MASTER THESIS

Acceptance of standardized construction management processes

Project managers' acceptance in a change towards Standard Operating Procedures in construction consultancy firms

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Preface

This thesis is the result of the research I conducted at the University of Twente and represents the final step towards obtaining my MSc. degree in Construction Management and Engineering. I hope to apply the knowledge I have acquired in my future endeavours. I conducted this research in collaboration with Arcadis, and I would like to express my gratitude to Tjark Huisman and Iris Renkers, my company supervisors, for providing me with the opportunity, valuable advice, and support.

I would also like to extend my appreciation to my colleagues at Arcadis who made me feel at home and contributed to this research. Additionally, I am grateful to my University of Twente supervisors, Leentje Volker and Wilco Tijhuis, for their constructive criticism and the fruitful discussions we had throughout the thesis research.

Lastly, I want to express my heartfelt gratitude to my friends and family who supported me through both the ups and downs of this journey. I would like to dedicate this thesis to my late mother. I know she would be extremely proud of me as it was one of her wishes for me to complete a master's degree outside of Suriname.

Kevin Lo-Fo-Wong

Enschede, July 2023

Summary

Business process standardization (BPS) is crucial in achieving digital transformation and improving organizational performance, offering benefits such as streamlined processes, cost reduction, enhanced quality, process transparency, and better coordination. However, strict standardization can hinder innovation and improvisation. Cultural and individual factors, as well as organizational culture, play a role in the successful implementation of BPS. The case study focuses on Arcadis, a construction consultancy firm, and its efforts to standardize construction management processes through Standard Operating Procedures (SOPs). The research aims to understand the factors influencing project managers in accepting these changes and provides insights into behaviour change and recommendations for successful implementation.

Arcadis follows a current way of working where each project is accompanied by a project management plan (PMP) that combines client methods and Arcadis' own approach known as The Arcadis Way. To enhance project management consistency and performance, Arcadis has developed Standard Operating Procedures (SOPs) for project and program management that provide detailed guidance for project managers. The SOPs cover processes such as Planning & Scheduling, and Quality Management. The intention is for the SOPs to become the new way of working for project managers. The implementation of the SOPs requires a change in the way of working by project managers, leading to resistance from project managers. Cultural factors play a crucial role in fostering acceptance of knowledge management practices like SOPs. Project managers go through the Kübler-Ross grief cycle in iterative stages of the 3C (Contact, Contract, Conflict) model, where there are phases of positive and negative behaviour during the implementation process.

Interviews with project managers at Arcadis Netherlands identified barriers to accepting SOPs, including concerns about the extensive and time-consuming nature, limited decision-making freedom, potential loss of autonomy and job satisfaction, as well as communication and clarity issues. Project managers also highlighted issues within the SOPs related to Scheduling & Planning and Quality Management. The expert panel discussion emphasized the need for pragmatic and efficient changes in project managers' work processes to minimize barriers while realizing the benefits of SOPs.

Cultural and technological drivers play a significant role in project managers' acceptance of the change, with cultural aspects heavily influencing acceptance. Effective communication, decision-making authority, and recognition of the value of experience are identified as cultural drivers. Technological drivers include the recognition of standardization, allowing flexibility within the SOPs and involving project managers through consultation.

Understanding project managers' experiences during the implementation of SOPs using the Kübler-Ross grief cycle enables organizations in the construction industry to develop effective strategies to support them through the change process. Addressing the identified barriers and drivers creates an environment where project managers accept the new way of working in standardized construction project management processes.

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1. Introduction

Chapter 1 serves as the starting chapter for this research. Section 1.1 introduces the problem of the research. Subsequently, section 1.2 highlights the case study company. In section 1.3, the problem statement is provided. Furthermore, the boundaries are defined in section 1.4. Lastly, to assist readers in navigating the thesis, a reading guide is presented in section 1.5.

1.1 Problem introduction

The importance of Business Process Standardization (BPS) is increasing in practical applications (Goel, Bandara, & Gable, 2023). “Business Process Standardization (BPS) entails derivation of an enhanced and approved master process as a standard and unifying other process variants with that master process” (Goel, Bandara, & Gable, 2023, p. 17). Standardizing processes is a crucial requirement for initiatives that aim to achieve digital transformation. The construction industry's complex projects and the ever-changing economic markets have necessitated ongoing improvement in process management (Peponi, 2019). To stay competitive in a global context, large multinational companies consistently strive to enhance their performance by leveraging existing knowledge and avoiding common mistakes.

Process standardization is an effective method to enhance current practices, and organizations stand to benefit significantly from its implementation (Peponi, 2019). Business Process Standardization (BPS) has been extensively studied and proven to yield numerous benefits. These benefits include streamlined processes, as evidenced by research conducted by Romero et al. (2015) and improved business performance, as highlighted by (Münstermann, 2015) and Wüllenweber & Weitzel (2007). Process standardization enables organizations to avoid redundancies (Tregear, 2015), reduce costs, and enhance the quality of their products and services (Münstermann, Eckhardt, & Weitzel, 2010). It also promotes process transparency (Kettenbohrer, Beimborn, & Kloppenburg, 2013) and allows for the efficient utilization of processing time for value-adding activities (Münstermann, Eckhardt, & Weitzel, 2010). Moreover, standardized business processes facilitate better coordination across organizational boundaries and internal task handover points (Davenport, 2005) and ensure compliance with rules and regulations (Mahmoodzadeh, Jalaliniya, & Yazdi, 2009). In addition to these advantages, standardized business processes are crucial for driving innovative digital transformations such as robotic process automation (RPA) (Desai, 2020; Syed et al., 2020) and blockchain-based workflow management (Fridgen, Radszuwill, Urbach, & Utz, 2018). This has prompted substantial global investments in process standardization by companies seeking to optimize their operations (Münstermann & Weitzel, 2008; Afflerbach & Frank, 2016). With the increasing exchange of information and activities among various companies and business units, process standardization has become indispensable for global operating companies (Liu, Li, & Zhao, 2009). The benefits of process standardization extend to improved process performance, enhanced readiness to respond to regulatory changes, technical interchangeability, improved customer confidence, and the ability to maintain uniform information systems within organizations (Münstermann, Eckhardt, & Weitzel, 2010).

However, while standardization and routines optimize effectiveness under normal operating conditions, they may hinder innovation and improvisation when organizations face unanticipated circumstances or operate in new, unknown markets (Vogus & Welbourne, 2003; Gilson et al., 2005; Gibbs et. al, 2012). Imposing strict rules on processes can stifle innovation, reduce accountability, and harm overall performance (Trkman, 2010; Benner & Tushman, 2003; Hall & Johnson, 2009). Nonetheless, studies suggest that innovation and work standardization are not mutually exclusive but can actually complement each other (Kondo, 2000).

Moreover, the level of cultural differences within a national context also plays a significant role in determining the degree of process standardization (Ang & Massingham, 2007). The greater the cultural differences, the more challenging it becomes to transfer knowledge across cultures (Ang & Massingham, 2007). Furthermore, inter-firm collaborations are influenced by factors such as power distance, financial and legal independence of partners, and operational and cultural diversity, which affect the scope, structure, and performance of these collaborations (Romero et al., 2015). Personal differences among employees, including work experience, tacit knowledge, and personal preferences, can impact the success of process standardization initiatives (Romero et al., 2015; Schafermeyer et al., 2010; Tregear, 2015). Moreover, individual skills, competencies, and behaviours contribute to variations in task performance, influencing the standardization of business processes (Münstermann, 2010).

For construction consultancy firms operating globally, variations in standardization not only stem from differences in regulations but also from the frequency of interaction between individuals performing different tasks and their cultural backgrounds (Romero et al., 2015). Balancing the standardization of processes across functional and geographical structures with the need to accommodate local requirements poses a significant challenge known as the "standardization dilemma" (Tregear, 2015). Organizational culture, defined as the customary and traditional way of doing things within an organization, plays a vital role in improving organizational performance through business process change (Špundak, 2014). The influence of culture on the implementation of process standardization initiatives has been widely acknowledged (Davenport, 2005; Hall & Johnson, 2009; Špundak, 2014). Successful implementation of process standardization requires addressing cultural factors, such as individual values, beliefs, and attitudes towards change and standardization, to facilitate organizational change (Špundak, 2014; Tregear, 2015). Similarly, Polesie et al. (2009) indicate that construction managers freedom, value and motivation in their work should be considered in that standardization process. While process standardization is a powerful tool for driving organizational efficiency, effectiveness, and innovation, it poses challenges and requires careful consideration of cultural and individual factors of project managers. Therefore, this study aims to gain insight of barriers and drivers that influence project managers in accepting a new way of working during the implementation of standardized construction processes.

1.2 Case study company Arcadis

Construction companies undergo regular organizational changes at both the project and business levels (Erdogan, Anumba, Bouchlaghem, & Nielsen, 2005). To enhance performance and maintain operational excellence, these companies must consistently introduce initiatives that embrace new methodologies and technologies (Errida & Lotfi, 2021). Some of these initiatives include enhancing project management practices (Arefazar, Nazari, Hafezi, & Maghool, 2019), implementing lean construction principles (Bygballe, 2018), increasing digitalization (Won, Hwang, & Samion, 2022) and adopting building information modelling (BIM) (Liao & Teo, 2018; Alankarage, Chileshe, Rameezdeen, Edwards, & Samaraweera, 2023). According to Nguyen, et al. (2023), digital transformation is an unavoidable trend of the fourth industrial revolution. In today's rapidly changing landscape, it is crucial to upgrade in order to keep pace with technology trends. The constant development of technology and innovative advancements have not only transformed our environment but also improved our quality of life (Budayan & Okudan, 2022). In this dynamic society, standardizing the production of goods and services based solely on basic needs is no longer sufficient to meet customer expectations. Customers now expect enhanced service quality, faster construction processes, and technological innovations (Budayan & Okudan, 2022). As consumer behaviours evolve, the construction industry faces new challenges that companies must overcome to survive in the market (Budayan & Okudan, 2022). To address these challenges and stay competitive, businesses in the construction industry need to embrace digital transformation.

This includes implementing standardized and synchronized activities to adapt to the ever-changing technology trends (Nguyen, et al., 2023). By leveraging digital transformation strategies, construction companies can effectively navigate the evolving landscape and meet the demands of the modern market.

Arcadis, a construction consultancy firm that aims to align with the digital transformation initiatives described by Nguyen, et al. (2023) through their strategy for 2021-2023 (Arcadis, 2020b). This strategy involves a trajectory focused on standardizing, digitalizing, and automating construction management processes. Arcadis suggests that optimization, standardization, digitalization, and automation are key drivers of change in the construction consultancy industry (Arcadis Nederland, 2022). These changes require adjustments in the way projects are controlled, marketed, and managed, including the implementation of Standard Operating Procedures (SOPs) (Arcadis Nederland, 2022). However, within Arcadis, resistance from project managers is expected due to the organizational culture (Stuurop, 2022), which aligns with the findings in the literature of Špundak (2014) and Tregear (2015). Arcadis is a people-oriented organization and seeks to address individual behaviours of its employees. These intriguing developments provide sufficient grounds to select Arcadis as the case study company for this research.

“Arcadis is the world's leading company delivering sustainable design, engineering, and consultancy solutions for natural and built assets. They are dedicated to improving the quality of live, with more than 29,000 employees in over 70 countries. The solutions they develop address important societal challenges around resilience, places, and mobility. Leveraging data and technology, they have the capabilities and services to meet client demands driven by global trends such as urbanization, climate change, digitalization, evolving stakeholder expectations and potential unforeseeable events” (Arcadis, 2022a).

Arcadis is a consultancy firm that is currently in the process of standardizing and in the future digitizing processes through 21st Century Standard Operating Procedures (SOPs). Automation will be the step that follows. A standard operating procedure (SOP) refers to a collection of detailed guidelines established by an organization, intended to assist employees in executing intricate routine tasks (Awasthi & Grzybowska, 2019). The primary objective of SOPs is to enhance operational efficiency, ensure high-quality outcomes, and promote consistency in performance, while also mitigating issues related to miscommunication and non-compliance with industry standards and regulations.

The Arcadis 2021- 2023 strategy (2020b) sets out how they will maximize impact, which will go beyond the day-to-day tasks and into solving some of the world’s most pressing issues. Megatrends like digitalization, climate change, and societal expectations are impacting Arcadis and their clients everywhere. Through the transformation of their business, Arcadis is implementing a global approach that enables to accelerate knowledge exchange across markets, be faster to respond to internal and external client needs, and place sustainability at the heart of how they operate and what they offer (Arcadis, 2020b). Becoming a global business will take collaboration, sharing local expertise to harmonize best practices that improve client and people experience. All Arcadians will be engaged in efforts to simplify, standardize and then automating ways of working. Standard Operating Procedures (SOPs) will ensure that data and platforms are used to improve service delivery, business performance and employee experience, consistently across Global Business Areas and regions (Arcadis, 2020b). Among others, there will be less human error and risks, the way of working will be more efficient and employees will be globally employable.

The Standard Operating Procedures (SOPs) provide project managers with the step-by-step detailed explanation of the tasks, activities, and methodology required to perform the specified service to consistent high standards, aligned with current guidance from professional bodies and industry best practice (Arcadis, 2022d). The purpose of the SOPs is to set out the minimum required process for successfully delivering the scope of services that Arcadis is contracted to provide. This will ensure consistency of approach and awareness of best practice to support achieving objectives and delivering successful and sustainable outcomes (Arcadis, 2022d). Furthermore, the SOPs describe the minimum basic steps that must be complied with on all projects starting with the less complex projects. For more complex projects it may be necessary to go into more detail for each step. SOPs have been developed for the 22 most commonly used project and program management services. A list of these SOPs can be found in appendix A. Many of these SOPs were launched on the 7th of November 2022 and are ready to be used, but they are not being implemented yet in projects. Arcadis has implemented a change strategy to ensure a successful adoption of Standard Operating Procedures (SOPs) by project managers (Stuurop, 2023). The rollout is divided into three phases: preparation, management, and reinforcement. The change approach is built on five pillars (Arcadis, 2023b): effective communication and engagement, leadership drive and support, a champion network to motivate others, establishing a feedback mechanism, and providing opportunities for familiarization with the SOPs. These strategies aim to facilitate understanding, acceptance, and integration of the SOPs within the organization.

For this research, the SOPs on Planning & Scheduling and Quality Management have been chosen as they are key subjects within the field of study of Construction Management & Engineering. These SOPs are also relevant to the project control advisory group, which is a part of the mobility department of Arcadis where this research is being conducted. During the pre-implementation phase, interviews have been conducted with project managers to anticipate their behavioural changes during the implementation period of the two SOPs. Chapter 4.2 provides further elaboration on these SOPs. The implementation of the Standard Operating Procedures for Quality Management and Planning & Scheduling will be anticipated through interviews with project managers involved in various civil engineering programs. These programs are elaborated upon in appendix B.

1.3 Problem statement

While process standardization is recognized as a powerful tool for driving organizational efficiency, effectiveness, and innovation, its successful implementation in the construction industry faces challenges related to cultural and individual factors of project managers. Standardizing construction management processes will require changes in the way of working of project managers. However, this new way of working may lead to behavioural changes among project managers during the implementation of SOPs, potentially impacting their acceptance of the SOPs. Moreover, concerns about job security and the fear of automation taking over their roles in the future may arise among project managers. These factors can create resistance and hinder the smooth adoption of SOPs within construction consultancy firms. The anticipated behavioural changes among project managers may have detrimental effects on their work performance and client relationships. It is expected that their drive and enjoyment in managing projects will decrease, resulting in a less enthusiastic approach to their work. This can lead to delays, errors, and reduced work quality.

The primary goal of this research is to gain insight into the factors that influence project managers in accepting the new way of working during the implementation of process standardization in project management processes within construction consultancy firms. By addressing the barriers and drivers associated with construction process standardization and behaviour change of project managers, this research can provide valuable insights and recommendations for construction firms embarking on similar change journeys. The findings can contribute to the existing body of knowledge on managing process standardization initiatives, highlighting the importance of addressing behavioural factors to enhance the effectiveness of such initiatives.

1.4 Boundaries of the research

The research has been conducted at Arcadis Netherlands, focusing on the implementation of Standard Operating Procedures for Quality Management and Planning & Scheduling in different civil engineering programs. Moreover, the research is conducted in the pre-implementation phase of the SOPs. Finally, the study has explored the theoretical framework of behavioural change of project managers involved with programs, with the hypothesis that a cultural change (sum of the behavioural changes) within Arcadis is required for a successful SOP implementation.

1.5 Reading guide

The research structure of this thesis consists of seven distinct chapters, each contributing to the overall investigation and understanding of the research topic. Chapter 1 served as an introduction of the research. Chapter 2 focuses on the analysis of theories related to change management. Thereafter, the research methodology is delved into in chapter 3. Chapter 4 involves the analysis of the case study. Chapter 5 is dedicated to the discussion of the research findings, while chapter 6 presents the conclusions drawn from the research. Finally, chapter 7 provides recommendations.

2. Analysis of theories

Change management theories provide a framework and understanding of how individuals and organizations navigate and adapt to change. For this research, change management theories will help to explain the challenges and dynamics involved in introducing and implementing new processes and ways of working. Over the years, various change management theories have been developed. These theories can be divided into different categories, including organizational change management, change management within teams, behaviour change management of individuals, cultural change, and behaviour change management in projects. This chapter provides an overview of the different change management theories and highlights the theories that will be further utilized in this research, namely Alavi and Leidner's Knowledge Management System Theory (1999; 2001; 2009), the 3C-Model (Tijhuis, 1996; Tijhuis & Fellows, 2012) and the Kübler-Ross change model (Kübler-Ross, 1969; Kübler-Ross & Kessler, 2014).

2.1 Change management timeline

Change management theories have evolved over the years, and they can be categorized into different eras (Ratana, Raksmey, & Danut, 2020). These eras include Planned Change Management Theories (Pre-1990s), Emergent Theories (1990s), and Contemporary Theories. Planned Change Management Theories, developed before the 1990s, emphasize a deliberate and structured approach to change (Ratana, Raksmey, & Danut, 2020). These theories involve planned and predetermined goals and objectives. They often involve top-down decision-making, hierarchical structures, and a linear process of change. Emergent Theories, emerging in the 1990s, recognize that change can arise organically and unpredictably within organizations (Ratana, Raksmey, & Danut, 2020). They emphasize flexibility, adaptability, and learning. Emergent theories view change as a complex social process influenced by multiple factors such as individual behaviour, group dynamics, and organizational culture. Contemporary Theories reflect the evolving nature of change management and the challenges faced by organizations in the modern business environment (Ratana, Raksmey, & Danut, 2020). These theories often integrate elements from both planned and emergent perspectives. They recognize the dynamic and complex nature of change, the importance of employee engagement, and the role of leadership in fostering innovation and positive change. These categories provide a framework for understanding the development of change management theories over time. It's important to note that the boundaries between these categories are not rigid, and there can be overlap and evolution of theories (Ratana, Raksmey, & Danut, 2020). Contemporary theories may build upon or challenge earlier theories, incorporating new insights and approaches based on changing organizational dynamics and societal trends.

The above-described analysis of the change management theories in different eras is summarised in table 1.

Table 1. Analysis of change management theories adapted from Ratana, Raksmey, & Danut (2020).

Theories	Elements	Types	Process
Planned change management theories (pre-1990s) Taylor (1911) Juran (1920) Shewhart (1931) Lewin (1951)	- Human and strategy - Technology barely discussed	Planning has critical role	- Top-down - Top- manager level - Unfreezing, move and act, and refreezing
Emergent theories (1990s) Judson (1991) Kanter et al. (1992) Simsek and Louis (1994) Kotter (1996) Orlikowski (1996) Hamel (2000) Luecke (2003)	- Technology	Emergent	- Bottom-up - Front-line manager level - Process driven approach
Contemporary theories Gardner & Ash (2003) Wagner and Newell (2006) Anderson and Anderson (2011)	- Human - Technology - Strategy	Emergent, but planning not outdated	- Bottom-up - Middle manager level - The interdependence of human, technology and strategy - Open, flexible and practical strategy

In figure 1, the different theories are visually presented in a timeline, illustrating the development of change management practices in the context of management techniques and their applications (Ratana, Raksmey, & Danut, 2020).

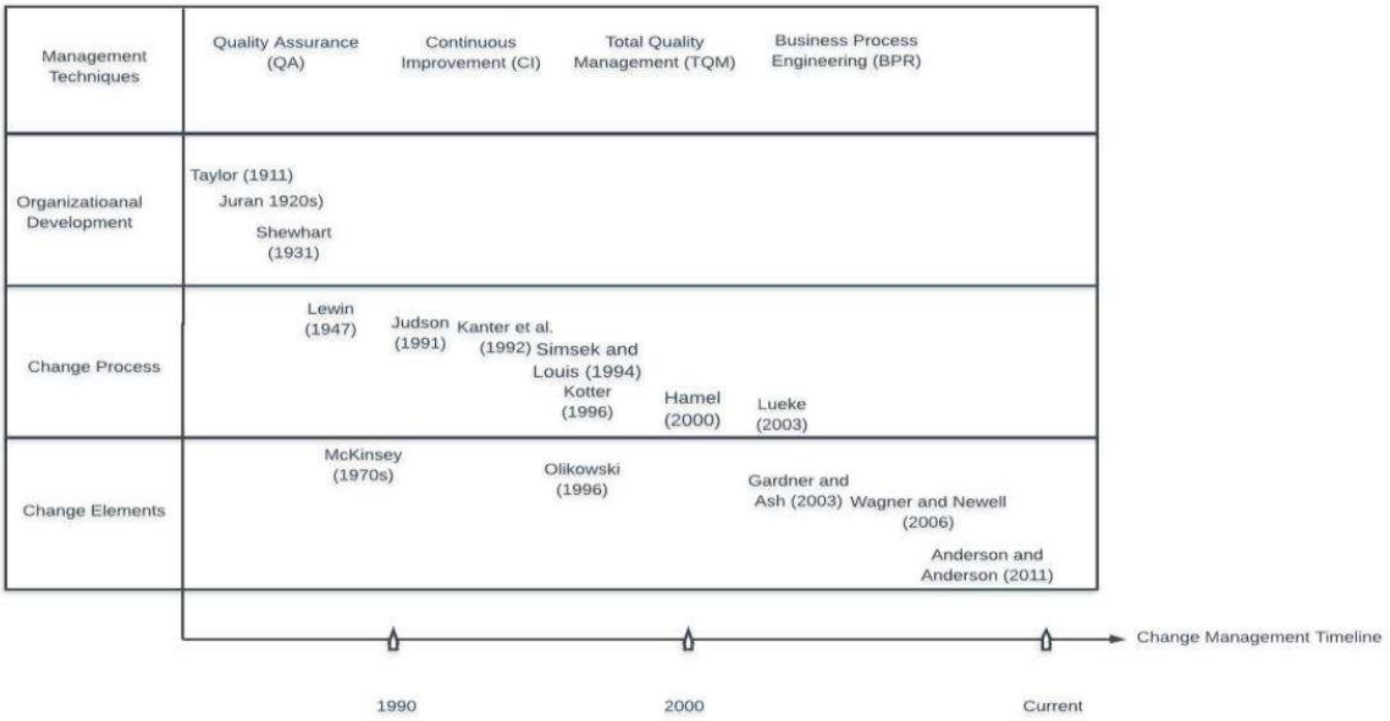


Figure 1. Change management timeline (Ratana, Raksmey, & Danut, 2020).

All of the aforementioned theories amply illustrate yet another noteworthy managerial component of change, not as an independent concept but rather as additional criteria for the development of a framework for change management (Ratana, Raksmey, & Danut, 2020). The only thing that separated them was that some were just more advanced than the others.

2.2 Change management categorization

Change management theories offer valuable insights and frameworks for organizations to navigate and facilitate successful change initiatives. These theories span various categories, each addressing specific dimensions of change management. This analysis will explore key change management theories categorized into organizational change management, change management within teams, behaviour change management of individuals, cultural change, and behaviour change management in projects. In the category of organizational change management, early theories such as Taylor's scientific management (1911) focused on improving efficiency through standardization and specialization. In contrast, Juran's quality management theory (1920) emphasized implementing quality control measures and continuous improvement. Additionally, Shewhart's statistical process control theory (1931) introduced statistical methods for quality control, while Lewin's three-step model (1951) provided a framework for managing planned change at the organizational level. Change Management within teams' theories delve into the dynamics of change within teams. Judson's social process theory (1991) highlights the importance of effective communication, collaboration, and leadership as key factors for successful change within teams. Similarly, Kanter et al.'s empowerment theory (1992) emphasizes empowering employees and involving them in decision-making processes. On the other hand, Simsek and Louis' leadership theory (1994) examines the impact of different leadership styles on managing change within teams.

Kotter's eight-step model (1996) offers a structured approach to change management, while Orlikowski's technology-driven change theory (1996) explores the role of technology adoption. Furthermore, Hamel's innovation theory (2000) focuses on fostering a culture of innovation within teams, and Luecke's change implementation theory (2003) provides insights into managing resistance and effectively implementing change.

Behaviour change management of individuals theories concentrate on understanding and facilitating behaviour change at the individual level. Gardner & Ash's leadership theory (2003) explores the role of leaders in influencing behaviour change, while Wagner and Newell's technology-driven change theory (2006) examines the impact of technology adoption on individual behaviour change. In a similar vein, Anderson and Anderson's positive change theory (2011) emphasizes the importance of positive reinforcement and motivation as drivers of individual behaviour change. Cultural change theories shed light on managing cultural change within organizations. Kübler Ross's stages of grief theory (1969), extended by Kübler-Ross & Kessler (2014), provides valuable insights into navigating and managing cultural shifts, including changes in values, beliefs, and norms.

Finally, behaviour change management in projects theories address behaviour change within the context of projects. The team development cycle (developed from Katzenbach & Smith, 1993 and Tuckman, 1965) explains the stages of team development and the role of behaviour change in project success. Similarly, Alavi and Leidner's Knowledge Management System Theory (1999; 2001; 2009) focuses on managing behaviour change during the implementation of Knowledge Management Systems. Moreover, Heifetz, Linsky, & Grashow's adaptive leadership theory (2009) emphasizes adaptive behaviour change in managing complex projects. Additionally, the ADKAR model of Prosci provides a framework for understanding and managing individual behaviour change in the project context (Hiatt, 2006). Finally, the 3C Model (Contact, Contract, Conflict) (Tijhuis, 1996) highlights the importance of contact, contract and conflict in managing behaviour change during projects. This research will focus on the change in the way of working within civil engineering programs (multiple projects grouped together). Furthermore, the focus will be on the behaviour change that project managers go through and the cultural change (sum of the behavioural changes) that is required for acceptance of the new way of working. Therefore, a deeper dive will be taken into the cultural change theories and behaviour change management in projects theories.

2.3 Cultural Change Theories: Kübler-Ross

A relevant model to analyse the behaviour of project managers and where they are from acceptance of the new way of working, is the Kübler-Ross model. In 1969, Kübler-Ross introduced the 5 stages of grief based on experiences with terminal ill patients. This model was adapted to include any form of personal loss (Kübler-Ross & Kessler, 2014). The Change Curve is a widely accepted model for the stages of change. It offers valuable insight in determining individuals' progress in their change process (Kübler-Ross & Kessler, 2014). It is a human and bottom-up approach which zooms in on human behaviour during change, and therefore is an addition to the contemporary theories mentioned in table 1. When an organization undergoes change, it disturbs the existing state and elicits various emotional reactions from employees, which can manifest as internal resistance to the change (Kübler-Ross & Kessler, 2014). The five stages of grief model or the Kübler-Ross model (1969) is a model that describes the emotions experienced by people who are grieving. This model, that is included in the Arcadis change manual (2020a), is used within Arcadis to manage the resistance of employees to change.

The stages of grief from denial to acceptance are illustrated in the Kübler-Ross grief cycle in figure 2 (Kübler-Ross, 1969).

Figure 2. Kübler-Ross grief cycle (Kübler-Ross, 1969).

The change curve that is portrayed in figure 3, is a popular model that is used to understand how employees will react to change. The change curve is based on the five stages of grief model described by Kübler-Ross (1969). Since then, the stages have been utilized and adapted into the Kübler-Ross change curve, which can be used to understand and follow the emotional response of people to significant change.

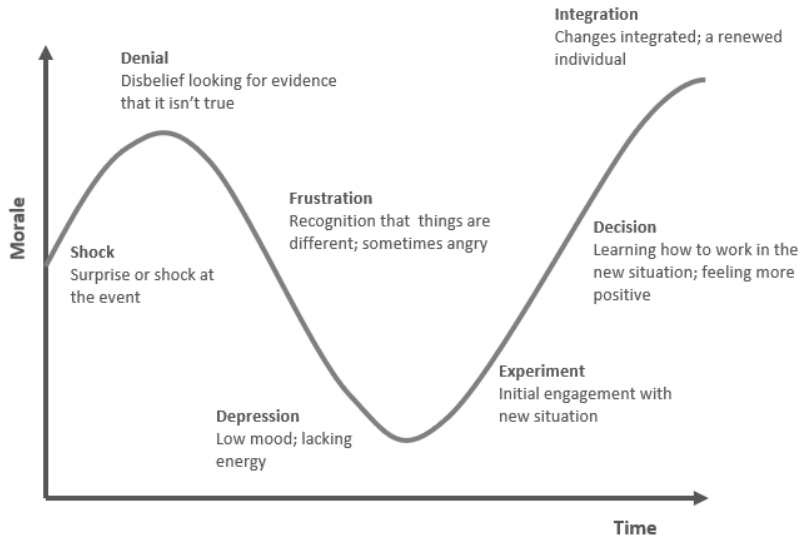


Figure 3. The Kübler-Ross change curve (Kübler-Ross, 1969).

The five stages of grief can be seen as a framework for understanding and managing the emotional reactions that individuals may go through during times of change (Kübler-Ross & Kessler, 2014). These stages can provide guidance on how individuals may respond to change, the emotions they may experience, and the process of adapting to a new reality. In the context of change management, the stages of grief can help leaders and change agents understand and empathize with the emotional journey of individuals affected by change. By recognizing and addressing the emotions associated with change, organizations can provide support, communicate effectively, and facilitate the change process (Kübler-Ross & Kessler, 2014). This can include allowing time for people to process their emotions, providing opportunities for dialogue and expression, and offering resources for coping and adjustment.

It is important to note that the stages of grief proposed by Kübler-Ross and Kessler are not linear or universally experienced by everyone (Kübler-Ross & Kessler, 2014). People may move through the stages in different orders, revisit certain stages, or experience additional emotions beyond the five stages. Therefore, it's crucial to approach change management with sensitivity, individualized support, and an understanding that each person's experience may be unique. While Kübler-Ross and Kessler's (2014) work primarily focuses on personal grief and loss, the principles of understanding and addressing emotions can be valuable in managing change and supporting individuals through change in organizational settings**.**

2.4 Behaviour Change Management in Projects Theories

Also relevant for this research is the behaviour change that project managers go through due to dynamics of the change in the way of working within civil engineering projects. In this section, the following behaviour change management theories used in projects will be described: the team development cycle (Winch, 2010), Alavi and Leidner's Knowledge Management System Theory (1999; 2001; 2009), Heifetz, Linsky, and Grashow's adaptive leadership theory (2009), the Prosci ADKAR Model (2006) and Tijhuis' 3C Model (Tijhuis, 1996; Tijhuis & Fellows, 2012).

2.4.1 Team development cycle

The first theory that will be described is the team development cycle. Project teams go through a certain cycle while they are learning to work as a team. This is illustrated in the four-phase cycle in figure 4. Personal interests come into play in the storming phase and group behaviour is established in the norming phase (Winch, 2010). Sometimes a pseudo team is created when a false consensus is achieved, hiding conflicts from the outside. So, it can also happen that individual group members do not show their true nature, where they first go along with the changes and yet later show dysfunctional behaviour because of a change in the way of working (Winch, 2010).

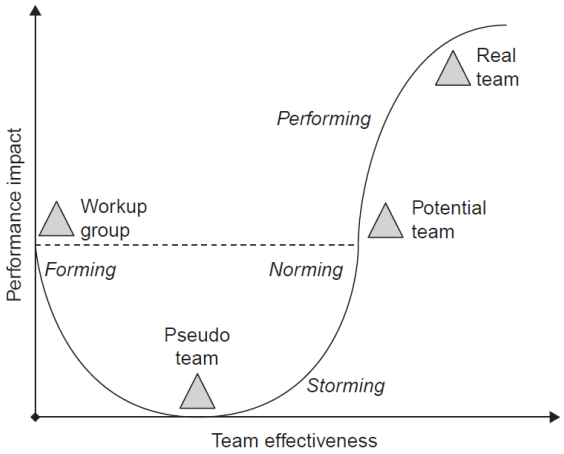


Figure 4. The team development cycle (Winch, 2010) developed from Katzenbach & Smith (1993) and Tuckman (1965).

2.4.2 Alavi and Leidner's Knowledge Management System Theory

Standard Operating Procedures (SOPs) can be considered as a type of Knowledge Management System (KMS), as they provide a documented and standardized way of sharing knowledge and best practices within an organization. However, implementing a KMS such as SOPs can bring about several challenges and issues (Alavi & Leidner, 1999). Some of these challenges include resistance to change from employees, difficulty in identifying and capturing tacit knowledge, and ensuring the accuracy and relevance of the knowledge being shared.

Additionally, there may be issues related to the integration of the KMS with existing systems and processes, as well as the need for ongoing maintenance and updates to ensure that the knowledge remains up-to-date and useful (Alavi & Leidner, 1999). Therefore, organizations should carefully plan and manage the implementation of a KMS such as SOPs, and ensure that they have the necessary resources and support in place to address any issues or challenges that may arise. This includes providing training and support to employees to ensure their buy-in and engagement in the process, and continuously monitoring and evaluating the effectiveness of the KMS to make any necessary adjustments.

According to Alavi and Leidner (2009), organizational culture plays a significant role in shaping employees' attitudes and behaviours towards knowledge sharing and management practices. They emphasize the importance of developing a culture that values knowledge sharing and collaboration, and supports the development and use of knowledge management systems such as SOPs. However, they also caution that implementing SOPs requires more than just developing and disseminating standardized procedures (Alavi & Leidner, 2009). It requires a cultural shift towards a more systematic and process-oriented approach to work, which may require significant changes to existing work practices and attitudes towards work (Alavi & Leidner, 2009). Therefore, they highlight the importance of understanding and addressing cultural factors when implementing knowledge management practices such as SOPs, in order to ensure their effectiveness and sustainability over the long term. According to Alavi and Leidner (1999; 2001; 2009), there are several strategies that can drive acceptance of KMS among individuals in organizations. These strategies include:

- Demonstrating benefits: Clearly communicate and demonstrate the benefits and value of the KMS to individuals. Highlight how the system can improve their work processes, enhance decision-making, save time, and increase productivity. Showing concrete examples and success stories can help individuals understand the positive impact of the KMS on their work.
- Addressing concerns: Identify and address individuals' concerns about the KMS implementation. Common concerns may include fear of technology, job security, privacy, or increased workload. Provide reassurance, clarify misconceptions, and emphasize the support and resources available to mitigate these concerns effectively.
- User involvement and participation: Involve end-users in the design and implementation of the KMS. Seek their input, feedback, and suggestions throughout the process. Involvement creates a sense of ownership and empowerment, making individuals more likely to accept and adopt the system.
- Offer training and education: Offer comprehensive training and educational programs to help individuals understand how to effectively use the KMS. Provide hands-on training, workshops, and user guides that cater to different skill levels. Empowering individuals with the necessary knowledge and skills increases their confidence and acceptance of the KMS.
- Ensure user-friendly interface: Ensure the KMS has a user-friendly interface that is intuitive, easy to navigate, and visually appealing. A well-designed interface reduces the learning curve and makes it more likely for individuals to embrace the system.
- Encouraging knowledge sharing: Emphasize the importance of knowledge sharing and collaboration facilitated by the KMS. Promote a culture that recognizes and rewards individuals for sharing their knowledge and expertise. Highlight the potential for personal and professional growth that comes from active participation in the KMS.

- Provide continuous support and improvement: Provide ongoing support for individuals using the KMS. Establish help desks, user communities, or forums where individuals can seek assistance, share experiences, and learn from each other. Actively listen to user feedback and continuously improve the system based on their needs and suggestions.
- Leadership support: Obtain support and endorsement from organizational leaders, including senior management and supervisors. When individuals see that leaders are actively engaged and supportive of the KMS, it can significantly influence their acceptance and adoption.

These strategies are aimed at driving individual acceptance of KMS by addressing their concerns, highlighting the benefits, involving them in the process, and providing the necessary support and resources. By applying these strategies, organizations can increase the likelihood of successful implementation and adoption of Knowledge Management Systems. It is essential to tailor these approaches to the specific organizational context, taking into account the unique challenges and characteristics of the organization and its workforce.

2.4.3 Heifetz, Linsky, and Grashow's adaptive leadership theory

The concept of organizational culture encompasses various aspects of behaviour within an organization. It encompasses a system of behavioural patterns, modes of cooperation, provides direction and meaning to actions, and serves as the foundation for acquired behaviour (Hendriks, 2004). Additionally, organizational culture contributes to stability within the organization, offering a sense of security to individuals while reducing uncertainty and fear. It facilitates both external adaptation and internal integration (Hendriks, 2004). In the face of changing conditions or unprecedented challenges, organizations must adapt to survive (Heifetz, Linsky, & Grashow, 2009). Adaptive leadership involves mobilizing people to confront problems that lack known solutions and thrive in the process. These challenges, known as adaptive challenges, possess certain characteristics (Heifetz, Linsky, & Grashow, 2009):

- Loss: Progress necessitates leaving behind old ways.
- Resistance: Change is met with resistance due to the fear of loss.
- Discomfort: Addressing adaptive challenges involves experimentation, iteration, failure, disorientation, and conflict, often requiring enduring discomfort for an extended period as the solution remains unknown.

2.4.4 Prosci ADKAR Model

The term "ADKAR" represents the five essential outcomes required for successful change: Awareness, Desire, Knowledge, Ability, and Reinforcement (Hiatt, 2006). The ADKAR Model is built on the premise that organizational change is only possible when individuals themselves undergo a change. By following the ADKAR Model, individuals are guided through the specific change process while addressing any obstacles, resistance, or barriers that may arise along the way (Hiatt, 2006). This model effectively tackles these challenges by providing leaders with appropriate strategies and tools, and individuals with the necessary information, motivation, and skills to navigate organizational changes successfully. By clearly outlining the objectives and desired outcomes of a successful change, the ADKAR Model enables leaders and change management teams to focus their efforts on driving individual change, thereby leading to organizational achievements (Hiatt, 2006).

2.4.5 *Tijhuis' 3C Model*

A management tool to research behavioural experiences in construction projects and processes is the 3C-Model, as a structuring framework to analyse personal relationships within construction processes as examples of business processes (Tijhuis & Fellows, 2012). In the 3C model that is portrayed in figure 5, the following three aspects and their interconnections are analysed (Tijhuis, 1996):

- Contact – culture
- Contract – project organization
- Conflict – technology

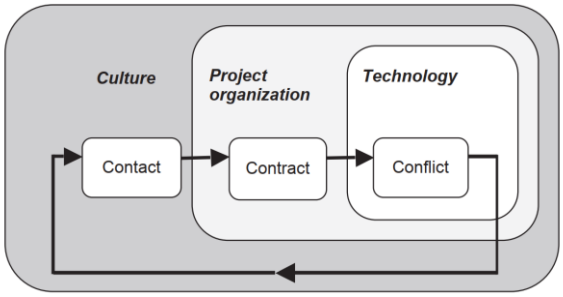


Figure 5. The 3C-Model as a framework for investigating (behavioural) experiences in construction processes (Tijhuis, 1996).

The three aspects Contact, Contract and Conflict together form the basis for the 3C-Model, where they are connected by a framework characterized as a continuous loop (Tijhuis & Fellows, 2012). In this possible repeating process, several behavioural experiences can be structured and analysed within construction processes. The 3C model is an analysis tool to capture moments of positive and negative behaviour per aspect in the continuous loop. The three aspects Contact, Contract and Conflict are related on the basis of levels of influence (Tijhuis & Fellows, 2012). In this model, culture (Contact) and technology (Conflict) are the main drivers for change of processes within project organizations (Contract). The drivers for change are illustrated in figure 6. The 3C-Model can be used to analyse case studies, where several differences of behaviour between the stakeholders involved, can be seen by focusing on critical incidents negatively influencing the progress of the construction processes (Tijhuis & Fellows, 2012). This shows what the influence is of business cultures and their representing human behaviour on daily (construction) processes.

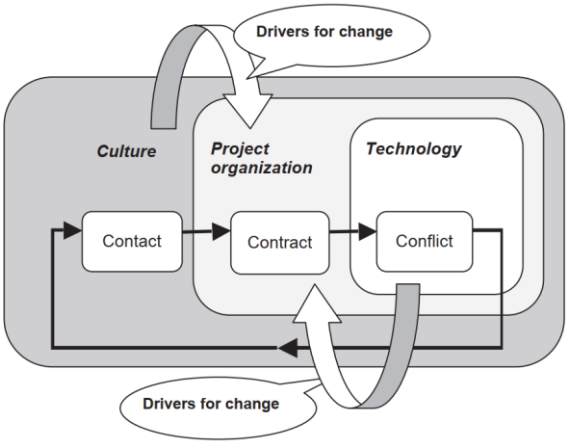


Figure 6. Culture (Contact) and technology (Conflict) as drivers for changing construction processes (Contract) within project organizations, based on the 3C-Model (Tijhuis & Fellows, 2012).

2.5 Theoretical framework

In this section, a theoretical framework will be developed to provide a conceptual set of theories that will guide the understanding and analysis in this research. One of the most relevant theories for this research is the Kübler-Ross theory, which will be used to explore behavioural change of project managers involved with civil engineering programs. Furthermore, the 3C-Model is important to research the behavioural experiences of project managers in the construction programs and construction processes in the iterative contact, contract and conflict stages. The 3C-model (Tijhuis, 1996; Tijhuis & Fellows, 2012) can be combined with the Kübler-Ross change curve (Kübler-Ross,1969; Kübler-Ross & Kessler, 2014) in one model, in which the positive and negative behaviour relative to change in each stage of the implementation of the SOPs coinciding with each moment of the continuous contact, contract and conflict loop can be captured. An illustration of this model is shown in figure 7.

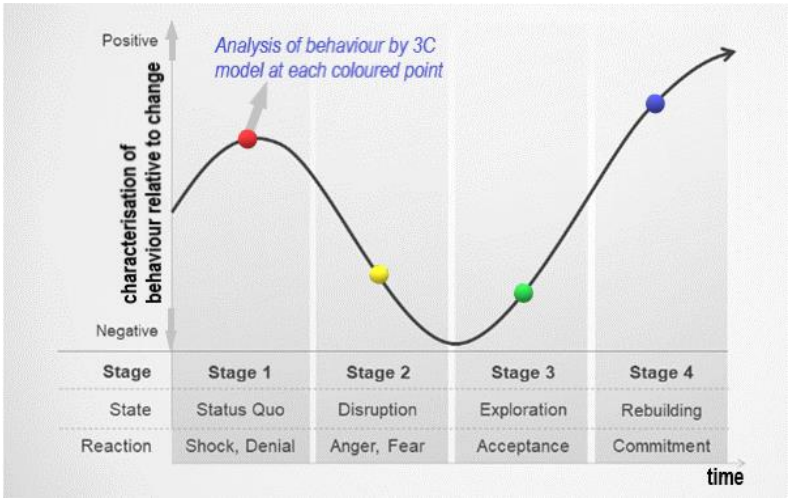


Figure 7. Characterization of behaviour in each stage of the SOP implementation, adapted from Kübler-Ross (1969) and (Tijhuis, 1996; Tijhuis & Fellows, 2012).

Also essential for this research is the Alavi and Leidner's Knowledge Management System Theory (1999; 2001; 2009) to identify the barriers and drivers of project managers in the process of adopting Knowledge Management Systems (KMS), where SOPs can be seen as a kind of KMS. The cultural and technological drivers for change can be illustrated in the 3C model. The model in figure 7 can be expanded by applying the cultural and technological drivers for change during the implementation of KMS (Alavi & Leidner, 1999; 2001; 2009), in the 3C model (Tijhuis, 1996; Tijhuis & Fellows, 2012). This is illustrated in figure 8.

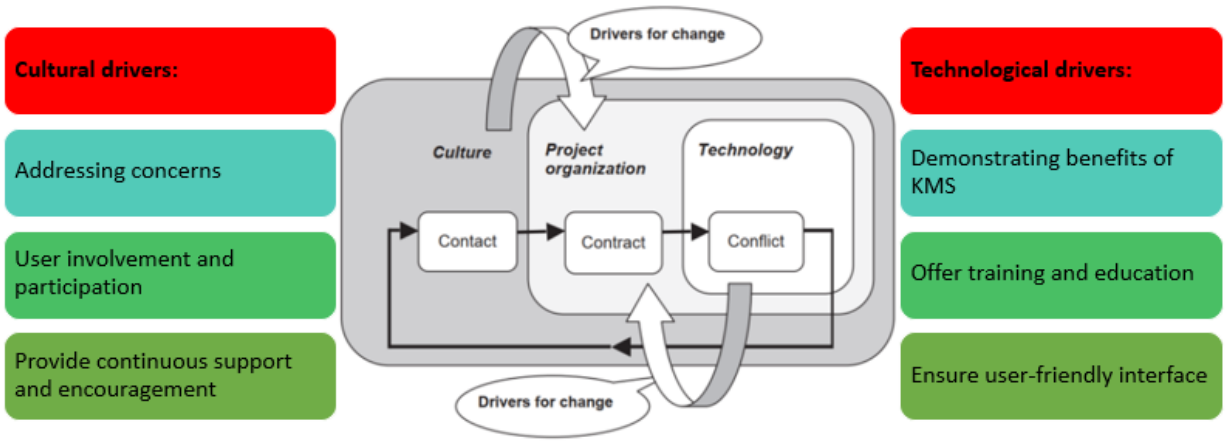


Figure 8. Drivers for change during the implementation of KMS, adapted from Alavi & Leidner (1999; 2001; 2009) and Tijhuis & Fellows (2012).

3. Research methodology

In this chapter, the research methodology will be described, which covers the research question and the research design.

3.1 Research question

The research focuses on acceptance by project managers of a new way of working in a change during the implementation of standardization of construction project management processes. Therefore, the following research question is posed:

What factors influence project managers' acceptance of a new way of working during the implementation of standardized construction project management processes?

In order to answer this question, the following sub-questions are posed:

1. What are the barriers for project managers to accepting a new way of working, being standardization of construction management processes?

- What are the barriers regarding employee behaviour during the change of implementing Knowledge Management Systems within organizations?
- What is the way of working of Planning & Scheduling and Quality Management before implementation of SOPs on these project management processes within Arcadis Netherlands?
- What is the new way of working based on the Planning & Scheduling and Quality Management SOPs within Arcadis Netherlands?
- How is it expected that project managers' behaviour will change during the implementation of SOPs within Arcadis Netherlands?
- What are the barriers that influence project managers' acceptance of the new way of working within Arcadis Netherlands?

2. What are the key drivers that motivate project managers to accept a new way of working during the implementation of standardized construction project management processes?

- What strategies have been effective in driving employees to acceptance of change within organizations?
- What are the drivers of employees during the change of implementing Knowledge Management Systems within organizations?
- What are the potential drivers that influence project managers' acceptance of the new way of working within Arcadis Netherlands?

3.2 Research design

In this section, the research design will be elaborated. The research has been a qualitative research to put the focus on getting a better understanding of the problem (Hartmann, 2017). The research consisted of the following four phases.

Phase 1: Literature review

The literature review consisted of the research of different change management theories categorized into organizational change management, change management within teams, behaviour change management of individuals, cultural change, and behaviour change management in projects. This study concentrated on the change in the way of working in civil engineering programs, specifically exploring the change in behaviour of project managers and the cultural adjustments necessary for embracing the new approach. Therefore, it was required to dive into literature related to cultural change (Kübler-Ross change model) and behaviour management within projects (3C-Model and KMS) to gain a deeper understanding of these phenomena. By doing research on these topics, the sub-questions about the barriers and drivers regarding employee behaviour during the implementation of KMS and project managers' behaviour change could be answered.

Phase 2: Data collection

The data collection was conducted within Arcadis Netherlands through three civil engineering programs. Arcadis Netherlands is used as a single case study, an approach "commonly used to better understand a complex phenomenon within its context" (Hartmann, 2017, p. 121). The three programs have been chosen based on the nature of the programs. The programs had to be various types of civil engineering programs. That is the reason why a rail, bridge and water project have been chosen, namely Program Bridges Quay Walls (PBK), Water Framework Directive South Netherlands (KRW-ZN), and Region Contract North (GCN). There were no other types of programs available, so these three programs have been chosen. For this research, the SOPs on Planning & Scheduling and Quality Management have been chosen as they are key subjects within the field of study of Construction Management & Engineering. These SOPs are also relevant to the project control advisory group, which is a part of the mobility department of Arcadis where this research is being conducted. First, the current Quality Management and Scheduling & Planning practices of the case studies have been determined out of project management plans of the programs. Then, the SOPs on Quality Management and Scheduling & Planning drafted by Arcadis have been studied to determine the new way of working of project managers. Thereafter, interviews have been conducted with 12 Arcadis Netherlands employees in different functions working in the three programs, performing construction project management tasks. Interviews are chosen to collect data, because "the use of interviews can help to gather valid and reliable data that are relevant to the research questions and objectives" (Saunders, Lewis, & Thornhill, 2009, p. 318). The different functions were the head of the advisory group, project managers, assistant project leaders, project control manager, and technical managers from three civil engineering programs of Arcadis. The idea behind this was to interview people in different functions and job levels divided into three to four people in each program. These employees have been called project managers in the rest of this study. The interviews were semi-structured interviews. The advantages of this type of interviews are that questions can be prepared in advance and further questions can be asked based on the answers (Saunders, Lewis, & Thornhill, 2009). A minimum of 9 to 17 employees had to be interviewed to reach saturation and thus, 12 interviews was a reasonable set of data (Hennink & Kaiser, 2022).The interviews have been conducted in the pre-implementation phase of the SOPs.

Out of the interviews, the current way of working of Quality Management and Scheduling & Planning in practice has been determined. Furthermore, the proposed new way of working in practice and the project managers' behaviour have been determined. The project managers have been asked to read the Quality Management and Scheduling & Planning SOPs in front of the interviews. During the interviews, a summary of the SOPs with the key steps were shown. The project managers were asked to imagine that they have to apply the SOPs for Quality Management and Planning & Scheduling into their program and to anticipate on their behaviour in the implementation phase of the SOPs. They were asked if applying the SOPs into their program was possible and what changes in their way of working had to be made. This highlighted the difference in the current and new way of working. Furthermore, they were asked how they would react and feel if they had to follow all steps in the SOPs, so their behaviour would be clear to the researcher. The interviews took one hour each, were conducted online via videoconference and were recorded and transcribed. Out of the transcriptions, various statements of the project managers, highlighting barriers and drivers were put into categories. Out of these categories, the most common and notable statements from the project managers were presented. "The categories are labels that have been used to group data, to organize and analyse the data further" (Saunders, Lewis, & Thornhill, 2009, p. 492). An elaboration of the interview protocol can be found in appendix C.

Phase 3: Expert panel validation

Out of the most notable and common interview statements, hypotheses have been developed. These have been presented in an expert panel discussion to validate the interview findings. An elaboration of the participants of the expert panel discussion including the hypotheses derived from the interviews with project managers is added in Appendix E. Expert validation is a form of content validity (Hyrkäs, Appelqvist-Schmidlechner, & Oksa, 2003). The expert panel discussion involved 7 experts from Arcadis. A separate session has been held with two other experts that could not attend the expert panel discussion. This number of experts have been chosen, because an expert panel typically consists of four to eight members (Saunders, Lewis, & Thornhill, 2009).The experts had expertise in change management, project management, SOPs, quality management and scheduling & planning. In the discussion, experts have given their opinions about the hypotheses. These opinions were recorded and compared with the results out of the interviews with the project managers.

Phase 4: Data analysis

In the data analysis phase, the findings out of the project management plans and interviews that have been validated, have been compared with the change management literature findings. A discussion has been conducted to compare the barriers and drivers experienced by project managers with the literature of the 3C model, the Kübler-Ross grief cycle and the literature on Knowledge Management Systems. Hereby, the Contact-Culture, Contract-Project Organization and Conflict-Technology phases in the 3C Model have been used whereby in the contact phase, the cultural context of the behaviour of project managers has been highlighted with the Kübler-Ross grief cycle and in the conflict-technology phase, the technology-driven context of the SOPs has been highlighted with the KMS theory. Eventually, a conclusion has been drawn of what factors influence project managers' acceptance of the SOPs and the research question has been answered. A flow chart is portrayed in figure 9, consisting of all the steps to be taken during this research.

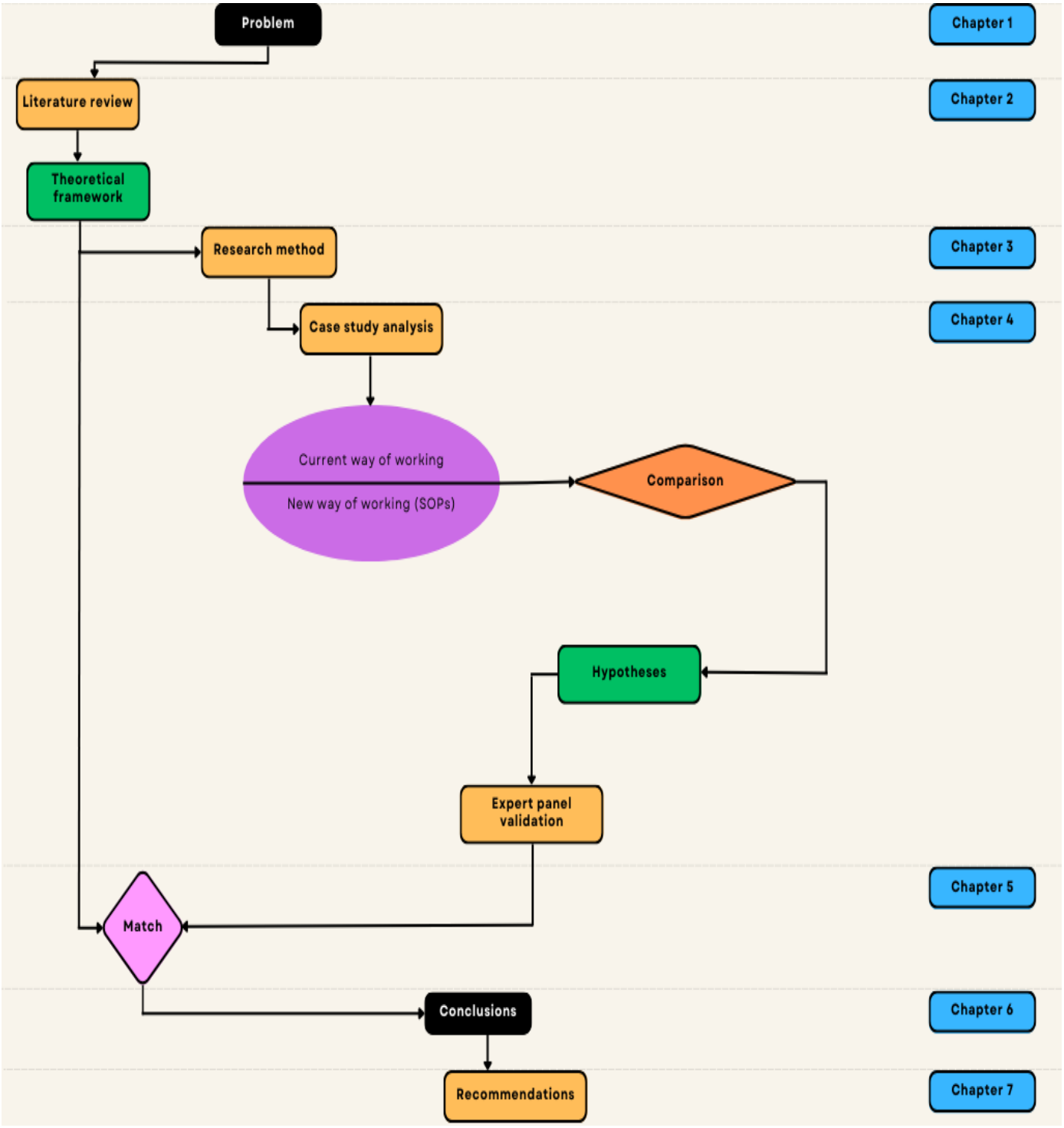


Figure 9. Research process flow chart.

4. Case Study Analysis

In this chapter, an analysis is conducted of the case study Arcadis. In paragraph 4.1, insight is given in the current way of working in the different civil engineering programs. Furthermore, there is elaborated upon the Planning & Scheduling and Quality Management SOPs in paragraph 4.2. The barriers and drivers of the project managers are summarized in paragraph 4.3. Finally, the findings are validated with the expert panel in paragraph 4.4.

4.1 Current way of working within projects

The current way of working within projects will be highlighted in this section. A project management plan (PMP) is prepared for each project, which includes the approach within the project. The approach is often based on the client's methods and systems, supplemented with those of Arcadis. Within Arcadis, The Arcadis Way is used, which generally describes what needs to be done and provides relevant information on how it should be done. The Arcadis Way follows the fit-to-size principle, where activities must be pragmatically carried out, tailored to the size or complexity of the project, and no procedures or activities should be skipped. Project managers have a sufficient degree of freedom and their own approach to procedures.

There are often deviations from the project management plan (PMP), which are made through a change process. However, the PMP is generally followed. The PMP is evaluated at least annually. The current approach according to The Arcadis Way and PMP is well received. Changes to the PMP are not seen as difficult, but they do take time to implement. Minor changes are agreed upon via email with the client and the project team and are not included as official changes in the PMP. For document delivery, a second reader principle is applied. In the following sections, the current way of working regarding planning and quality is discussed based on the project management plans of the three civil engineering programs.

4.1.1 Project Management Plan Programma Bruggen Kademuren (PBK) [Program Bridges Quay Walls] (Arcadis/Fugro, 2022)

The main agreements regarding quality management in the PBK program are that the project leader, together with the client, ensures the execution of the evaluation of the NOK (Further Agreement). The project leader of each work package is responsible for the execution of the evaluation and the assurance of best practices and lessons learned. A joint evaluation of the NOK must take place. The evaluation reports are documented through the client's SharePoint and the best practices and lessons learned are documented in an audit module in Systematic Assurance. Risk-based internal audits and evaluations are carried out periodically.

At the level of process management, project management, and project execution, the PDCA cycle is followed within the client as follows:

• Plan: drafting work package descriptions and the PMP. This describes and documents the processes within the project.

• Do: following the processes described in the work package descriptions and in the PMP.

• Check: conducting quality controls through integrated reviews, verification and validation processes, product release processes, and (internal) audits & evaluations.

• Act: making process and product improvements after quality controls.

In the Arcadis-Fugro bid document, a two-legged organization was proposed. In the acceleration lab, initiatives are developed to improve, accelerate, and innovate production. Only when an initiative has been sufficiently developed and the consequences for the production process are understood, it is implemented at a baseline moment in the production process.

4.1.2 Project Management Plan Gebiedscontract Noord (GCN) [Region Contract North] (Arcadis, 2023a)

The PMP for GCN is still under development and will mainly be drafted based on The Arcadis Way (Arcadis, 2017). The Work Breakdown Structure and planning, which have been re-planned in detail during the initiation phase, will be part of the project plan. The method for accepting changes in the planning will be determined in advance. Quality management is an essential part of the project plan. It ensures that a level of quality is delivered that is promised to the client and meets the standards in the construction industry. Quality management is divided into quality assurance (QA) and quality control (QC). Quality assurance is the process or set of processes to measure and ensure the quality of a particular product. It is process-oriented and focuses on error prevention (Arcadis, 2017). Quality control is the process in which it is verified whether our services and products meet the agreed requirements of the client and quality standards of Arcadis. It is product-oriented and focuses on identifying errors.

4.1.3 Project Management plan Kaderrichtlijn Water Zuid-Nederland (KRW-ZN) [Water Framework Directive South Netherlands] (Arcadis, 2022b)

The main goal of planning management in the KRW-ZN program is to control the activities of the contractor, client, and third parties involved in the project to achieve the project objectives. The contractor uses several planning forms and tools, including deterministic project planning, probabilistic project planning, planning notes, and product planning to manage the critical work activities related to achieving project objectives. Additionally, the KRW-ZN program has a well-defined quality management process to ensure the desired and required quality of processes and products. The compliance and effectiveness of the project management plan and associated plans are periodically audited by a non-project-related person. The results of these audits are reported to the project control manager, and any negative findings are treated as deviations and resolved accordingly. The project management plan is updated during the project's progress, especially when significant changes occur or at the start of a new phase. Suggestions for improvement, deviations, and changes are kept separately until they can be incorporated into the updated plan. Finally, the revised plan undergoes implementation and monitoring, similar to the original plan.

4.2 Standard Operating Procedures

In this section, the Standard Operating Procedures (SOPs) will be highlighted. Arcadis has developed Project and Programme Management Standard Operating Procedures. It is intended that in the near future, project managers will apply and integrate this standardization into the project management plans. The Standard Operating Procedures (SOPs) provide project managers with the step-by-step detailed explanation of the tasks, activities, and methodology required to perform the specified service to consistent high standards, aligned with current guidance from professional bodies and industry best practice (Bhageloe, Maddison, Galgoczy, & Minns, 2022). The SOPs describe the minimum basic steps that must be complied with on all projects; for more complex projects it may be necessary go into more detail for each step, and the contracted services may require additional steps described in other SOPs. These SOPs are subject to continuous review and improvement. The purpose of the SOPs is to set out the minimum required process for successfully delivering the scope of services that Arcadis is contracted to provide (Arcadis, 2020b). This will ensure consistency of approach and awareness of best practice to support achieving objectives and delivering successful and sustainable outcomes. SOPs are structured as global documents that describe the basic process steps which are mandatory to achieve a successful outcome.

These process steps are the same across every project or program of work regardless of scale or complexity. More complex projects will require more detail, less complex projects may rely on the basic steps described in these SOPs. In the next sections, the two chosen SOPs for further research will be described, namely the Planning & Scheduling SOP and the Quality Management SOP.

4.2.1 Planning and Scheduling SOP

In this section, the Planning and Scheduling SOP will be described. In the SOP is described that Planning and Scheduling is the process of defining what needs to be done and when, in order to optimize the information available to the project team and improve the likelihood of a successful project completion within the approved timeframe (Bhageloe, Maddison, Galgoczy, & Minns, 2022). Planning and scheduling activities are important inputs into the project management process, as they enable the program or project manager and other stakeholders to understand the optimum order in which the scope of work should be executed given the dependencies and various constraints affecting the project.

The Planning and Scheduling SOP includes the following sub-processes (Bhageloe, Maddison, Galgoczy, & Minns, 2022):

- Planning Process, to confirm scope and services are accurate, agreed with the client and align with the client requirements in the business case.
- Schedule management and control, to update the project current schedule at the end of every reporting period.
- Schedule change management, to assess the impact of any potential change to the project scope or services to the current schedule and Performance Measurement Baseline (PMB).
- Schedule integrity/quality, where a schedule integrity check shall be carried out on the creation of the PMB.
- Schedule close out, ensure that the current schedule is progressed to completion at the end of the project.

The key steps that should be followed according to the Scheduling and Planning SOP are shown in the key steps summary in figure 10.

Process Steps			Complexity
Level	Step	Process	green amber red
1		Project and Program Management	
2		Planning and Scheduling	
3	2.1	Planning Process	
4	2.1.1	Plan Project Scope & Services	
4	2.1.2	Create Work Breakdown Structure (WBS)	
4	2.1.3	Define activities	
4	2.1.4	Define Activity Sequencing (Logic)	
4	2.1.5	Estimate activity durations	
4	2.1.6	Cost Loading the WBS	
4	2.1.7	Schedule validation	
4	2.1.8	Set project baseline	
3	2.2	Schedule Management and Control	
4	2.2.1	Progressing the Current Schedule	
4	2.2.2	Confirming and Validating Progress information	
4	2.2.3	Reviewing the Updated Current Schedule	
4	2.2.4	Generate report and Publish update	
3	2.3	Schedule Change Management	
4	2.3.1	Analysis of scheduled change	
4	2.3.2	Schedule Change Decision	
3	2.4	Schedule Integrity/Quality	
4	2.4.1	Conduct integrity/quality checks	
3	2.5	Schedule Close out	
4	2.5.1.	Progress Schedule to completion	

Figure 10. Planning & Scheduling SOP key step summary.

4.2.2 Quality Management SOP

In this section, the Quality Management SOP will be described. In the SOP is described that Quality Management is the process that includes all activities to make sure that project deliveries (products and services) at least meet the client's requirements and quality standards of the contracting company, within the calculated costs and within the time schedule (Nijland, et al., 2022). It is all about reaching client satisfaction to get paid timely for the products and services provided and building sustainable client relations.

The Quality Management SOP includes the following Sub-Processes (Nijland, et al., 2022):

- Prepare quality management: define the fit to size quality management processes for the project based on the client's and Arcadis' quality standards and the projects risk assessment. Record those processes in a project quality plan (PQP) if a local quality management system (QMS) is not in place or not sufficient.
- Perform quality assurance: execute internal audits and evaluations according to the Project Quality Plan (PQP) or according the local QMS.

- Execute quality control: check the deliverables by appointed project team members to determine if they meet the quality standards as described in the PQP or according the local QMS.
- Perform quality reporting: report periodically to the client the predefined KPI's (Key Performance Indicators) captured in the PQP or to line management according the local QMS.
- Establish and monitor quality improvements: register non-conformities including determined corrective and preventive actions. Maintain the register until all issues are handled. Define and communicate best practices and lessons learned within the project and if relevant to the organization.
- Closing-out project: check if all non-conformities are handled satisfactory. Evaluate the project with the client and produce a final report.

The key steps that should be followed according to the Quality Management SOP are shown in the key steps summary in figure 11.

	Process Steps		Complexity
Level	Step	Process (the sources are hidding below the level 3)	green amber red
1		Project and Program Management	
2		Quality Management (Quality Assurance and Quality Control)	
3	2.1	Prepare Quality Management	
4	2.1.1	Define quality standards	
4	2.1.2	Identify related risks from project risk register	
4	2.1.3	Define quality management processes for project deliverables	
4	2.1.4	Determine document control process	
4	2.1.5	Determine quality assurance (QA) and quality control (QC)	
4	2.1.6	Determine quality report requirements	
4	2.1.7	Identify roles and responsibility for each task	
4	2.1.8	Create project quality plan (PQP)	
4	2.1.9	Validate PQP with client	
3	2.2	Perform Quality Assurance	
4	2.2.1	Determine internal audit program	
4	2.2.2	Prepare and execute audit	
4	2.2.3	Create report and process audit results	
4	2.2.4	Prepare and execute mid-term evaluation	
4	2.2.5	Create report and process mid-term evaluation results	
3	2.3	Execute Quality Control	
4	2.3.1	Maintain PQP	
4	2.3.2	Define products to be quality controlled	
4	2.3.3	Execute quality control and create report	
4	2.3.4	Evaluate quality control results	
3	2.4	Perform Quality Reporting	
4	2.4.1	Report on quality to client periodically	
3	2.5	Establisch And Monitor Quality Improvements	
4	2.5.1	Establish action register and non-conformances register	
4	2.5.2	Determine corrective and preventive actions	
4	2.5.3	Update action register and non-conformances register	
4	2.5.4	Monitor actions from action register and non-conformances register	
4	2.5.5	Identify best practices and lessons learned	
4	2.5.6	Define and submit best practices and lessons learned and report to business	
3	2.6	Closing-out Project	
4	2.6.1	Review register to ensure all activities are closed	
4	2.6.2	Evaluate with client	
4	2.6.3	Produce final report	

Figure 11. Quality Management SOP key step summary.

4.3 SOP barriers and drivers

In this section, the identified barriers and drivers of project managers regarding the SOP implementation will be discussed. During the interviews, project managers made the following common remarks about the SOPs in general, expressing their barriers for accepting the SOPs:

• Most project managers identify new or additional steps that should be added to the current process if the SOPs were implemented.

• Some project managers consider the extra steps to be unnecessary and time-consuming. They argue that the time required for these steps will also be budgeted. Customers will not agree because projects will become more expensive, especially if the new process is not required by the customer.

• Most project managers claim that it will not be very different but some adjustment to the current process will need to be made.

• Certain project managers may be annoyed by the new process because they feel that with this standard process, little room is left for project managers to make decisions based on their experience. They believe that project managers with practical experience can determine and feel how to carry out a certain activity or process themselves. They think that the SOPs are described in too much detail. Some suggest that with the subheadings of level 3 in the SOPs (2.1 through 2.6), the project manager could already do well. Project managers who cannot do this and need this list are deemed unsuitable. The SOPs are seen as a checklist, but when this checklist is completed, it does not mean that quality is guaranteed. Project managers with their experience should still be able to monitor risks. They can do that best by following their own feelings and intuition, without a checklist. Some project managers predict that some may even leave their job at Arcadis because their freedom and pleasure will be taken away from them in this way.

• According to project managers, it is possible to incorporate the SOPs into current project management plans because most of the basic elements of the SOPs are already applied. For most project managers, it is the extra detailed and administrative steps that will take a lot of time and effort. Therefore, many project managers will postpone changing their process for as long as possible. This way, they can ultimately use the improved versions of the SOPs and take lessons learned and tips from others. They would also observe the process of others and use their planning and quality management of projects as templates. This will help them spend less time changing to the new process. It would also help if a Dutch version of the SOPs could be introduced.

• Some project managers were hesitant when the SOPs were announced. One project manager stated that Arcadis is constantly innovating, and there is no end to it. Multiple project managers wonder how, in what way, and in what timeframe this change will take place. More and better communication is expected on this subject. Numerous general emails are sent within Arcadis, and the first announcement of the SOPs was hidden among these emails for many. Most general emails are not read by many project managers. The SOPs require further explanation, and providing as many templates and a Dutch version of the SOPs as possible will help most project managers.

• Certain project managers argue that the time spent on the new control and administrative steps that differ from the current process should be weighed against the amount of quality that will be delivered. These steps cost money, and it must be determined whether they will make more profit. Some project managers argue that projects will actually become more expensive, and customers will not choose them. Multiple project managers predict that customers will not be enthusiastic about this new process, especially since they claim that Arcadis already meets their quality requirements.

Furthermore, the project managers have identified several barriers within the Standard Operating Procedures (SOPs) related to Scheduling & Planning and Quality Management. These barriers include variations in terminology, redundancy in certain processes, inadequate documentation and validation, lack of internal audits and mid-term evaluations, incomplete reviews and closure of activities, limited emphasis on best practices and lessons learned, and absence of project evaluations and final reports. The full list of these barriers can be found in appendix D.

Only few project managers have identified drivers that can motivate them to accept the SOPs. The less experienced project managers have expressed that following the SOP steps will help them in their work, ensuring quality and efficiency. Some project managers have said that introducing templates and a Dutch version of the SOPs will motivate them to accept the SOPs. The majority of the project managers pointed out that further explanation of the SOPs is needed. They stated that better communication will help to understand the purpose and benefits of the SOPs.

4.4 Validation by expert panel

Out of the most notable and common interview statements of project managers, hypotheses have been developed. These have been used as a starting point in an expert panel discussion to validate the interview findings. An overview of these starting results is portrayed in table 2.

Table 2. Starting results

2.1.6 Cost loading only through Oracle. Not included in the WBS of the planning.
2.2 Schedule management & control and 2.3 Change Management done in one step.
2.1.8 Project Quality Plan briefly included in the PMP.
2.2.1 No Internal audits in small projects.
2.5.1 No updates necessary on action register and non-conformance register.
2.5.6 No need to write a lessons learned report.
2.6.1 No need to deliberately check all activities again to see if they are closed.
2.6.2. If the client does not require it, there is no need to evaluate the project.
2.6.3. No final report needs to be produced.
The introduction of SOPs takes away the freedom and pleasure of project managers.
The SOPs are too detailed. Up to level 3 (2.1 tm 2.6) already sufficient.
Extra steps, time-consuming. Projects will become more expensive.
Clients not enthusiastic about SOPs, do not want to pay more for increased quality.
In small and non-complex projects, SOPs do not contribute to quality and efficiency. SOPs too detailed and take too much time.
SOPs should be implemented pragmatically. SOPs create a false sense of assurance. Project manager himself has to ensure quality of the project.
Communication with the project managers needs to be stepped up. Initiate alternative ways of communication. Better input sought from PPM community.

In the remaining part of this section, the results of the expert panel discussion are presented. Expert 4 noted a potential misunderstanding regarding cost loading of Arcadis costs and project costs, as the Arcadis costs in Oracle are not the same as the project costs included in the WBS. Expert 4 clarified that if cost loading were to be implemented, it should be based on project costs. Expert 4 emphasized the need for a revision of this step of the Scheduling and Planning SOP, as cost loading the schedule was not intended for every project. The expert opinion suggests the need to revise step 2.1.6 of the Planning and Scheduling SOP, because cost loading is not required for every project. It is expected that the project managers will accept this revision, because the duplication of steps will be removed and cost loading is not always required.

Expert 3 disagreed with integrating schedule management and control with change management processes in the SOPs into a single step. Expert 3 emphasized the importance of understanding the nature of the change before considering its implications on the schedule and other factors. Treating schedule management and change management separately allows for timely and effective management of changes without being constrained by periodic schedule updates. This distinction should be communicated clearly during the implementation process to ensure client acceptance. The expert opinion highlights the significance of treating schedule management and change management as separate processes to ensure flexibility and effective change control. This is in contrast with the opinion of some project managers.

Expert 4 agreed with preparation of a separate Project Quality Plan for each project and its potential integration into the Project Management Plan (PMP), emphasizing the importance of a project quality plan. Expert 4 suggested that while a separate plan might be necessary for certain projects, it is not obligatory for every project. The quality plan can be included as a section within the project management plan, offering a more streamlined and integrated approach. The interpretation of "project" and project phases influences the need for individual plans, and flexibility should be considered based on specific project requirements. The expert opinion supports integrating the Project Quality Plan into the PMP, but highlights the need for flexibility in preparing project quality plans. Integrating the quality plan within the project management plan can streamline processes while considering project-specific requirements. This opinion aligns with the viewpoints expressed by the project managers who were interviewed.

Expert 5 suggested that conducting internal audits on small projects could be valuable with certain considerations. Expert 4 supported this viewpoint, emphasizing the importance of consistent quality assurance across all projects, regardless of their size. Expert 3 highlighted the correlation between project evaluation and internal audits, suggesting that project reviews could be considered a type of internal audit. The approach to internal audits should be tailored to specific program and project requirements, potentially utilizing less intensive methods such as quick surveys or questionnaires. The expert opinions advocate for conducting internal audits on small projects, considering the importance of consistent quality assurance. The approach to internal audits can be adjusted based on project requirements, utilizing methods such as quick surveys or questionnaires. The project managers expressed that internal audits are often not executed on small projects, but with the tools from the experts it seems possible to use methods that do not require a lot of time.

Expert 4 emphasized the advantages of maintaining action and non-conformance registers as a record of actions taken and lessons learned throughout the project. Expert 6 supported this viewpoint, highlighting the benefits of maintaining a centralized repository of actions and non-conformances. The use of registers facilitates knowledge sharing and continuous improvement, contributing to enhanced project performance.

The experts emphasize the benefits of maintaining action and non-conformance registers and the importance of this step, although the project managers do not agree that this step should be mandatory.

The experts unanimously disagreed with the statements that checking all activities at the end of the project and evaluating the project are unnecessary if the client does not require them. They stressed the importance of conducting a thorough closing process, evaluating the project, and producing a final report for internal purposes. Integrating relevant information from various SOPs into a comprehensive report helps in assessing project performance, identifying improvement areas, and enhancing future project outcomes. The experts disagree with the viewpoint of the project managers that the activities at the end of the project do not need to be checked and the project does not need to be evaluated.

The experts discussed the notion that the introduction of Standard Operating Procedures (SOPs) takes away the freedom and pleasure of project managers. They disagreed with this perspective, highlighting the benefits, and efficiency that SOPs can bring to project management. Expert 3 emphasized that SOPs provide guidance and support, making the work of project managers more efficient and relieving them of burdensome tasks. The same expert suggested that SOPs allow project managers to focus on the enjoyable aspects of their role by streamlining processes and delegating certain responsibilities to PMO assistants or project control managers. It has to be stressed that with the introduction of the SOPs, some freedom and pleasure of project managers will be taken away. Delegating certain responsibilities will only shift the problem to others. However, the guidance and support of the SOPs will be helpful and enjoyable as long as they are implemented in a flexible and pragmatic way.

It was acknowledged by the expert panel that some individuals perceive the SOPs, particularly up to level 3 (2.1 to 2.6), to be too detailed. However, it was also noted that new project managers or those with limited experience may benefit from the level of detail initially. As project managers become more familiar with the SOPs, certain elements could be streamlined or removed based on feedback and usage patterns. The goal is to strike a balance between providing the right amount of information without overwhelming users. The experts emphasized that the level of detail in the SOPs is necessary to provide a standardized framework for colleagues who may not have extensive experience or exposure to live projects. The SOPs serve as a reference point and guidance for consistent project management practices. The experts further emphasized that the SOPs were not intended to change the way project managers work but rather to promote consistency across the organization. Project managers are expected to utilize their expertise and experience to customize the SOPs according to specific project needs while demonstrating compliance with the provided guidelines. The experts highlighted the need for effective communication and a clear rollout strategy to address concerns and ensure clarity. It was recognized that the implementation and maintenance of the SOPs require continuous effort and integration into existing procedures and ways of working. The conclusion is that the experts acknowledged that the SOPs might be too detailed for experienced project managers, but that the right balance has to be sought. It has been expressed by the experts that the project managers can use their expertise to use the SOPs according to their project needs. However, it is indicated in the SOPs that all steps need to be followed. This causes a complete misunderstanding of what the intention of the SOPs is and needs to be clearly communicated with the project managers.

The expert panel discussed if the introduction of SOPs may lead to increased time consumption and higher project costs for project managers. It was pointed out that considering whether people were initially doing things the right way and if enough budget was allocated to the original project is important. The experts emphasized the trade-offs involved and highlighted the importance of using the information provided by the SOPs to improve client outcomes and project efficiency. While there may be a time impact, the experts believed it is a reasonable trade-off considering the benefits achieved. The experts stressed the need for smart implementation, such as consolidating registers and utilizing existing processes for multiple purposes. They emphasized the importance of effective planning to minimize rework throughout the project, ultimately leading to better results. This approach will require a change to a smarter way of working by project managers. It is important that these project managers understand this new approach, otherwise they will not accept this new way of working.

The project managers have expressed that clients would not be enthusiastic about the SOPs and would be unwilling to pay more for the anticipated increased quality. While there were differing opinions by the experts, it was argued that clients primarily care about service quality and cost, and the SOPs would improve quality without significantly increasing expenses. The experts emphasized the importance of effective communication of the SOPs' value to clients.

The panel discussed the applicability of SOPs to small and non-complex projects, raising concerns about the level of detail potentially consuming excessive time without contributing to quality and efficiency. It was emphasized that the intention is not to mandate a project management plan for every small project but rather to promote consistency while allowing for flexibility and authority in decision-making. The experts agreed that not every step in the SOPs should be followed literally, and flexibility and discretion should be exercised by project managers based on their expertise and specific project circumstances. The importance of having the necessary tools and plans while allowing project managers to choose the best path within the framework provided by the SOPs was highlighted. It is expected that allowing the pragmatic use of these SOPs will result in more acceptance by project managers.

Moreover, the experts discussed the topic of implementing the steps in the SOPs in a pragmatic manner. The panel agreed that not every step should be followed and ticked off literally, as the SOPs should not become a rigid checklist. The experts agreed with the project managers and emphasized that the expertise and creative problem-solving of the project manager play a crucial role in ensuring project success within the framework provided by the SOPs.

The expert panel expressed that there is a pressing need to enhance communication within the Arcadis Project and Program Management community (PPM community). The experts unanimously agreed that the purpose of the SOPs should be better communicated, requiring increased coordination and input from the community. They emphasized the urgency of finding alternative channels to effectively engage with the community and highlighted the importance of thoughtful and strategic communication methods to ensure that crucial information reaches the intended recipients in a more impactful and efficient manner. It is expected that by communicating the purpose and the way of implementation of the SOPs better, project managers will be accepting the SOPs more.

The conclusion is that the implementation of the SOPs does require some changes in the way of working by project managers, and that these changes can create barriers. However, it is necessary to implement these changes pragmatically and efficiently, so that it doesn't necessarily require more time compared to the old way of working. This will allow experiencing the numerous benefits of the SOPs while minimizing the barriers. The expert panel often disagrees with project managers who believe that certain steps can be skipped, and they emphasize that these steps actually contribute to efficiency and quality in the projects. However, these steps do not have to be extensive and time-consuming. Furthermore, expert 4 emphasized that the feedback that came out of the interviews was very helpful and that it will be included in the questions and answers section of the SOP website. The expert mentioned the need to make the SOPs more user-friendly, particularly by streamlining the introduction section, which often contains repetitive information across different SOPs. Finally, it has been noted that communication about the implementation of the SOPs needs to be improved, so that project managers understand what is expected of them and ultimately accepting the SOPs. In table 3 an overview of the revised results, based on the expert-panel's comments is added.

Table 3. Revised results

2.1.6 Revision of this SOP step is required. Cost loading should be based on project costs. Cost loading is not required in all projects.
Treat schedule management (2.2) and change management (2.3) as separate processes to ensure flexibility and effective change control.
2.1.8 Project Quality Plan can be integrated within the PMP. Separate PQP sometimes required.
2.2.1 Internal audits across all projects, regardless of their size, are required utilizing less intensive methods if needed.
2.5.1 Action register and non-conformance register need to be updated.
2.5.6 Lessons learned report is required.
2.6.1 All activities need to be checked if they are closed.
2.6.2. Project evaluation is always required.
2.6.3. A final report needs to be produced.
The lessons learned (2.5.6), closing process (2.6.1), project evaluation (2.6.2), final report (2.6.3) and other relevant information from various SOPs can be integrated into a comprehensive report and helps in assessing project performance, identifying improvement areas, and enhancing future project outcomes.
The introduction of SOPs takes away some freedom and pleasure of project managers. However, the guidance and support of the SOPs will be helpful and enjoyable as long as they are implemented in a flexible and pragmatic way.
The SOPs might be too detailed for experienced project managers, but the level of detail was needed to provide a standardized framework for project managers with less experience. Project managers can use their expertise to use the SOPs according to their project needs. However, all steps need to be followed.
The extra steps will not be time-consuming if the SOPs are implemented in a smart way. While there may be a time impact, it is a reasonable trade-off considering the benefits achieved.
Clients will accept the SOPs after effective communication of the SOPs' value. SOPs will improve quality without significantly increasing expenses.

SOPs contribute to quality and efficiency in small and non-complex projects if detail of the SOPs is tailored to specific project circumstances.
SOPs should be implemented pragmatically. SOPs create a false sense of assurance. Project manager himself has to ensure quality of the project within the framework provided by the SOPs.
Communication with the project managers needs to be stepped up. Initiate alternative ways of communication. Better input sought from PPM community.

5. Discussion

In this chapter, a discussion will be conducted to compare the barriers and drivers experienced by project managers with the literature of the 3C model (Tijhuis, 1996; Tijhuis & Fellows, 2012), the Kübler-Ross grief cycle (Kübler-Ross & Kessler, 2014), and the literature on Knowledge Management Systems (KMS) by Alavi and Leidner (1999; 2001; 2009). The following sections provide a breakdown of the results. The first three sections highlight the contact-culture, contract-project organization and conflict-technology aspects of the 3C model. Hereby, the discussion on the behaviour change of the project managers based on the Kübler-Ross grief cycle is incorporated in the contact-culture section and the discussion on the Knowledge Management System theory by Alavi and Leidner is incorporated in the conflict-technology section. Eventually, the behaviour characteristics of the 3C Model are coupled with the Kübler-Ross change model to provide an analysis of the behaviour of project managers in each stage of the Arcadis SOP implementation. The chapter is concluded with the identification of drivers for change of project managers' behaviour.

5.1 Contact-Culture

In this section, the contact-culture aspect of the 3C model will be addressed. According to the project managers who were interviewed, Arcadis' communication regarding the SOPs was insufficient and unclear. Some project managers did not even see the announcement via email, because they received too many general Arcadis emails and did not read them all. These project managers stated that email was not the best way to introduce the SOPs. Furthermore, some project managers feel that the SOPs limit their decision-making authority and hinder their ability to utilize their experience and intuition. They believe that project managers should have the flexibility to determine the best approach based on their practical knowledge. As a result, most project managers had a negative perception of the SOPs and exhibited resistance towards them. This negative perception translates to negative behaviour of project managers.

Behaviour change based on Kübler-Ross Grief Cycle

The project managers who were interviewed are in different stages of the Kübler-Ross grief cycle. There is still significant resistance towards the SOPs. The project managers stated that they are not against the SOPs, but they have difficulty with the way they are communicated, introduced, and the level of involvement and input of the people who will actually use the SOPs. Certain project managers may become irritated by the new steps and more administrative and control work, which is translated as anger in the grief cycle. One project manager initially claimed that the SOPs were no different from his current practices. However, after further explanation of the SOPs, he was against them. He gave short answers to questions and suddenly had less time for the interview. This is translated as denial by Kübler-Ross and Kessler (2014), pretending that there is no change while knowing that there will be a difference. Some project managers have already accepted the SOPs to some extent, because they want to use them as soon as possible to be done with the implementation process. They say that it will take some time to adjust to the SOPs, but prefer to start experimenting with them as soon as possible. Others would rather delay the implementation as much as possible and try to negotiate to modify the SOPs, indicating that they are bargaining and have not yet accepted the SOPs. Younger, less experienced project managers are generally happy with the SOPs and have received them well. They believe that the SOPs will help them with their daily tasks. Younger people are often more flexible and adapt quickly to new ways of working (Alavi & Leidner, 2009), which is translated as full acceptance by Kübler-Ross and Kessler (2014).

Further analysis can be made by looking at the different stages of the Kübler Ross grief cycle and how they relate to the behaviour of project managers towards the implementation of the SOPs (Kübler-Ross, 1969).

Denial: Some project managers are in denial and are pretending that the implementation of the SOPs will not affect them. They will claim that the SOPs are no different from their current practices, even though they know that there will be a change.

Anger: Other project managers will become angry or irritated by the new steps and the extra administrative and control work required by the SOPs. They will feel that their expertise and experience are not being taken into account, and that the SOPs limit their ability to make decisions based on their own intuition.

Bargaining: Some project managers will try to negotiate or bargain with the implementation team to modify the SOPs to better suit their needs or to delay the implementation as much as possible.

Depression: Project managers who are in the depression stage will feel overwhelmed by the amount of work required to implement the SOPs, or feel that they are being forced to change their ways of working without adequate support or resources.

Acceptance: Finally, some project managers will reach a stage of acceptance, where they acknowledge that the SOPs are necessary and are willing to make the necessary changes to their ways of working. They will see the benefits of the SOPs in terms of increased efficiency, consistency, and quality.

Understanding how project managers are experiencing the implementation of the SOPs through the lens of the Kübler Ross grief cycle can help Arcadis to develop strategies to support project managers through the change process. It is essential to recognize that not all project managers will progress through the stages of the grief cycle at the same pace or in the same way. Some may move quickly from denial to acceptance, while others may remain stuck in one stage for an extended period. By understanding the individual experiences of project managers, organizations can tailor their support and strategies accordingly. Providing clear and consistent communication about the reasons for the change and involving project managers in the development of the SOPs can help to reduce resistance and move project managers towards the acceptance stage.

The strategy that can be initiated is as follows:

- Acknowledge the emotional impact: Recognize project managers experience a range of emotions during the change process. Create a safe and supportive environment where the project managers can express their feelings and concerns.
- Communicate effectively: Provide clear and transparent communication about the change, addressing the reasons for the change, the expected impact, and the support available. This helps project managers understand the need for change and reduces feelings of uncertainty.
- Provide support and resources: Offer resources, training, and support systems to help project managers navigate the change. This can include providing training programs, coaching, or counselling services to address emotional concerns and build resilience.
- Empower and involve project managers: Involve project managers in the change process and decision-making whenever possible. This gives them a sense of control and ownership over the change, increasing their engagement and motivation.

- Celebrate milestones and successes: Recognize and celebrate achievements and milestones throughout the change journey. This fosters a positive environment, boosts morale, and reinforces the benefits of the change.

The change management strategy is visualized in figure 12.

Figure 12. Change management strategy.

5.2 Contract- project organization

In this section, the contract-project organization aspect of the 3C model will be highlighted. According to some of the project managers, the implementation of the new SOPs methodology will lead to changes in the project organization. The new approach is often described as time-consuming and unnecessary, resulting in negative behaviour of the project managers. They argue that the extra time required for these steps will increase project costs, which may not be accepted by customers. The perceived administrative burden of the SOPs is a significant concern. While project managers recognize the possibility of incorporating SOPs into current project management plans, they find the detailed and administrative steps to be time and effort intensive. They prefer to postpone the changes for as long as possible and learn from improved versions of the SOPs.

5.3 Conflict- technology

In this section, the conflict-technology aspect of the 3C model is discussed. The idea behind the SOPs is standardization, digitization, and ultimately automation. It is a technology-driven change (Directorate-General for Research and Innovation, 2021). The project managers are not against technology, but some of them want to retain the freedom to lead projects in their own way and to apply the SOPs pragmatically rather than literally. They feel that the level of standardization is too high due to the level of detail in the SOPs. They want to avoid the SOPs becoming checklists that do not necessarily contribute to the quality of the project. Their opinion is that individual interpretation and experience as a project manager remain necessary to lead projects correctly and ensure quality. There has been insufficient consultation with the end-users of the SOPs, resulting in resistance from project managers and the implementation of the SOPs being put on hold. This ultimately translates into negative behaviour of project managers.

The challenges and concerns raised by project managers in implementing SOPs are consistent with the issues identified in the literature on knowledge management systems (KMS) by Alavi and Leidner (1999; 2001; 2009). Specifically, the concerns about losing decision-making autonomy and the perception of the SOPs as a checklist reflect the potential cultural barriers to knowledge management identified by Alavi and Leidner (2009).

The authors argue that cultural factors such as power distance, uncertainty avoidance, and individualism can affect how knowledge is shared and used within organizations. In the case of SOPs, project managers may resist the standardized procedures, because they feel it limits their ability to use their own experience and intuition.

Additionally, the challenges of incorporating the new processes into existing project management plans and the need for clear communication and training reflect the implementation issues identified by Alavi and Leidner (1999). They highlight the importance of addressing the technical, organizational, and cultural issues that arise when implementing KMS, and emphasize the need for training and support to facilitate adoption. Firstly, Arcadis should foster a culture that values knowledge sharing, collaboration, and empowerment, addressing cultural factors like power distance, uncertainty avoidance, and individualism. This creates an environment where project managers feel comfortable to accept the SOPs. Secondly, clear communication of the purpose and benefits of the SOPs is essential. Project managers need to understand how SOPs enhance project outcomes, improve efficiency, and ensure quality. By emphasizing the advantages of standardized procedures and addressing concerns regarding decision-making autonomy, Arcadis can help project managers view SOPs as valuable tools rather than restrictive checklists. Thirdly, integrating new processes into existing project management plans can be a challenge. Arcadis should allow flexibility within SOPs to accommodate unique project requirements. This customization empowers project managers to adapt SOPs to specific circumstances while adhering to overarching guidelines, demonstrating that SOPs can be tailored to fit their needs.

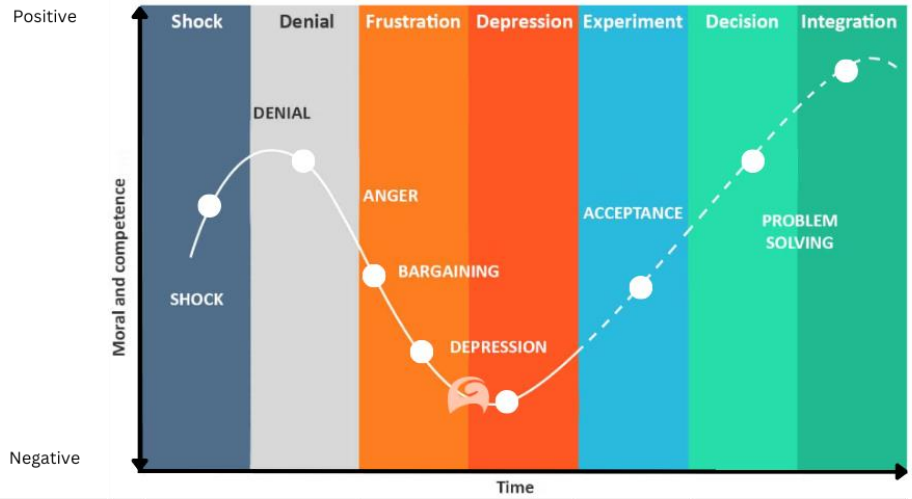
Lastly, comprehensive training programs and ongoing support are vital. Providing guidance on incorporating SOPs into work processes and addressing challenges or concerns facilitates acceptance among project managers. By offering training and support, Arcadis will enable project managers to understand and navigate SOPs effectively, ensuring their successful implementation. By addressing these implications, organizations can create an environment where project managers recognize the value of SOPs, understand how they fit within their work processes, and see the benefits of standardized procedures in improving project outcomes.

5.4 Analysis of project managers' behaviour

In this section, the behaviour of project managers in each stage of the Arcadis SOP implementation is analysed. Hereby, the stages of the SOP implementation are represented by the iterative stages of the 3C Model. Furthermore, the behaviour characteristics of this 3C Model are coupled with the Kübler-Ross change model.

The first stage of contact involved the announcement of the SOPs via email, stating that these SOPs should be applied in the projects. Many project managers were shocked by this announcement. This reaction was often followed by denial, where project managers refused to acknowledge the reality of the upcoming change from the status quo. In the next phase, the initial contract stage, the implementation of the SOPs should have begun in projects. However, the change was not accepted by project managers. The change has sunk in with the project managers, leading them to express feelings of fear, anger, frustration, and depression. Others are attempting to bargain and modify the changes according to their preferred methods of working. Currently, most project managers of Arcadis are still frustrated or depressed with the new way of working. The implementation of the SOPs in programs was halted after a lot of resistance from project managers, which resulted in a disruption of the implementation process. Therefore, it is determined that Arcadis is in the conflict stage of the SOP implementation. Because of the disruption, Arcadis developed an adoption strategy. Currently, business directors of Arcadis are being briefed about this strategy.

A prediction is made of the next stages of implementation of SOPs within Arcadis. In the second stage of contact, a renewed engagement with project managers will commence through improved communication and a more personalized approach. In doing so, the feelings of the project managers will be taken into account. Furthermore, there will be an opportunity to experiment with the SOPs in pilot projects, and training sessions will be provided to support project managers. Feedback from the project managers will be taken into consideration. The project managers will start getting accustomed to the SOPs, leading to the gradual acceptance of the SOPs. Ultimately, in the second contract stage, the SOPs will be globally implemented and integrated into the way of working, with the SOPs being embraced by project managers. In figure 13, the behaviour change of project managers of Arcadis is illustrated in the different stages of the implementation process of the SOPs. The Arcadis logo in figure 13 shows 'where Arcadis currently is' in the change process.



Stage	Contact 1	Contract 1 / Conflict 1	Contact 2	Contract 2
State	Status quo	Resistance / Disruption	Exploration	Rebuilding
Reaction	Shock, denial	Anger, fear, frustration, bargaining, depression	Experiment acceptance	Embracing, integration

Figure 13. Behaviour of project managers in each stage of the Arcadis SOP implementation, adapted from Kübler-Ross (1969) and Tijhuis (1996).

5.5 Drivers for change

In this section, the drivers for change of project managers' behaviour will be identified. Overall, the barriers of project managers identified in the interviews align with the 3C model, where culture (contact) and technology (conflict) are the primary drivers for change within project organizations (Tijhuis & Fellows, 2012). Furthermore, some cultural and technological drivers for change of project managers' behaviour during the implementation of SOPs are similar to the drivers for change during the implementation of Knowledge Management Systems (Alavi & Leidner, 1999; 2001; 2009). The cultural aspects, such as communication, decision-making authority, and the value of experience, heavily influence project managers' acceptance of the SOPs. The contact with project managers and their behaviour influences the implementation of the SOPs, and the way the project organization is structured. Poor communication leads to a poor reception of the purpose of the SOPs, and they will not be accepted.

Furthermore, it may be due to their behaviour that they postpone the use of the SOPs as long as possible. This proves that "soft aspects" of project management such as communication and trust are very important. The technology-driven change represented by the SOPs raises concerns about standardization, flexibility, and the need for consultation. That explains why introducing a new way of working will also change the project organization. This is where more of the hard aspects of project management come into play, such as the way in which planning and quality are managed in projects.

The drivers for change in the context of implementing SOPs can be categorized into cultural drivers and technological drivers. The cultural drivers include:

- Communication: Effective communication plays a crucial role in driving change. Clear and transparent communication about the need for change, the purpose of the SOPs, and the benefits they bring can motivate project managers to embrace the new way of working.
- Decision-making authority: Empowering project managers and involving them in the decision-making process regarding the implementation of SOPs can increase their acceptance. When project managers feel their input is valued and that they have a degree of control over the change, they are more likely to support it.
- Value of experience: Acknowledging and recognizing the expertise and experience of project managers is important. Project managers will be more accepting of the SOPs if they understand how their knowledge and experience can be integrated with the standardized procedures, rather than feeling that their expertise is being disregarded.

The technological drivers include:

- Standardization: SOPs are designed to bring consistency and standardization to project processes. Project managers may recognize the value of standardization in improving efficiency, reducing errors, and ensuring quality outcomes, which can drive their acceptance of the change.
- Flexibility: While standardization is important, allowing flexibility within the SOPs to accommodate project-specific requirements can facilitate acceptance. When project managers can customize and adapt the procedures to fit their unique project circumstances, they are more likely to embrace the change.
- Consultation: Involving project managers in the development and implementation of the SOPs through consultation and collaboration can increase their acceptance. When project managers have a voice and are part of the decision-making process, they are more likely to view the change positively.

The cultural and technological drivers for change of project managers' behaviour are displayed in figure 14.

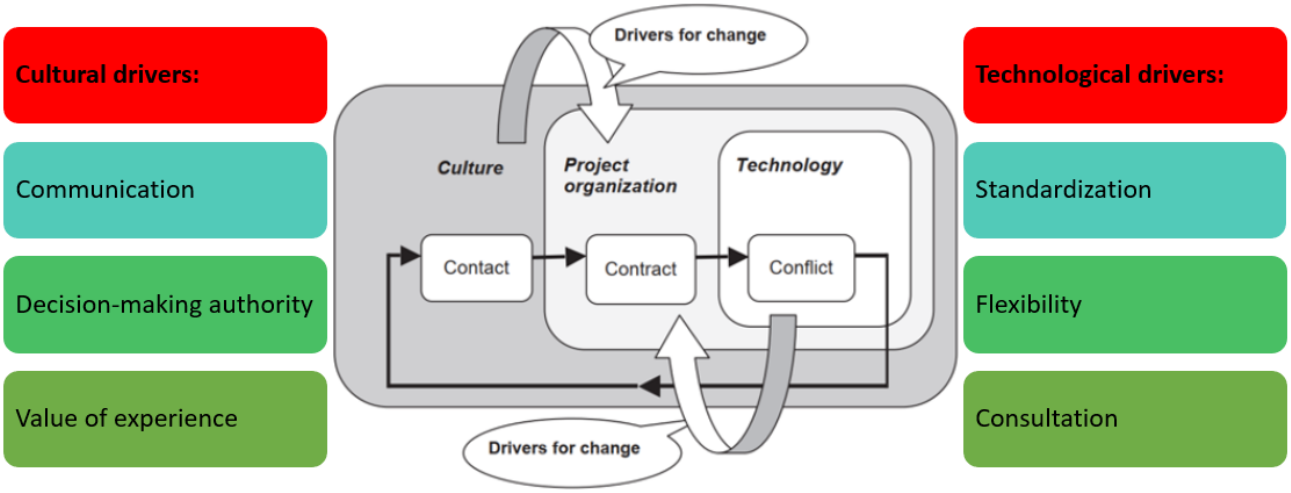


Figure 14. Drivers for change of project managers' behaviour, adapted from Tijhuis & Fellows (2012) and Alavi & Leidner (1999; 2001; 2009).

By addressing these drivers for change, organizations in the construction industry can foster acceptance of SOPs among project managers and create an environment where the new way of working is embraced. It has already been shown that the working method using SOPs does not differ much from the current way of working, but that adjustments in the way of working are needed, creating barriers for project managers. These barriers have an influence on the acceptance of the SOPs. The adjustments can sometimes be implemented in a pragmatic and smart way that requires less time. This is the case for small projects, for example, but not always. It has emerged that the level of detail in the SOPs is maintained and that all steps are actually required, which means that these technical barriers cannot always be reduced. The focus largely has to be on cultural aspects rather than technical aspects. It is more about the fact that changing the way of working is something that is not easily accepted by project managers, even if there are no big changes. It is mostly about the feeling that project managers have regarding the change and how it is communicated. However, it remains a combination of technical and cultural aspects, as the feeling of reduced freedom, for example, comes from having to work with a certain level of detail in the SOPs. Project managers often struggle with change, but they do not fully understand what that change entails. They go through the Kübler-Ross grief cycle in this process. Paying attention to the cultural drivers in particular, can influence project managers and drive them to accept the SOPs.

6. Conclusions

In this research, the factors influencing project managers' acceptance of a new way of working during the implementation of standardized construction project management processes have been identified. These factors have been divided in barriers and drivers. The implementation of the SOPs requires some changes in the way of working by project managers, and these changes create barriers for project managers. Project managers go through the Kübler-Ross grief cycle in iterative stages of the 3C model, where there are phases of positive and negative behaviour.

In the interviews conducted with project managers at Arcadis Netherlands, the following barriers to accepting Standard Operating Procedures (SOPs) were identified:

- Perceived extensive and time-consuming nature: Project managers viewed the SOPs as too detailed and time-consuming.
- Limited decision-making freedom: Project managers felt that standardization of processes left little room to make decisions based on their experience.
- Loss of autonomy and job satisfaction: Project managers anticipated that the SOPs would limit their freedom and pleasure in carrying out their tasks.
- Communication and clarity: There was a need for clearer communication regarding the implementation of SOPs.

The drivers for change of project managers' behaviour in the context of implementing SOPs can be categorized into cultural drivers and technological drivers. Cultural drivers heavily influence project managers' acceptance, whereas technological drivers play a significant role in driving acceptance.

The cultural drivers include:

- Communication: Effective, clear and transparent communication about the need for change, the purpose of the SOPs, and the benefits they bring.
- Decision-making authority: Empowering project managers and involving them in the decision-making process regarding the implementation of SOPs.
- Value of experience: Acknowledging and recognizing the expertise and experience of project managers.

The technological drivers include:

- Standardization: Project managers may recognize the value of standardization in improving efficiency and quality of project processes.
- Flexibility: Allowing flexibility within the SOPs to accommodate project-specific requirements.
- Consultation: Involving project managers in the development and implementation of the SOPs through consultation and collaboration.

Overall, addressing the identified barriers and drivers can create an environment where project managers accept the new way of working in standardized construction project management processes.

7. Recommendations

In this chapter, a set of recommendations for the case study company and other companies in the construction industry will be presented based on the findings and analysis of this master's thesis. Furthermore, the limitations of this research will be discussed, along with recommendations for future studies.

7.1 Recommendations for the company

The recommendations are that the SOPs should not be imposed on the project managers, but the introduction of the SOPs should be done on a personal level. It is recommended that project managers are actively involved in the pre-implementation process and given the opportunity to provide their input as much as possible. In the future, communication with project managers should be handled better, and it should be clearly explained why these SOPs are beneficial, what actually changes from the current project procedures, how these SOPs can be efficiently applied, and what the benefits are for project managers in implementing them. Furthermore, it is recommended that the following aspects are taken into account:

- Pragmatic implementation: Ensure that the SOPs are clear and discuss how and when they can be implemented pragmatically.
- Cultural focus: Emphasize cultural aspects rather than technical aspects when introducing SOPs. Pay attention to project managers' feelings about the change and how it is communicated. Foster a cultural shift towards a systematic and process-oriented approach to work.
- Address barriers: Address the barriers identified by project managers, such as the perceived time-consuming nature of the SOPs, limited decision-making freedom, and concerns about loss of autonomy and job satisfaction. Provide clearer communication, templates, and a Dutch version of the SOPs to aid understanding and acceptance.
- Demonstrate benefits: Clearly demonstrate the benefits of SOPs to project managers, including improved quality, efficiency, and adherence to client requirements. Highlight how SOPs contribute to project execution optimization and ensure client satisfaction.
- Involve and support project managers: Involve project managers in the development of SOPs and decision-making processes. Provide training, continuous support, and user-friendly SOPs. Encourage knowledge sharing and provide continuous support to drive acceptance.
- Leadership support: Gain leadership support for the implementation of SOPs. Leaders should emphasize the importance of SOPs, address concerns, and actively promote the benefits of the new way of working.
- Manage change: Recognize that project managers may go through the Kübler-Ross grief cycle during the implementation of SOPs. Understand their individual experiences and provide support accordingly. Acknowledge the emotional impact, celebrate milestones and successes, and create a supportive environment.
- Address cultural and technological drivers: Address cultural and technological drivers for change in project organizations. Improve communication, involve project managers in decision-making, and recognize their experience as important cultural drivers. Address technological drivers such as standardization, flexibility, and consultation to promote acceptance of SOPs.

7.2 Limitations and recommendations for further research

In this section, the limitations and recommendations for further research will be discussed. The research conducted for this master's thesis was limited to interviews with 12 project managers at Arcadis. To enhance the sample size, it is suggested to include a larger group of project managers for interviews. The interviews were conducted during the pre-implementation phase. To further expand the research, data collection can be extended to the implementation phase, allowing for the identification of barriers that may not have been previously identified during the pre-implementation phase.

Additionally, it is proposed to analyse the behaviour of project managers at different stages of the implementation phase and examine the changes they undergo using the Kübler-Ross change curve and 3C model. This analysis can provide insights into the behavioural patterns and adaptations of project managers during the implementation of the SOPs. Furthermore, an evaluation of the practical effectiveness of the change approach of the implementation of SOPs can be conducted.

For the validation of this research, an expert panel discussion was conducted involving 7 experts from Arcadis. However, two additional experts were unable to participate in the discussion and provided their input in separate sessions. To enhance the validity and comprehensiveness of the discussion, it is recommended to involve all experts in a single discussion session. This would enable the inclusion of the change manager's viewpoints, which would have enriched the discussion and would have further validated the findings.

Moreover, it is important to note that the interviews were exclusively conducted at Arcadis in the Netherlands. Consequently, project managers at Arcadis in other countries may encounter different barriers and drivers. Additionally, conducting similar research in other firms within the construction industry can help validate the barriers and drivers of standardization of construction management processes.

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Appendix A. SOP topics

Table 2. List of the 22 SOPs that will be implemented.

#	Topic
1	Planning & Scheduling
2	Risk management
3	Change Management
4	Scope Development
5	Performance & Management Reporting
6	Document Management
7	Governance
8	Document Control
9	Contract Administration
10	Stakeholder Engagement for Programs
11	Operational Readiness, Activation, and Transition
12	Project Close, Handover & Completion
13	Defects and Liability Management
14	Benefits Management
15	Quality Management
16	Resource Management
17	Design Management
18	Investment Assessment (business case development)
19	Program Leadership & Organization
20	Program Vision
21	Requirement Management
22	Issue Management

Appendix B. Civil engineering programs

Project managers of the following civil engineering programs of Arcadis have been interviewed and the project management plans of these programs have been studied. The programs are described below.

Programme renovation of bridges and quay walls Amsterdam

Framework agreement including three collaboration agreement partners (Arcadis-Fugro, Witteveen&Bos and Factor 020 = AnteaGroup + Tauw+ WSP). The objective is to carry out and accelerate work for replacement and renovation of bridges and quay walls in Amsterdam through intensive and close cooperation with collaboration agreement partners and Engineering company of the Municipality of Amsterdam. The scope includes approximately 800 bridges and 200 kilometres of quay walls.

Water Framework Guideline programme - Southern Netherlands

In 2000, the EU adopted the Water Framework Guideline (WFD). Because of this directive, EU member states are obliged to improve the quality of European waters and make them healthy according to set requirements. This means that the waters are clean according to standards and provide a suitable environment for the plants, fish and small water creatures that naturally belong there. The Maas too has to meet these agreements.

Over the past hundred and fifty years, the Maas changed from a freely meandering river downstream from Maasbracht to a canal-like waterway. Bends were cut to drain the water faster to the sea and for better navigability. Weirs and locks for shipping also appeared. The shores were defended with stone or gravel in the 1970s to prevent erosion of farmland. Shallow zones along the shores disappeared, while this is where the river's aquatic life takes place. This canal-like design caused many plant and animal species to decline in numbers or even disappear altogether.

Meanwhile, insights have changed. Flood safety, ecology, recreation and other functions go well together if you use the natural forces of the river in the right way. No longer going against the water, but moving with it. To this end, the 'DNA' of the Maas, the river's original characteristics, is now being looked at. With targeted measures, the authentic character will then be restored as much as possible. Shallow gullies will be created, floodplains will be lowered and filled, upriver arms will be re-excavated. Wherever possible, paving will be removed to create a more natural shore. Stream mouths that flow into the Maas will also be redesigned in collaboration with the water boards. The so-called morphological restoration also falls under the Water Framework Guideline. This means that normal river processes such as erosion and silting of the shores are given more room to shape the Maas landscape. Implementation of the improvement programmes started in 2009 and the Netherlands has until 2027 to implement the WFD improvement programme.

Prorail Region contract Northern Netherlands

Region North comprises the provinces of Friesland, Groningen, Drenthe and most of the province of Overijssel. The region also includes 75 stations, 936 km of track, 596 points, 1,331 signals, 22 movable bridges, too many level crossings and 2 traffic control stations (Groningen and Zwolle). Within this area, there are 2 performance-based maintenance contract areas 'Wadden' maintained by Strukton and 'Drenthe' maintained by Asset Rail. These form the basis for defining the area boundaries. Important corridors running through Noord are the lines Zwolle - Leeuwarden and Zwolle - Groningen as well as the international lines Groningen - Bremen and Emmen - Rheine. Noord is characterised by a solid input from 3 passenger carriers (NS, Arriva and Keolis) and the 4 provinces as regional concession holders.

These regional concessionaires invest in their own concession lines and, in order to achieve a better connection between the North and the Randstad, also co-finance adjustments to the main network. A key item for the future will include zero emission: replacing diesel trains with more sustainable variants.

The main technical policy topics for the coming years are:

- Replacing concrete with steel overhead wire portals and providing bridges without overhead wires with overhead wires for power supply purposes.
- Large-scale replacement of train safety detection based on service life and the roll-out of new safety system ERTMS on northern lines.
- Increasing safety at level crossings by removing or securing non-actively secured level crossings and improving road safety around level crossings.
- Future-proof overhaul of movable bridges, improve video monitoring for remote operation, implement new European regulations (Machinery and Work Equipment Directive) and draw up an integrated multi-year plan (construction, movement, remote operation and monitoring and pipelines & cables) movable bridges.
- Improve track technology by upgrading 1:9 switches in the main track to 1:15, phasing out wooden girders, improving the load-bearing capacity of embankments and putting drainage of railway yards in order.

Appendix C. Interviews

In total, 12 individuals have been interviewed with the following roles in the three programs:

1. **Program Bridges Quay Walls Amsterdam (PBK)**

- Project Manager
- Project Control Manager [1]
- Assistant Project Leader

2. **Water Framework Directive South Netherlands (KRW-ZN)**

- Acting Project Manager/Contract Manager
- Project Control Manager
- Assistant Project Leaders: 3 persons
- Technical Manager

3. **Region Contract North (GCN)**

- Head Advisory Group (HAG)
- Project Manager
- Project Control Manager
- Technical Manager

Interview Protocol

- Send the SOPs Quality Management and Planning & Scheduling beforehand and request the interviewee to review them.
- Introduction of myself and the interviewee.
- Introduction of the topic and the purpose of the interview.
- Explain that the interview is confidential and will be recorded for personal processing.

Interview Questionnaire

1. What is your role within this program, what does it entail, and how many years of experience do you have?
2. What is the current approach to Quality Management in this program?
3. What is the current approach to Planning & Scheduling in this program?
4. Is the project management plan strictly adhered to, or are there deviations? If so, what are they?
5. Which aspects of Q&M are not functioning according to the current approach, and are there any plans to do things differently or address them?
6. Which aspects of P&S are not functioning according to the current approach, and are there any plans to do things differently or address them?

[1] The same person serves as the Project Control Manager in both the PBK and KRW-ZN programs.

7. Have there been any changes to the project management plan?
8. How did you handle these changes? Did you find it challenging, and how did you feel about it?
9. Have you ever expressed these feelings to your line manager?

Imagine you have to implement the SOPs Quality Management and Planning & Scheduling in this program.

10. Are there any new steps you would need to add to your approach if you were to follow the SOPs Quality Management and Planning & Scheduling?
11. Do you consider these steps unnecessary or necessary, and why?
12. Can you mention specific planning and/or quality processes that would work differently when following the SOPs?
13. Would this change significantly affect you, and would you need to make many adjustments?
14. Could you find these changes frustrating, or do you see them more as a challenge?
15. Is it possible to incorporate the two SOPs into the current project management plan?
16. Are any parts or aspects of the two SOPs already being implemented in the project?
17. What was your initial reaction when you learned about the implementation of the SOPs? Were you surprised, hesitant, angry, or positive?
18. Do you find it challenging to transition to this new approach, and why?
19. Will you start using the SOPs as soon as possible in future projects, or will you postpone it as long as possible?
20. Do you think it will take a long time to adapt to the SOPs, or will it be easy?
21. What challenges do you anticipate when implementing the SOPs in similar projects?
22. Do you believe that implementing the SOPs will contribute to the progress of quality and efficiency in similar projects?
23. What would help or motivate you to better use the SOPs?

- Finally, ask if there are any further questions or comments.
- Thank the interviewee for their time and wish them success with the project.

Appendix D. SOP barriers

The following points from the SOPs Scheduling & Planning and Quality Management have been identified by some of the project managers that are different from their current way of working and would change the project organization.

Scheduling & Planning SOP

• 2.1 The name of “The pursuit” in The Arcadis Way differs from “Planning Process” in the SOP.

• 2.1.6 Cost loading does not take place in the project WBS, but the costs are placed in Oracle WBS. Including both is perceived as unnecessary and redundant by project managers.

• 2.3 Change Management is usually done in one step with 2.2 (Scheduling Management and Control). These two processes are split in the SOPs, which is seen as redundant. In projects, some project managers pragmatically perform these steps simultaneously in one step, rather than separately.

• 2.4 This step is not always well understood. It is believed that quality and integrity checks should be included in the contract planning. This step actually refers to quality and integrity checks of the planning itself that need to be performed.

Quality Management SOP

• 2.1.8 Usually, no separate Project Quality Plan (PQP) is prepared. A section of often only one page on quality management is included in the PMP. This is still too little to be considered a PQP.

• 2.1.9 Quality plans are not always validated with the customer.

• 2.2 On small projects, no quality assurance is performed through internal audits.

• 2.2.1 No internal audits are performed on small projects. However, random audits are carried out on certain projects within Arcadis.

• 2.2.4 No mid-term evaluation is performed.

• 2.5.1 The action register and non-conformance register are not always kept up to date. This is seen as unnecessary administration.

• 2.5.5 Identify best practices and lessons learned. Usually not done consciously. Usually, little attention is paid to it.

• 2.5.6 Usually, no separate report is written with the lessons learned.

• 2.6.1 Often, not all activities are consciously reviewed to see if they are closed.

• 2.6.2 Often, there is no evaluation of the project if the customer does not require it.

• 2.6.3 Therefore, no final report is produced.

Appendix E. Expert panel discussion SOPs

The expert panel discussion has taken place via Teams on the 17th of April and took 1,5 hours. The researcher Kevin Lo-Fo-Wong was the moderator in this discussion and gave a presentation of the barriers and drivers of the project managers that were interviewed.

Experts

The following experts have participated in the expert panel discussion:

Expert 1. Project Manager Project & Program Management SOPs/ Head Advisory Group Project Control.

Expert 2. Service Lead/Director Project & Program Management Mobility Netherlands.

Expert 3. Operations Director Mobility Netherlands.

Expert 4. Service Lead Places UK & Ireland/ Driver SOPs.

Expert 5. Subject Matter Expert Quality.

Expert 6. Subject Matter Expert SOPs

Expert 7. Subject Matter Expert Planning & Scheduling.

The two following experts could not join the expert panel discussion, but gave their insights in a separate session:

Expert 8. Subject Matter Expert Change management / Knowledge Management Systems.

Expert 9. Global Change Director.

Hypotheses

From the findings of the interviews, hypotheses have been formulated. The following hypotheses were presented to the expert panel and formed the basis for the discussion:

- 2.1.6 Cost loading should only go through Oracle and does not need to be included in the WBS of the planning. Otherwise, it will be unnecessarily duplicated.
- 2.2 Schedule management & control and 2.3 Change Management should be done in one step. These 2 processes are split in the SOPs and this is unnecessary. In projects, these steps should be handled pragmatically by doing them in one step at a time and not separately.
- 2.1.8 A separate Project Quality Plan should not be prepared for each project, but can be briefly included on one sheet in the PMP.
- 2.2.1 Internal audits should not be conducted on small projects.
- 2.5.1 The action register and non-conformance register do not always need to be updated, especially not on small projects. It creates unnecessary administration.
- 2.5.6 There is no need to write a lessons learned report.
- 2.6.1 At the end of the project, there is no need to deliberately check all activities again to see if they are closed. The project manager is well aware that everything is closed.
- 2.6.2. If the client does not require it, there is no need to evaluate the project.
- 2.6.3. Then, also no final report needs to be produced.
- The introduction of SOPs takes away the freedom and pleasure of project managers.

- The SOPs are too detailed. Up to level 3 (2.1 tm 2.6) would already be sufficient.
- The extra steps identified by project managers will be time-consuming. Certain processes will take more time and projects will become more expensive as a result.
- Clients will not be enthusiastic about the SOPs and will not want to pay more for the intended increased quality the SOPs will deliver, because Arcadis already meet their requirements.
- Especially in small and non-complex projects, the SOPs do not contribute to quality and efficiency in projects, as the SOPs are too detailed for this purpose and take too much time in small projects.
- The steps in the SOPs should be implemented pragmatically. Not every step should be followed and ticked off literally. The SOPs should not become a checklist. When all the steps in the SOPs are followed through, quality in the project is not guaranteed. It creates a false sense of assurance. The project manager himself has the experience to interpret the way to perform a certain activity or process and can therefore best ensure the quality of the project.
- Communication with the project managers within Arcadis (Project and Program Management community) needs to be stepped up and the purpose of the SOPs needs to be better communicated. Better coordination and input should be sought from the PPM community. Too much irrelevant mail is sent within Arcadis, which means that important mail gets overshadowed and not read. As a result, e-mails about SOPs, for example, are not read. There must be another way to communicate with the PPM community about this than via e-mail.