).  A program might be a way to way to facilitate knowledge transfer between project as it can provide integration of more strategic goals, such as knowledge transfer and learning.

## 2.1    Knowledge Transfer as Organization Learning

Knowledge transfer is recognized as of great importance to support organizational learning. Successful knowledge transfer can thus be seen as prerequisite for organizational learning (Almeida & Soares, 2014). It is recognized that the team level is an important level at which learning can occur. Often in the literature the individual level and the organizational level are recognized as levels at which organizational learning occurs (Argote, et al., 2000). The team level has been gaining increasingly more attention at the level at which learning and organizational change occurs: "*an increasing amount of work of organizations is carried out by teams and the context for organizational learning – for evaluating the current state and making changes – is often the team* (Edmondson, 2002, p. 129). There is enough support for the idea that organizational change needs to be done through group dialogue. This idea has its origins from the theoretical literature on the social construction of knowledge that speaks to the issue of how new knowledge is created in context and then transferred by groups ( Langley, et al., 1995; Nonaka, 1994 in: Kramer, et al., 2004). First we will discuss however, how knowledge is transferred.

The transfer of knowledge implies a number of things. First it implies the existence of a source, furthermore there must be a channel, message recipient and context. The transferability is dependent on a number of characteristics, namely the characteristics of the sender and the receiver, the relationship between sender and receiver, and the knowledge transferred. Within certain conditions knowledge will flow from one individual/ project to another individual project. The first condition is that the sender is knowledgeable and willing to share its knowledge. The second condition is that the receiver possesses the

capacity to absorb the knowledge. The third condition is that appropriate transmissions channels are used between sender and receiver for the transmission of knowledge (Lin, et al., 2005).

For the transfer of tacit and explicit knowledge different of channels are used. Because tacit knowledge is based on experience and therefore hard to put down into documents. Tacit knowledge is personal, it is hard to formalize and to communicate to others. Moreover, tacit knowledge is more complex, existing solely in the mental models and expertise gained over time through personal insight. Tacit knowledge transfer therefore might happen through more interpersonal means and using processes that are less structured. Examples include: chat rooms, mentoring, teamwork, face to face interaction such as group dialogues or personal reflection on experience and lessons learned (Goh, 2002). This type of knowledge is gained through experience. Explicit knowledge on the other hand is "codifiable" and easy to share in documents (Dutton, et al., 2014). Explicit knowledge is what is written down or recorded in manuals, reports, assessments, documents and databases and can be captured, articulated and codified. Thus knowledge can be transferred through more technology driven structured processes. Context and experience in that sense are not needed. Explicit knowledge can be codified and be made tangible, thus making it easier to transfer (Goh, 2002; Jasimuddin, et al., 2005). However even if knowledge can be codified much of tacit elements can remain uncodified and consequently the transfer codified knowledge might fail. Some elements, tacit knowledge, can only be transfer through a process of demonstration, or show-how, facilitated through face to face contact between transmitter and receiver (Roberts, 2000).

So far we have discussed knowledge in terms of it's explicit and tacitness, with a sender, receiver and a channel. In the introduction of this thesis it was mentioned that knowledge can undergo a number of steps: from knowledge accumulation to knowledge codification. These steps will now be described.

### 2.1.1  Experience Accumulation

Organizational learning is target oriented and essentially based on historical experiences and stored in routines (Prencipe & Tell, 2001). Routines can be seen as the outcome of trial and error and reflect the accumulation of experimental wisdom: "*experiential wisdom accumulates as the result of positive and negative reinforcement of prior choices. Choices that have led to what are encoded as positive outcomes*" (Gavetti & Levinthal, 2000, p. 114). Experience based learning is often local and is closely related to existing routines. Learning by doing and learning by using are based from actions where actors either have difficulties in drawing or ignore inferences to causality (Prencipe & Tell, 2001). The knowledge gathered in a situation such as this inhibits a certain amount of procedural rationality, it lacks conscious processes i.e. largely automatic. Actors learn passively. This is known as single loop learning (Prencipe & Tell, 2001). Changes are sought in existing routines (Zollo & Winter, 2014). Incremental improvements can be made through the tacit accumulation of experience. However, as Zollo & Winter (2014) warn us, remaining with the same operating systems could soon become dangerous when conditions are subject to rapid change. Systematic changes are needed to track environmental change (Zollo & Winter, 2014). Experience accumulation are vital for an organization's capability for two reasons: first smooth functioning of routines creates the possibility of automatic behavior, which requires less attention on behave of the skilled worker, and secondly organizational routines allow for efficient specialization and coordination (Prencipe & Tell, 2001).

### 2.1.2  Knowledge Articulation

In this second step of codification, knowledge is articulated. Important collective learning happens when individuals express their beliefs and opinions and participate in productive confrontations and challenge each other's viewpoints. By sharing these viewpoints and individual experiences and comparing these with colleagues, organization members can achieve: "*an improved level of understanding of the causal mechanisms intervening between the actions required to execute a certain task and the performance outcomes produced*" (Zollo & Winter, 2014, p. 341). This process of articulation could require considerable

investment and commitment on the part of the members of the organization. Nevertheless, such efforts can produce and enhanced understanding of new and changing action-performance links, and therefore could potentially result in adaptive adjustments to the current set of routines or it could enhance the recognition of the need for more fundamental change (Zollo & Winter, 2014). When knowledge is articulated, new conceptions of the issues can be formed and new routines can be made; this is an example of double loop learning (Argyris, 2003). These new routines will routines allow for a more efficient specialization and coordination.

### 2.1.3 Knowledge Codification

Knowledge codification is an extension of articulation. Codification allows for the externalization of knowledge, in linguistic and symbolic means (Prencipe & Tell, 2001), and thus eases the transfer of knowledge. Although it is an extension of knowledge articulation, it is also a considerable step beyond articulation since individuals or groups codify their understanding of performance implications of internal routines in written tools such as: blueprints, spreadsheets, manuals, project management software and decision support systems. Since this step is a considerable one, this could explain why some articulated knowledge is never codified. Translating individual or group experiences to developing manuals and other process specific tools might be a step too far for most organizations. Often the codification process is used to provide guidelines for future actions. In such a case codification merely serves as routine replication (Prencipe & Tell, 2001), and not to uncover linkages between actions and performance outcomes. Moreover, codification is an important mechanism for the entire knowledge evolution process, not just the transfer phase (Zollo & Winter, 2014).

Knowledge codification can contribute to knowledge transfer and can thus contribute to an organizations learning capability. Zollo & Winter (2001) argue that the accumulation and the routinization of knowledge and experience cost less effort than the actual articulation and codification of knowledge. In this knowledge process group dialogue is an important factor in knowledge transfer; as it give as platform to articulate, share and combine knowledge. Multiple sources have confirmed the importance of these meetings (Kramer, et al. 2004; Pan & Wang 2010; Enberg, 2012; Schindler & Eppler 2003). Leal-Rodríguez et al. (2014, p. 894/5) say that these social integration mechanisms could lower the barriers to information sharing while increasing the efficiency of assimilation and transformation capabilities. So knowledge transfer through group interaction is a way to increase learning in an organization.

The first step, accumulation can be seen as a passive way of learning, the second step could be seen as the transfer of knowledge, since viewpoints are shared and compared with other individuals within the organization. The third step in this process is the actual internalization of knowledge acquired and applying set knowledge in new routines. Every step of the codification process makes the likelihood of learning elsewhere in the organization more likely. Learning will result in a change of action or organizational routines. As knowledge gets more codified more and more people can make use of it. Some elements however can only be transfer through a process of demonstration, or show-how, facilitated through face to face contact between transmitter and receiver (Roberts, 2000).

We have read about the codification steps that could be taken in an organization. It is now time we turn to a specific organizational form: the project and its relation with knowledge transfer and learning.

## 2.2 Project Management

A project can be seen as a temporary organization. For the implementation of one decision, a project manager has been appointed to complete the job in a fixed time and within a certain budget. According to Ferns (1991, p. 148) a project can be defined as: "*A project is a group of related tasks (or activities) which together satisfy one or more objectives*". Project management can be defined as: " *the planning, directing and controlling of tasks or activities and resources with the objective of completing a specific project with*

*pre- determined parameters of quality, time and money*" (Ferns, 1991, p. 149). However, the greatest strength of project management is also its greatest weakness: it focusses too much on one single goal, therefore it suffers from a singular logic and is limited in terms of scope and time (Glasbergen & Driessen, 2005) However, one can argue that be it a project or program, time is always limited. This singular logic can be explained by the fact the project management has its roots in the construction industry (Lycett, et al., 2004).

Projects are often viewed in a linear input-outcome relationship. Plans, designs and associated activities are were knowledge resides. These plans are implemented by a competent team to achieve predetermined goals such as cost, time and scope. Knowledge is seen to be available up-front, as explicit "known knowledge". This knowledge is the assembled like Lego blocks with little learning anticipated beyond the application of prior knowledge. These kinds of plans and designs are explicit knowledge and can be easily transferred without much difficulty between projects. The project team *"(…) endeavors to manage a separate project plan as documented informational knowledge that is fully specified in advance, in order to successfully deliver a project*" (Ahern, et al., 2014, p. 24). This is often explicit knowledge and offers numerical data of "what", "where" and " how many", but on the other hand it fails to answer " why" and the " how" questions. Project documentation (feasibility study, user manuals and technical rapports) are often superficial and focus simply on capturing standardized business figures or the description of the project results (Prencipe & Tell, 2001). The retention of experiences are often not part of a projects documentation, and are seldom transferred to other people in or outside the project. This is because experiences are bound by definition by the people who are personally involved in the problem solving process. After their task is complete project members return to their line function and take experiences with them. These experiences are only then accessible through networks (Prencipe & Tell, 2001). So from the literature knowledge does seldom undergo the process of accumulation, articulation and codification, because of the often "situatedness" of knowledge.

The codification of project experiences allow an organization to compare its project systematically and allows for the documentation of its most successful problem solving mechanisms. Furthermore the articulation and documentation of mistakes, calamities and potential pitfalls helps to reduce project risks. When project learning happens systematically it has the potential to develop project competencies that lead to an competitive advantage (Prencipe & Tell, 2001).

### 2.2.1 The problem with project management and knowledge transfer

Knowledge accumulation, articulation and codification remain a problem because of the nature of project: "*obstacles stem from the relatively self- contained, idiosyncratic and finite nature of project tasks*" (Almeida & Soares, 2014, p. 770). Projects produce information at a high pace, from formal official documents to informal personal and or group notes. The information is structured to the distinct needs of the project, and within the project, the information is meaningful to the social and operational context. However as soon as we move outside of the project, where the context is dispersed, information loses its meaningfulness. This is known as the "learning paradox" and describes that on the one hand that projects are by their very nature suited for knowledge creation in the context of its application. On the other hand, again because of the nature of projects, its temporariness does not inhibit the "codification" of knowledge, because when the project ends, participants move on. The knowledge gained is likely to disperse (Bakker, et al., 2011). Also due to the often new structure and context of the new project, knowledge is "trapped" in the old project, this is referred as the "informational limbo" (Almeida & Soares, 2014). Argote (1993, p. 42) confirms this: "*some of the knowledge acquired through learning by doing is idiosyncratic to the particular constellation of people, technology, structures and environmental conditions*".  These factors Argote (1993) mentions form a good baseline to set out factors that influence cross project knowledge transfer.

## 2.2.2 Cross Project Knowledge Transfer

Zhao et al. (2015) distinguishes four dimensions of cross project knowledge transfer that relate to the quote of Argote (1993) above. The first dimension is the project team context, this refers to the team's knowledge management systems by both the source and the recipient project team. The second factor is project task context. The focus of this dimension is the teams perceived time urgency and task similarity between the source and the recipient project. The third dimension is the relationship between teams. The project team's capability refers to the source team's capability to transfer knowledge and the recipient team's absorptive capacity to decode the information (Zhao, et al., 2015).

### Project Team's Context

This category refers to the source and recipient projects teams' knowledge and governance efforts. This refers to the management efforts taken by both project teams to support cross project knowledge transfer (Zhao, et al., 2015). Knowledge governance involves: "*choosing organizational structures and mechanisms that can influence the process of using sharing, integrating and creating (storing) knowledge in preferred directions and towards preferred goals*" (Foss, et al., 2010, p. 456). These knowledge governance mechanisms are either informal or formal. Informal systems comprise, networks, cultures and communities of practice. Formal networks include the deployment of rewards, information systems and decision rights (Foss, 2007). Generally there are two types of knowledge governance systems: organizational (reporting, project management) and technical (technologies, components) management systems. These systems embody the organizations capabilities and can usually be transferred from project to project, and they can be sometimes modified by project development efforts (Prencipe & Tell, 2001).

Projects often lack a "natural" learning mechanism, in contrast to more permanent organizations. Often project goals are relatively short term and have a focus on immediate deliverables, whereas learning is often a long term objective. Short term project deliverables might be in conflict with long term learning objectives. Also due to the uniqueness and temporariness hinders the emergence of and development of new organizational routines and organizational memory and therefore impedes organizational learning (Linder & Wald, 2011). Leadership is also recognized as a factor that can positively contribute to cross knowledge transfer.

Reporting can be done roughly through two approaches: process based approaches and document based approaches. Process based approaches focus on relevant steps and their sequence in the course of a projects timeline. Document based approaches focus on the content wise representation of the experiences and the storage of content within the organization (Schindler & Eppler, 2003). Technical management systems are often electronic based sharing, storing and communication systems. A governance system "controls" the flows of knowledge. These are electronically based systems of knowledge transfer. This thesis argues that the program can facilitate knowledge transfer by providing platforms were knowledge can be accumulated, articulated and codified. These platforms provided by the program can then be seen as a shared governance system.

Instead of having a source and a recipient governance system, a program could provide this system for all projects. This "system" can be described as the platform between team's in which knowledge can be transferred. These platforms include group meetings, face-to-face interactions and social venues. These platforms provided by the program could provide the "silver bullet" (Busscher, et al., 2015) in the accumulation, articulation and codification of knowledge.

### Project Task Context

Two factors influence the project task context: project similarity and the perceived time urgency and in turn cross project knowledge transfer. We will discuss these two sub-factors below.

## Project Similarity

Project similarity refers to the similarity between the source and the recipient project, or the similarity in implementation methods and workflow embedded in executing the project tasks (Zhao, et al., 2015). Task similarity between projects is an important factor for cross project knowledge transfer as it implies some correlation and resemblance of the work flows and implementation methods. This also means that project share common project knowledge (Zhao, et al., 2015). These shared methods or workflows can also be the result of knowledge transfer; successful workflows get transferred to other projects. The greater the task similarities are between projects, the more common work experience the projects have (Park & Lee, 2014), and the more easily both teams can share a common understanding of knowledge (Newell, et al., 2006). Mortensen (2005) stated that a shared context will reduce the likelihood of divergent approaches and misunderstandings, which facilitates the sharing of diverse expertise. As project share a common context with each other it becomes easier to articulate and transfer knowledge. A shared context will reduce the likelihood of divergent approaches and misunderstandings, which facilitates knowledge transfer (Pan & Wang, 2010). The relationship between projects could be facilitated by working on the same floor, facilitating team meetings (Kramer, et al., 2004), and the sharing of common elements. This need not necessarily be content, but could also be process: "*knowledge integration is enabled by a shared understanding of the process of project work*" (Enberg, 2012).

Newell (2004) found that learning across projects was easier the more homogenous were the teams across which the learning was being transferred. Newell (2004) also found that that project team members will only go look for help if they have an urgent need (they cannot solve the problem themselves). Furthermore, they will only go look for a previous solution from other projects if they believe they are likely to find expertise that is pertinent to their own context. In Newell's (2004) case there was a strong belief that each project was unique. If each project is seen as unique than there is no need to look elsewhere for knowledge. This could be an indication of the Not-Invented-Here (NIH) syndrome, which is defined as the tendency of a project group of stable composition to believe it possesses a monopoly of knowledge of its field, which leads to the to the rejection of new ideas from outsiders (Katz & Allen, 1982). Unique information may be able to be accessed by a group from an expert, but the group will have trouble considering the new information in completing its task if there is a lack of shared context group between the group members and the newcomer (Hinds & Mortensen, 2005). This phenomena is supported by Gruenfeld et al. (1996) who states that the probability that a give piece of information will be mentioned increases with the number of people who are aware of it. New information thus has less chance to be mentioned if only one or two people are aware of it. Decision making groups are often dominated by information that is widely shared rather than information held by one or two experts (Pan & Wang, 2010).

## Time

Time is always an issue. Especially in projects, where scope, time and resources are clearly defined. The perceived time urgency is defined in terms of a kind of time pressure for a team to accomplish its goals. Time pressure is expected to affect attitude and actions towards knowledge transfer with other teams (Zhao, et al., 2015). When members of a team experience time pressure, like final due dates, milestones and deadlines the team will tend to focus predominantly on the delivery of project tasks or services rather than on knowledge transfer (Wiewiora, et al., 2009). Zhao et al. (2015, p. 329) states that when a team experiences time pressure: "*the project team is likely to devote much more time and energy to completing their own tasks and less time communication with others and sharing lessons learned*". This time pressure also arises from the fact that it also takes time to transfer knowledge across teams and making the recipient understand the transferred knowledge. Knowledge transfer and therefore learning follows the path of least resistance. Often knowledge transfer can be explained by the ease of transfer (Reagans & McEvily, 2003). Both time pressure within the project team and time it takes to transfer knowledge are considered to hinder this ease of transfer.

## Project Team's Relationship

The relationship between teams is also an important factor in effective cross project knowledge transfer. Transferring and absorbing knowledge requires frequent interaction of the source and the recipient's team. A projects success could be increased by friendly cooperation enhancing communication and understanding of knowledge. The opposite, an "arduous" relationship, and especially a competitive relationship, can hinder knowledge transfer (Zhao, et al., 2015; Burgess 2005). Park & Lee (2014) determined that interdependence and trust between projects has a strong impact on knowledge sharing.

One of the insights from the network perspective, the organization seen as a series of social relations with a specific contents and objectives, to the field of knowledge transfer is the observation that relations between individuals within an organization play a crucial role in knowledge transfer. Knowledge transfer within a firm can be seen as a series of social relations with specific content and objectives (Aalberts et al., 2014). The organization's formal and informal networks are well recognized as distinct patterns of social relations. Especially the informal network has been claimed to enhance knowledge transfer. A network can be seen as: "*the patterns of contact between communication partners that are created by transmitting and exchanging messages through time and space*" (Monge and Contractor, 2001, in: Aalberts et al., 2014). Informal networks refer to interpersonal relationships in the organization that affect decisions within it, but are omitted or not consistent with that formal scheme. Informal networks are emergent patterns of interactions between individuals within the organization on the basis of shared norms, beliefs and values (Aalberts, et al., 2014). According to Wu et al. (2007) the more social interaction within a team (and this thesis argues; between teams) the higher the amount of learning opportunities offered. Social venues such as after work activities, face-to-face meetings, talk rooms etc. effect knowledge sharing and learning intensity in teams.

The relationships above are mostly from the perspective of the individual. It is about his or hers formal and informal network. Hansen (2002, p. 234) describes the relationship between teams in terms of direct as indirect relations:

> "*a product developments team's direct and indirect interunit relations in its knowledge network affect the effectiveness of its search for useful knowledge by being important conduits for information about opportunities – the existence, whereabouts, and relevance of substantive knowledge residing in other business units*".

The shortest path length is to have an established direct relationship to all other business units in a knowledge network. Having a number of direct relations in a knowledge network could enhance the chances that a team is able to use one of his or her direct relations transferring (non) codified knowledge (Hansen, 2002). This is concurrent with the statement of Reagans & McEvily (2003) that knowledge transfer follows the path of least resistance. Having direct relations increases the ease of transfer.

However a team's might have a competitive relationship as Wiewiora et al. (2013) identified. In competitive relationships it is expected that the transferring knowledge will be less because knowledge is used to gain competitive advantage as opposed to the clan type culture where knowledge is shared on the basis of collaboration.

## Project Teams Capabilities

Research on team behavior suggests that the capability of a team to integrate the knowledge and skills of its team members is essential for the successful completion of team work. Stevens & Campion (1994) have identified that group effectiveness is dependent on employees being capable of interacting in a positive manner with peers. This requires good communicative and interpersonal skills, conflict management, collaborative problem solving and the facilitation of team discussion. "*the key to understanding…group effectiveness… lies in the ongoing interaction process which takes place among group members while they*

*are working on a task*" (Hackman & Morris, 1975 in: Stevens & Campion, 1994, p. 506). Focused on a certain task people exchange tacit and explicit knowledge. The manner and effectiveness in which they exchange this information can be revered to as transfer capability. This transfer capability has two side, firstly the source team's capability to transfer knowledge (the sender) and second the recipient's team absorptive capacity (receiver).

The source teams transfer capability refers to the source project teams capability to identify potential uses of its knowledge in light of the context of the other project where the knowledge needs to be transferred to. The team needs to assess the capabilities and more specifically the needs of the other team (Rulke, et al., 2000). The source team needs to transmit the knowledge to the other team (Zhao, et al., 2015) via the appropriate channels. The absorptive capacity has multiple definitions Cohen and Levinthal (1990) view it as the ability of the firm (or any organization) to value, assimilate and apply new knowledge. Mowery and Oxley (1995) defined it as a broad set of skills needed to deal with the tacit component of transferred knowledge and the need to modify this knowledge. The definition of Mowery and Oxley (1995) makes reference to knowledge transfer. In the definition of Cohen and Levinthal (1990) this reference is missing. However, one can argue that is implicitly mentioned, since new knowledge has to come from somewhere.

## 2.3    Program Management

The program could offer a form to incorporate these constellations of people, technology, structures and environmental conditions. A program is defined as "*the integration and management of a group of related projects with the intent of achieving benefits that would not have been realized if they were managed independently* (Lycett, et al., 2004. P. 289). Program management can be defined as: "*the coordinated support, planning, prioritization and monitoring of projects to meet changing business needs*" (Ferns, 1991, p. 149).

However, as Pellegrinelli (1997, p.41) explains, a program is much more than a collective of projects. Often a program is seen by project managers as:

> *"(…) programs of work', implicitly regarding the term program as meaning schedule or quantity. This confusion is exacerbated by the implicit view that, in a multi-project environment, the management of resource conflicts is the key challenge facing the organization."*

Program management encompasses much more than common resource management. Pellegrinelli et al. (2007) discerned four differences from the project based perspective. First, a project based perspective promotes the definition of a fixed objective and scope, a program on the other hand, is a emergent phenomenon and program managers need to be aware of, and responsive to external change (learning), and shifting strategic goals, rather than follow the pursuit of singular goals of projects. Second, projects often have a linear life cycle, programs are perceived as frameworks or structures, and so a-temporal or with indeterminate time horizons. Third, program management is concerned with cultivating organizational wide and individual capabilities as well as the efficient use of resources. Lastly: "*program management work is intimately bound up with, and determined by, context rather than governed by a common set of transferable principles and processes*" (Pellegrinelli, 2007, p. 42). Moreover, a program approach is a way of managing the interdependencies between projects and the requirement to learn and respond to changing circumstances associated with strategy implementation (Pellegrinelli, 1997).

Programs are often used to realize higher strategic aims, and are therefore connected to higher-scale organization on the strategic level. Projects are put in a program to achieve these strategic goals. The strategic level generally offers more attention towards double loop learning (Willems, et al., 2015). Lycett (2004) argues that effective means of transferring lessons from experience on projects has been noted as one of the key factors leading to repetitively successful projects. This means that successful knowledge

transfer between projects is the cornerstone of effective Program management (Lycett, et al., 2004). The hypothesis is that a program can overcome some of the shortcomings of project management in relation to knowledge transfer.

By offering a common structure for the related projects a program can overcome the singular logic and limited scope often associated with projects. The program offers a structure for projects to look beyond their immediate project needs but also look at common interlinkages between projects. Based on these interlinkages platforms such as group meetings can be created to ensure learning through the transfer of knowledge. The program can create time and platforms for knowledge transfer. Since we have already determined that group meeting can be important for knowledge transfer, these platforms can take the shape of group meetings to discuss and evaluate important lessons. Schindler & Eppler (2003) found a couple of success factors to gain lessons learned from debriefing workshops: (1) frequently capture the most important experiences straight after important milestones are reached, (2) ensure a collective interactive evaluation and analysis of experiences made by individual team members, (3) strive to gain commitment is the sense of action consequence and (4) perform the lessons learned gathering graphically. This means collecting and structuring the project experiences and provide workshop documentation in a poster format visible for all (Schindler & Eppler, 2003). In the next section we will but some of the concepts above into a conceptual model.

## 2.4    Conceptual Model

In the previous sections we have discussed a number of different concepts: knowledge transfer, project and program management and the process of knowledge accumulation, articulation and codification. Knowledge transfer is influenced by project team context, task context, capacity of the team and the relationships between teams. These are factors that were identified to influence cross project knowledge transfer. In this case, the projects have an extra structure: the program. The program can facilitate knowledge transfer by offering joint structures, such as team meetings, between projects so that knowledge can be better accumulated, articulated and codified.

These structures are called the team's context and entail the governance efforts by each team to facilitate cross project knowledge transfer (Zhao, et al., 2015). Knowledge governance involved: "*choosing organizational structures and mechanisms that can influence the process of using sharing, integrating and creating (storing)  knowledge in preferred directions and towards preferred goals*" (Foss, et al., 2010, p. 456). It is the argument of this paper that the program now provides these knowledge governance structures for the sharing, integrating and storing of knowledge i.e. accumulation, articulation and codification, instead of each project separately. Bellow in figure 2 we see three projects as example. The teams context is now offered by the program. The program offers platforms such as the after lunches and program days where knowledge is transfer. The idea is, that in these platforms knowledge is transferred and lessons are learned, but as we have seen in the theoretical framework knowledge undergoes some steps. Within these platforms knowledge needs to be  accumulated, articulated and codified. When the knowledge is codified it can be transferred more easily. This facilitates cross project knowledge transfer.
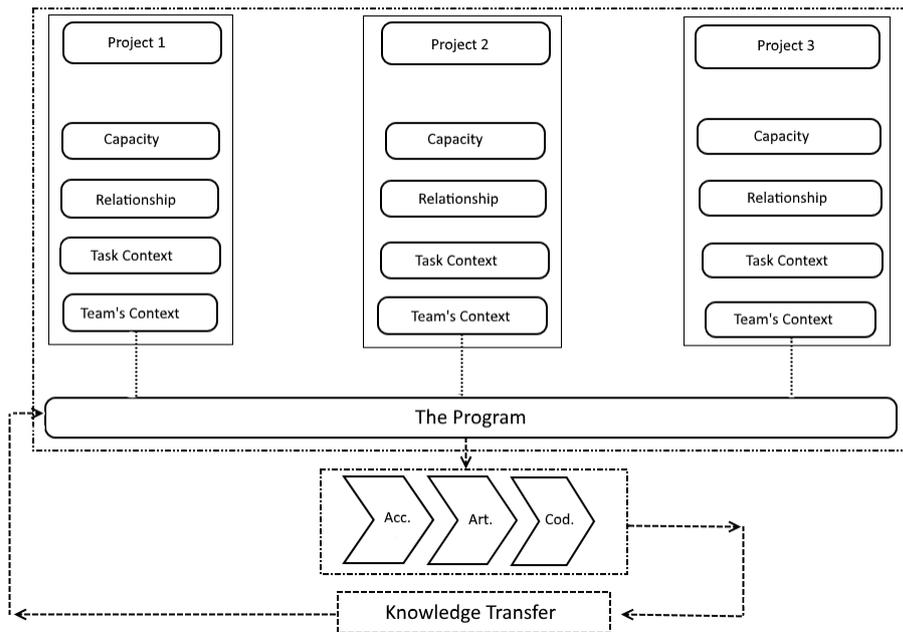
Figure 2 – Conceptual Model

This is not to say that knowledge only flows through these more formal structures. There are also a lot of informal connections between projects where knowledge is transferred. This thesis focusses more on the formal knowledge transfer structures since they are better to observe. The other factor such as the relationship, capacity and task context influence the effectiveness of these knowledge sharing platforms.  A program could facilitate knowledge transfer by providing for common interactive structures where knowledge is accumulated, articulated and codified.

# 3 Methodology

In the previous chapter a theoretical background was provided about the various elements involved in cross project knowledge transfer. In this chapter we will explain how the various components will be researched. This chapter will discuss a number of topics: first we will explain the reason for qualitative research and the kind of qualitative research. Next, the methods, analysis and the ethics and positionality will be discussed.

## 3.1    Qualitative research

Qualitative research accepts multiple perspectives and realties, appreciates subjectivities and acknowledges the power of the researcher and the participant. It is more focused on doing in depth analysis of a certain phenomenon rather than on quantity. In short is concerned how and why phenomena occur or are occurring (O'Leary, 2000). Because qualitative research seeks to explore underlying mechanisms behind certain phenomena, it does contain some elements not found in quantitative research. Qualitative research seldom follows a linear process. There is a continual back and forth process between interaction and observation, interpretation and description theorizing and conceptualizing. This type of research has more to do with examining, exploring and describing people in their natural habitats (Orb, et al., 2000).

Below in figure 3 the main and sub questions are represented graphically. The factors that facilitate knowledge transfer are on the right side of the figure. In the conceptual model the argument was put forward that the team context, the knowledge transfer structures,  are now given by the program. The other factors affect the teams context. Based on the other factors this paper will research how knowledge transfer structures, the team context, by the Lock Program facilitate knowledge transfer between teams. Based on the answers provided by the Interviewees this paper will propose a number of recommendations.
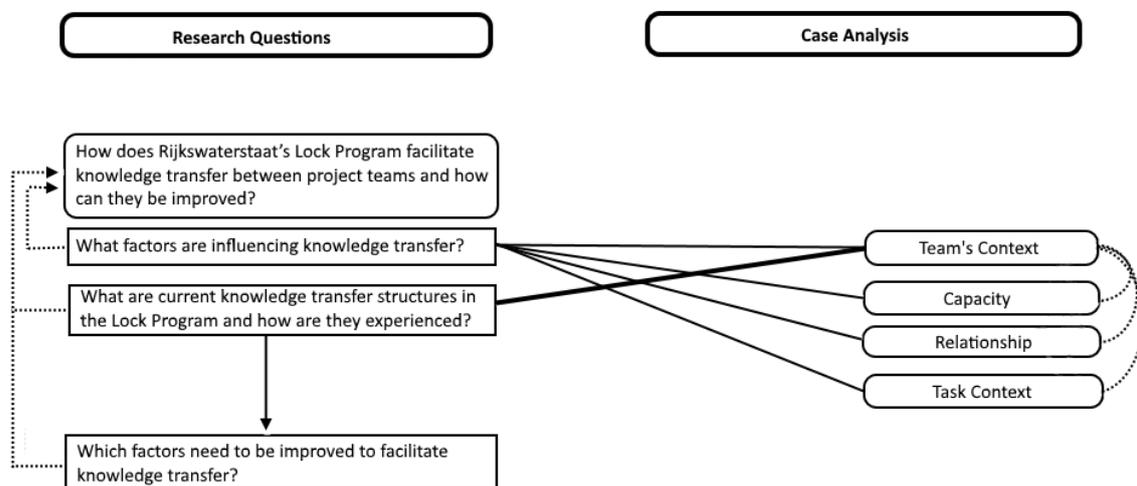


Figure 3 – Research Design

Because of the semi structured nature of the interviews, the relationships between the team context and the other factors are not always directly connected, and are sometimes discussed in more general terms in the results.

## 3.2    Case Study

This is a case study in how cross project knowledge can be facilitated in the lock program of RWS. As O'Leary (2000) observes, a case study needs identifiable boundaries. A case study could be used to debunk a theory, bring new variables to light, provide supportive evidence for a theory or could be collectively to

form the basis of a theory (O'Leary, 2000). Creswell (1998) describes a case as bounded system or a case over time through, in-depth data collection using multiple sources of information rich in context. This bounded system is bounded by time and space, and it is the case being studied, such as an event, an activity, a program or individuals. Creswell further distinguishes between multi-site study or within-site study. This research will study one program that has multiple sites (cases). The cross project knowledge transfer between cases within the lock program will be the scope of study.

The boundary, therefore, is the Lock Program. Within the Lock Program five locks are being researched. The sixth, Terneuzen is a special case, having no DBFM contract and working in collaboration with the Belgians. This research has chosen to leave out this project. The cases that will be discussed are the following cases locks: Limmel, IJmuiden, Beatrix, Eefde and the Afsluitdijk. Due to time constrictions the respondents will be limited to 11. This means that there will be two respondents per case or lock. Respondents will be both from the management level but also the "regular" employee. This mixing of various positions is expected to result in a richer account of cross project knowledge transfer and the mechanisms that influence this process. This will provide a deeper understanding of these processes and could help facilitate and improve existing processes. Below in table 1, the list of Interviewees and their respective position is shown.

| Interviewees | IPM area | Interview date | Location |
|---|---|---|---|
| Interviewee 1 | | 10-05-2016 | Utrecht |
| Interviewee 2 | Project Control | 20-04-2016 | Utrecht |
| Interviewee 3 | Stakeholder Management | 26-04-2016 | Roermond |
| Interviewee 4 | Contract Management | 02-05-2016 | Utrecht |
| Interviewee 5 | Project Control | 02-05-2016 | Utrecht |
| Interviewee 6 | Stakeholder Management | 09-05-2016 | Haarlem |
| Interviewee 7 | Contract Management | 03-05-2016 | Utrecht |
| Interviewee 8 | Technical Management | 12-05-2016 | Utrecht |
| Interviewee 9 | Project Control | 17-05-2016 | Utrecht |
| Interviewee 10 | Technical Management | 11-05-2016 | Utrecht |
| Interviewee 11 | Contract management | 04-05-2016 | Utrecht |

Table 1 – Interviewees

Participants will be semi-randomly selected based on their field (as varied as possible) and their position (also as varied as possible) within the five locks under study. From each project two respondents will be selected. All Interviewees where made anonymous. The numbers given to the Interviewees above do not correspond to the numbers used in the results. Only in the case of the Afsluitdijk there is one Interviewee less. Since this paper will not draw any inferences on the project level this will not affect the overall analysis. On the project level, generalizations will be hard, however common element across projects could be used as generalizations, because various participants from different backgrounds could draw attention to the same inferences. All interviewees will be anonymous.

## 3.3    Methods

This paper makes use of triangulation. Using observations, document analysis both scientific and RWS documents, and interviews as sources of data to answer the research questions. In figure 4 , below, the various components of cross project knowledge transfer are represented in the middle. Also, as was observed at RWS the distinction between learning and knowledge transfer was no always clear, so this was added as a factor.



Figure 4 – Contribution of research methods to case analysis

In the last column the various questions are represented as indicators of that factor. The factors are derived from the theoretical framework and RWS documents. Especially the "Rijkswaterstaat 2014a", see references, was helpful. RWS also subdivides there analysis in much in the same way Zhao et al. (2015) have made their framework. So this paper at least expects some of the same results as that document has found, but we will return to this later.

### 3.3.1  Interviews

As Creswell (1998) noted, interviews can be seen as a number of steps. First in that step is the purposeful sampling methods. This first strategy sampling strategy is convenience sampling, and involves the selection of most accessible subjects. This method is least rigorous and least costly in terms of time, effort and money. This may result in poor quality of data and lacks intellectual credibility. It can however not be denied that there often is an element of convenience sampling in qualitative studies. The next strategy is called judgement sampling and involves the selection of the most productive sample, is also known as purposeful sampling.  Researchers recognize that some informants are "richer" than others, due to their position in the organization for example. These "richer" people could potentially provide a better understanding and insight for the researcher (O'Leary, 2000).  This could involve a framework of variables

that might influence an individual's contribution. The last of the sampling strategies is the theoretical sample. Theoretical sampling involves building interpretative theories from emerging data and selecting a new sample to examine and elaborate on this theory (Marchall, 1996). This is also known as grounded theory and it involves the emergence of theory from the data (Strauss & Corbin, 1990), or as Barbour states (2001): "*in its purest form the grounded theory approach to data analysis alleges that all explanations or theories are derived from the dataset itself rather than from a researcher's prior theoretical viewpoint*".

This research has chosen a sort of middle way. The method is called stratified sampling; and it involves the subdivision of the population into various subgroups and taking a random sample from each one (O'Leary, 2000). The identification of Interviewees was based on three elements: (1) a mixed variety of different employee levels both from the IPM as well as advisory level, (2) a mixed variety of employee background, such as technical or in the contract field and (3) preferably they had to have some knowledge of knowledge transfer. This was not always the case however. Some were just selected, more or less random, based on the first two selection criteria. The reason for this mixed approach is to capture more views and realities, rather than limit oneself with just the managerial layer or just the employees. In this fashion a more layer image might be the result, leading to a thicker description. A second reason for this approach is that when different persons across professional levels and expert fields say the same thing, the statement gains weight and increases validation.

The second step is to determine what type of interview is practical and will result in the most useful information to answer the research question. The research has chosen the one-on-one, face to face style interview, because you will gain more information (Creswell, 1998). The second reason is, as opposed to for example focus groups, one does not have to account for inter-group dynamics, with some participants just saying they agree. In this way the Interviewee has the freedom to express her or his own thoughts (O'Leary, 2000). The interview are semi-formal, there is still a clear divide between researcher and Interviewee, however the researcher will endeavor to keep the interview style causal and relaxed, in order to minimize any "gulf" between researcher and Interviewee. In line with this more casual approach a semi-structured interview seems appropriate: it makes flexible use of the structure. One can start with a predefined plan, but one can shift or flow with the conversation. Advantage of this approach is that one can collect all the data one intended but is also open for unexpected and interesting data that might emerge. Similarly with one on one interviews one has to find participants that are not hesitant to speak or share ideas (Creswell, 1998).

To facilitate "hesitant" speakers the interviews are executed in a way that can described as: "research with people, rather than on people" (Heron & Reason, 2006). It is about the co-construction of knowledge between the researcher and the participant. The role and responsibility of the researcher in the construction of knowledge are emphasized. It is the researchers responsibility to create a "*welcoming, nonthreatening environment in which Interviewees are willing to share personal experiences and beliefs*". This nonthreatening environment is "creating a feeling of empathy for the informants". This nonthreatening environment is also fueled by the style of the interview: informal, unstructured, anti-authorative and creating a non-hierarchical atmosphere (Karnieli-Miller, et al., 2009, p. 280).

The structure of the interview is added in the appendix. It begins at the program level and follows the themes indicated by Zhoa et al. (2015), to end at the program level again. Because it was indicated by Orb et al. (2000) that the qualitative research was about examining, exploring and describing people in their natural habitats, all the interviews where held on location of the place where the Interviewee worked. Most interviews were held in Utrecht; the main office of Rijkswaterstaat. Two others were held in Roermond and Haarlem. The researcher always made sure the interviews were held in a separate rooms to safeguard the privacy and the freedom of speech of the Interviewee. A separate room also has the advantage of making clear audio recordings. All interviews were recorded with the permission of the

Interviewees. At the interview itself, consent was obtained to record the interview and the purpose and the structure of the interview was explained (Creswel, 1998). Audio recordings have the advantage preserving your raw data for review on a later date, so you can focus on the interview at hand, however there are some drawbacks: it can cause unease with the Interviewee, the fallibility of equipment, the time it cost to transcribing the data, and its inability to capture non-verbal cues (O'Leary, 2000).

### 3.3.2   Observations

The writer of this thesis did an internship at Rijkswaterstaat for six months. During this time I was working in the main office approximately four days a week. That time at RWS allowed me to observe and interview people in their natural environment. I was present during multiple after lunch meetings and one program day and even one strategic meeting on organizational learning in Rotterdam. In the case of RWS I focused on a certain social setting. By focusing on  social setting you can observe how people make use of a certain place, social setting or institution (Hennink, et al., 2011). In these settings participants were observed on in their stance on the after lunch meetings. Were there many participants, did they ask questions, is there a lot of interaction? These are some of the factors I observed during these meetings. In that way differences between after lunches and program days became clear prior to the actual study.

Since I worked at RWS, there is also the question of participation. According to Hennink et al. (2011) one has to adopt a certain role when participating, while you remain enough distance to observe the situation. The level of participation can be described as moderate. This is a form of participation where you conduct some participation with observation, and are thus both insider and outsider (Hennink, et al., 2011). But first and foremost I was a student researcher.  This was a deliberate choice since going native, or the other extreme, being completely invisible, is not fitting the type of research I which to conduct. In order to question people about their experiences about various knowledge transfer structures, one has to be present to form one's own opinion about these structures and reflect on this with the Interviewees. In this way knowledge can be created by exchange of each other's viewpoint. In this way new topics were uncovered during the interviews that were both relevant for the interviewer and the Interviewee. Also by working and interacting with your research community, one gains a certain recognition and later during the interviews, you are not regarded as a stranger, but to the very least seen as someone familiar.

### 3.3.3   Document Analysis

The primary documents that were used in this thesis were scientific peer review articles. These articles were found on  the search engine SmartCat. The snowball method was used in the search of various articles. The scientific articles where limited to mainly organizational or management journals. This assures that the concepts used are relevant and recognized within the field of study. Secondary data came primarily from Rijkswaterstaat. Documents of the Lock Program from 2013 onward were used since that was the date that the firs project started. Older documents were also used, but those were about the organization *an sich*. One RWS document was used to verify at least some of the aspect found in the interviews. This document was an analysis of RWS in 2014 (Rijkswaterstaat, 2014a) of what should be improved on the topic of knowledge transfer. These categories of the results of RWS were used as basis for the framework of this thesis and were used to compare the results of this thesis with. In this way this thesis can corroborate and expand current issues in cross project knowledge transfer.

## 3.4     Analysis

Any analysis begins with data. Based on the interviews a verbatim transcription was made soon after the interviews. Transcription involves a written record of an interview or discussion. The purpose of research influences the type of transcription, for example linguistic and conversational analysis focus on the nature and structure of the dialogue and it may include length of pauses, accents and emphasized sounds or words. In other approaches however (discourse analysis, grounded theory) the transcription relies less on the mechanics of speech, but instead focusses on the on the informational content of the interview. So the

focus is on what is said and not how it is said (Hennink, et al., 2011). A transcription for the purpose of grounded theory involves a word for word replica of the words spoken in the interview. In the beginning of the this section it was stated that the transcription of the interviews started as soon after the interviews. This is an advantage because it allows the researcher to identify new issues that could then be explored in further interviews. These issues can be included in successive interviews leading to greater depth in the information collected (Hennink, et al., 2011). This proved to be an important step, since new inductive codes where uncovered in this way.

### 3.4.1  Coding

After the data has been transcribed the data needs to be analyzed. The analysis of qualitative data derived from transcripts is called coding. A code is an opinion, idea or topic that is evident in the data. There are two types of code: inductive codes and deductive codes. Inductive codes are raised from the participants themselves, they emerge from the interview. Deductive codes are derived from literature and theory. Since this is the first time this study is executed in a qualitatively, broad deductive codes are used from the literature. The questions from figure 4 are used as deductive codes. Inductive codes emerge as Interviewees discuss these codes or topics. ATLAS ti7 was used to make and analyze these codes. The primary mode of analysis was to gather deductive codes on a certain topic, from all the Interviewees and comparing their inductive answers. This is known as inductive and deductive analytic comparison and involves the comparison of issues topics or subgroups that were defined from the outset, or they may involve comparing inductive issues or subgroups that were identified during the analysis (Hennink, et al., 2011).

Based on the factor team context and the related question: does the program offer clear structures for the transfer of knowledge, and what are these structures (see figure 4)? Five inductive codes emerge from the Interviewees (see figure 5 below). IPM is associated with knowledge transfer, because primarily it is a project management structure, not a knowledge transfer structure. Although knowledge could be transferred through the IPM roles.
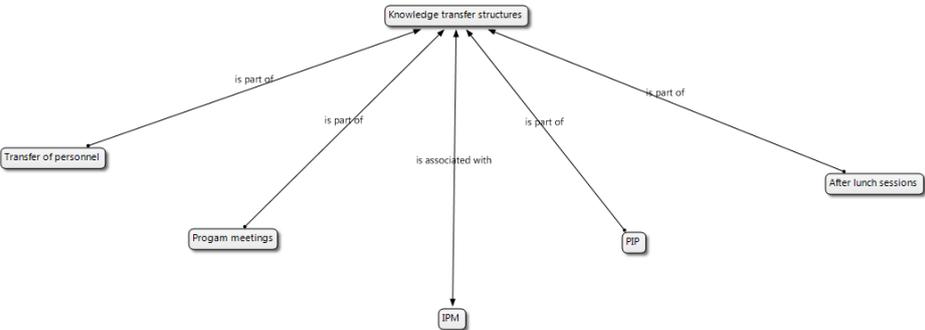


Figure 5 – Coding example

Since this study is done qualitatively for the first time broad questions and hypotheses were asked. There is little research and empirical data available that analyze the link between program management and cross project knowledge transfer using this specific framework.  Although some studies make a reference to the possible connections (Lycett, Rassau, & Danson, 2004; Pellegrinelli, 1997) empirical evidence remains absent. This study is a first attempt to uncover the connection between the program and enhanced cross project knowledge transfer. Because empirical evidence is slim, the analysis will first and foremost be a cross case comparison: compering a single code across interviews in the dataset. This method is used to collect perspectives and experiences of a single issue (Hennink, et al., 2011). Some of the single issues were compared. The after lunches and the program days where compared for example to establish why and how a certain structure contributes better to cross project knowledge transfer than the other.

This section mainly discussed the collection and analysis of data. The next section will discuss the ethical issues that can occur when collecting empirical data.

## 3.5     Ethics

This chapter is of particular concern since the writer of this paper will follow an internship at RWS. The writer will also do a "job" for RWS concerning risks. Providing accurate and verifiable account of the research process is essential to the credibility of the study (O'Leary, 2010), this part is aimed at precisely that. One of the hazards is that one does not remain objective, since the subjects of this study might also become colleagues. Perhaps what is lost in objectivity is gained in trust. Taking the post positive perspective that one "truth" does not exist but rather is socially constructed (Zuidema, 2015), in that perspective, true objectivity does not exist.  According to O'Leary (2010) building trust is essential in capturing truth. Trust can be impacted by the ability of the researcher to listen without judging and other attributes of the researcher. With trust also comes the responsibility to make relevant and appropriate arguments, according to O'Leary (2010) researchers need to make arguments that take into account and acknowledge limitations.

Furthermore this research is done with the help of Interviewees. Ethical issues might arise during the various dialogues with the Interviewees. Any kind of research should be done in with respect to people, justice and benefice. According to O'Leary (2010) ethical obligations refer to professional code of practice. These codes include informed consent, right to privacy and causing no harm. Orb et al. (2000) explores similar concepts more in depth. It starts with the fundamental respect for people. The respect for people begins with recognition of participants right's. This means that any person has the right to be informed about the research, the right to decline to participate in the research and the right to withdraw at any point in the research without penalty. In qualitative research this principle is enacted through informed consent. Another ethical principle is called benefice, and means doing good for other and preventing harm. This is mainly done through confidentiality and anonymity of the Interviewees. However as Orb et al. (2000) also recognizes, when interviewing a small number of participants, they can be easily recognized, so this might be useless in such a situation. Their anonymity will be protected so that no one will be able to recognize who said what.

In this research there are only 11 Interviewees, so the population is relatively small. Before each interview the participant was asked if they want to remain anonymous. None of the Interviewees decided that they want to remain anonymous, on the condition that quotations should not bare their names. There is also the ethical issue of confidentiality and confirmability. In other words: who can look at the data to confirm the findings. Due to the sometimes sensitive nature of the recordings, with Interviewees sometimes stating: "do not quote me here", this research will only reveal the raw data to the writers supervisors. The last principle is that of justice and is primarily concerned with the avoiding of exploitation and abuse of participants. This principle is demonstrated by recognizing vulnerabilities and contributions made by the Interviewees (Orb, et al., 2000).

### 3.5.1  Positionality

The positionality of the writer is important in all research types. It stems from the idea that all knowledge is situated, since it is marked by its origins and therefore has to be accompanied  by  a  statement  on  the position  of  the  researcher (Gold, 2002). McDowell (1992) argues something similar:  "*we must recognize and take account of our own position, as well as that of our research participants, and write this into our research practice*" (McDowell, 1992, p. 409: in Gold, 2002). The writer is first and foremost a critical researcher.  It was already noted that the writer is doing an internship for six months with the organization under study. So, in a way, the people working there are also colleagues. This has affected the writer in some way, when speaking to some else the writer revers to the project as "my project", indicating some sort of ownership with the project and program, but with ownership comes responsibility. Working with

RWS also gained me some trust, at least in the way that people knew who I was, since I was there nearly every day. If any, working with RWS increased my awareness of my responsibility of doing good research, finding answers that both RWS and the knowledge transfer literature might find useful.

In this section we have discussed the methods of research. In the next section we will delve into the results.

# 4 Results

In this chapter the results will be discussed. This chapter will begin with the difference between knowledge transfer and learning, see also figure 4 in the previous chapter. This paper will then discuss the various program structures through which knowledge is transferred between projects. Then the other factors that can influence knowledge transfer will be discussed, sometimes in a more general fashion, other times related to the program structures (see figure 3).

## 4.1     Learning

It was observed that knowledge transfer and learning are sometimes used interchangeably during after lunches and other meetings. The question arises if the difference between knowledge transfer and learning is clear. As we have seen in theoretical framework knowledge transfer is just one way to learn. One Interviewee (5) remarked: "*if you don't do anything with the transferred knowledge then nothing is learned*". Indeed, many Interviewees stated that there was a difference between knowledge transfer and learning. Another Interviewee stated that: "*knowledge transfer is primarily the sending of knowledge, learning is part of the receiving of knowledge*" (Interviewee 4). Knowledge transfer is more about sharing of knowledge, letting the other know what you are doing (Interviewee 3). It is also claimed that knowledge transfer could prevent someone from "reinventing the wheel", and that knowledge transfer could be seen as method of achieving uniformity: "*uniformity is a consequence of knowledge transfer*" (Interviewee 1). Similar work structures could be transferred from project to project saving precious time and money. Thus knowledge transfer can be seen as the movement of knowledge from people to people, from project to project, or alternatively moving people from project to project.

Learning on the other hand is somewhat more complicated however, a one Interviewee stated: "*learning flows more or less automatically from knowledge transfer*" (Interviewee 7). Another Interviewee (7) stated: "*we have the same contract form, so when you receive information you will automatically learn*". Although this statement supports the assumption that knowledge transfer is sometimes seen as being equal to learning, most Interviewees observed a difference between knowledge transfer and learning. Learning is not just seen as the sending and receiving of information, but it is also what you do with that knowledge: "*learning... there is more in it (...), it also means that you capture what you transfer and that it leads to a better situation*" and that "*learning takes more effort than knowledge transfer*" (Interviewee 2). Learning thus also entails some sort of application and retention. This application of knowledge is supported by another Interviewee who stated that: "*a lot of learning happens, simply by doing it; on the job*" (Interviewee 4). There is also a more personal aspect with learning, as one Interviewee stated: "*learning is a personal goal*" and "*learning is the application of knowledge that you yourself receive*". Learning entails "*making the knowledge your own*" (Interviewee 3), which does not, or to a lesser extend happens in knowledge transfer.

As a subsequent question Interviewees were asked if knowledge transfer and learning get the same attention. As we have just seen in the previous section learning is considered as more complicated: "*there is more in it*", than knowledge transfer. It is not surprising that more structures are offered for the transfer of knowledge, which can also lead to learning, but only a few structures that are actually focused on learning specifically. One Interviewee stated that do not get the same attention:

> "*because knowledge transfer is easier. Knowledge transfer is easier to organize; you see a lot more of that going on than learning. It is also harder to capture in what degree that works. So there is a lot more attention for knowledge transfer than for learning*"
> *(Interviewee 2).*

Another Interviewee agreed with this statement saying that knowledge transfer is easier to facilitate and bring within one structure than learning, because everybody learns in his or her own way (Interviewee 3). Not all Interviewees pointed towards this discrepancy between learning and knowledge transfer.

As was also stated above, learning is a way of receiving knowledge, then applying that knowledge and somehow storing that knowledge. Learning is also seen as a more personal matter, rather than a team or even organizational matter. Because learning happens, or is perceived to happen on a personal level it is harder to capture in an organizational context. In general knowledge transfer is seen as the act of sending and sharing of knowledge, not only as means to learn but also as means to create uniformity. Learning is what one actually does with that knowledge, it implies some sort of action that leads to an improvement. Because sending and sharing knowledge is easier then learning, there is a stronger focus on knowledge transfer.

This focus on knowledge transfer leads to more knowledge accumulation than of the actual articulation. The knowledge gathered in a given situation inhibits a certain amount of procedural rationality, it lacks conscious processes i.e. largely automatic. Actors learn passively. This is known as single loop learning (Prencipe & Tell, 2001). This is exemplified by the fact that Interviewees state that the after lunches help them in "who knows what?", this is also clear in the RWS document (Rijkswaterstaat, 2014a) that learning happens ad-hoc. Changes are sought in existing routines. Knowledge does not seem to go beyond the accumulation phase. People know who to go to, but knowledge is rarely articulated in the sense of Zollo & Winter (2014), let alone codified.

## 4.2   Team Context

Within the Lock program a number of different structures exist to transfer knowledge. We will begin with a general picture and see "the program" as a structure to transfer knowledge (see also figure 5). Then we will subdivide the program in more specific structures such as the after lunches, program days, PIP's and the transfer of personnel.

### 4.2.1  Program

The program as such is perceived as being beneficial for knowledge exchange. When compared with other programs, such as SAA (Schiphol, Amsterdam, Almere), this program is way better, as one Interviewee observed: *"I feel more personally involved with the exchange of knowledge and I also feel that responsibility"* (Interviewee 2). It was also observed that the SAA was a lot more bureaucratic, making it less efficient. This could be explained in the way the program director choses to steer the program: *"I don't steer the program in a classical way. People are used to a captain in front of his troops, I am not like that"*. The program structure is such that all the project managers and the program director are in the program team. The goal was to share in the responsibility of the success of the project but also in the program. Steering mainly happens trough certain themes that are important such as learning and knowledge transfer. These themes have to find a way into the projects, but how they go about this is largely open.

Others also feel that the program quite literally connects the projects together: "*It binds and connects us together*" (Interviewee 7). One factor that can explain this is an often mentioned by the Interviewees: being on the same floor: "*one of the main advantages of this program is that we are on the same floor*" (Interviewee 4). As Interviewee 4 observed this helps that people work together and go look to each other faster, because you are on the same floor. Another Interviewee observed the same (9): "*it is a huge plus that the program is on the same floor*". The difference is notable, even if people work in the same building interaction will be less, opposed to working in the office: "it *is important to stay together, that way you don't have to organize these meetings, but you just meet each other in the workplace*" (Interviewee 7).  So working on the same floor as a program is a physical factor that positively influences cross project knowledge transfer. Since knowledge follows the way of least resistance (Reagans & McEvily, 2003),

knowledge transfer is more likely to occur when people work in the same office; the physical distance is smaller and colleagues see each other coincidentally or otherwise. In the regional offices the connection and the "feel" of the program is less, as one Interviewee observed: "program *thinking is much less in the regional offices, much less, but you have to experience it to feel it. (…) the interest of the program are also less*" (Interviewee 7). Another Interviewee confirmed this statement saying that the distance from the regional office to the main office in Utrecht is greater, than from Utrecht to the regional offices. We are not just talking about the physical distance to the main office, but also about the mental distance to the main office, which is larger in the regions. Since only two persons were interviewed from the reginal office it is unclear how the actual physical and the perceived mental distance to the main office influence knowledge transfer. It is not surprising however that the program is less "alive" in the regional offices as Wiewiora et al. (2009) have found in their research that knowledge transfer by social communication is hard to achieve when projects are geographically dispersed. In their research it was recognized by most Interviewees that social communication is the most effective way to transfer valuable information and knowledge.

### 4.2.2  After lunches

After lunches are a monthly reoccurring meeting on the program floor. Certain issues observed within projects are gathered and are presented after the lunch by the project managers. All the members of the different projects are invited via email, and on the day itself to join the meeting. This is one of the most frequent platforms of knowledge transfer within the program. Various other meetings take place, but this is mostly limited by IPM role or within a specific project team or even in the line management. It is observed that these meetings are a way of 'knowing what the other is doing'. Another responded that after lunches are useful in two ways: "*one receives information what the other project is working on and how they fixed their problems*" (Interviewee 5). After lunches and their contribution to knowledge transfer are "*mixed*" (Interviewee 2). The contribution varies in the themes discussed, the experiences shared and the time available; as one Interviewee stated: "*if the theme is no relevant for you, or if you don't have anything to do with it, and work pressure is high, you make a different choice* (to not go)" (Interviewee 4). Another factor that one Interviewee observed is the way a certain issue is presented: "*when people can talk about their experiences, and they can articulate that well, then I can always do something with those experiences*" (Interviewee 2).

Some, however, have gone as far as to call the after lunches a platform for the summation of issues: "*often it is a summation of issues, and that's it*" (Interviewee 2). Another Interviewee claimed that the after lunches are a way of superficially transferring knowledge and that it is just about sharing the state of affairs and not about how certain problems are fixed. So there are positive aspects to the after lunches (1) you know what the others are doing, (2) you see one another.  So the after lunches primarily facilitate the supply of knowledge. Who knows what? This is accentuated by the statement: "It *(*after lunches*) helps me because I know who I need for a certain topic. Even if I can't do anything with that knowledge at the time, but I know where I can get it*" (Interviewee 4). Another Interviewee concurs with this statement, claiming that you can't always use the presented knowledge directly, but it can often be used at a later moment.

Also it was noted that the turnout of people became lower. And the question arises if one should make these after lunches mandatory. The general trend of the Interviewees was that it should remain a choice to go or not to go: "*I like the fact that I have that freedom, that I can make that choice. Sometimes there are more pressing matter, then I don't go*". It is also a question of one's own responsibility to be present: "*you don't need more obligations in your agenda. No, I think everyone can take responsibility to be present from time to time and can judge if the subject is relevant*" (Interviewee 9).

So the after lunches are a platform for the sharing and articulation of knowledge, however they are also not always relevant to everyone. In the articulation phase important collective learning happens when individuals express their beliefs and opinions and participate in productive confrontations and challenge

each other's viewpoints. By sharing these viewpoints and individual experiences and comparing these with colleagues, organization members can achieve: "*an improved level of understanding of the causal mechanisms intervening between the actions required to execute a certain task and the performance outcomes produced*" (Zollo & Winter, 2014, p. 341). As was previously observed the after lunches serve as a way of knowing who knows what? It about sending or supplying knowledge. The active and participative confrontations seldom take place. So a different approach to the after lunches might be needed to enhance these productive confrontations. We will return on this topic later.  First we will talk about another meeting: the program days. Then we will come back and compare the program days with the after lunches and recommend some improvements.

### 4.2.3   Program days

The program day is a day held ones every six months. The program day is bigger in scope and in duration, and lasts almost half a day. When compared to the after lunches which mostly take about 45 minutes, the program day is considerably more of an event. Program days are not on site, i.e. not in Utrecht and are held in conference locations. They often consist of a collective presentation and multiple workshops. These workshop often consistent of a group of eight people. Participants can choose which workshop they would like to attend. In the workshop the writer attended A3 sheets of paper were provided and the group discusses a central theme. All are free to write questions, issues, solutions etc. on these sheets. As multiple groups go over the same questions, they rotate, and a picture emerges from those sheets. All these sheets are gathered after the program day and collected. This is a good example of the codification of knowledge. We will return to this later.

These program days are bigger in size and scope as one Interviewee (6) observed:

> *"There is a lot more invested in these program days, with different workshops. Something like that really works. I can do something with that, you can choose a subject that is relevant to you, and talk to your colleagues."*

Another Interviewee experienced that, as opposed to some after lunches; these program days are popular and there are a lot of people: "*we are in a big building that we have rented for the occasion. These days are really about what is happening and what do we learn?"* Interviewee 10 noted something similar: "*you can network, but is really geared that you take something home with you".*

It is not just about learning. One Interviewee observed that it created a sense of togetherness. This togetherness was also observed by others, realizing that they were not just single projects but are part of something bigger. The trick is however, keeping that feeling alive. After the program days that feeling disappears as one is swallowed up by issues of the present. As one Interviewee observed: "*it requires constant attention to keep it alive*" (Interviewee 8).

These program days really function as a platform for knowledge articulation. At the program days one can exchange viewpoints and individual experiences and comparing these with colleagues and other organizational members. Such efforts can produce and enhance understanding of new and changing action-performance links, and therefore could potentially result in adaptive adjustments to the current set of routines or it could enhance the recognition of the need for more fundamental change (Zollo & Winter, 2014). During these sessions I observed that there was a need for a better way of communicating safety issues on site. One of the outcomes was a visual board that indicated how many accidents, in several degrees of severeness, have happened. So there was an action attached to an issue that came up during these workshops. Knowledge was not just 'superficially shared' as was remarked with the after lunch meetings.

The program days ensure a collective and interactive discussion of certain themes. There are consequences based on the interactive discussion and project experiences are written down on a poster format, being codified, so that other teams can also see the outcomes of previous groups and discuss and elaborate on them as well. The program days can be seen as the stage for knowledge articulation, however, as was observed in the literature and by the Interviewees, this requires a lot of preparation, considerable investment and commitment on the part of the members of the organization (Zollo & Winter, 2014).

In this section we have discussed the after lunches and the program days. In the next section we will discuss another structure of knowledge transfer: the transfer of personnel.

### 4.2.4   Transfer of Personnel

Successful knowledge transfer is often hard to achieve (Kogut & Zander, 1992) since a lot of valuable knowledge in organizations is embedded in individuals. Hiring experts from other organizations, or within an organization is a frequently used method in facilitating organizational knowledge transfer, although in the last case when individuals come from the same organization increases the reliance on an organizations own knowledge rather than new knowledge (Pan & Wang, 2010). Knowledge transfer through people also happens in the Lock Program "*experiences are also shared because people are hopping from one project to another*" (Interviewee 9). The main reason was the lack of capacity. An added bonus was that personnel from a project could use their knowledge gained in another project. This transfer of personnel is mostly viewed as a good way of knowledge transfer and learning: "*that is an organic process; the same people are transferred to other projects, and knowledge transfer and learning capacities happens automatically*" (Interviewee 2). This automatic transfer was also observed by another Interviewee. This particular Interviewee has multiple responsibilities in multiple projects and remarked that knowledge transfer occurs almost automatically. Another Interviewee remarked that the transfer of personnel is "*the most important, cheapest and fastest way to transfer knowledge*" (Interviewee 3).

The transfer of small teams was also mentioned as a way of not just transferring knowledge but also improving efficiency. Because of a lot of common elements in the contract in the field of IA (industrial automatization) a small team integrated IA elements in every contract in every project. Also it was noted that in the field of technical management transfer of personnel is relatively common. In the field of project control, this was less so: "*I see a lot of fun stuff happening with the PIP contract and technical management, but here this is less so*". Some Interviewees remarked that the PIP of contract management and of technical management is more active and more present then other PIP's. Although this statement is not directly related to the transfer of personnel, it serves as an indication that in the field of contract and technical management knowledge transfer is more explicit.

The transfer of personnel also has a drawback: the project loses a valuable member:

> "*(…) then you lose a valued member of your team. I don't like that at all, but apparently there are people who have a wider view and more power, they say that he or she is more important elsewhere. You have to choose your battles*" (Interviewee 6).

So there are some tensions between program and project priorities. The line is also included in the transfer of personnel, because these people originally come from their line managers who allocate them to specific places in the organization. On the other hand, the program has gained more relations because more people are working in more than one project. This facilitates knowledge transfer and also facilitates relations between projects and the program.

What helps explain the positive outcomes of these small project hopping teams can be found in the literature: a shared context will reduce the likelihood of divergent approaches and misunderstandings, which facilitates the sharing of expertise (knowledge articulation) (Pan & Wang, 2010). Unique information

may be able to be accessed by a group from an expert, but the group will have trouble considering the new information in completing its task if there is a lack of shared context group between the group members and the newcomer (Hinds & Mortensen, 2005). So the transfer of personnel and the shared context helps in the articulation of knowledge. We will explore this further in the "project similarities" section. The transfer of personnel within the same context facilitates knowledge transfer since there is less likelihood of misunderstanding.

### 4.2.5   IPM & PIP

In the introduction of this section an overview was provided of the program structure. All the managers have a team supporting them in their activities. The PIP is a special kind of manager. He is the Primus Inter Paris or PIP for short. There is only one PIP per IPM role; there is just one PIP technical management for example, and one PIP stakeholder management. They gather knowledge from all the fellow managers in their field. Their specific role is often unclear, but in general they help facilitate knowledge transfer in their respective field. If issues arise from a specific field, the idea is that the issue is passed on to the PIP who then discusses it in the PIP meeting, and if deemed urgent enough it is then passed on to the program team. In the interview the question was asked if the Interviewees knew what the PIP does, if his role was clear: "What *is their role? Is it defined? I don't know, I can imagine it though*" (Interviewee 7). Another Interviewee observed: "I *know them all, so I know what they are doing, but I don't think that is clear for everyone*" (Interviewee 4). One Interviewee remarked that: "*Yes I do believe that they contribute to knowledge transfer, (…) but I work with the PIP the whole day*" (Interviewee 7).  But when another Interviewee was asked about their contribution to knowledge transfer, one who was not close to the PIP: *"I think the PIP's are practical if you have an issue that needs the attention of the program (…) but I never do it, I would take it up with my manager"*. Also one Interviewee saw one PIP as being PIP for project X, instead of being PIP for the program. So a PIP is seen as a member of another team, rather than being there for the whole program. Especially if the PIP is seen as being of another team, this might be a barrier going to him or her. The PIP is recognized more as manager from a certain project team than as PIP.

However, when the Interviewee was asked a bit further about their contribution about knowledge transfer the Interviewee replied: "*I know that they have a meeting once a month to share knowledge and talk about issues in their fields*" (Interview 4). But what they actually did there was no mention. One Interviewee stated about the role of the PIP: "(…) *it is keeping an eye out, but I think that they receive more than that they send*" (Interviewee 9). These statements seem to corroborate each other; apparently the PIP's have meetings, but no one knows what is going on in those meetings, as one Interviewee (3) remarked: "*the feedback from the PIP meetings does not have a structural place yet, that's an interesting one*". This lack of feedback from higher levels in the program is not just an issue with the PIP's. One Interviewee remarked that there was seldom any feedback from the Program team: "*I don't hear much from them, sometimes you hear something, but no, I don't know what is going on and what issues they are discussing*" (Interviewee 7). Interviewee 9 concurs with this statement in saying that: "*you don't hear much what happens on the program level, and that is a shame*".  This is not to imply that the PIP's do nothing, nor that nothing happens on the program level, but apparently it happens unseen.

Three things become clear: (1) the PIP role is still unclear (2) there is no feedback from the PIP's which adds to the unclear role of the PIP and (3) the relative distance to the PIP, the degree you know the PIP might influence the likelihood of going to the PIP with an issue. If you know the PIP well, the likelihood will be higher taking an issue up with the PIP. Knowledge follows the way of least resistance (Reagans & McEvily, 2003), so if you don't know the PIP, you go to the next best person that you do know; your manager for example. So the relative distance to the PIP might be an explanation why their role is unclear; a lot of people don't know the PIP that well, especially because chances are high that the PIP is from another project.

Based on the above there is an apparent gap between the program and the advisory level in the degree that knowledge is exchanged. Knowledge transfer primarily happens on the IPM level: "*there are a lot of meetings on the IPM level, on lower levels? That I don't know*" (Interviewee 4). Another Interviewee stated that: "*there are a lot of meetings on the IPM level, we hear something back in our project meetings, but that is just very general information*" (Interviewee 7). One Interviewee remarked that a lot of knowledge transfer structures happen on the IPM level and that you are always notified in the second or third instance. Interviewee 1 observed the following: "*you have two layers, the IPM and the advisory layer and I have the feeling that the communication between those two is not going well*".
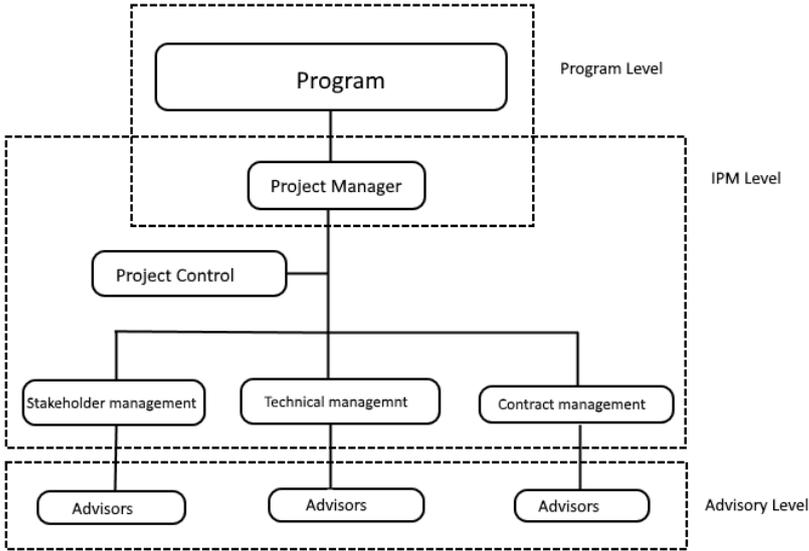


Figure 6 - Program levels

Above in figure 6 we see a graphical representation of the Program structure. the IPM level consists in this case of all the separate managers. Project control also has a team of advisors but it did not fit well in the graph. Although there might be a gap in the way knowledge is transferred between levels, the gap between these layers is not equally large in size in all IPM fields: "*I know they do a lot in contract management, but in my own field, not so much*" (Interviewee 10).

In this section we have explored the PIP's and the gap between the advisor and the IPM level. The role of the PIP still remains unclear, or what they do happens unseen. This gap between the program/ IMP level is not at all surprising, however the advisors do want to know more about what happens on the program level. If the advisors have a better image about what is happening in the program, it might also be easier to recognize common elements and relationships between projects that were previously less clear. This could facilitate the perceived project similarity. It is to this subject that we know turn.

## 4.3    Project Team Task Context

In the previous section we have discussed various structures in the Lock Program and how they influence cross project management. In this section we will explore to other factors that influence cross project knowledge transfer: project similarities and time. Project similarity refers to the similarity between the source and the recipient project, or the similarity in implementation methods and workflow embedded in executing the project tasks (Zhao, et al., 2015). This section will explore the degree in which the Interviewees perceive that shared context and if it hinders knowledge transfer. Then we will discuss how time plays a role in knowledge transfer. Time was identified as a factor because when on experiences time pressure one might be less inclined to transfer knowledge but instead focus on project deliverables (Wiewiora, et al., 2009). Time seems to have two dimensions: a personal and a structural dimension.

### 4.3.1 Project Similarity

In the theoretical framework homogenization of project teams was a factor that influences cross project knowledge transfer. Newell (2004) found that learning across projects was easier the more homogenous were the teams across which the learning was being transferred. The five projects in this research are all locks, but they differ in functionality. The lock of Amsterdam is totally different lock than Beatrix for instance, the lock in Amsterdam has a protective function against the sea, Beatrix has not. Also the size and scope of the projects vary. Amsterdam will have the biggest sea lock (IJmuiden) in the world for example (Amsterdam, 2016). The lock at Limmel is tiny compared to the lock in Amsterdam. So there are some considerable differences in functionality, size and scope.

There are also a lot of commonalities, but these commonalities should be sought at a higher level of abstraction. Commonalities should be sought in process rather than function. First all project work with the IPM model, so the type of managers are all the same. Second, all locks are tendered with a DBFM (Design Build Finance and Maintain) contracts, except for Terneuzen. So this means that all locks have to follow a certain legal process; from tendering process to completion and maintenance. To facilitate learning and knowledge transfer a "train" structure was developed by the program team. This means that the first project will make a contract and project two will build and expand the contract (but not make a new one!) where necessary, while learning from the mistakes in project one, see figure 7 below. This could result in a more or less standardized contract.
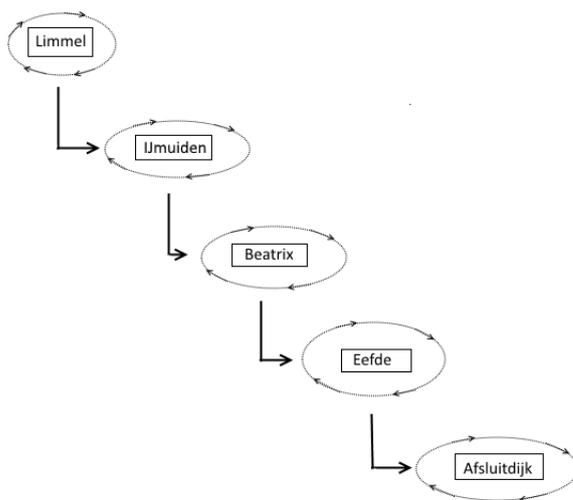


Figure 7 – Train Structure

The Interviewees were asked if the project differ significantly so that knowledge transfer between projects would suffer. One Interviewee responded: "No*, each project has its own unique features, but there are also a lot of commonalities. And I think that each project can learn from each other and I think that we are indeed learning*" (Interviewee 4).  Interviewee 9 observed that: "*each project has its own unique features, these features do not obstruct knowledge transfer, but you have to be aware that one often cannot copy something from Beatrix to Afsluitdijk*". Another Interviewee specified that the common elements are in the contract form: "we all work with the same contract form, and we are all locks, so you learn automatically from the information that you get" and this particular interviews expands the argument: "*although there are functional differences you can share a lot because considerations made in that are made in project x will also be made in project y*" (Interviewee 7).

So there are a lot of common elements in the contracts. In the field of stakeholder management these common features seem less apparent: "*well, in the areas of contracting, technical management and the market demand you can learn a lot from each other. (…) but the stakeholder component is vastly different in each project, the municipalities for example are not very comparable*" (Interviewee 6). The unique characteristics of a certain area, such as the unique composition of stakeholders, determine to a large extend the approach taken. This approach is something that is not often shared: "*these approaches to an area is something we do not share often*". Although, through the interview the interview did realize that it might be a good idea to perhaps share and compare their stakeholder's risks and the preventive actions taken.

Most Interviewees recognize that they share a common context and that this helps in knowledge transfer:

> "*I was talking to somebody the other day, and I just needed two phrases to know what he was talking about. So I stopped for a minute, because I felt I could learn from him. I knew what he was talking about, we speak the same language*" (Interviewee 2).

This is also an example why is so Important to have a common area where at least most of the employees of the program work. By having a common floor one facilitates also "accidental meetings", that are then becoming less accidental. There are some indications in the previous section and this one, that especially in the field of contract management, more knowledge is being transferred. This could be explained by the facts the contract is highly codified; it is a set of strict demands for all parties the sign the document. These documents can be easier to transfer than for example the approaches to stakeholder management. A second reason is that there are teams in contract management and an active PIP that guides contract management across projects. The third and probably the most important reason is that all project share a common context, they are locks and most importantly, they share a common contract: DBFM. The importance of a common context was already observed in the literature, especially in team meetings (Mortensen 2005; Pan & Wang 2010). As project share a common context with each other it becomes easier to articulate and transfer knowledge. A shared context will reduce the likelihood of divergent approaches and misunderstandings, which facilitates knowledge transfer (Pan & Wang, 2010).

Some of the Interviewees felt however that the lock program is a bit arbitrary, because other projects could also be involved because they also share some of the elements above. An example of this ambiguity is the Terneuzen (the project shared with Belgium), some Interviewees where unclear whether Terneuzen is in or out of the Program.

### 4.3.2  Time
This thesis uncovered two components of time: structural and personal. The structural dimension is found within the "train" structure, the sequence in which the projects are structured over time. While on the one hand facilitating learning and knowledge transfer, on the other hand this sequencing is also hindering knowledge transfer. The hindrance is primarily due to the fact that project drift away from each other as time progresses, and that is hard to remain connected with the other projects:

> "*because the project phases are so far apart; project X is in the implementation phase, but some are still in contract preparation, so it becomes increasingly difficult to exchange knowledge. It still happens, but you have to look for your information*" (Interviewee 7).

Another Interviewee expands this assertion and explains why it becomes increasingly difficult to transfer knowledge: "*The job of all these different disciplines is so different in each phase, it makes it hard to connect with everyone*" (Interviewee 9).

Particularly in the implementation phase knowledge transfer is becoming increasingly difficult because of the scope:

> *"(…) when you are in the contract preparation phase you are future oriented, this orientation changes in the implementation phase; you are busy with ad-hoc issues, you are very 'in the moment' so to speak. Only at the end of the implementation are you looking forward again" (Interviewee 10).*

Although not observed in other factors, here in the implementation phase, there was an indication of the NIH syndrome: "people are less inclined to share knowledge, because they think they have to fully figure the issue out themselves before they share it" (Interviewee 2). Other than the phases of the project it was also observed that the sharing of knowledge becomes less for the simple reason that a lot of activities move to the regional offices where the project is situated thereby increasing the physical distance to the main office. As knowledge follows the way of least resistance (Reagans & McEvily, 2003), an increase in distance will hinder knowledge transfer.

The second dimension was the personal dimension of time. When there is a lot of time pressure people tend to transfer less knowledge and return to their core tasks, as one Interviewee stated: "This *is a natural response, you are going to prioritize the things that scream for your attention, more than the things that are less prominent*" (knowledge transfer not prominent) (Interviewee 8). One Interviewee observed that the limited amount of time was also connected to limited capacity: "*with limited capacity you are just putting out fired, and learning is not a priority, so it is the first to go*" (Interviewee 6). Time is often coupled with priorities, everybody is buzzy or hides under the fact that they are buzzy, so there is limited time for knowledge transfer or learning. Other issues are more important than learning or transferring knowledge. Some Interviewees have acknowledged that knowledge transfer could also save time, because you do not have to invent nor solve the problem, because it was already done in another project.

Although knowledge transfer is recognized to have the potential to save time, other project issues often have priority. This was also found by Wiewiora, et al. (2009 p. 225) whom stated: "*Projects have to be delivered within the desired timescale. In the project environment, time is literally limited and is always running out. People are focused mainly on delivery rather than on knowledge transfer activities*". This was specifically the case with the after lunch sessions, when other issues called immediate attention, the after lunch was the first to drop out of the agenda.

## 4.4    Relationship

The relationship between projects could affect cross project knowledge transfer. Transferring knowledge means frequent interaction. Friendly cooperation could enhance communication and understanding of knowledge (Zhao, et al., 2015). The relationship between projects is described by Interviewees as being cordial:

> *"(…) cordial, most advisors are from the same department, (…) that is friendly. People get transferred between projects. At first Afsluitdijk was a bit of a stranger in the program, but because people were moved there from other projects it gained a closer relationship with the program." (Interviewee 3)*

The transfer of personnel not only facilitates knowledge transfer but also increases the relationship between projects and the program. Another Interviewee remarked on this as well: "*at the moment things are going well, but as I have said before, I work on multiple projects and there are others who do so as well, and that helps*" (Interviewee 4). Apparently with people working on multiple projects also strengthens the relationship between projects.

As one Interviewee explained however, discussion could arise if a team member is transferred to another project: "*there was also discussion to which project I should go*" and "*it is aggravating for the project managers who are losing personnel*" (Interviewee 3). This aggravation was also observed in the transfer of

personnel section, were an Interviewee stated that he would lose a valued team member (Interviewee 6). These quotes indicate that the transfer of personnel could not only facilitate the relationship but could also stress this relationship. So there is an apparent tension between program and project priorities and even in the line priorities. As was observed in the transfer of personnel, the project that loses a valued employee could skew that relationship, as the other project is prioritized over the one the employee came from.

Some have experienced competition and not just in personnel:

> *"there is always rivalry, also within the Lock Program (…) when a project boasts about their project during a presentation, we are a smaller project and then I can't stop myself from thinking: here we go again" (Interviewee 2).*

Surprisingly one Interviewee stated that the competition described in the theoretical framework is even more present within a program than in separate projects. The explanation for this is because project have a closer relationship with each other. The projects are working closely together, you are working with your "*brothers and sister*" (Interviewee 2), instead of some other project elsewhere in the organization. So the proximity with other project could also induce competition. This need not be a bad thing however, as one Interviewee observed: "*it is healthy competition; it triggers other projects to perform better*" (Interviewee 2).

Informal networks also play a role. Interviewees also mentioned they often search for knowledge outside of the program from people they know well, have worked with in previous projects, or have a good relationship with: "*a project manager works there whom I know well. That helps if you know that someone works and thinks like you*" (Interviewee 7). But these informal relationships might also be an accidental encounter in the hallway or at the coffee machine. This was also mentioned in the previous section. Working on the same floor facilitates informal and accidental encounters.

So the relationships between teams can be described as mostly friendly. The transfer of personnel helps because more people know each other, and as we have seen in the theoretical framework; the more people know each other the more easy knowledge is transferred between people. The more interaction between people the higher the amount of transfer opportunities offered (Wu, et al., 2007). However, competition could arise between teams, because a member of a team is transferred to another team where he is deemed more necessary. The original project loses a valued member. Surprisingly, competition could also be induced by the program itself, because project managers work in close proximity with each other this could trigger the need to distinguish oneself from the others, more so than in separate projects.

## 4.5    Team Capacity

In the theoretical framework team capacity is describes in terms of the sender and receiver: the source and the recipient project and if they are able to understand each other's messages.

One Interviewee observed:

> *"Most of the time the knowledge we share is clear, not always by mail, but we always clear it up in a conversation. So everybody is willing to help each other understand the message. If the message is unclear this might be the fault of the sender or the receiver. It's a two-way street. In any case both, are willing and invest time in clearing up the message." (Interviewee 3)*

This points towards a responsibility that both the sender and receiver of the message have. The Interviewees where also asked if they thought about the context of the team to whom they are sending the information. One Interviewee responded: "*that is the responsibility of both the sender and the receiver. If*

*you send a message you have to provide some context*" (Interviewee 6). Interviewee 7 concurred with the previous statement:

> *"You always have to provide some color, sound or imagery to your message, but the important thing is, consideration are hard read from paper, meeting one- to- one is best. That also saves me a lot of time in writing it down."*

As an indication of this context specific nature of these messages one Interviewee stated: "*we are asking very specific questions, and that works well and it works so well because we have a common basis*" (Interviewee 7). As Kramer et al. (p. 327, 2004) argued: "*that although it requires a heavy up-front investment of resources, the long-term returns in institutional and social linkages and networks justify the expenditure*". This seems the case in the Lock program as well. The upfront investment made seem to have the effect that everybody shares a common basis or a shared context right from the start. There are some indications that knowledge is harder to find, with Interviewees saying that they are more "in search" of information, more so than in the earlier stages of the program. In the beginning there was considerable investment in a shared basis, with the organization of summer schools and extra schooling in DBFM contracts for example. But as the project are now in different phases, the connections become less as one Interviewee explained: "*the tasks of all these different disciplines is very different per phase*" (Interviewee 9). Because all these different disciplines are doing totally different things it is harder to connect them as time progresses. Although they have a common basis, the consequence of the specific sequencing of the projects also makes it more difficult to transfer knowledge because of the divergent tasks per phase. As one Interviewee observed: "*knowledge transfer required constant attention*", this attention is diminishing as projects move further apart.

Team capacity has a link with the similarity of projects as one Interviewee observed: "*there is a click between teams. Of course projects differ 20-30% from each other so there is always some degree of translation, but communication is no problem*" (Interviewee 2). This is not surprising since we have already found that sharing at least some of the same context could facilitate knowledge transfer. Project similarity not only helps facilitate knowledge transfer but also apparently helps in the understanding of each other's knowledge. Similar processes are followed, so it is easy to recognize what the other team needs, because everyone goes through the same processes attributed to DBFM. Interviewee 2 gave an example: "*we have specialist meetings, there was also a specialist from another project present, because he knew a lot about the subject. He just needed a couple of questions to know what the issue is about*". So project similarity also facilitates project members to better translate and communicate each other's messages which also became apparent in section 4.3.1.

As we have already observed in the task context section, there is a difference between the IPM layer and the advisory layer. The advisors get the information, but as we have already seen in section 4.2.5 this is often more general. One Interviewee stated that: "*I am up to speed, but always in the second line or even later*". It was noted that in some programs the core team (program team), also has some advisors present from the projects: "*I am faster up to speed in that way, because I am in the first line, now I have to wait and see what information comes my way (...) in this way I am searching more*" (Interviewee 10). Interviewee 1 concurs with this statement:

> *"Knowledge transfer takes place at higher levels of the organization, after lunches, IPM meetings, but it does not land with the advisors"* and *"you have two layers: the IPM and the advisors, and I have the feeling that the communication between those two; they (IPM) know everything about each other, and the advisors know considerably less."*

This is envisaged by the fact that an IPM member stated: "there are a lot of IPM meetings, on a lower level I don't know". In responds to this apparent gap between these levels Interviewee 1 stated: "*the IPM level*

*needs to make more time for use, and we as advisors should be more proactive in getting the knowledge that we need*" (Interviewee 1).

This thesis cannot say whether the absorptive capacity or sending capability is good or bad in one project. The only thing this thesis is able to say is that both sender and receiver share a feeling of responsibility towards each other in clear communication. This thesis has not found any signs that the employees of RWS do not understand each other, that does not mean that they always understand each other.

So, the afore mentioned training of personnel did have a noticeable impact in understanding each other. The shared basis facilitated knowledge transfer. However, as projects drift apart, i.e. they are in different phases, this shared basis is becoming increasingly less relevant since all projects are working on different tasks now relating to their project phase. Knowledge from one phase of the project does not correspond to that of another project. Either the project has not reached that phase or is already passed that phase. Project are under a lot of time pressure, so when knowledge is shared, during an after lunch for example, and your project has yet to reach the phase, that knowledge is not directly relevant.

## 4.6  Summarizing

In this chapter we have discussed various structures of the lock program. In the team's context, the after lunches, program days, IPM & PIP, train structure and the transfer of personnel were discussed. The after lunches should be more interactive and in smaller discussion groups, like in the program days. There was is a gap observed between the IPM and advisory level. In the section project similarity, it was found that a common context, especially in the DBFM area, helps knowledge transfer in the sense that employees understand each other better. That could be the explanation why Interviewees often observe that within contract management knowledge transfer is going well. This could also be because contracts are already highly codified, knowledge is transferred more easy as codification increases. The relation between projects are often portrait as friendly, although there are indications of competitiveness. The teams seem too able to understand and transfer knowledge well, but because they drift apart, or are in different phases, knowledge becomes less relevant. See table 2 below.

| | Main findings |
|---|---|
| **Team Context** | |
| *Program* | Binds project together. Working on the same floor noted as being beneficiary for knowledge transfer. |
| *After lunches vs. Program days* | Program days are more focused on articulation of knowledge. After lunches are deemed as "mixed" |
| *Transfer of Personnel* | Transferring people also means transferring knowledge. As a side benefit, because personnel transfer between projects, their network also increases. |
| *IPM & PIP* | There is a gap between IMP level and the advisory level. The advisory level wants to know more about what happens at IMP and program level. The role of the PIP remains unclear. This seems to be influenced by the proximity one has to the PIP |
| **Project Task Context** | |
| *Project similarity* | Project similarity important for understanding each other, and also for the articulation. Especially the common basis of the DBFM contracts seems to explain why contract management is often noted as doing well in knowledge transfer. Also because |

| | |
|---|---|
| | contracts are very explicit type of knowledge that is easier transferable |
| *Time* | There is a personal and structural dimension to time. Time is personal because when there is a lot of time pressure people tend to transfer less knowledge and return to their core tasks. The structural dimension is the train structure: one the hand it allows for subsequent learning, but on the other projects also drift apart |
| *Relationship* | The relationships between projects is mostly deemed as friendly. The transfer of personnel seems to benefit the relationship between teams, but there is also a flipside as one project loses a valued member. This has led to competition for members. Also competition between teams could become worse in a program, as project are now each other's "brothers and sisters". |
| *Team's Capacity* | In general people are able to understand each other. This is also facilitated by the shared basis that a lot of team members have. As time progresses the connection between teams also becomes less, ass employees are more and more "in search" of knowledge. It is unsure how this effects the team's capability. |

Table 2 – Main findings

In this chapter we have discussed various components of knowledge transfer in the Lock Program. The Lock Program already has multiple structures in place that facilitate knowledge transfer such as the program day, after lunches, transfer of personnel etc. The relationship, capabilities and similarities between projects seem to act as glue between projects, and between themselves. One can imagine that if people experience the projects as being very similar, one might also expect to find a good relation between them, because they share common element. The opposite can also be the case, but the question then would be why but project together that have no common elements?

In the next sections we will discuss the most important findings at length.

# 5 Conclusions

In the previous section we have explored the various structures of knowledge transfer in the Lock Program of Rijkswaterstaat and how these structures facilitate or hinder knowledge transfer.

Returning to the main questions:

**How can knowledge transfer be facilitated between different project teams within the Lock Program of Rijkswaterstaat to improve project performance?**

- What are current knowledge transfer procedures and how do they perform?

- What factors are hindering knowledge transfer?

- Which factors need to be improved to facilitate knowledge transfer?

The Lock Program has several structures in place for the transfer of knowledge such as: after lunches, program days, transfer of personnel, IMP & PIP structures. These structures where examined using Zhao et al.'s (2015) framework. This framework subdivided four factors that can influence knowledge transfer: the team context, task context, relationship and the team's capacity. If these project were separate, every team would have their own team context, or knowledge transfer structure. The projects in the Lock Program are not separate entities but have the program. This program now offers the structures for knowledge transfer, mainly in the form of team meetings. These team meetings are instrumental in organizational learning and change (Edmondson, 2002), as they form a platform for knowledge accumulation, articulation and codification. Important collective learning happens when individual articulate their beliefs and opinions and participate in productive discussions and challenge each other's viewpoints (Zollo & Winter 2014). The next step in the process is knowledge codification: the translation of individual or group experiences to developing manuals and other process specific tools. The codification of knowledge might be a step too far for most organizations.

Another factor that can influence transfer of knowledge is the task context. This factor relates to the degree in which project members perceive they are similar and the time pressure they experience. The greater the task similarities are between projects, the more common work experience the projects have (Park & Lee, 2014), and the more easily both teams can share a common understanding of knowledge (Newell, et al., 2006). When members of a team experience time pressure, the team will tend to focus predominantly on the delivery of project tasks or services rather than on knowledge transfer (Wiewiora, et al., 2009). Next is the relationship between team projects. Project success could be increased by friendly cooperation enhancing communication and understanding of knowledge. The opposite, an "arduous" relationship, and especially a competitive relationship, can hinder knowledge transfer (Zhao, et al., 2015; Burgess 2005). Lastly the team's capacity, or the degree the teams are able to understand each other has two sides: the sender's capability to send a message and the receivers absorptive capacity to receive the message (Zhao et al. 2015).

In the conceptual model it was assumed that the program now offers structures for knowledge transfer. The team's context is now being offered by the program. The program has structures in place to transfer knowledge. The likelihood of between project knowledge transfer will increase when knowledge has been fully codified, but as we have seen, the codification of knowledge is the last but most difficult step to make. This thesis researched these links by questioning 11 employees from the lock program, all different in their roles and responsibilities, on how they have experienced various knowledge transfer structures offered by the Lock Program. This was done by adapting the framework of Zhao et al. (2015) for qualitative research. Aside from the interviews, observations and relevant documents were used.

Various structures have been put in place to facilitate knowledge transfer and learning in the Lock Program. These primary structures are: after lunches and the program days. Other structures that facilitate knowledge transfer are the transfer of personnel and the IMP roles and PIP's. There is a difference between the way the after lunch and program days are perceived in terms of knowledge transfer and learning. The program days are experienced as being far more popular and they are really geared for learning, while Interviewees experienced the after lunches as being "mixt" in their relevance. This difference can be explained by the fact that there is considerably more effort put in the program days than on the after lunches. As we have seen from the literature, knowledge articulation will need considerable investment (Zollo & Winter, 2014). In case of the program days, it appears that employees have a very positive experience with those days. The second reason why the programs days are experienced better could be for the reason that people can articulate their opinions on certain subjects in a small workshop setting; opposed to the after lunches where there is mostly one person sending knowledge on a certain topic, and group discussions are not common.

The transfer of personnel and therefore knowledge is often described as having a positive effect in other projects where knowledge can be used. Because there are similarities between project people are able to contribute their knowledge and experience in other projects. Also because of similarities between projects divergent approaches and misunderstandings become less likely (Pan & Wang, 2010). It was also observed that the transfer of personnel might increase the relationships between projects, as one moves from one project to another one also expands their network. It was also observed that this might cause competition between projects for the best employees. The managers from which an employee leaves to another project might not always be pleased because they lose a valued member of the project team.

Although not formally a knowledge transfer structure, the IMP level consists of the managers in a project team. It was observed that there is a gap between the IPM layer and the supporting advisory level. Although this might seem logical, the advisors often do not know what happens on the levels above them, or they do know but often in general terms. This is concurrent with the PIP's who are seen as receiving more information then they sending it back. There is very little feedback from the PIP's back to the advisory level. This can also be explained by the fact that in one of RWS's documents (Rijkswaterstaat, 2014a) that the PIP's should work top down. It was expected that this approach would lead to a more explicit role of the PIP's. PIP's are often seen as a manager from a certain project, rather than knowledge facilitator of the program. This thesis has found that their role is still for a large part unclear with many of the employees. Only those working in direct contact seem to know what they are doing. This is not to say they do nothing to transfer knowledge, only that what they do remains unseen. A point of discussion is if they *should* be seen. As they are an important part of the program goal of learning through knowledge transfer this paper argues that they should. Combining bottom up and top down approaches might work to improve the recognition of the PIP's, in the recommendation sections we will return to this subject.

Answering the first sub-question, this thesis can say that these structures facilitate knowledge transfer, however they seldom moved passed the articulation phase. As was indicated in the literature this is a difficult phase and requires considerable effort to make the step into the next phase: codification (Zollo & Winter 2014). The codification ensures a more efficient transfer of knowledge. So a program can facilitate knowledge transfer by offering interactive structures for the accumulation, articulation and codification of knowledge. As one Interviewee observed: "*if these structures were not in place, nothing would happen*". The next step would be to make specifically the after lunches more interactive.

The task context, relationship and the team's capacity could be seen as the proverbial glue between projects. The task context had two sub-factors: project similarity and the perceived time pressure. Project similarity is especially vital in programs. A shared context facilitates knowledge transfer in a way that prevents communication errors and divergent approaches (Pan & Wang, 2010), it also allows for the

transfer of personnel. Particularly in the contract management department, where the similarity in the DBFM contracts seem to explain why knowledge transfer and learning activities are often positively mentioned by Interviewees. Another explanation to support this claim is the fact that contracts are by their very nature explicit pieces of knowledge. Explicit knowledge is easier to transfer than tacit knowledge (Dutton, et al., 2014). One thing that is missing between projects is a shared digital knowledge repository, in which the whole program can share knowledge. It was observed by one of the Interviewees that there was also a risk to such a knowledge repository: because everybody is adding and changing documents and such, one runs the risk that these documents "begin to live their own life".

Time was the second sub-factor. As time pressure increases team members would primarily focus on project deliverables than on knowledge transfer (Wiewiora 2013). As soon as other things came along the after lunch was one of the first meetings to be dropped from the agenda. This could also be because the after lunches are perceived as mixed in their contribution to knowledge transfer and learning. So the willingness to go to such a meeting could also be a factor. Secondly there is the structural dimension of time, more specifically the train structure. While on the hand enabling knowledge transfer due to the specific sequencing of projects over time, but on the other hand it raises a barrier, because the phases of the projects are drifting apart from each other. Since the work processes are very different per phase, the work that each project is doing on any given point in time is very different in other projects. This limits transfer because the knowledge that one project is generating has lost is relevance for the project before, and that knowledge is not jet relevant for the project after. This calls for regularly evaluating project phases in the project team and it calls for a program wide knowledge repository where this knowledge is stored and where everyone can access the knowledge of every project when they need it. It was also observed that especially in the executive phase knowledge transfer became less. This could be due to the fact that more of the IPM team moves to the regional office, but it was also observed that moving from product (the contract) to object (the lock) was very exciting. It was observed that this may also limit knowledge transfer, out of fear of making a mistake.

The relationships between teams was mostly experienced as being cordial or friendly. The transfer of personnel benefits in this friendly relationship. From the network perspective an organization can be seen as a series of social relationships. As Wu et al observed (2007) the more social interactions within and between teams, the higher the amount of knowledge transfer opportunities offered. Competition was also found to be present between projects. Surprisingly even more so than if the projects were separate, so a program might also facilitate competition because one works in closer proximity to other projects and one might be more inclined to distinguish oneself from the other project. In the theoretical framework it was suggested that a competitive relationship might hinder knowledge transfer (Wiewiora et al. 2013); this thesis has found no evidence of this. Interviewees explained that competition is a bit part of the RWS culture and that it is "healthy competition", to push other projects to perform better.

Due to the common basis the projects have and the project similarities between them, employees are often able to and to understand each other's messages. The framework of Zhao et al. (2015) assumes a transfer process that is based on a team that sends a message (teams capability) and a team that is receiving that message (team's absorptive capacity). This thesis cannot say whether a team has one or the other. There are general indications that the employees of the Lock Program are able to understand each other, and if not, then efforts are made to clear up any misunderstandings. The employees are able to understand each other because of the shared basis of the projects in the DBFM area and the project similarities. Projects similarities could prevent divergent approaches and misunderstandings since similar work processes are followed (Pan & Wang, 2010).

Answering the second sub question, there seem to be two main factors that hinder knowledge transfer: time and the prioritization of knowledge transfer. Time has a structural and a personal element. The

structural element was the train structure, while one the one had facilitating learning, one the other hand hindering knowledge transfer. It was observed by some Interviewees that projects drift further apart as time progresses: "*It becomes harder to keep connected with other projects*". The personal element was also observed by Wiewiora, et al. (2009 p. 225) whom observed that under time pressure the focus will move towards project deliverables instead of knowledge transfer. This was also observed within the Lock Program. When something else comes up, the after lunches are the first to drop from the agenda. The prioritization of other issues rather than visiting the after lunches also has a root that these meeting are mixed in their contribution. Also due to capacity issues project are more focused on "putting out fires" i.e. focusing on existing routines i.e. single loop learning, rather than double loop learning. It was also recognized that knowledge transfer could save time and facilitate standardization. Projects are primarily focused on delivery; the delivery is evaluated on the basis of time, scope and money, not knowledge transfer.

Knowledge transfer can be facilitated in a program by facilitating team meetings that are participative and interactive. The Lock program already has multiple knowledge transfer structures in place to facilitate knowledge transfer to improve project performance. There are still improvements to be made, but we will continue with the recommendations in the next section.

This thesis is relevant since teams are becoming the pinnacle of organizational work, and a lot of organizations are PBO's. The transfer of knowledge is about achieving efficiency through learning. This thesis has shown how a program can facilitate knowledge transfer with the goal to learn in order to improve project performance. Put in a grander perspective knowledge transfer and learning are about adaptation to external changes. These external changes seem to be happening faster, and are increasingly more unexpected. Planning to these changes is a vital, and learning is the only way we can keep track of these changes.

## 5.1    Recommendations

Based on the findings and the on literature this thesis proposes a couple of recommendations. This thesis has chosen three areas in which recommendations will be made; these are the after lunches, IMP & PIP's and the factor of time. The after lunches were compared with the program days. This was done because the program days are often experienced as a better platform for knowledge transfer and learning. The program days have small and interactive group discussions, after lunches often have not. It is recommended that these small interactive discussions also be applied in the after lunches. This will require more time preparing these after lunches. This could also be a chance for the PIP's to lead these discussions and to actively participate, because there was a gap observed between the IPM and thus PIP's. This gap could be diminished if the IPM level provide more feedback what happens on their level and the program level.  This need not be in an after lunch session, but it is an important aspect, because it can influence a sense of commonality and similarity.

*Recommendations*

| After lunches | 1.      Small and interactive group discussions<br>2.      PIP leads discussions on their IPM area<br>3.      Collect and structure project discussions<br>4.      Attach actions to the outcomes of group discussions |
|---|---|
| *IMP & PIP* | 5.      Top down and bottom up. PIP's need to find a way to become more present. More feedback from PIP to the teams and from teams to PIP's. Not just top down.<br>6.      IMP needs to give more feedback what happens on program level |
| *Time* | 7.      Regularly capture the most important project experiences directly after important milestones are reaches with the entire project team<br>8.      Store these experiences and lessons in a program wide knowledge repository where everyone can reach that knowledge when they need to. |

Table 3 – Recommendations

The first four recommendations are also found in the literature (Schindler & Eppler, 2003) and are primarily geared towards the facilitating of group meetings. Making the after lunches smaller, more interactive and participative one assures that knowledge is articulated and discussed. The PIP's could lead these discussions. In this way they will be recognized as more than a project manager but instead as PIP. These meetings need to be structured and the outcomes must be collected and preferably stored. It must be clear that actions will be taken as a result of these outcomes of these meetings. The PIP is now experienced as a top down figure. This could change if he participates more in these lunches.

Especially the seventh recommendation can be discussed during the after lunch sessions. Regardless of how one structures these group meetings it is important to continue to facilitate these group meetings. There is enough support for the idea that organizational change needs to be done through group dialogue. This idea has its origins from the theoretical literature on the social construction of knowledge that speaks to the issue of how new knowledge is created in context by groups (Langley, et al., 1995; Nonaka, 1994 in: Kramer, et al., 2004). These groups facilitate the accumulation, articulation and codification of knowledge.

Through the process of knowledge articulation and codification, its transferability increases, making changes in other parts of the organization more likely. Project managers could play a larger role in organizing and structuring of these meetings, and making sure that actions are taken as a result of these meetings. This could also decrease the observed gap between the IPM managers and the advisors. Also there are indications that knowledge transfer does not happen in equally intensity between the IPM roles. Interviewees observed that within contract and technical management more is happening then in project control for example. An explanation for this that specifically contract management all share a context: the DBFM contract. This shared context makes it easier to transfer knowledge between projects.

## Continue Facilitating Group Dialogues

The group dialogue is an important factor in knowledge transfer; as it gives as platform to articulate, share and combine knowledge. Multiple sources have confirmed the importance of these meetings (Kramer, et al. 2004; Pan & Wang 2010; Enberg, 2012; Schindler & Eppler 2003). Leal-Rodríguez et al. (2014, p. 894/5) say that these social integration mechanisms could lower the barriers to information sharing while increasing the efficiency of assimilation and transformation capabilities. These meetings are however observed to be a "time consuming dialogue among its members". It seems that organizing more meetings would not solve the issue. Instead it is proposed to make these meetings more inclusive and interactive to assure the: "ongoing *collective process of constructing, articulating and redefining shared beliefs through the social interaction of organizational members*" (Enberg, 2012, p. 722). The outcomes of these meeting need to be retained in order to systematically compare its projects and document its most successful problem solving mechanisms. Furthermore, systematic documentation of mistakes and mishaps help to reduce project risk. In the long term systematic project learning enables the organization to develop project competencies that lead to sustainable change (Schindler & Eppler, 2003). The recommendations made for the group dialogue also go beyond the sender receiver principle often associated with knowledge transfer, but instead recognized the contextual and social nature of learning.

Both in the literature (Wiewiora, et al., 2009) and in this research time is an important barrier of knowledge transfer. This barrier cannot merely be fixed by allocating extra time for knowledge transfer activities, because time in projects is always limited due to their temporary nature. One way to go about this could be the incorporation of lessons learned in the project scope or budget. This also has the advantage that the gathering and transferring of these lessons becomes a priority, because it is now in the projects scope rather that a second tier objective.

The Lock Program makes considerable efforts in knowledge transfer and learning. At this point a lot of the structures of the lock program are geared towards knowledge transfer. Learning does occur but mostly higher in the organization and ad-hoc, but it has not attained a structural place in the Lock Program. This is concurrent with RWS documents (Rijkswaterstaat, 2014a). As was indicated by the Interviewees more knowledge is transferred on the IPM level. This might be one of the reasons that learning occurs at higher levels of abstraction, because on those levels more knowledge is transferred.

# 6 Discussion

One of the limitations of this study is that the research was done in just one project department in a governmental organization. The research was done in a single organization with a limited number of employees interviewed, this limits generalizability. Therefore, this study should be considered exploratory; as it is a first attempt to analyze knowledge transfer within a program.

In the framework of Zhao et al. (2015) and in other literature knowledge transfer is at the root of learning. There has to be sender and a receiver with the message going true some medium. Knowledge production, transfer and consumption become autonomous activities with the transfer of knowledge as a central activity for learning to occur. This approach relies heavily on storage retrieval and transfer of explicit knowledge that can be codified and stored in document based repositories. It also distinguishes between tacit and explicit knowledge. Tacit knowledge can be converted and into explicit knowledge to make it transferable (Hartman & Doreé, 2015). Although this view is unquestionably helpful in disseminating the process of communication and learning it does not take into account that knowledge is socially constructed. Learning does not just take place in the human mind, but instead is the product of social interaction during their day to day activities. In other words, emerges from collective actions that is enacted through the participation of individuals in social processes (Gherardi, 2000), in communities of practice (Brown & Duguid, 1991). Perhaps one can speak more of an exchange than a transfer of knowledge. The exchange of knowledge assumes a reciprocal process of knowledge. This paper supports the social interaction point of view by recommending a more interactive and inclusive organization of team meetings. Knowledge can then be collectively created and exchanged.

This paper has shown that a program can offer structures that can facilitate knowledge transfer. Furthermore, this paper builds on the framework of Zhao et al. (2015) and contributes that there are signs of interaction between factors. Further research needs to establish how each of the factors can influence each other and influence knowledge exchange. Based on Interviewees, project similarity for example has been mentioned in both the relationship and team capacity. This research shows that these factors are more fluid and can have interaction effects. Finally, a new perspective emerged from the interviews. This perspective is that within a program competition between projects can actually increase instead of decrease. Because project managers are working in close proximity with each other, with each other's "brothers and sister", competition might actually increase.

In the conceptual model it was assumed that the program now offers the project teams context and that the other factors influence this context as the proverbial glue that keeps the projects together. This model too, just as Zhao et al. (2015), assumes a rather technical approach in the flow of knowledge. First this thesis assumes some rather strict boundaries, such as the projects, program and advisors, seeing them as separate entities. In reality these entities are hardly strict and knowledge can flow between these entities. Secondly the progression of knowledge is set forth into three consecutive steps: first knowledge accumulated, then articulated and codified. At the point of codification knowledge becomes easier to transfer. However, knowledge rarely follows these steps in this particular order. Furthermore, team meetings are not the only places for the articulation of knowledge. This can happen at any time at any place between anyone. This model and this thesis do show the importance of group meetings, once again, as being a central platform of knowledge transfer.

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# Appendix

## Interview guide

### Introductie

Kennis delen tussen projecten, binnen het sluizen programma. Het gaat hierbij om verschillende onderwerpen: context, project/programma structuur, relaties tussen de teams etc. Doel is beter in kaart te brengen hoe het delen van kennis gaat binnen het programma, over de zojuist genoemde thema's en hoe deze een rol spelen. Dit zal moeten leiden tot aanbevelingen die het proces van kennis delen moet bevorderen.  Graag zou ik deze onderwerpen met u bespreken. Het interview zal worden opgenomen, maar alleen de onderzoeker heeft hier toegang tot de opnames. Dit gesprek is semi-gestructureerd, globaal zullen we beginnen op programma niveau en we zullen daar ook eindigen.

Kennis delen en leren zijn programma doelen, is het verschil tussen beiden duidelijk?

Vindt u dat deze onderwerpen voldoende aandacht krijgen? En waar blijkt dit uit?

### Project team context

- Bestaan er heldere structuren waarlangs kennis wordt gedeeld en lessen worden geleerd en welke zijn dit?
- Zijn er binnen jullie project specifieke personen voor de overdracht van kennis?
- In welke mate draagt de PIP bij aan de overdracht van kennis (levert of vraagt hij/zij de relevante kennis op?)
- Wordt het gestimuleerd aanwezig te zijn bij elkaars "kennis" en "lessons learned" sessies (en hoe wordt dit gestimuleerd?)
- In welke mate dragen de "after lunch" en andere team meetings bij aan de kennis overdracht? Wat wordt er met de gedeelde kennis gedaan?
- Hoe wordt het opgeslagen?
- Hoe wordt actie ondernomen?
- In welke mate bevorderend het programma de kennisoverdracht tussen projecten?
- Hoe draagt de project manager bij aan de overdracht van informatie?

### Relatie tussen projecten

Met welk project(en) deelt u de meeste kennis?

Heeft u daar ook de beste relatie mee (collegialiteit etc.), hangt er een vertrouwelijke sfeer?

- Hoe liggen de verhoudingen tussen de teams?
- In welke mate kennen jullie elkaar, zitten jullie in hetzelfde gebouw?
- Hoe zou je de communicatie met het andere team willen omschrijven (goed/slecht veel/ weinig contact)
- In die relatie, wordt er competitie ervaren met het andere teams?

### Capaciteit team (bron en ontvangend team)

In welke mate steunt dit team de kennis overdracht tussen projecten (zie je het nut en noodzaak in van kennis delen?)

Wanneer men kennis overdraagt aan een andere team :

- Wordt er nagedacht over wat het andere team nodig heeft?

- Hoe wordt er dan nagedacht over de context waarin het andere team zich verkeerd?
- Wat voor kanalen worden er gebruikt voor de overdracht van kennis ( ervaring/informatie)

Als men informatie ontvangt van een ander team:

- Wat kunt u zeggen over de bruikbaarheid van de informatie die u ontvangt van het andere projecten?
- Moet die informatie dan "vertaalt" worden aan de eigen context voordat het bruikbaar is?
- Leidt de overgedragen kennis tot oplossing/verheldering van het probleem(is de informatie die je vraagt ook de informatie die je krijgt)?
- Kan je een verklaring geven tussen  het verschil tussen vraag en aanbod van kennis?

## Project task context

**Project overeenkomsten** – wanneer ons project kennis overdraagt, maken beiden teams dan gebruik van:

- Van welke (software)tools wordt gebruik gemaakt bij het delen van kennis?
- Worden dezelfde proces stappen doorlopen?
- In welke mate is dit project vergelijkbaar met het overdragende team?
- Hoe kunt u dit project omschrijven in relatie tot de andere projecten (uniek/standaard)?

## Tijdurgentie

- In hoeverre beïnvloed de tijdsdruk de overdracht van kennis?
- Duurt het lang om kennis uit te wisselen met andere teams (voorbereiding etc.)?
- Als de druk hoog is, is bent u dan eerder geneigd kennis buiten het project te zoeken?

## Afronding

- Op welke schaal moet kennis delen worden belegd, programma of project niveau?
- Hoe kunnen processen van kennis delen en leren structureler worden opgenomen in het programma/project?
- Slotopmerking
- Zijn er nog zaken die niet aan bod zijn gekomen maar die u nog wel belangrijk vindt?