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The role of a supplier in the implementation of a new software system in the AEC sector

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Abstract

The rapid development in technology ensures that companies are increasingly working digitally. These changes in a company may cause problems or the new way of working may not be accepted. The purpose of this research is to find out how the supplier of new software application technology can help customers to successfully make this transition. This research focuses on the construction sector and is being carried out at the Van Meijel Automatisering company.

An online survey was used to collect both qualitative and quantitative data among users of Metacom Online a Van Meijel application. The survey is administered to two different target groups. The end users, in essence the ones who are working with the new method, and the project team members who supervised the implementation process on behalf of the customer. Data was analyzed by performing hierarchical regression analyse and a structural equation model (SEM) analysis.

The results of the regression analyse and the SEM model indicate that employee behavioral attitude, system quality, change agent, need for change and top management support positively contribute to the readiness to change. However, employee cognitive attitude lowers the readiness to change. Furthermore, affective commitment is positively related to change success. According to the project teams, the factors supplier's support after the implementation, reliability of the supplier, satisfaction of the stakeholders and achieving goals are the most important for a change to succeed.

Both theoretical and practical implications have been formulated based on this research. An important theoretical implication is that in addition to the known architecture, engineering and construction (AEC) factors that influence readiness, this research also shows that system quality is also related to readiness. However, this research does not prove that readiness is related to change success, in contrast to existing literature. This may be caused by the low number of respondents.

The most important practical implication is that Van Meijel can improve support to the customer during the follow-up phase. In addition, they will have to involve the end users better during the development of the application, in order to ensure a more successful change process.

Preface

This is the thesis "The role of a supplier in the implementation of a new software system in the AEC sector". The specific purpose of this research was to investigate how Van Meijel Automatisering can ensure that the Metacom Online application is better implemented and accepted by the customer during the development, implementation and follow-up phase. This thesis was written as part of my graduation from the Operations Management & Logistics course at Eindhoven University of Technology and was carried out from May 2019 to January 2020.

Together with my internship supervisors from the company Van Meijel Automatisering, Theo van Meijel and Roy Gevers, and my university supervisor, Pascale Le Blanc, I came up with the subject and the research goal. Despite several frustrating moments, such as the low number of respondents, I tried to write the best possible thesis to come up with useful results. During the investigation, these supervisors were always there for me if I had any questions.

Hereby I would like to thank my supervisors for the good supervision and their help in writing the thesis. In addition, I would also like to thank my colleagues at the office in Eindhoven for the pleasant cooperation. I also want to thank all respondents who participated in this research. I could not have done this research without their input.

Finally, I would like to thank my family and friends for their support during graduation. When I was frustrated, these people cheered me up again and convinced me that I will solve the problems.

Enjoy reading the master thesis.

N.R.P. Cloosterman
February 2020

Management Summary

Context

The purpose of this study was to investigate how the supplier of a software application can support the smooth implementation of a new working method at the customer. This research assumed that companies want to involve the supplier in the implementation process. This study will investigate how the supplier could best fulfill this role. The research was conducted at the company Van Meijel Automatisering. They provide customers with a new software application, namely Metacom Online, with a focus on the construction sector. This research therefore focused on the role of the software supplier in the construction sector. A model was developed and tested, to determine this role of the supplier.

The literature showed that especially individual and organizational readiness and different types of commitment, namely normative, affective and continuance, influence the success of a change process (Weiner, 2009; Golembiewski, 2000). Individual and organizational readiness were influenced by several critical success factors, which can be divided into several categories, namely people, system and project. The people category included the factors self-efficacy, training and attitude. The system category contained only the system quality factor. The project category consisted of the change agent factors, key people support, communication climate, benefits & rewards, need for change, top management support, provider quality, benchmarks, project management, teamwork and timeframe. A model was developed containing these variables (Figure 0.1). The green arrows are the positive relationships and the red arrow the negative relationships that were found by testing this model.

Method

To test the model, two different surveys were used. The target group of the first survey were the end users of the Metacom Online application (sample size = 73) and the target group of the second survey were the project teams of the customers with whom the employees of the supplier collaborated during the implementation process (sample size = 29). After the data was collected, hierarchical regression analyse and a structural equation model analysis (SEM) were performed to analyze the relationships between the different predictor variables and change success.
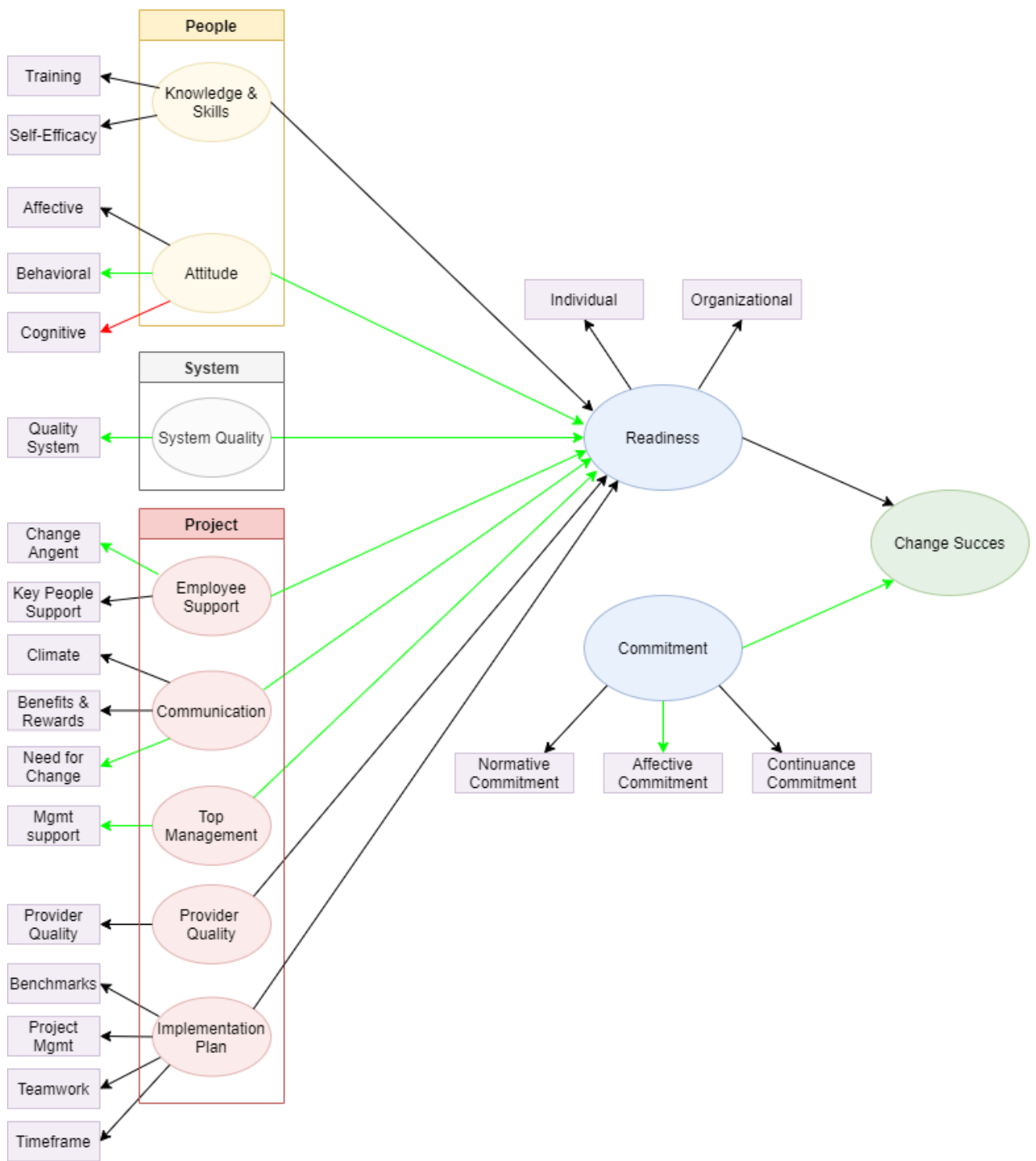
Figure 0.1: Theoretical Model

Furthermore, qualitative data was collected from the project teams' surveys, to gain more insight into the most import topics regarding customer satisfaction, project success and the improvement factors of Van Meijel.

Results

The results of the hierarchical regression analyse indicated that the variables employee behavioral attitude, system quality, need for change, change agent and management support were positively related to readiness for change. This means that when one of these variables increased, the readiness also increased. In contrast to earlier research of Bouckenooghe (2010), employee cognitive attitude appeared to be negatively related to readiness. Furthermore, the results showed that when employee affective commitment increased, performance and customer satisfaction also increased and therefore the change success also increased. However, this study did not show that readiness is related to change success. This contradicts earlier research of Golembiewski (2000) and Weiner (2009). The analysis of the SEM model showed that there was no mediation effect of readiness in the relationship between the independent variables of people, system and project and change success. However, the analysis did indicate that there is a direct relationship between the variables system quality and customer satisfaction and change agent and customer satisfaction. The above-mentioned results only applied to the target group of end users. The data from the project teams did not indicate any significant relations between the most important variables of the model, possibly due to the low number of respondents. That is why no SEM-analysis was performed in this part of the data.

The qualitative analysis of the project teams showed that support in the follow-up phase (52%), reliability of the supplier (38%), satisfaction of stakeholders with the application (81%) and the achievement of objectives (62%) are the most important factors to achieve project success and customer satisfaction. Furthermore, the project teams indicated that Metacom Online has added value for the company (68%) and that Van Meijel can improve customer support after the implementation of the application (57%).

Recommendations

Based on these results, four recommendations were made to Van Meijel. These are the appointment of a 'closer', incorporating change agents in project teams, improving the quality of the system and offering a communication package.

The 'closer' is a person who is responsible for the follow-up phase. This means that questions and problems with the application end up with him/her. The "closer" tries to come up with a solution him/herself and if this fails, (s)he asks help from a consultant. This prevents customers from asking the questions directly to these consultants. Furthermore, faster first-line support is provided because the consultant usually has no time for support. In addition, (s)he is also responsible for supporting the entire change process of the customer. This means that after conversations with the client's stakeholders the closer can decide about the best way to implement the application.

The composition of the customer's project team will have to be adjusted to ensure that a change agent can be deployed. The change agent should be included as a standard member of the client's project team and should be an end user of the application. (S)he should participate in the project team from the start of the project. This allows the change agent to ensure that the requirements of the end users can be met during the development of the application. So, this will result in a more user centered design method.

Van Meijel is dependent on a third party that develops the software. That is why Van Meijel cannot change much about the layout of the application. They can, however, appoint a user experience designer who is responsible for communication between the customer and the third party to ensure that the software is more in line with the wishes of the customer. Nevertheless, the development of manuals for end users is an opportunity for Van Meijel to make the application more user-friendly. A technical writer will have to make a basic manual, which is then personalized per customer. This makes it easier for end users to work with Metacom Online, because they can look up what to do in specific situations with the application.

The last recommendation for Van Meijel is to help the customer with communication within his company. Van Meijel can support the customer by offering a communication package. This

communication package should contain information brochures about the planned changes for the employees of the customer. In addition, videos will have to be made, showing the benefits of the application quickly and easily for end users. The existing videos are mainly focused on the members of the project team, and therefore do not fit for the end users. The marketing department could record a new video clip together with the consultants aimed at the end users. These actions will facilitate the communication of the need for change to end users.

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1 Problem Context and Scope

1.1 Problem Context

Van Meijel was founded in 1987 by Frans van Meijel and operates in the construction sector. Over the years they grew into a company of more than 100 employees. A distinguishing characteristic of the company is that it is a family business. Family businesses mainly think of long-term innovation compared to non-family businesses (Cassia et al., 2012). In addition, they have a lot of market knowledge (Alberti and Pizzurno, 2013) and they have a good internal exchange of knowledge (Tobak et al., 2018).

Van Meijel provides software and services related to project, financial, logistics and service management. These services and solutions result in a more efficient and qualitatively better process for the customer in the construction sector. For example, if the wage process is still carried out through paper notes, then Van Meijel automates this process so that it can run digitally. Van Meijel has two products that a customer can purchase, Metacom+ and Metacom Online.

Metacom+ is an enterprise resource planning (ERP) system that allows employees of a company to keep track of everything from the status of projects to finance and logistics. It meets the definition of an ERP system of Laudon and Laudon (2017), namely a system in which all business processes are visible in a software system.

Metacom online, launched in 2015, is a cloud platform for process innovations. All conceivable registrations in the field of projects, finance and logistics can be digitized with this platform from any location and from any device. Furthermore, the platform and application itself is adaptable by the customers. This allows every customer to get their own specific and unique solution, that fits in best with their requirements for a software application (Meijel, nd; Van Meijel, 2016). The aim of the current study is to identify how the supplier of an application can support the implementation of a new working method. Therefore the study focuses on Metacom Online.

The process to install Metacom Online at the customer consists of four phases; initiation, inventory, implementation, and follow-up (Figure 1.1). The initiation phase consists of identifying customer needs. The sales consultant of Van Meijel tries to find out what the problems are that a customer experiences and how they want to solve this. Then the sales consultant considers

whether Van Meijel can solve the customer problem. If this is the case, the inventory phase starts. In this phase, also the consultant or the project manager of Van Meijel will be involved. The consultant will give the customer a demonstration and advice on the possibilities of Metacom Online, based on the wishes and demands of the customer. This results in a negotiation about the requirements that Metacom Online must meet before a quotation is offered by Van Meijel.

The implementation phase starts when the project has been approved by the customer. The first part of this phase consists of developing the software to generate the customer specific application. This development can be partly based on packages that already exist. A package is a generic part of a customer's process that has already been developed and only needs to be adapted to the specific customers requirements. This is done by adding extra functionalities to the package or by making specific adjustments to the software in addition to the package. The Van Meijel consultant develops this new software to meet customer needs. If there is a specific process at a customer that can be useful for other customers too, the consultant will request the package to be updated so that this process can also be used by other customers. However, packages cannot be adopted for all processes, because some processes differ too much per customer. It is also possible that the consultant does not use the packages, because the customer prefers customised approaches, and so the consultant modulates the solutions by himself/herself.

During the development of the software, work is mostly done according the scrum methodology. This depends on the type and size of the software that must be delivered to the customer. If the delivery includes a package that has already been implemented several times before, then a standard procedure will be used whereby the implementation of the software takes place in usually two days. If the delivery requires more specific work than just installing a package, a scrum method will be applied. The scrum methodology will differ per customer, because it is adapted to the capabilities of the customer. In general, the method will consists of the following events. A schedule is made for each project, where responsibilities per organization and milestones are agreed upon. The project team, which consists of a delegation of employees of Van Meijel and the client, will meet on a regular basis to evaluate the developments and make possible adjustments to the project. The Van Meijel project manager is responsible for ensuring that the scope of the project remains guaranteed.

Training can be offered to users of the Metacom Online application. Depending on the agree-

ments with the customer, this training is provided by Van Meijel. It can also happen that the customer wants to do the training himself or does not want to provide any training for the end users. When the application is almost ready, it will be tested. The testing method depends on the wishes of the customer. This results in different test approaches for each project. Van Meijel strives to conduct tests with a pilot group of end users. These end users will test the new application for a specific period and share their feedback with Van Meijel's consultant. The consultant will then adjust the application when needed. Afterwards, the application can go into production for the entire organization. For large organizations, the application will be introduced in different phases in order to not overload the system.

In the follow-up phase, the consultant will be available to solve problems that arise when the application is used. It is an utopia that the application functions are perfect after the implementation phase. The aim is that the application works for approximately 90%. This means that the basis of the application must work flawlessly, but exceptional cases that occur in practice are only programmed later. The reason for this is that it is impossible for Van Meijel consultants to consider all situations that may occur with a client, even after a test period. The project manager will try to identify these problems through contact with the customer. However, the customer will also have to report the problems himself, because the number of contact moments with Van Meijel is lower than in the previous phases. There are usually a few hours in advance budgeted with the client, so that the consultant can immediately start working on a solution. This research focuses primarily on the implementation and follow-up phase
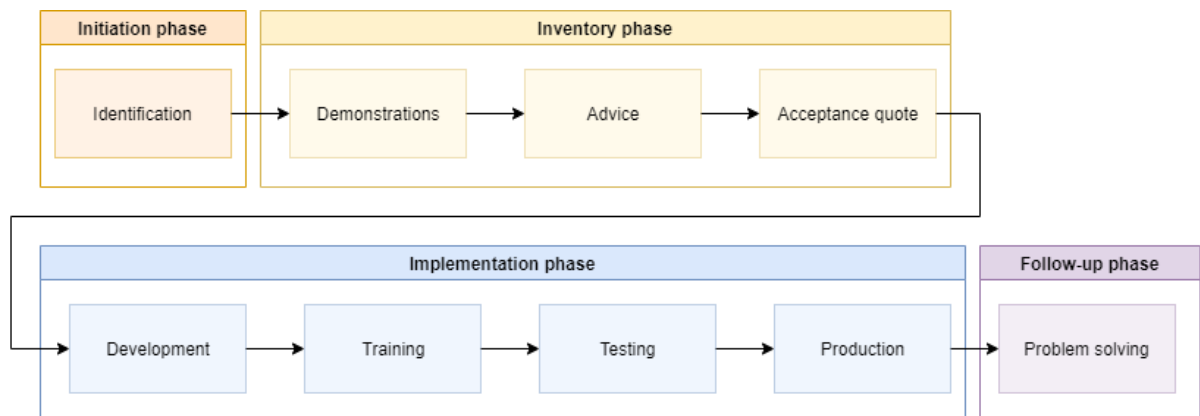
Figure 1.1: Process Metacom Online

1.2 Research Objective

The main subject of the research is the successful implementation of new working methods and the change that comes with it. The focus will be on the role of the application supplier of the new working method. Current literature pays a lot of attention to the implementation of changes within a company. Researchers also note that this can be done by external change leaders (Al-Haddad and Kotnour, 2015). This research assumes that companies want to involve the supplier in the implementation process. The research will investigate how the supplier could best fulfill this role.

The second part of the research focuses on determining the factors that influence successful implementation of new work methods, for example the aspects that are important for integrating new applications in the current business processes of construction companies. These factors are being investigated at companies that have already implemented a new working method. As a result, a general basis for the construction sector can be laid concerning the most important factors that influence a change in a working method. All in all, the purpose of this study will be to investigate how the supplier of an application can support the smooth implementation of a new working method.

1.3 Research Question

To achieve the goals of the research and answer the main research question, several research questions have been formulated. These are based on the objectives described above.

1.What are factors of relevance for the implementation of a new IT application in the construction sector?

The literature search consists of three different parts. First, the general factors, such as communication (Lines and Reddy Vardireddy, 2017), higher-level involvement and commitment (Razali and Vrontis, 2010), that play a role in change management will be investigated. Next, it will be examined which of these factors influence the implementation of new software applications. These factors also include the factors that serve as potential barriers to the implementation of a new IT working method. Finally, I will look at whether there are factors that specifically affect

the construction sector. However, research shows that there is little literature available on the most important change factors in the construction sector (Lines and Reddy Vardireddy, 2017). Based on the literature findings, a framework is developed of the most important factors that potentially influence the implementation of new application in the construction sector.

2. How can the probability of a successful implementation of an IT application be enhanced?

The framework of research question 1 will be used to answer research question 2. It will provide insight into which factors are the most important according to the customers of the supplier of the new application, to determine which actions can be taken to enhance successful implementation. The readiness of an organization is important for the successful implementation of a change. Furthermore, it will also be investigated how potential other barriers, such as employee resistance, can be removed. If these are not properly addressed, then these barriers can be the reason that an implementation fails (Arendt, 208). The answer to this question will therefore focus on what an organization in the construction sector needs to do to improve the likelihood of a successful implementation of an IT application.

3. Which role should the supplier take during the implementation of an IT application at a customer in the construction sector?

An answer will be sought as to how the IT supplier can play a role in the transition process of implementing this new application. The supplier may be able to perform this role of change leader as an additional business or service. A change leader can be appointed to lead a transition. This leader can come from either the organization implementing a change, or be appointed from an external party (Al-Haddad and Kotnour, 2015). However, it is also possible that customers want no support of the supplier. In addition, this question should provide clarity about which actions a supplier can perform to ensure that his solution can be implemented successfully. The answer to this question will focus on the needs of the customer regarding the supplier's role during the implementation process of a new application.

2 Definitions

Chapter two will define the key concepts in the field of change management. If there are multiple definitions of a concept, then the most relevant description for the current project will be chosen, on the basis of comparing the definitions. This description should have the best fit with the context of this study, an implementation of a new IT infrastructure in a construction company.

The first concept that is defined is *organizational change*, the migration process of an organization from the present state to a preferred future state (Nelson and Kletke, 1990). To conceptualize this, two types of organizational changes can be distinguished. The first is a slight and incremental change in the area of strategic, structural or personal factors to make the organization function better. The second is a radical change (Amis et al., 2002), that is acute and relates to a large part of the organization. These changes may bring in new values for the organization, e.g. by expanding sales markets, setting up new production lines, or making major adjustments to the organization's structures and systems (for example, new IT systems) (Mack et al., 1998; Amis et al., 2002).

According to Nadler et al. (1995), there are four types of organizational change, namely tuning, adaptation, re-orientation, and transformation. These four are distinguished by being radical or incremental, and reactive (make a change when an event occurs), or anticipatory (make a change before there is a trigger to need do a change) (Nadler et al., 1995; Nadler, 1997). The characteristics of these four types are shown in table 2.1. The review focuses on the adaptation changes, because these changes are planned in reaction of a specific trigger. Furthermore, an IT implementation can be considered as adjusting of the individual work components and their alignments and some of the organizational components.

Change management is defined as "the process of continually renewing an organization's direction, structure, and capabilities to serve the ever-changing needs of external and internal customers" (Moran and Brightman, 2000). This definition is relatively similar to that of organizational change. Both definitions indicate that a change is from a current status to a desired future status. However, change management is about managing the continuous process of implementing changes, whereby it is important that the manager provides a high level of resources to implement the changes successfully (Kramer and Magee, 1990; Todnem By, 2005). Organiz-

Table 2.1: Types of organizational change characteristics (Nadler et al., 1995; Nadler, 1997)

	Incremental	Radical
Anticipatory	*Tuning* • Individual components • Internal alignment • Finding better way of achieving strategic vision	*Re-Orientation* • Proactive changes based on the environment • Organizational components • Fundamental redefining the organizational positioning (predicted)
Reactive	*Adaptation* • Response to external demands • Internal alignment • Individual components	*Transformation* • React on performance crisis • Organizational components • Fast and simultaneous change of all organizational basic elements

ational change, on the other hand, is more about the transition itself.

The *need for change* is about making the employees of an organization aware that the current way of working is no longer acceptable for all stakeholders. Information will have to be provided to employees to make the gap between the current way of working and the expected way of working clear to all involved stakeholders, to clarify the need for change (Self, 2007).

Many definitions of *commitment* can be found in the existing literature. This illustrates that there is no clear consensus on which definition is the leading one. However, commitment to change is an important predictor of change success (Herscovitch and Meyer, 2002). The definitions of commitment can be divided into several categories. These categories are in general, organizational, job, career, goal, organizational change and strategy commitment (Meyer and Herscovitch, 2001). Table 2.2 gives an example of a definition of each of these categories.

Allen and Meyer (1990) developed a model of organizational commitment to conceptualize the concept. This three-component model is widely accepted (Herscovitch and Meyer, 2002). The model describes commitment as a psychological state that consists of three components; affective commitment, continuance commitment, and normative commitment. Affective commitment is the desire to stay within an organization, because of one's emotional involvement with the organization, continuance commitment is based on the fact that the perceived costs of leaving are high and normative commitment is the moral obligation that an employee feels to stay within an organization (Herscovitch and Meyer, 2002). Meyer and Herscovitch (2001) have been able to derive a general definition of commitment from this model: "a force (mind set) that binds an

individual to a course of action or relevance to one or more targets."

For this review, a definition of commitment to an organizational change is needed, because the definition of organizational change fits best with the situation in this study, namely the implementation of an application and thereby a new working method in an organization. The three-component model definition of commitment to organizational change that is used for this review is "a force (mindset) that binds an individual to a course of action deemed necessary for the successful implementation of a change initiative" (Herscovitch and Meyer, 2002).

Table 2.2: Different definitions of commitment (Meyer and Herscovitch, 2001)

Category	Definitions of commitment	Authors
In general	"... an obliging force which requires that the person honor the commitment, even in the face of fluctuating attitudes and whims."	Brown (1996)
Organizational	"... a psychological state that binds the individual to the organization".	Allen and Meyer (1990)
Job	"... refers to the likelihood that an individual will stick with a job, and feel psychologically attached to is, whether it is satisfying or not".	Rusbult and Farell (1983)
Career	"... one's motivation to work in a chosen vacation."	Carson and Bedeian (1994)
Goal	"...the degree to which individual considers the goal to be important, is determined to reach it by expending effort over time, and is unwilling to abandon or lower the goal when confronted with setbacks and negative feedback."	DeShon and Landis (1997)
Organizational change	"...a psychological state that binds an employee to a course of action deemed necessary for the successful implementation of a change initiative."	Herscovitch (1999)
Strategy	"... involves the willingness of the person to put forth effort to enact the strategy."	Weissbein et al. (1998)

3 Theoretical Background

According to the literature, the concepts readiness (Chunningham et al., 2003; Weiner, 2009; Vakola, 2014; Self, 2007) and commitment (Razali and Vrontis, 2010) to change are important to successfully implement new working methods in organizations. These aspects have a positive effect on the successful implementation of a change. Readiness is influenced by other variables, which thus have an indirect relationship with the successful implementation of an organizational change (Vakola, 2014). This chapter will give an overview of these variables and their relationships with readiness. The literature also shows that commitment and readiness are reciprocally related (Santhidran et al., 2013; Madsen et al., 2005). In the following sections the specific factors that are important for implementing a new IT method in the construction sector will be discussed.

3.1 Core Factors of Implementing Change

3.1.1 Readiness

The *readiness to change* can be represented by two different concepts: individual readiness to change and organizational readiness to change (Vakola, 2014; Chunningham et al., 2003). As previously defined, the definition of readiness to change is about whether an individual person in both psychological and behavioral terms is ready to change (Weiner et al., 2008). This definition fits in particular with the individual concept. The organizational readiness to change relates to the ability of a company to manage the transition successfully. So, the organization makes the right resources available to properly carry out a transition (Vakola, 2014) that has a positive effect on implementation success (Weiner, 2009). The current study will focus on both concepts.

3.1.2 Commitment

Commitment is a mindset that employees of an organization must have to make a change successful, otherwise the chance that the change will fail is high (Herscovitch and Meyer, 2002). As mentioned before, commitment has different aspects affective, continuance and normative (Allen and Meyer, 1990). Commitment to a change is seen by many scholars as one of the most important factors for a change to succeed (Golembiewski, 2000). However, there is little to be found in the literature about which variables influence this commitment to change. Some researchers who have demonstrated that the factor readiness is related to commitment. They

imply that the causal relationship between readiness and commitment is positive, but can work in both directions. This means that there are investigations where as the commitment increases, the readiness increases (Madsen et al., 2005). On the other hand, there are also researchers who claim that as readiness increases, commitment also increases (Santhidran et al., 2013).

Figure 3.1 presents the preliminary model of the current study. This model shows that commitment and readiness both have an effect on the success of the implementation of the change. The readiness factor is influenced by other variables. In addition, the factor readiness and commitment are reciprocally related.
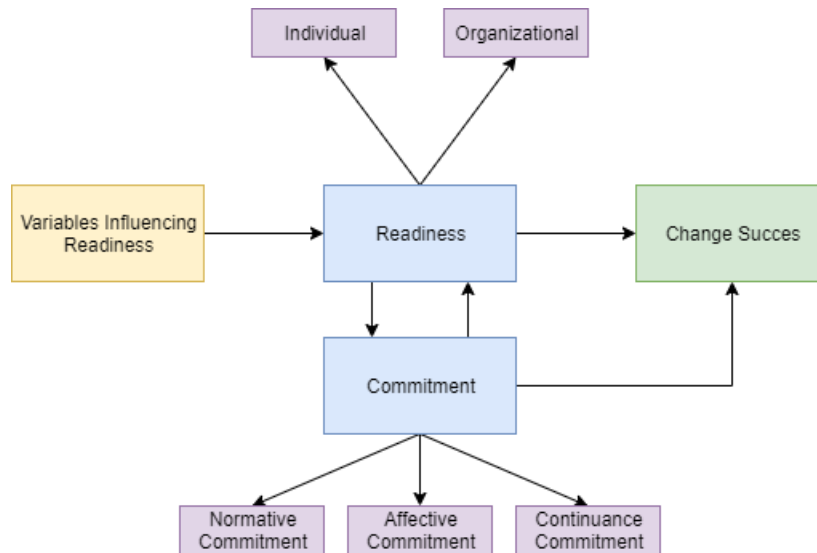
Figure 3.1: Preliminary model

3.2 Variables Influencing Readiness

Based on a review of the current literature, several factors are found to influence the readiness to change. These 11 variables; benchmarks, benefits and rewards, change agents, change leader, communication, attitude, involvement top management, key people support, need for change, self-efficacy, and trust in management, are briefly explained below. In order to be able to expand the model in figure 3.1, these variables will be compared at a later stage with the factors that are presented in chapter 3.3 and 3.4, in order to come to a decision whether or not to add these factors to the final model.

Creating clear *benchmarks* for the change process is an important strategy for companies to manage the momentum of change. Clearly formulated benchmarks should be communicated to employees before the transition starts, because then the whole organization can track the progress of the change, on the bases of milestones (Lines and Reddy Vardireddy, 2017). A company will have to formulate short-term goals so that success can be recognized and rewarded (Kotter, 1995). This makes employees feel more confident to make the change a success (Lines and Reddy Vardireddy, 2017), which increases the readiness.

Employees must know where they stand in the event of a change in work processes, so what's in it for them. They need to know both the *benefits and rewards* of the change for themselves (Self, 2007). If the disadvantages are too big for an individual, then this person will show less readiness. An important negative consequence is the risk of losing one's job. If there is a serious chance that the employee will be fired after the change, (s)he will show less readiness. If the benefits are an improvement compared to the employee's current situation, the person will show an increased readiness (Lines and Reddy Vardireddy, 2017; Self, 2007). In addition to a tangible reward, job satisfaction is an important advantage. If the employee expects more satisfaction from his/her job as a result of the transition, the individual readiness to change will increase (Vakola, 2014).

A *change agent* is an employee who is actively involved in all aspects of the implementation of the change (Lines and Reddy Vardireddy, 2017; Rowland, 2007). This employee is immediately available to offer support to his/her colleagues. (S)he is also responsible for providing communication about the change to the entire organization (Lines and Reddy Vardireddy, 2017). Because this agent is a regular employee and not a manager, there will be less of a top down approach for the implementation of the change process (Rowland, 2007). The agent defends the interests of employees within the organization (Rowland, 2007). If the change agent performs well enough according to the other employees, this will create a greater readiness among the employees to change.

A *change leader* ensures that principles are respected, techniques are present and activities take place that influence the individual employees, so that they are more willing to accept the change and consequently their readiness for change increases (Griffith-Cooper and Kink, 2007). Change

leaders are usually people who understand why people resist a change, but through their resolving power, they can motivate employees to actively participate in the change (Griffith-Cooper and Kink, 2007; Gioia et al., 2013).

Exchanging information through *communication* is one of the most important ways to influence readiness (Oreg, 2006; Vakola, 2014; van den Heuvel et al., 2015). It is important that there is a two-way communication. This means that the messages about the change from the management to the employees are clear, and that employees can respond to this by communicating their ideas and feelings to the manager. The management should listen carefully to this and preferably also act. This process of two-way communication increases the readiness of employees to participate in the change process (Levasseur, 2010). In addition to this two-way communication, it is important to have a good communication climate within the company. In a good communication climate, the employees believe that they have received all relevant information about a subject. This information includes the vision, strategy, policy plans and procedures (Vakola, 2014). The exchange of this information must take place on time and adequately, so every employee receives the information in the most complete form and in the most appropriate way in order to satisfy him/her and give him/her the opportunity to ask questions (van den Heuvel et al., 2015). When there is a good communication climate, employees show more readiness for the change (Vakola, 2014).

The *attitude* that an employee can have towards a change consists of three components; affective, behavioral and cognitive (Dunham et al., 1989). The affective attitude is about the set of feelings that an employee experiences about a change (Bouckenooghe, 2010), for example whether (s)he is generally against change or, on the contrary, always encourages change (Oreg, 2006). In addition, people who experience stress through change may have a lower readiness to change (Chunningham et al., 2003). The behavioral attitude refers to the actions that a person has taken or is about to take for or against the change (Bouckenooghe, 2010). This means that, for example, the person would very much like to participate and help during the change process if this person is positive about the change. The cognitive attitude is the opinion that a person has developed about the advantages, disadvantages, necessity and usefulness, and knowledge that is needed to implement change (Bouckenooghe, 2010). If the perceived disadvantages of the change are greater than the benefits, then employees will experience a more negative cognitive attitude, which will also reduce readiness. In general, a more positive attitude to change will lead to an

increase in readiness (Bouckenooghe, 2010)

The *involvement of top management* will lead to a higher likelihood of a successful implementation of the change (Razali and Vrontis, 2010; Lines and Reddy Vardireddy, 2017). Active involvement of management requires that managers actively participate in the change. This means that the employees want to see that management is making efforts to realize the change. These efforts increase the sense of commitment of management as perceived by employees. As a result, employees are more satisfied and get a more positive attitude about the transition. They are more likely to accept the change, which results in a higher readiness (Razali and Vrontis, 2010; Lines and Reddy Vardireddy, 2017). On the other hand, if too little involvement is shown by top management, this will lead to negative reactions among employees. They are more likely to feel ignored and to see no benefits of the change (Razali and Vrontis, 2010). This will decrease their readiness to change.

Support of key persons, people who are ambassadors for change and can convince people of the usefulness of change, is important to create high readiness within a company. These key people are often interested in helping with the transition to a new situation. Based on this motivation, they will make themselves available to management to help with the process. These ambassadors are involved in the change from the start. The other employees will be involved in the process as early as possible and as often as possible. The key people will try to convince other employees to actively participate in the change (Self, 2007; Levasseur, 2010). This role looks a bit that of a change agent, but the agent is responsible for supervising the transition in addition to motivating. By getting more employees enthusiastic about the change, key people support ensures a higher readiness among employees (Self, 2007).

The *need for change* is about making the employees of an organization aware that the current way of working is no longer acceptable. Information will have to be provided to employees in which there is a gap between the current way of working and the desired way of working (Self, 2007). This need for change will increase the sense of urgency among employees. As a result, employees feel responsible for changing faster and more successfully, so readiness will increase (van den Heuvel et al., 2015).

The confidence that someone has to implement the change with his/her own capabilities is

called *self-efficacy* (Chunningham et al., 2003). This ability consists of both the emotion and the skills that someone possesses to cope with change (Chunningham et al., 2003). If, after a self-evaluation, the employee feels that (s)he has the skills to change, an increased individual readiness will arise (Vakola, 2014). The employee can also use his/her total ability and skills to analyze whether (s)he is ready for the transition. If the person experiences high self-efficacy, the readiness will increase. When a person experiences low self-efficacy, the readiness will decrease (Chunningham et al., 2003; Prochaska and Velicer, 1997).

Trust in management can lead to an increase in readiness (Vakola, 2014). Trust between manager and employee is described in the integrative model of trust (Mayer et al., 1995). Mayer et al. (1995) defines trust as "the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action that is important to the trustor, irrespective of the ability to monitor or control that other party". Trust in management is also seen in the literature as a necessary precursor to improve the readiness to change. When employees consider their management to be able to handle change effectively, find them reliable, feel supported, and respected, they become more willing to accept the change (Chunningham et al., 2003; Kiefer, 2005; Coyle-Shapiro and Morrow, 2003). Top management must therefore demonstrate that the announced change is the right solution for the problem of the organization (Self, 2007), and to prevent cynicism about the change among employees (Stanley et al., 2005). They will have to communicate the change to the employees in a good way, so that every employee is satisfied with the way of communicating, and is completely informed. If the communication is poor or incomplete, the employees' confidence in management decreases (van den Heuvel et al., 2015), and this will decrease their readiness to change.

3.3 Factors influencing the implementation of new IT systems

Implementing a new IT system in an organization does not always run smoothly. In the literature, several important barriers can be found that each may delay implementation or make it impossible. A barrier is seen as something that prevents the progress of an organization or makes it difficult for an organization to achieve a goal (Soja, 2015). These barriers, together with the critical success factors, are of great relevance to achieving a successful implementation of a new system (Fui-Hoon Nah et al., 2001). The new IT system that will be investigated in my master thesis project is an enterprise resource planning (ERP) system, which is a program that

provides support to the organizational core activities, such as human resources, planning and sales (Aladwani, 2001). This paragraph will describe the most important barriers and success factors for implementation. Next, it will be described why they do (not) fit into the research model (figure 3.1) and what relationship they have with the previously determined factors.

3.3.1 Barriers

The barriers that organizations encounter when implementing an ERP system are often linked to the problems related to the new system and to the problems that occur in the organization when a new system is introduced (Koh et al., 2011). Although the introduction of a new system often occurs due to technological triggers, system acceptance mostly depends on the behavior of employees (Bingi et al., 1999). Barriers occur in the human, technological and organizational areas (Soja, 2015).

According to Soja (2015), there are at least 28 proven barriers in current literature. To provide structure, these barriers can be divided into four different categories: individual, system, project, organization. The individual category is about the skills and behaviour that an employee demonstrates in relation to the new ERP system. The system category contains the barriers in terms of quality, price and the functioning of the new system. The project category contains all barriers that may occur during the transition to a new system, such as communication problems and/or poor time scheduling. The organization category is about the barriers that relate to the entire organization, such as cultural barriers (Soja, 2015; Antlova, 2009). To give a complete picture the barriers of Soja (2015) will be supplemented with the barriers defined by Antlova (2009) and Wielicki and Arendt (2010). This creates an overview of the most commonly experienced barriers. Table 3.1 shows these barriers per category.

Soja (2015) suggests, on the basis of nine previous studies, that the most important barriers are *quality of the implemented system, knowledge & skills of the project participants, provider support, costs, resistance of employees,* and *business processes.* These barriers are divided over the different categories, so there is no category that can be designated as the most important (Soja, 2015; Wielicki and Arendt, 2010). For the model, it is assumed that the organization will be financially able to purchase a system. Though the costs thereby become a less important variable, they can still be a barrier because the costs can also rise during the implementation process.

Table 3.1: Barrier Overview (Soja, 2015)

Barrier	Description
People	
Knowledge & Skills	Individual has too little knowledge and skills to work with a new ERP system
Resistance	Individual is against change and against new systems, and does not want to make an effort to learn
Relations	The understanding of the relationships between employees and the company
Reluctance	Individual is reluctant to learn a new system
Habits	Individual is used to the current system and its proven usefulness
Involvement	Individual's not or not sufficiently involved in the implementation process
Fear	Individual is afraid of changing to new systems
Attitude	Individual is negative about changing to a new ERP system
System	
Infrastructure	A company does not have the right techniques available to implement a new system
System Fit	Lack of fit between the needs of the customer and the delivered system
Cost	Too high costs to implement the new system and associated infrastructure
Quality	The new system can have poor quality in terms of functionality, user-friendliness, reliability and efficiency
Data	Creating a complete and reliable data set from the new system
Security	The lack of security for the new system
Project	
Time	The planned implementation time is too little
Workload	The workload of employees is too high due to poor planning, working with two systems at the same time and too many extra tasks
Training	Employee training is too incomplete, not on time and of poor quality
Project Management	Lack of clearly defined project plan, lack of personal project responsibility and lack of information about the project
Management Personnel	Lack of management capacities
Communication	Problems with communication between stakeholders
Changes	Problems with implementing organizational changes
Provider	The system provider has insufficient knowledge, skilled employees, and poor training
Organization	
Finance	The organization has a limited budget compared to the high adoption costs
Organizational	The poor organization within the company
Process	Lack of understanding of all processes within a company

3.3.2 Critical Success Factors

Critical success factors are factors that influence the success of the implementation of an ERP system. These factors will have a positive relationship with the success rate of the implement-

ation (Finney and Corbett, 2007). A distinction can be made between two different groups of success factors; the strategic factors and the tactical factors. These strategic factors are factors that help to determine what the overall organizational objectives are, and how these objectives can be achieved, by splitting the objectives into executable projects. The tactical factors relate to how these organizational objectives must be achieved. By using human, financial and technical means in combination with a good working method, an attempt is made to implement the strategic planning. All in all, the strategic factors are mainly about the planning of organizational objectives and the tactical factors are about the implementation of these plans (Holland and Light, 1999; Pinto and Slevin, 1987). Various studies show that there are several factors that almost always have a positive effect on the success of an implementation of a application (Finney and Corbett, 2007; Fui-Hoon Nah et al., 2001; Amini and Sadar Safavi, 2013). Table 3.2 shows these factors, which are divided into the strategic and tactical categories.

Table 3.2: Critical Success Factors (Finney and Corbett, 2007; Fui-Hoon Nah et al., 2001; Amini and Sadar Safavi, 2013; Aladwani, 2001; Nah et al., 2003)

Strategic critical success factors	Tactical critical success factors
Top management support	Training
Change Management and plan	Software
Implementation strategy	Communication
Project management	Teamwork and composition
Project champion	

Table 3.2 shows that there are five important strategic critical success factors. The first is *top management support*. It is important that top management sets clear objectives and that they are involved in the implementation of the objectives (Finney and Corbett, 2007; Fui-Hoon Nah et al., 2001; Amini and Sadar Safavi, 2013; Nah et al., 2003). Top management will have to participate during the introduction of the new system. This gives management a feeling for the employees and enables them to anticipate quickly if something goes wrong (Finney and Corbett, 2007). A high level of management involvement is essential for the success of an implementation (Sarker and Lee, 2003). *Change management* refers to the need to draft a change plan. The change plan must ensure that employees more easily accept the implementation (Fui-Hoon Nah et al., 2001; Finney and Corbett, 2007; Nah et al., 2003). This can be achieved by explaining the importance of the new system and offering training. An *implementation strategy* will have to be

developed to ensure that the implementation runs smoothly. This strategy includes everything about the steps that and the time schedule that must be followed and any problems that may be encountered (Amini and Sadar Safavi, 2013; Finney and Corbett, 2007). An *implementation plan* for a new system will have to be led by project management. A project manager is a person who maintains an overview of the different phases of the project, the responsibilities that everyone has, defining intermediate objectives and scheduling training. If something threatens to go wrong in the execution of the transition process, the project manager will have to make adjustments (Fui-Hoon Nah et al., 2001; Finney and Corbett, 2007). The last strategic factor is the *project champion*. The project champion is a person that is used to create unity and consistency within the implementation process. This person must be known throughout the organization and must be at a high hierarchical level within the organization, so that (s)he has a mandate to implement adjustments. The champion must always have the goal of resolving conflicts and improving readiness (Fui-Hoon Nah et al., 2001; Nah et al., 2003).

Table 3.2 shows that there are four important tactical factors; training, software, communication and teamwork & composition. *Training* is a crucial aspect because employees must be able to work with new ERP systems. In addition to this user training to improve the skills of the end users, project training is also important to make the implementation project run better. If the training courses are insufficient, the chance of a successful implementation will decrease (Amini and Sadar Safavi, 2013; Finney and Corbett, 2007). The *development, testing and installation of the software* is important for a successful implementation. The new software will have to meet the requirements of the customer and the needs of the end users. The quality of the interface must be good enough, so that it is user-friendly. The problems that arise will have to be solved in a quick and adequate way. During all phases of the implementation process, attention must be paid to feedback from the project team and the end users (Amini and Sadar Safavi, 2013; Fui-Hoon Nah et al., 2001). Employees must be informed about the objectives, activities and changes that are taking place, so *communication* is crucial and the communication must ensure that employees know where they stand. Effective communication is needed to manage expectations and motivate employees to participate in the implementation. A communication plan will therefore have to be developed, so that all information reaches the right person at the right time (Amini and Sadar Safavi, 2013; Fui-Hoon Nah et al., 2001; Finney and Corbett, 2007). The *team* that leads the ERP implementation will consist of skilled people who have a good sense of the new technology. Building a cross-functional team, where consultants, end users and

technical staff work together is needed. In order to prevent an overload of work tasks among the employees of the project team, they must be focus as much as possible on the change project. In addition, this team will have to work together with all departments involved. In this way of this they create confidence among all stakeholders that a successful implementation is possible (Fui-Hoon Nah et al., 2001).

3.3.3 Most important Barriers and Critical Success Factors

In total, six important barriers, namely quality of the implemented system, knowledge & skills of the project participants, provider support, costs, resistance of employees, and business processes were found. The barriers that relate to the organization itself are not taken into account because the research assumes that these barriers have been removed before an organization makes the choice to change. The barrier resistance is left out of the study because, according to Weiner (2009), it mainly influences change success. The relationship between readiness and resistance is rather reciprocally (Weiner, 2009; Razali and Vrontis, 2010). Because of this interaction, resistance is a poor predictor of readiness and therefore this barrier is omitted from the model. So only three barriers, quality of the implemented system, knowledge & skills of the project participants and provider support are included in the model.

Nine critical success factors were found (table 3.2) and will be added to the model. However, the change management and plan factor is not specifically mentioned as a specific factor. This is because change management, supporting the change, is very similar to management support. The change plan, the creation of a change plan, is already partly developed and implemented by a project manager, therefore the change plan will fit better with implementation strategy and project management.

However, some of the barriers and success factors are quite similar in their definition, and will be combined as one factor in the model. For example the quality and the software variable can be combined as one factor system quality. The combined variable, system quality, will contain both the quality of the system and the fit between supply and demand.

To keep the model clear, the four types of barriers will be used to group the variables in the model. The critical factors and the barriers will be grouped together under a common denom-

inator 'project', because they all influence the readiness to change. Figure 3.2 presents the new model.
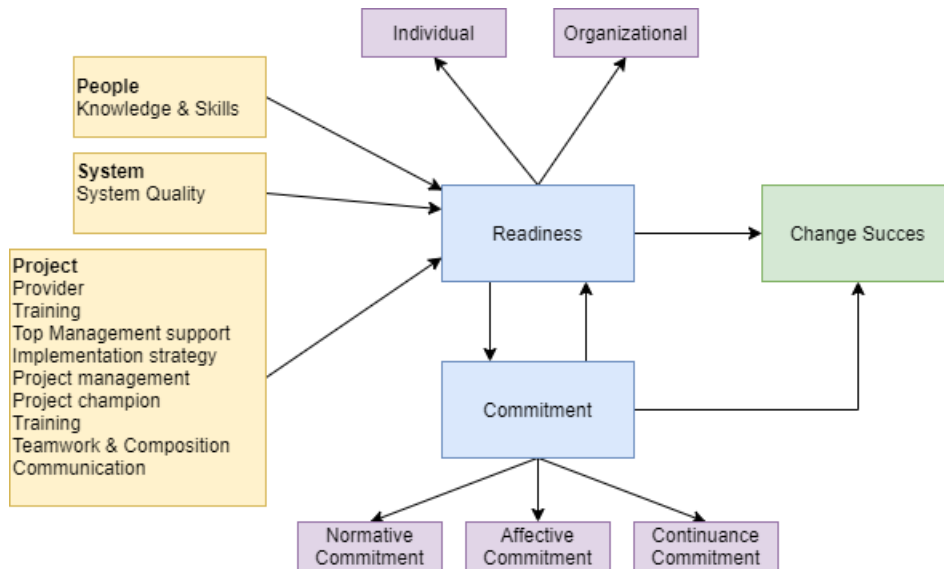
Figure 3.2: Barriers and critical success factor model

3.4 Factors Construction Sector

The architecture, engineering and construction sector (AEC) is often regarded as lagging in the use of innovations and new technologies. Staff readiness to change is seen as one of the most important obstacles. As a result, a major effort is needed from the entire organization to enable change (Lines et al., 2016). The AEC literature on change management is quite limited. The studies are often based on small data samples and limited case studies (Lines and Reddy Vardireddy, 2017). This makes it difficult to clarify which variables are of importance for the AEC companies to change successfully. However, several important factors can be distinguished in the literature; commitment of senior leadership, communication of benefits for employees, change agents, realistic timescale, sufficient training (Lines and Reddy Vardireddy, 2017).

Showing the visible *involvement of senior management* in relation to a new change ensures that the change is considered relevant to employees (Beer and Eisenstat, 1996). Within the AEC industry there are examples where low commitment to change from management made the change

fail. For example, it has been proven in the UK that a lack of commitment on the part of managers has led to a failure to implement a new program management system (Shehu and Akintoye, 2010). The visibility and involvement of management will lead to more employees accepting the change (Razali and Vrontis, 2010).

Employees of an organization want to know what happens to their position within the company when a change is implemented. They will weigh the advantages and disadvantages against each other to determine whether they want to participate in the change (Lines and Reddy Vardireddy, 2017). Good and complete *communication about the benefits and losses* for employees is necessary to convince them. Without this extensive communication, employees will certainly against the change because they are afraid of the unknown consequences (Bourne et al., 2002). For example, employees may start to doubt whether they will keep their jobs (Oreg, 2006). It is therefore also important in the AEC sector to communicate benefits and disadvantages in a good and timely manner with employees, so that their readiness increases (Lines and Reddy Vardireddy, 2017).

Change agents are directly involved in all aspects of a change. They are available to provide support to employees immediately (Self and Schraeder, 2009). The usefulness of these agents in the AEC sector has been demonstrated in a study on contractors. The conclusions of this investigation were that an agent undertook actions regarding training, communication and to enforce the use of a new application. This resulted in a successful implementation (Dossick and Sakagami, 2008). It can therefore be said that change agents are also of great importance in the AEC.

A realistic *time schedule* is needed to create readiness among employees. If management expects an unrealistic pace of change, employees are less willing to cooperate (Smollan, 2011). According to research, AEC companies often underestimate the time it takes to bring about a change. This makes implementation less successful (Sullivan, 2011).

When an employee receives no or low-quality training, this decreases his/her readiness to change. *Training* is the key to make the transition a success (Schneider et al., 1994). When people must work with new techniques, support to understand these techniques is important. If the support fails, employees are less inclined to accept the change. If the training is successful, employees feel more familiar with the new technology and there will be a higher chance of readiness (Lines and Reddy Vardireddy, 2017).

3.5 Theoretical Framework

In the previous sections the most important factors for successfully implementing a change delivered from the general literature, literature about successful ERP implementations and about implementations in the AEC sector have been reviewed. To create the final theoretical model, we will look at the factors described in all three chapters (Table 3.3).

Table 3.3: Total Factors Literature Review

General factors	System Factors	AEC factors
People		
Self - Efficacy		
Attitude		
	Training	Training
	Knowledge & Skills	
System		
	System Quality	
Project		
Benefits and Rewards		Communication of Benefits
Change Agent		Change Agents
Change Leader	Provider	Realistic Time-frame
Communication	Communication	
Involvement Top Management	Top Management Support	Commitment Senior Leadership
Benchmarks		
Key People Support		
Need for Change		
Trust in Management		
	Implementation Strategy	
	Project Champion	
	Project Management	
	Provider	
		Realistic Time-frame

It can be seen in table 3.3 that several factors were included in at least two of the three sections. It concerns the factors Training, Communication, Top Management Support, Change Agent and Benefits. To keep the model manageable, a number of these variables are combined and placed under a general term. These terms are knowledge & skills, implementation plan, communication, employee support, top management, attitude, system quality and provider quality.

3.5.1   Hypotheses

The *knowledge & skills* factor involves all variables that influence the knowledge and capabilities of an individual. The employee must first be able to judge for him/herself whether (s)he is ready for the change. This means that (s)he must know whether (s)he has enough knowledge and skills to work after the change (Chunningham et al., 2003). If this is not the case, then training must be followed to get the knowledge of the new system up to standard. If the training is of high quality, then the employee will experience that (s)he can handle the change and the readiness will probably increase (Lines and Reddy Vardireddy, 2017).

Hypothesis 1A: Knowledge & skills is positively related to readiness.

The *attitude* factor consists of the affective, behavioral, and cognitive attitudes towards change. The attitude, positive or negative, that an employee adopts about a change, increases or decreases the readiness to change (Bouckenooghe, 2010). For example, if a person is naturally against change, this person will have a low readiness to change (Oreg, 2006). It is therefore important to know the attitude of a person towards change.

Hypothesis 1B: Attitude is positively related to readiness.

System quality is about the quality that the new system delivers. First, the system must meet the needs of the organization, there must be no misfit between what has been delivered and what was expected. Furthermore, the system must be user-friendly, functioning well with few errors and work as expected. It must be tested during every phase of the implementation and the wishes of the end user must always be listened to (Amini and Sadar Safavi, 2013; Fui-Hoon Nah et al., 2001; Soja, 2015). A good quality of the new system will have a positive impact on readiness.

Hypothesis 2A: System quality is positively related to readiness.

The *employee support* factor ensures that employees motivate each other about the planned change. The influence of social groups plays an important role in whether an individual is for or against change (Oreg, 2006). It is therefore important to ensure that key people support is created within social groups. This means that employees who support the change are actively involved in the change process to ensure that they also convince other employees with their enthusiasm to accept the change (Self, 2007). In addition to being actively involved in every step in the implementation process, change agents will also guide the employees during the process, they will offer help and support if requested by the employees. As a result, there is less of a top-down approach, and readiness can be increased (Lines and Reddy Vardireddy, 2017; Oreg, 2006).

Hypothesis 3A: Employee support is positively related to readiness.

The *communication* factor relates to the communication climate, the communication about benefits and rewards and the communication about the importance of the change (van den Heuvel et al., 2015). The information exchange between management and employees should be fair, so it should be complete and management should carefully listen to feedback of the employees. Employees should be informed in time about the advantages and disadvantages of the change. In addition, they should be updated of all new information, so that they themselves see the advantages or disadvantages of the change (Vakola, 2014; Finney and Corbett, 2007). It is important to make clear why there is a need for change. Through good and targeted communication strategies, management can convince employees that change is necessary (Self, 2007). The readiness will increase if the communication about the consequences of the change is complete (Vakola, 2014; Oreg, 2006).

Hypothesis 3B: Communication is positively related to readiness.

The *top management* factor relates to the support of the management. Management will have to be actively involved during the entire implementation. They will have to be actively present in the workplace and show commitment and visibility towards the employees (Razali and Vrontis, 2010). The top management should show that they support the entire change, because it will increase readiness. In addition, top management should show that they have the adequate

knowledge of current processes. This knowledge is needed to ensure that the change solves the organizational problem (Lines and Reddy Vardireddy, 2017; Finney and Corbett, 2007; Amini and Sadar Safavi, 2013).

Hypothesis 3C: Top management support is positively related to readiness.

Provider quality is about the quality that the supplier of the new system can deliver. It is important for the organization that the provider can supply skilled people and that problems are solved quickly (Soja, 2015). If the provider cannot provide this, there will be less readiness to implement the new system, because people do not trust the supplier.

Hypothesis 3D: Provider quality is positively related to readiness.

The *implementation plan* contains topics that have to do with the smooth running of the project itself. The phases of the project will be written out in a plan (Amini and Sadar Safavi, 2013). Each phase will be accompanied by several benchmarks that monitor the quality and progress of the process (Lines and Reddy Vardireddy, 2017). The project management and the project champion will implement the plan. This means they will check whether everyone complies with his/her duties and responsibilities and manage where necessary. Regulating teamwork is also an important part of the plan. The better the cooperation of a team, the higher the readiness. (Finney and Corbett, 2007; Fui-Hoon Nah et al., 2001). The time schedule of the entire project and the different phases are also determined in the project (Lines and Reddy Vardireddy, 2017). A good change implementation plan will increase the readiness.

Hypothesis 3E: Implementation plan is positively related to readiness.

Figure 3.3 shows the final model. In the model it was decided to classify the eight factors mentioned above based on the types of categories described in chapter 3.4. These eight factors influence the readiness to change. *Readiness* and *commitment* both influence the factors of *change success* (Weiner, 2009; Golembiewski, 2000). Finally, on the basis of the direct and indirect effects, it will be investigated whether the relationship between the factors of people, system and project with change success is mediated by readiness.

Hypothesis 4A: Readiness is positively related to change success.

Hypothesis 4B: Commitment is positively related to change success.

Hypothesis 5A: Readiness mediates the relation of people factors to change success.

Hypothesis 5B: Readiness mediates the relation of system quality factors to change success.

Hypothesis 5C: Readiness mediates the relation of project factors to change success.

Figure 3.3: Final Theoretical Model

4 Research Methods

4.1 Research Design

The research design consists of two parts, the collecting of quantitative survey data to test the model and the hypotheses as drawn up in chapter 3, and the collection of qualitative data to get a more complete picture of the role that a supplier could play in an implementation process of a new IT application.

4.1.1 Questionnaire

To test the model, two different surveys will be used, both of which will be filled out by their own target group. The target group of the first survey are the end users of the Metacom Online application, these end users work with the supplied application on a weekly basis. The purpose of the first survey was to gain insight into the variables that, according to end users, are important to consider the new application as successful.

The target group of the second survey are the project teams of the customers with which the employees of the supplier collaborated during the implementation process. This second target group does not necessarily have to work with the application after the implementation. The purpose of the second survey was to determine the variables that, according to the project team, are important to consider the implementation successful. In addition, the second survey was also used to ask qualitative questions to the project team, to determine the main bottlenecks in the entire implementation process. Both surveys contained various items to assess the different constructs that have been included in the theoretical model (figure 3.3).

Both surveys were sent simultaneously to the members of the project team. In the accompanying text, the project teams were asked to forward the survey for the end user to the end users of the application. This indirect approach to the end users was needed because the contact details of the end users were unknown. Ultimately, the email with the online surveys was sent successfully to 29 different companies. These companies had to meet the requirement that they had installed Metacom Online.These companies have all switched to Metacom Online in the last three years. This means that some already started the application four years ago and others only last year. However, the year of implementation was not included in this study, since most companies received updates from the application after the initial installation. The introduction to the survey

informed the respondent that the results would be analyzed and reported completely anonymously.

The period during which the respondents could reply was two weeks. After these two weeks it turned out that the response was too low, especially in the end user survey (N = 49, response rate companies = 41,4%). A reminder was then sent to the project teams with a request to resend the end-user survey and to inform them that the time to complete the survey was extended by one week. After this extension period there were 79 (response rate companies = 58,6%) respondents to continue with the research.

4.1.2 Qualitative data

In order to gain more insight into the problems, processes, relationships and possible solutions, qualitative data was collected from the customers. The customer data came from the project teams that were appointed by the customer to support the implementation of the application. Because it was impossible to speak to all these customers in person, due to time constraints, it was decided to approach them via the project team survey. Several open questions were included in the survey to gather additional information on various subjects. These topics were the responsibilities of the supplier and the customer during the change process, the satisfaction with the application as a whole, the most important factors to successfully complete a project, customer satisfaction and changes that Van Meijel should implement in order to achieve higher customer satisfaction.

4.2 Questionnaire Construction

The construction of the surveys consisted of three phases. In the first phase, based on the model variables, questions were drawn up based on questionnaires from previous studies. Thereafter, these questions were adapted to the specific situation of Metacom Online. The second phase consisted of formulating questions about model variables for which there was no measurement instrument available. These statements are partly based on discussions with employees of Van Meijel and partly on the description of the variables in the literature. The third phase is the translation of some questions into Dutch, because the participants in the surveys are all

Dutch-speaking. This procedure has been used for both the end-users survey (survey 1) and the project team survey (survey 2). This chapter describes for each survey how the initial choice of scales/questions has been made, which additional questions have been added and what the coding of a question was.

4.2.1 Content Survey End-User

The target group of survey 1 were the end users of Metacom Online. To keep the threshold for users low, an attempt was made to keep the time for completing the survey short, with a maximum of 10 minutes. This was decided because the end users are relatively 'far away' from Van Meijel and are therefore more difficult to reach. The consequence was that only a limited number of questions could be asked to employees.

There were open and closed questions in the survey. The answer options for the closed question were on a 5-point Likert scale, from (1) "Strongly disagree" to (5) "Strongly Agree", or a 7-point Likert scale, ranging from (1) "Strongly disagree" to (7) "Strongly agree". The scales were based on already validated scales from the literature. One answer option was added to all scales, namely the 'not applicable' option. This option was for questions that did not relate to the participant, so the participant was unable to answer the question. Appendix A.1 shows all the 62 items of the questionnaire.

General Variables

The questionnaire started with a number of general questions about participants' demographics. The general questions consisted of two open questions and two closed questions. The open questions related to the organization for which a participant works and what function that (s)he has. The closed questions were about the person's age and the number of years that an (s)he had been working at the current company.

People

The concept of *training* during the transition process was measured with a 5-point Likert scale from (1) "Strongly disagree" to (5) "Strongly Agree". Training was assessed with four items derived from Karim et al. (2007). Based on interviews, it was decided to split the question about the adequacy of the training into three sub-questions, to make a better distinction on the subject of adequacy. These questions are about the training's content and the outcomes of the training.

A typical question is "I have had enough time to follow training to work with Metacom Online". Self-efficacy was measured by two questions based on Holt et al. (2007). Answers were scored on a 7-point Likert Scale from (1) "Strongly disagree" to (7) "Strongly agree". An example item is "I can easily work with Metacom Online".

Affective, behavioral, and cognitive attitude toward change were all three measured with three items based on Dunham et al. (1989). Answers were scored on a 5-point Likert scale from (1) "Strongly disagree" to (5) "Strongly Agree". Typical items were "I don't like change" (affective), "Changes tend to stimulate me" (behavioral) and "Change usually benefits the organization" (cognitive).

System

System quality was measured with three items based on interviews with various employees of Van Meijel, because in the current literature there were no suitable questions about the quality of the system that was delivered to the end user. These items relate to user-friendliness, the errors and the layout of the application, assessed with a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". An typical item is "Metacom Online is user-friendly".

Project

Communication climate was measured with four items (Bouckenooghe et al., 2009) that were scored on a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". Based on interviews, it was decided to add one extra item to get a better understanding of communication climate. This question (1CC5) focused on the feedback processing, an important part of two-way communication. Because the concept of two-way communication will not be clear to everyone, it was decided to only include the feedback from employees in an additional question. The first step of two-way communication, providing complete and proper information to employees, was already included in questions 1CC1 and 1CC3. An example item is "The information I received about the transition to Metacom Online was clear".

The *benefits and rewards* were measured with two items that were scored on a 7-point Likert scale from (1) "Strongly disagree" to (7) "Strongly agree" and based on Holt et al. (2007). A typical item is "I expected that Metacom Online would made my work easier". *Need for change* was also measured with two items that were scored on a 7-point Likert scale, ranging from (1)

"Strongly disagree" to (7) "Strongly agree" and based on Holt et al. (2007). A example item is "Management gave clear reasons why we are switching to Metacom Online".

Change agent was measured with two items that were scored on a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". The questions arose from discussions with Van Meijel employees and were based on the description of the concept from the literature review. *Key people support* was measured with one item derived from Wang and Chen (2006) and scored on a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". In addition one extra item was added, based on the interviews with Van Meijel employees, because there were no suitable questions in the current literature about convincing colleagues, one of the characteristics of key people support. The added item was "There were people in my team who were able to convince me that Metacom Online is the best new way of working".

Top management support was assessed with three items of which two were derived from Karim et al. (2007) and one was based on Wang and Chen (2006). Answers were scored on a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". An example item was "The management was enthusiastic about Metacom Online". One extra item was added, because it is also important to investigate the availability of resources from management. The added item was "The management provided sufficient resources to implement the Metacom Online implementation".

Readiness to Change

The measurement of *individual readiness* to change was based on the research of Bouckenooghe et al. (2009). The three items were scored on a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". A typical item is "I want like to put energy into Metacom Online to make it a success". *Organisational readiness* was measured with three items and answered on a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree" based on Claiborne et al. (2013). An example item is "My colleagues were open to working with Metacom online".

Commitment to Change

Affective, normative and continuance commitment were all measured with three items that were scored on a 7-point Likert scale, ranging from (1) "Strongly disagree" to (7) "Strongly agree",

derived from Herscovitch and Meyer (2002). Typical example items are; "I did not find the change to Metacom Online necessary" (affective), "I felt pressure to go along with the change to Metacom Online" (continuance) and "I would have felt guilty if I had opposed Metacom Online" (normative).

Change Success

The *satisfaction of the end users* was measured with one item added by the researcher himself and three items derived from (Bouckenooghe et al., 2009). The first four items were measured with a 5-point Likert scale, ranging from (1) "Strongly disagree" to (5) "Strongly agree". An example item of the researcher is "I am satisfied with Metacom Online" and an example item derived from Bouckenooghe et al. (2009) is "Metacom Online makes my work easier". The last item was an open question, where a total score had to be given to the implementation (score option between 1 and 10), the *performance score*. This performance score will probably lead to an interesting insight into whether the implementation is perceived successful or not, because the score is broader than just agreeing or disagreeing.

There were no questions about provider quality and implementation plan in the survey for end users. The reason for this is that end users have had little or no contact with Van Meijel employees. As a result, it is not relevant to ask questions about the performance of Van Meijel's consultants. These questions will therefore only be asked to the project team, because this group of participants has spent enough time with the consultants to have a grounded opinion on provider quality. The implementation plan is drafted by the project team, the end users has no influence on this. Therefore these questions were only asked to the project team members.

4.2.2 Questions Survey Project team

The second survey was targeted at the project team of a company with which Van Meijel has collaborated to implement the application. These participants were in close contact with the employees of van Meijel for a period and were therefore suitable to provide more insight into the actual implementation process. The questions in the survey consisted of open and closed questions. The answer options for the closed question were on a 5-point Likert scale, from (1) "Strongly disagree" to (5) "Strongly Agree", or a 7-point Likert scale, ranging from (1) "Strongly disagree" to (7) "Strongly agree". The scales were based on already validated scales from the

literature. One answer option was added to all scales, namely the 'not applicable' option. The open questions were added to gain more insight into the entire process. The open questions served to enable the participants to express themselves in more detail about the items of the questionnaire and to better indicate which aspects they consider important for a change to succeed. Appendix A.2 shows the questions asked in the survey. For the open questions there is the symbol quotation mark (") behind the code, reversely-coded questions are indicated with an asterisk. The survey contained a total of 80 items.

General Variables

The questionnaire started with four items about participants' demographics and four items about their product knowledge. The first two items relate to the company and the function of the participant. The next questions asked for the person's age and the numbers of years that the participant has worked for his/her company. The last four questions were about the differences between and the definitions of the two products Metacom and Metacom Online, to investigate how customers relate these products to each other and whether they know the function of the products.

People

The concept *training* was assessed with four items derived from Karim et al. (2007). Answers were scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". Based on the interviews, it was decided to split the question about the adequacy of the training into three sub-questions, to get more detailed information on the subject of adequacy. These questions are about the training's content, and the outcomes of the training. A typical question is "The training was of a high level".

System Quality

The concept *system quality* was assesed with open and closed questions. First, open questions were asked about whether the participant was satisfied with the work delivered or not. The participants were asked to substantiate this. This allows each participant to form their own opinion about why (s)he was satisfied. Further, system quality was measured with four items scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree" based on Wang and Chen (2006). Four questions were added in order to get insights in to the topics of user-friendliness, expectation management and errors. Interviews with Van Meijel employees

have shown that these topics were seen as important, so it is useful to investigate these further. A example question is "Metacom Online performs its tasks as required".

Project

Responsibilities were measured with open questions only, the purpose of which is to find out how the most important tasks were divided between the client and Van Meijel during the entire implementation process. An example item is "What responsibilities did you have as an organization when implementing Metacom Online". The concept *project management* was measured with two items and scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". An example item is "The project techniques used to make the project a success are the right ones". *Time frame* was measured with one item and scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". Both the time frame and project management items were derived from Karim et al. (2007). The concept *benchmark* was measured with one item, and was develop for this research, because no suitable question could be found in previous studies. The item is "There were clear milestones in the implementation process of Metacom Online". *Teamwork and cohesion* were assessed with two items derived from Bouckenooghe et al. (2009). One question was added in order to investigate the cooperation between the project team of the customer and the employees' of Van Meijel. Answers were scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". A typical question is "I found it difficult to ask the project team for help".

Communication climate was measured with three items based on Bouckenooghe et al. (2009). A typical item is "The communication about Metacom Online from the organization to employees was clear". The questions about communication with Van Meijel employees were added to get more information on the clarity and flexibility with which Van Meijel employees communicated with a customer (2CM1 and 2CM2). Several Van Meijel employees have indicated that this is sometimes a problem, but they do not have concrete examples and proof of it, therefore it could be interesting to ask for it. Answers were scored on a 5-points Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". *Need for change* was measured with a two-item scale based on Holt et al. (2007), that were scored on a 7-point Likert scale ranging from (1) "Strongly disagree" to (7) "Strongly agree". An example item is "The reasons for working with Metacom Online were clear".

Provider quality is measured with eleven items, two of which were derived from Karim et al. (2007) and nine that were based on Wang and Chen (2006). Answers were scored on a 5-points Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". These items related to the working methods and actions of Van Meijel consultants. A typical item is "The consultants treated us with respect".

Readiness to Change

Individual readiness to change was measured with a three items scale based on Bouckenooghe et al. (2009), and scored on a 5-points Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". An example question is "I wanted to put energy into Metacom Online to make it a success". *Organizational readiness* to change was measured with three items and scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree" derived from Claiborne et al. (2013). A typical question is "Colleagues understood how the introduction of Metacom Online could contribute to an improved quality of our work".

Commitment to Change

Commitment to change was measured with three sets of three items to determine the *affective, continuance and the normative commitment* that were derived from Herscovitch and Meyer (2002), and were scored on a 7-point Likert scale ranging from (1) "Strongly disagree" to (7) "Strongly agree". Example items are "I did not find the change to Metacom Online necessary" (affective), "I felt it is risky to speak out against Metacom Online" (continuance) and "I would have felt guilty if I had opposed Metacom Online" (normative).

Change Success

General success was measured with five open questions, to determine participants' view on successful implementations and whether this is the case with the implementation of Metacom Online. *Change success* was measured with two items derived from Karim et al. (2007) and three items derived from Bouckenooghe et al. (2009). One item was added in order to determine the general level of satisfaction. Answers were scored on a 5-point Likert scale ranging from (1) "Strongly disagree" to (5) "Strongly agree". An example item is "Metacom Online has improved our operational quality". Also, an open question was added to assess the overall process of implementation (score range between 1 and 10), the *performance score*. The customer satisfaction was measured with two open questions. The first item determined the most important factors of customer

satisfaction. The second question provided insight into the actions that Van Meijel could take to increase customer satisfaction.

In the second survey, several subjects that were included in the model were missing. The topics self-efficacy , employee support and attitude were not included in this survey, because they mainly play a role with the end users. The employees in the project team will usually not be working with the new application themselves, so it is less important for them to feel that they can work with it. Questions about top management support are also missing in this survey. The reason for this is that the project team itself often consists of managers of the client organization.

4.3 Missing and Odd values

Before the data could be analyzed, it was investigated whether there were no missing values, outliers or unrealistic values. The survey of end users was completed by 79 respondents. Five of the 79 respondents stopped answering questions having completed only half of the questionnaire. These five respondents have therefore been removed from the data set. One of the respondents only responded with "not applicable", and was therefore also removed from the data set. So the final end user data set contains of 73 respondents.

The survey for the project teams was completed by 32 respondents. Two of these 32 respondents stopped halfway through the survey and were therefore omitted from the data set. A respondent answered all questions with true values but indicated in the open questions that (s)he had never been involved with Metacom Online. Therefore this respondent was removed from the data set. So the final project team data set contains of 29 respondents.

4.4 Internal Consistency of the Scales

Both questionnaires consisted of sets of items that measure constructs. Because these constructs were assessed by at least two items, it was important to establish the internal consistency of the measures. The internal consistency of a two item scale was indicated by the inter-item correlation and the internal consistency of three of more item scales was indicated by the Cronbach alpha.

The inter-item correlation must have a value within the range of .15 and .50 (Clark and Watson, 1995). The closer the correlation score was to value 1, the more similar the items were. To get a reliable measurement, it was not desirable to build a construct from items that had too much similarity (Clark and Watson, 1995; Cronbach, 1951). The Cronbach alpha (α) must have a score between 0 and 1 (Tavakol and Dennick, 2011). The α must had a value of at least .7 to be considered good (Tavakol and Dennick, 2011). Values between .6 and .7 are questionable and values lower than .6 are a low or even unacceptable ($\alpha < .5$) (Tavakol and Dennick, 2011).

4.4.1 Construct reliability end user

Table 4.1 presents the values of the Cronbach alpha and the inter-item correlation for the constructs of the end users. All constructs with an $\alpha > .60$ (Churchill, 1979; Bland and Altman, 1997) or an inter-item correlation between range .15 and .50 met the minimum acceptable reliability (Clark and Watson, 1995). The table showed that the constructs self-efficacy, benefits and rewards, key people support, individual readiness and normative commitment did not meet this requirement. This section describes how these constructs are included in the research.

Table 4.1: Construct reliability end users

Construct	Number of items	Cronbach Alpha	Inter-Item Correlation
Training	4	.74	
Self efficacy	1		
Affective attitude	3	.84	
Behavioral attitude	3	.66	
Cognitive attitude	3	.70	
System quality	3	.63	
Communication climate	5	.81	
Need for change	2		.35
Change agent	2		.31
Key people support	1		
Management support	4	.77	
Readiness	6	.78	
Affective commitment	3	.84	
Customer Satisfaction	5	.83	

People

The construct *self-efficacy* had an inter-item correlation score of .91. This score suggests that the two items of this construct had too many similarities, therefore it was decided to use only

the item 1SE1 to measure the self-efficacy. The reason therefore is that construct 1SE1 better fits the definition of self-efficacy.

Project

The inter-item correlation score of the construct *benefits and rewards* (.07) indicated that the items did not measure the same construct, therefore both items were omitted from the study. The construct *key people support* had a negative and low inter-item correlation score (-.09). To measured this construct, item 1KS1 was omitted from the rest of this analysis, because construct 1KS2 better fits the definition of key people support.

Readiness

Individual readiness had an α of .58. Deleting an item was not possible because the inter-item correlation score becomes too high. Because the individual readiness and the organizational readiness resulted in the same latent construct readiness, the total α of the six readiness items was calculated. This α had a score of .78, therefore the items of individual and organizational readiness will be merged into one *readiness* construct.

Commitment

Normative commitment had an α of .59, if an item was deleted, the inter-item score was slight too high to be reliable (inter-item score $>$ .63). Merging with affective and continuance commitment were also not an option because the α was .03. The construct normative commitment will therefore not be included in the study. Also the construct *continuance commitment* is removed due to issue in project team questionnaire.

4.4.2 Construct reliability project team

Table 4.2 gave the values of the Cronbach alpha and the inter-item correlation for the constructs of the end users. All constructs with an $\alpha >$ .60 (Churchill, 1979; Bland and Altman, 1997) or an inter-item correlation between range .15 and .50 are included in the analysis (Clark and Watson, 1995). The table showed that the organizational readiness and continuance commitment constructs have an $\alpha <$ .6. This section describes how these constructs are included in the research.

Readiness

The Cronbach alpha of *organizational readiness* was .03. For the end users, the items from individual and organizational readiness were combined to obtain a reliable construct. To create homogeneity in the analysis, the items of individual and organizational readiness were also merged for the project team data set. This combined scale had an α-value of .63, which makes it above the cut-off and acceptable.

Commitment

Normative commitment was removed from the analysis for the project team, despite an α of .65. Because the normative commitment was not reliable with for end users, as much homogeneity as possible was complied between the same constructs of the surveys, normative commitment was omitted from the project team. The Cronbach alpha of *continuance commitment* was .42. After removing item 2CC2, the inter-item correlation score was .35. This score fell within the set range and therefore the construct continuance commitment consisted of items 2CC1 and 2CC3. However, to get homogeneity in the analysis, the end-user continuity commitment will therefore now only consist of the items 1CC1 and 1CC3. The inter-item score of these new combined two items was .72. This score was too high. Because the merging of the three components of commitment was already excluded by the end user data, the construct continuance commitment were removed from the model. This applies to both the end users and the project team.

Table 4.2: Construct reliability project team

Construct	Number of items	Cronbach Alpha	Inter-Item Correlation
Training	4	.61	
System quality	8	.80	
Project management	2		.28
Teamwork	3	.65	
Time frame	1		
Benchmark	1		
Communication climate	3	.67	
Communication Van Meijel	2		.15
Need for change	2		.21
Provider quality	11	.84	
Readiness	6	.63	
Affective commitment	3	.82	
Change success	7	.72	

5 Results

This chapter presents the results of analyzing the survey of the end users and the project teams, as well as the findings with respect to the open questions.

5.1 Descriptive statistics

The end users survey was completed by 73 respondents (17 companies, response rate = 58,6%). Of these 73 people, three respondents entered the answer "not applicable" for at least one item. These answers have been replaced by the sample's average score for this variable, so that 73 respondents can be used for the entire study. The project team survey was completed by 29 respondents (19 companies, response rate companies = 65,5%). Two of the 29 respondents indicated that the construct training did not apply. These answers have been replaced by the sample's average score for training, so 29 respondents can be used for the analysis.

Table 5.1: One way Anova test End Users and Project Teams

Construct	End users F-Value (16,56)	p-value	Project Team F-Value (18,10)	p-value
Training	2.06	.03*	1.47	0.29
Self-efficacy	2.02	.03*	-	-
Affective Attitude	1.29	.24	-	-
Behavioral Attitude	1.40	.18	-	-
Cognitive Attitude	3.04	.00***	-	-
System Quality	3.41	.00***	2.69	.06
Communication Climate	1.00	.47	1.32	.34
Communication Supplier	-	-	0.79	.68
Need for Change	2.56	.01**	0.40	.96
Change Agent	0.58	.88	-	-
Key People Support	2.20	.02*	-	-
Management Support	2.03	.03*	-	-
Time Frame	-	-		
Benchmarks	-	-	2.11	.12
Teamwork			0.58	.85
Project Management	-	-	1.63	.22
Provider Quality	-	-	1.44	.28
Readiness	2.43	.01**	1.12	.44
Affective Commitment	2.64	.00**	0.93	.58
Customer Satisfaction	3.07	.00***	0.86	.63
Performance Score	1.80	.06	1.15	.43

* p < .05 (2-tailed)
** p < .01 (2-tailed)
*** p < .001 (2-tailed)

An Anova test was conducted to investigate whether there are significant differences between the respondents of the different companies (Table 5.1). The Anova test indicates that there are no significant differences between the respondents for the different companies of the project teams. However, the analysis indicates that there are significant differences between companies for the end users. There is a significant difference in the means of the constructs *training* (p = .03), *self-efficacy* (p = .03), *cognitive attitude* (p < .001), *system quality* (p < .001), *need for change* (p = .01), *key people support* (p = .02), *management support* (p = .03), *readiness* (p = .01), *affective commitment* (p = .002) and *customer satisfaction* (p < .001)) of the companies.

To determine whether the groups of end users and project teams differ, the average values of these groups are compared with each other. The t-test analysis can be used to determine whether the two groups differ significantly from each other in their scores on the different constructs. If they do indeed differ from each other, it is justified to make a distinction between these groups. Table 5.2 shows the means, standard deviation and the results of the t-test of the variables.

Table 5.2: Mean, standard deviations and significant differences of the end users and project teams variable score

Variable	M end users	M project teams	p-difference
Training	2.68 ($SD = 0.55$)	3.20 ($SD = 0.48$)	.00***
Self-efficacy	4.78 ($SD = 1.46$)	-	-
Affective Attitude	1.89 ($SD = 0.72$)	-	-
Behavioral Attitude	3.47 ($SD = 0.53$)	-	-
Cognitive Attitude	3.68 ($SD = 0.48$)	-	-
System Quality	3.14 ($SD = 0.63$)	3.28 ($SD = 0.52$))	.30
Communication Climate	2.91 ($SD = 0.72$)	3.71 ($SD = 0.55$)	.00***
Communication Supplier	-	3.24 ($SD = 0.69$)	-
Need for Change	5.26 ($SD = 1.12$)	5.43 ($SD = 1.00$)	.48
Change Agent	3.56 ($SD = 0.75$)	-	-
Key People Support	3.29 ($SD = 0.78$)	-	-
Management support	3.50 ($SD = 0.65$)	-	-
Time frame	-	3.21 ($SD = 1.01$)	-
Benchmarks	-	3.38 ($SD = 0.73$)	-
Teamwork	-	3.75 ($SD = 0.60$)	-
Project Management	-	3.72 ($SD = 0.64$)	-
Provider Quality	-	3.67 ($SD = 0.48$)	-
Readiness	3.35 ($SD = 0.64$)	4.02 ($SD = 0.35$)	.00***
Affective Commitment	5.46 ($SD = 1.01$)	5.84 ($SD = 0.74$)	.07
Customer Satisfaction	3.57 ($SD = 0.61$)	3.84 ($SD = 0.44$)	.04*
Performance Score	6.51 ($SD = 1.11$)	6.72 ($SD = 1.10$)	.37

* $p < .05$ (2-tailed)
** $p < .01$ (2-tailed)
*** $p < .001$ (2-tailed)

The average age of the respondents to the surveys of the end users was 39.55 years ($SD = 9.10$) and for the project team survey the average age was 39.28 ($SD = 7.97$), this difference is not significant (p = .89). The average number of years that a respondent works at his company is about three years higher for end users ($Me = 10.25$, $SD = 7.20$) than for the project team members ($Mp = 7.34$, $SD = 6.53$), but this difference is also not significant (p = .06).

People

On average, end users score *training* ($Me = 2.68$, $SD = 0.55$) significantly (p < .001) lower than project team respondents ($Mp = 3.20$, $SD = 0.48$). This suggests that the members of the project team estimate the training courses to be of a better quality than the end users do. The standard deviation of self-efficacy ($Me = 4.78$, $SD = 1.46$, *maximum score* = 7, *minimun score* = 2) implies that there is a large difference between respondents in the end users group.

The low average score of *affective attitude* ($Me = 1.89$, $SD = 0.72$) suggests that the respondents are generally not very opposed to changes. The behavioral ($Me = 3.47$, $SD = 0.53$) and cognitive ($Me = 3.68$, $SD = 0.48$) attitude scores, on the other hand, show that respondents generally see changes as improvement.

System Quality

The average score of *system quality* indicates that both the end users ($Me = 3.14$, $SD = 0.63$) and the project teams ($Mp = 3.28$, $SD = 0.52$) are not exceptionally positive or negative about the quality of the system. There is no significant (p = .30) difference between the two groups, which indicates that they experience roughly the same level of quality.

Project

The average score for *communication climate* is lower for the end users ($Me = 2.91$, $SD = 0.72$) than for the project teams ($Mp = 3.71$, $SD = 0.55$). This difference is significant (p < .001). The project teams rate communication about the change significantly more positive than the end users. The project teams experience the quality of the communication with the supplier ($Mp = 3.24$, $SD = 0.69$) as average.

The *need for change* score of the end users ($Me = 5.26$, $SD = 1.12$) and the project teams ($Mp = 5.43$, $SD = 1.00$) is both relatively high. The difference between the groups is not significant

(p = .48). Moreover, the standard deviations for both groups are also relatively high, which indicates a large difference between respondents within each group

The end users are slightly positive about *change agent* ($Me = 3.56$, $SD = 0.75$), *key people support* ($Me = 3.29$, $SD = 0.78$) and *management support* ($Me = 3.50$, $SD = 0.65$). The project teams are slightly positive about *time frame* ($Mp = 3.21$, $SD = 1.01$), *benchmarks* ($Mp = 3.38$, $SD = 0.73$) and quite positive about *teamwork* ($Mp = 3.75$, $SD = 0.60$), *project management* ($Mp = 3.72$, $SD = 0.64$) and *provider quality* ($Mp = 3.67$, $SD = 0.48$). The standard deviation of time frame is quite high, which indicates quite large differences between respondents of the project teams. It is striking that the minimum answer value is 1 and the maximum 5, so the respondents rate the time frame over the entire score range.

Readiness

The average score of *readiness* is significantly higher (p < .001) for the project teams ($Mp = 4.02$, $SD = 0.35$) than for the end users ($Me = 3.35$, $SD = 0.64$). The end users do not have a very strong readiness to change, in contrast to the project teams. A reason for this may be that the members of the project teams are involved in the change from the beginning and the end users only at a later stage.

Commitment

The average values of *affective commitment* are slightly higher for the project teams ($Mp = 5.84$, $SD = 0.74$) than for the end users ($Me = 5.46$, $SD = 1.01$). However, there is no significant (p = .07) difference between the two groups, which indicates that they have about the same level of affective commitment. Both groups are positive about the added value of the new application and therefore want to help make the change a success. The standard deviation of the end users is slightly higher than that of project team members.

Change success

The project teams ($Mp = 3.84$, $SD = 0.44$) are slightly more positive about the *success of the change* than the end users ($Me = 3.57$, $SD = 0.61$). This difference is significant (p = .04). The *performance score* for the entire change process is also higher for the project teams ($Mp = 6.72$, $SD = 1.10$) than for the end users ($Me = 6.51$, $SD = 1.11$). There is no significant (p = .37) difference between the to groups, which indicates that they experience roughly the same level

of performance. However, this score shows a relatively high standard deviation in both groups, which indicates quite large differences between respondents in each group. Some respondents rate the performance as insufficient, with a lowest score of 4, and some others as more than sufficient, with a maximum score of 8.

All in all, it appears that the scores of variables *training*, *communication climate*, *readiness* and *customer satisfaction* differ significantly between the end users and project teams of respondents (Table 5.2).

5.2   Correlations

Tables 5.3 and 5.4 respectively show the correlation matrix of constructs for the end users and the project team. Figure 3.3 shows the hypothesized relations between constructs. In this sector the bivariate correlations are analyzed, by using the program IBM SPSS 26, before a regression analysis takes place.

5.2.1   Correlations End users

People factors and Readiness

Four people factors are significantly positively related to readiness. These factors are *training* ($r = .39$, $p < .01$), *self-efficacy* ($r = .69$, $p < .01$), *behavioral attitude* ($r = .39$, $p < .01$) and *cognitive attitude* ($r =. 52$, $p < .01$). The factor *affective attitude* is not significantly correlated with readiness. All correlations are positive, which means that when the score on one of these independent variables increased, the score on readiness also increased.

System factor and Readiness

The system factor *system quality* is significantly positively related to readiness ($r = .73$, $p < .01$), which means that when the score on system quality increased, the score on readiness also increased.

Project factors and Readiness

The only factor of employee support that is significantly positively related to readiness is *change*

agent (r = .62, p < .01). The factor *key people support* is not significantly correlated with readiness. The factors *communication climate* (r = .47, p < .01) and *need for change* (r = .59, p < .01) are both significantly positively correlated with readiness. *Management support* is also positively related to readiness (r = .68, p < .01).

Readiness, Commitment and Change success
Readiness is significantly positively correlated with affective commitment (r = .82, p < .01), which is a very high correlation. Furthermore *readiness* is significantly positively correlated with customer satisfaction (r = .73, p < .01) and with performance score (r = .41, p < .01).

Affective commitment is significantly positively correlated with customer satisfaction (r = .83, p < .01) and with performance score (r = .64, p < .01). This means that when the score on affective commitment increased, the scores on customer satisfaction and on performance also increased.

To summarize, the variables *training, self-efficacy, behavioral attitude, cognitive attitude, system quality, change agent, comminucation climate, need for change and management* support are all positively correlated with *readiness*. *Readiness* is positively correlated with *affective commitment, customer satisfaction* and *performance*. *Affective commitment* is positively correlated with *customer satisfaction* and *performance*.

5.2.2   Correlations Project Team

People, System, Project factors and Readiness
According to table 5.4 none of the people, system and project factors is significantly correlated with readiness.

Readiness, Commitment and Change success
Readiness is significantly positively correlated with customer satisfaction (r = .37, p < .05). Readiness is not significant correlated with affective commitment and with performance score. *Affective commitment* is not significantly correlated with change success and with performance score.

The analysis of the correlations of the project teams show that there are almost no significant

relationships between the model variables in figure 3.3. A possible cause of this may be the very low number of respondents. Therefore the survey results of the project teams will not be included in the further analysis of the research model. Because the effect size is independent of the sample size, the most notable correlations of the project teams will be discussed below.

The correlation analysis shows that the variables *training* (r = .31), *communication climate* (r = .36) and *need for change* (r = .36) are clearly positively correlated with readiness. It is remarkable, however, that the variables *timeframe* (r = -.18), *benchmarks* (r = -.12) and *communication supplier* (r = -.12) are negatively correlated with readiness, although this correlation is low. This means that when the score of one of these latter variables increased, the readiness decreased.

Affective commitment is positively correlated with customer satisfaction (r = .34), but is negatively correlated with performance score (r = -.28). This is inconsistent with the results of the correlation analysis of end users, where *affective commitment* is positively correlated with performance score (r = .64). However, just like for end users, *readiness* is positively correlated with performance score (r = .12).

Table 5.3: Means, standard deviation and correlation end user constructs (N = 73)

		N	M	SD	Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Training	73	2.68	0.55	1-5	1														
2.	Self-Efficacy	73	4.78	1.46	1-7	.30*	1													
3.	Affective Attitude	73	1.89	0.72	1-5	-.47**	-.04	1												
4.	Behavioral Attitude	73	3.47	0.53	1-5	.44**	.23*	-.65**	1											
5.	Cognitive Attitude	73	3.68	0.48	1-5	.42**	.54**	-.40**	-.50**	1										
6.	System Quality	73	3.14	0.63	1-5	.30**	.62**	-.11	.38**	.59**	1									
7.	Communication Climate	73	2.91	0.72	1-5	.41**	.40**	-.04	.12	.25*	.11	1								
8.	Need for Change	73	5.26	1.12	1-7	.40**	.61**	-.25*	.26*	.67**	.48**	.38**	1							
9.	Change Agent	73	3.56	0.75	1-5	.27*	.50**	-.23	.24*	.37**	.28*	.44**	.38**	1						
10.	Key People support	73	3.29	0.78	1-5	.03	.34**	.17	-.03	.00	.20	.17	.05	.21	1					
11.	Management Support	73	3.50	0.65	1-5	.51**	.49**	.09	.22	.50**	.48**	.61**	.43**	.41**	.33**	1				
12.	Readiness	73	3.35	0.64	1-5	.39**	.69**	-.03	.39**	.52**	.73**	.47**	.59**	.62**	.22	.68**	1			
13.	Affective Commitment	73	5.46	1.01	1-7	.45**	.82**	-.24*	.41**	.67**	.65**	.53**	.70**	.63**	.20	.60**	.82**	1		
14.	Customer Satisfaction	73	3.57	0.61	1-5	.43**	.78**	-.22	.38**	.61**	.74**	.39**	.58**	.60**	.27*	.55**	.73**	.83**	1	
15.	Performance score	73	6.51	1.11	1-10	.25*	.62**	-.13	-.07	.40**	.19	.53**	.46**	.68**	.27*	.41**	.41**	.64**	.58**	1

*p < .05 (2-tailed)
**p <.01 (2-tailed)

Table 5.4: Means, standard deviation and correlation project team constructs (N=29)

		N	Mean	SD	Range	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Training	29	3.20	0.48	1-5	1													
2.	System Quality	29	3.28	0.52	1-5	-.20	1												
3.	Project Management	29	3.72	0.64	1-5	-.32	.37*	1											
4.	Teamwork	29	3.75	0.60	1-5	-.01	.12	.62**	1										
5.	Timeframe	29	3.21	1.01	1-5	-.23	.32	.26	.36	1									
6.	Benchmarks	29	3.38	0.73	1-5	-.21	.30	.35	.42*	.47**	1								
7.	Communication Climate	29	3.71	0.55	1-5	-.06	.23	.40*	.08	.07	.19	1							
8.	Communication Supplier	29	3.24	0.69	1-5	.03	.34	.71*	.65**	.49**	.49**	.06	1						
9.	Need for Change	29	5.43	1.00	1-7	.47*	.09	.05	-.21	-.29	.04	.12	.18	1					
10.	Provider Quality	29	3.67	0.48	1-5	-.03	.17	.56**	.60**	.38*	.31	-.11	.58**	.06	1				
11.	Readiness	29	4.02	0.35	1-5	.31	.05	.09	.03	-.18	-.12	.36	-.12	.36	.11	1			
12.	Affective Commitment	29	5.84	0.74	1-7	.43*	.13	-.05	-.05	-.07	-.08	.46*	.07	.50**	-.17	.33	1		
13.	Customer Satisfaction	29	3.84	0.44	1-5	-.11	.68**	.33	.38*	.34	.34	.40*	.29	.15	.34	.37*	.34	1	
14.	Performance score	29	6.72	1.10	1-10	-.18	.59**	.40*	.45*	.41*	.18	-.21	.45*	-.10	.64**	.12	-.28	.52**	1

*p <.05 (2-tailed)
**p <.01 (2-tailed)

5.3   Regression analysis end users

The regression analysis for the end users was performed based on the results of the correlation analysis. The independent variables which have a significant relationship to the dependent variable readiness were entered as independent variables in the regression analysis. After this, a structural equation model (SEM) analysis, using the IBM SPSS AMOS 26 program, was performed. The SEM analysis also tested the mediation effects of readiness in the relationship between the significant independent variables and the dependent variables customer satisfaction and performance score. Figure 5.1 and 5.2 and table 5.5 shows the final model with regression results.
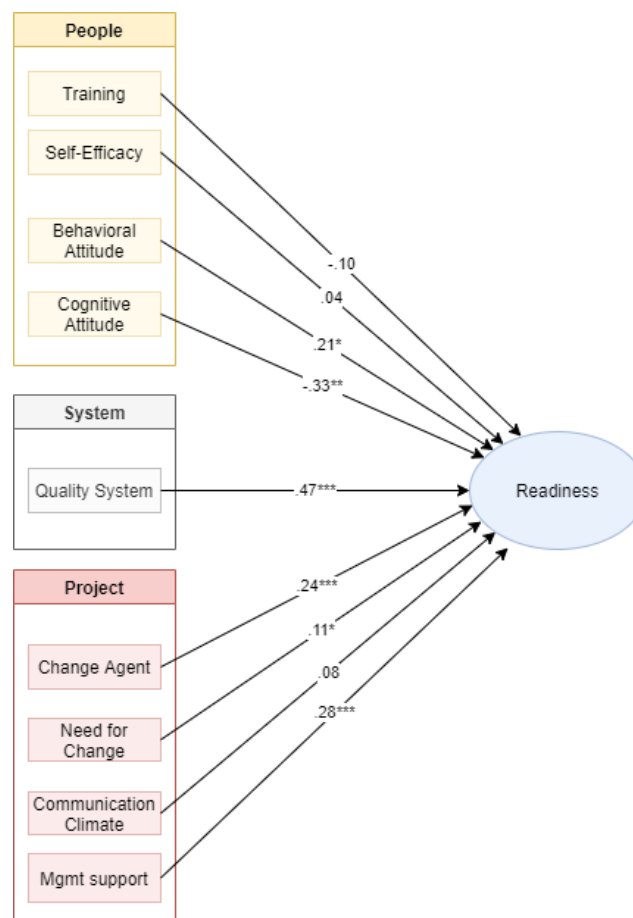

Figure 5.1: Regression Analysis of the final end users model part 1

The input of the regression analysis for the end users consisted of nine different independent variables. The method that was used was the forced entry, so all nine independent variables

Table 5.5: Multiple regression analyse independent variables people, system, and project and dependent variable readiness end users

Level of restriction	t	p	β	F	df	p	adj. R^2
Overall Model				33.65	9, 62	.000***	0.81
(constant)	-0.71	0.48	-0.22				
Training	-1.22	0.23	-0.10				
Self-efficacy	1.11	0.27	0.04				
Behavioural Attitude	2.51	0.02*	0.21				
Cognitive Attitude	-2.86	0.01**	-0.33				
System Quality	5.77	0.00***	0.47				
Communication Climate	1.22	0.23	0.08				
Need for Change	2.44	0.02*	0.11				
Change Agent	4.23	0.00***	0.24				
Management Support	3.42	0.00***	0.28				
* p < .05 (2-tailed)							
** p < .01 (2-tailed)							
*** p < .001 (2-tailed)							

were entered into the model in one step to analyze which still have a significant relationship with the dependent variable readiness. Table 5.5 shows that the overall model is significant ($F(9, 62)$ = 33.65, p < .001, R^2 = 0.81) and that six independent variables are significant predictors of readiness, namely *behavioral attitude* (β = 0.21, p = .02), *cognitive attitude* (β = -.33, p < .01), *system quality* (β = 0.47, p < .001), *need for change* (β = 0.11 p = .02), *change agent* (β = 0.24, p < .001) and *management support* (β = 0.28 p < .001).

5.3.1 Regression analysis people, system, and project

People

The regression analysis shows that *training* and *self-efficacy* are no significant predictors of readiness anymore. Therefore hypotheses 1A1 and 1A2, stating that training and self-efficacy are positively related to readiness, are both rejected. Therefore, the overall hypothesis (H1A) that knowledge and skills are positively related to readiness is rejected (Table 5.6).

Behavioral attitude is significantly positively related to readiness (β = 0.21, p = .02), so hypothesis 1B1 is confirmed. Cognitive attitude is also significantly related to readiness, only this relationship is now negative (β = -.33, p < .01). However, as the correlation analysis revealed that cognitive attitude is significantly positively related to readiness, this negative sign is probably a statistical artefact, the suppressor effect. This means that hypothesis (1B2) that there is a positive relation between cognitive attitude and readiness is rejected. *Affective attitude* is not

significantly related to readiness (Table 5.3) and therefore hypothesis 1B1 is rejected. As a result the general hypothesis that the independent variables of attitude have a positive relationship to readiness can only partly be confirmed, because only behavioral attitude is significant positively related to readiness (Table 5.6).

System

System quality is a significant positive predictor of readiness ($\beta = 0.47$, p $< .001$), so hypothesis 2A is confirmed.

Project

Change agent is significantly positively related to readiness ($\beta = 0.24$, p $< .001$), so hypothesis 3A1 is accepted. *Key people support* is not significant related to readiness (Table 5.3). Therefore, hypothesis 3A2 is rejected. As a result, hypothesis 3A, the independent variables of employee support are positively related to readiness, is partly confirmed (Table 5.6).

Hypothesis 3B, the communication independent variables are positively related to readiness, is also party accepted. Only the factor need for change is significantly positively related to readiness ($\beta = 0.11$ p $= .02$), so hypothesis 3B3 is confirmed. The independent variable *communication climate* is positively correlated with readiness but is not significantly related to readiness in the regression analysis (Table 5.5). So, hypothesis 3B1 is rejected. *Benefits and rewards* turned out to be an unreliable construct (chapter 4.4), and therefore hypothesis 3B2 cannot be tested.

Management support is significantly positively related to readiness ($\beta = 0.28$ p $< .001$), so hypothesis 3C is accepted (Table 5.6).

5.3.2   Regression analysis readiness, commitment and change success

Table 5.7 and figure 5.2 show the results of the regression analysis between the independent variables, readiness and affective commitment, and the dependent variables performance and customer satisfaction. The hierarchical regression method was used to determine the relationships between these independent and dependent variables. The independent variable readiness was added first to the model, after which affective commitment was added to the model.

Table 5.6: Hypothesis results variables People, System and Project end users

Hypothesis	Description	Confirmed
1A	Knowledge and skills → readiness (+)	No
1A1	*Training → readiness (+)*	*No*
1A2	*Self-efficacy → readiness (+)*	*No*
1B	Attitude → readiness (+)	Partly, only behavioral attitude
1B1	*Affective attitude → readiness (+)*	*No*
1B2	*Behavioral attitude → readiness (+)*	*Yes*
1B3	*Cognitive attitude → readiness (+)*	*No*
2A	System Quality → readiness (+)	Yes
3A	Employee support → readiness (+)	Partly, only change agent
3A1	*Change agent → readiness (+)*	*Yes*
3A2	*Key people support → readiness (+)*	*No*
3B	Communication → readiness (+)	Partly, only need for change
3B1	*Communication climate → readiness (+)*	*No*
3B2	*Benefits and rewards → readiness (+)*	*Not tested*
3B3	*Need for change → readiness (+)*	*Yes*
3C	Top Management → readiness (+)	Yes

Readiness is positively significantly related to customer satisfaction ($\beta = 0.69$, p $<$ .00), if only this independent variable is included in the model. When the independent variable affective commitment is also included in the model, readiness is not significantly related to customer satisfaction anymore ($\beta = 0.14$, p $<$ .22). This positive relationship is the cause of a statistical artifact, which is probably caused by the strong correlation (r = .81) between readiness and affective commitment (Table 5.3). The VIF score between readiness and affective commitment is 3.11. In general, VIFs scores of 2.5 or higher are considered as an indication of multicollinearity, meaning that it becomes more difficult to distinguish the independent contribution from the variables (Johnston et al., 2018). Therefore hypothesis 4A1 is only supported for the model of one independent variable.
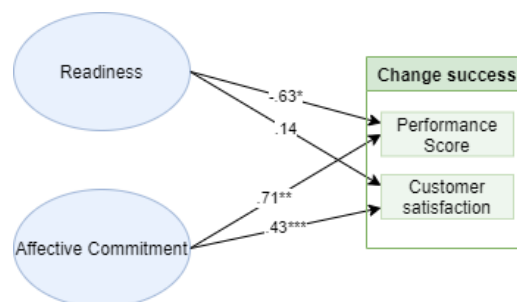

Figure 5.2: Regression Analysis of the final end users model part 2

Table 5.8 shows that *readiness* is significantly positively related to performance ($\beta = 0.71$, p < .001), if only this independent variable is included in the model. When the independent variable affective commitment is also included in the model, readiness is negatively significantly related to performance ($\beta = -0.63$, p < .02). This negative relationship is probably the cause of a statistical artifact, which maybe caused by the strong correlation and the possible multicollinearity between readiness and affective commitment (table 5.3). Therefore hypothesis 4A2 is only supported for the model of one independent variable. So hypothesis 4A is only accepted for the models of the independent variable readiness. Hypothesis 4B, commitment is positively related to change success, is only accepted for affective commitment, as the behavioral and cognitive commitment variables turned out to be unreliable constructs. The relationship between *affective commitment* and customer satisfaction ($\beta = .43$, p < .001) and *affective commitment* and performance ($\beta = 0.71$, p < .01) are both positive and significant. Therefore, hypotheses 4B1 and 4B2 are accepted for affective commitment (table 5.7).

Table 5.7: Multiple regression analyse independent variables readiness and affective commitment and dependent variables customer satisfaction and performance end users

Level of restriction	t	p	β	F	df	p	adj. R^2
Model 1A: Customer satisfaction				81.62	1, 71	0.00***	0.53
(constant)	4.75	0.00***	1.25				
Readiness	9.03	0.00***	0.69				
Model 1B: Customer satisfaction				81.40	2, 70	0.00***	0.69
(constant)	3.32	0.01**	0.75				
Readiness	1.23	0.22	0.14				
Affective Commitment	6.19	0.00***	0.43				
Model 2A: Performance score				14.59	1, 71	0.00***	0.17
(constant)	6.49	0.00***	4.12				
Readiness	3.82	0.00***	.71				
Model 2B: Performance score				29.26	2, 70	0.00***	0.46
(constant)	5.33	0.00***	2.95				
Readiness	-2.33	0.02*	-0.63				
Affective Commitment	6.05	0.00**	0.71				
* p < .05 (2-tailed)							
** p < .01 (2-tailed)							
*** p < .001 (2-tailed)							

Table 5.8: Hypothesis commitment, readiness, change success

Hypothesis	Description	Confirmed
4A	Readiness → Change success (+)	Yes
4A1	*Readiness → Customer satisfaction (+)*	*Yes*
4A2	*Readiness → Performance score (+)*	*Yes*
4B	Commitment → Change success (+)	Only for affective commitment
4B1	*Commitment → Customer satisfaction (+)*	*Only for affective commitment*
4B2	*Commitment → Performance score (+)*	*Only for affective commitment*

5.4   Structural Equation Modeling analysis

Two different SEM models have been analyzed. The first model (figure 5.3) has the six independent variables, which are significant related to readiness, as manifest exogenous variables. The endogenous readiness manifest examines the relationship between readiness and customer satisfaction. The path analysis of this starting model, performed with the IBM SPSS AMOS 26 program, shows that the fit of the model is not yet acceptable (RMSEA = .286, and CFI = .895). A model should have a score higher than 0.90 for CFI, NFI, GFI and IFI and a score lower than 0.08 for RMSEA in order to have an acceptable fit (Hair et al., 2013). To achieve this, three additional relationships have been added to the initial model, namely those of cognitive attitude, system quality and change agent to customer satisfaction. These relationships were suggested by the IBM SPSS AMOS program. The analysis of the revised model shows that this model had scores of CFI, NFI, GFI and IFI that are higher than 0.90. The score of RMSEA is 0.087, which is slightly higher than the threshold, but still acceptable.
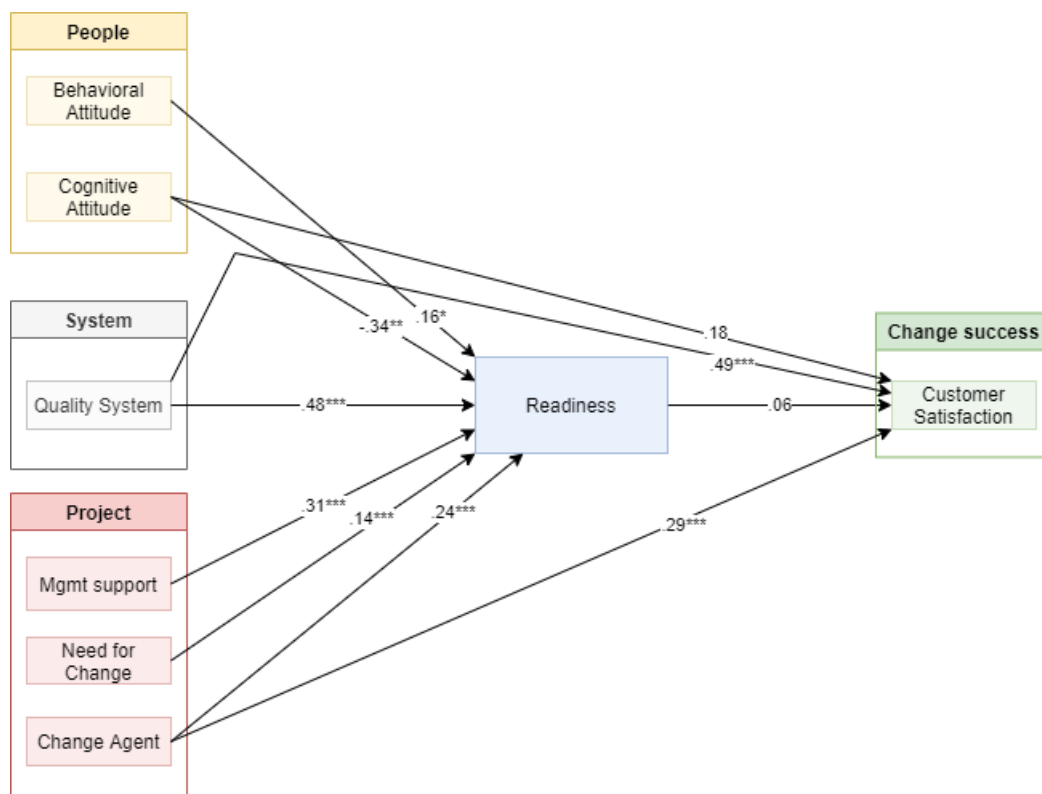
Figure 5.3: SEM Model Customer Satisfaction, df = 3, 28, GFI = .985, RMSEA = .087, NFI = .987, CFI = .995, IFI = .995, $X^2 = 4.638$, $X^2/df = 1.546$

The model shows that all six independent variables that are significantly related to readiness in the regression model (section 5.3), also have a significant relation to readiness in this SEM model. This means that the results of hypotheses 1 to 3 are not revised. The additional relationships that the variables have with customer satisfaction will be discussed below.
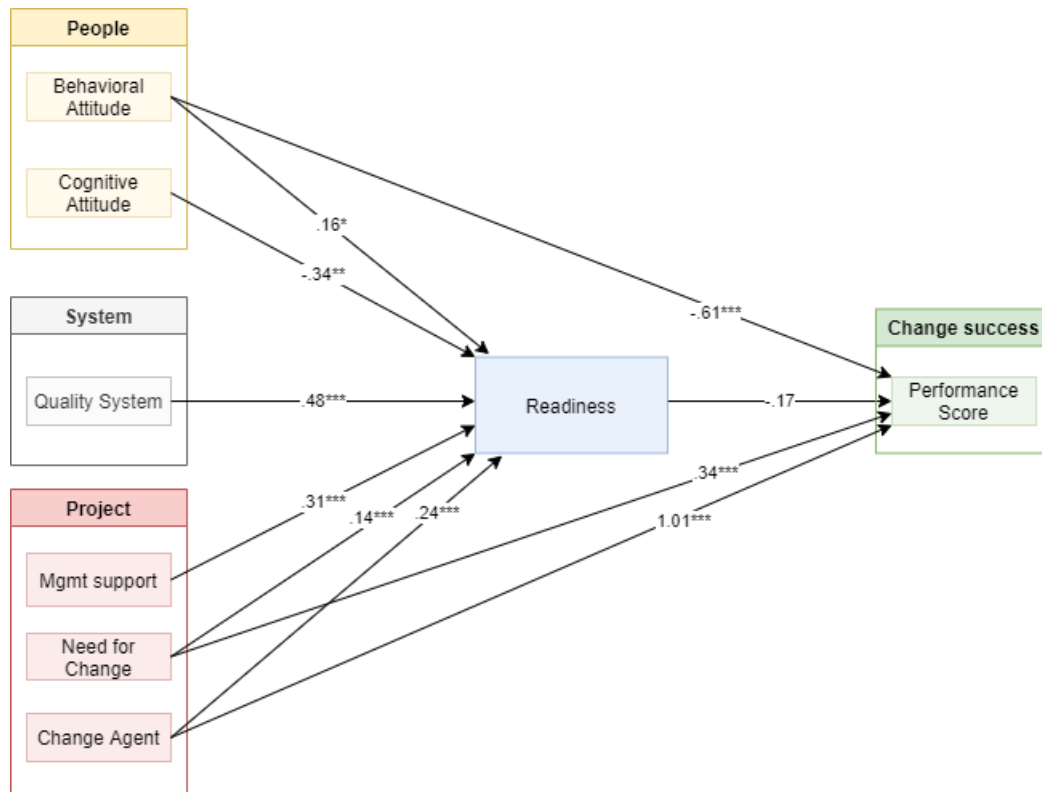
Figure 5.4: SEM Model Performance Score, df = 3, 28, GFI = .974, RMSEA = .155, NFI = .976, CFI = .983, IFI = .985 X^2 = 8.174, X^2/df = 2.725

The second model (figure 5.4) has also the six manifest exogenous variables, which are proposed to be related to readiness. In addition the endogenous readiness manifest examines the relationship between readiness and performance score. The analysis of this model, shows that the fit of the model is not yet acceptable (RMSEA = .358 and CFI = .823). To achieve a model with an acceptable fit, three additional relationships have been added to the initial model, namely the relationships of behavioral attitude, need for change and change agent respectively to customer satisfaction. These relationships were suggested by the modification indices of IBM SPSS AMOS program. The fit measures shows that this model is still not acceptable. The scores of CFI, NFI,

GFI and IFI are higher than 0.90. The score of RMSEA is 0.155, which is much too high. This model will therefore not be considered for the remainder of the SEM analysis. The hypotheses one to three are therefore only confirmed for the first SEM model, so with the change success variable customer satisfaction.

Table 5.9: Direct, Indirect and Total effect SEM analyse end users

	Behavioral Attitude	Cognitive Attitude	System Quality	Need for Change	Change Agent	Management Support	Readiness
Direct Effect							
Readiness	.161*	-.340**	.478***	.137***	.284***	.307***	-
Customer Satisfaction	-	.177	.486**	-	.294***	-	.063
Indirect Effect							
Customer Satisfaction	.010 (100%)	-.021 (13%)	.030 (6%)	.009 (100%)	.018 (6%)	.019 (100%)	- -
Total Effect							
Readiness	.161	-.340**	.478**	.137**	.284**	.307**	-
Customer Satisfaction	.010	.156	.516**	.009	.312**	.019	.063
*	p < .05	(2-tailed)					
**	p < .01	(2-tailed)					
***	p < .001	(2-tailed)					

Table 5.9 and figure 5.3 indicates that there is no direct significant relationship between readiness and customer satisfaction. This means that no mediation effect of readiness in the relationship between the exogenous manifests and customer satisfaction is possible. Therefore, these hypotheses will all be rejected (Table 5.10). The values of direct, indirect and total effects of table 5.9 are explained below.

5.4.1 Sem Analysis Mediation

Behavioral attitude has no direct effect to customer satisfaction, therefore there is no mediation effect, only a non-significant indirect effect (IE = .010, LLCI = -.023, ULCI = .079) . The direct effect of cognitive attitude to customer satisfaction is positive, but not significant (b = .177, p = 0.08). The indirect effect of cognitive attitude through readiness to customer satisfaction (IE = -.021) is not significant (LLCI = -.131, UCLI = .134). The total effect is .156, but not significant. 13% of the total effect is explained by the indirect effect.

Table 5.10: Changed hypothesis SEM model

Hypothesis	Description	Confirmed
4A	Readiness → Change success (+)	No
4A1	*Readiness → Customer satisfaction (+)*	*No*
4A2	*Readiness → Performance score (+)*	*No*
5A	Readiness fully mediates the relation of people to change success	No
5A1	*Readiness fully mediates the relation of training to customer satisfaction*	*No*
5A2	*Readiness fully mediates the relation of self-efficacy to customer satisfaction*	*No*
5A3	*Readiness fully mediates the relation of affective attitude to customer satisfaction*	*No*
5A4	*Readiness fully mediates the relation of behavioral attitude to customer satisfaction*	*No*
5A5	*Readiness fully mediates the relation of cognitive to customer satisfaction*	*No*
5A6	*Readiness fully mediates the relation of training to performance score*	*No*
5A7	*Readiness fully mediates the relation of self-efficacy to performance score*	*No*
5A8	*Readiness fully mediates the relation of affective attitude to performance score*	*No*
5A9	*Readiness fully mediates the relation of behavioral attitude to performance score*	*No*
5A10	*Readiness fully mediates the relation of cognitive attitude to performance score*	*No*
5B	Readiness fully mediates the relation of system quality to change success	No
5B1	*Readiness fully mediates the relation of system quality to customer satisfaction*	*No*
5B2	*Readiness fully mediates the relation of system quality to performance score*	*No*
5C	Readiness fully mediates the relation of project to change success	No
5C1	*Readiness fully mediates the relation of change agent to customer satisfaction*	*No*
5C2	*Readiness fully mediates the relation of key people support to customer satisfaction*	*No*
5C3	*Readiness fully mediates the relation of communication climate to customer satisfaction*	*No*
5C4	*Readiness fully mediates the relation of need for change to customer satisfaction*	*No*
5C5	*Readiness fully mediates the relation of benefits and rewards to customer satisfaction*	*No*
5C6	*Readiness fully mediates the relation of management support to customer satisfaction*	*No*
5C7	*Readiness fully mediates the relation of change agent to performance score*	*No*
5C8	*Readiness fully mediates the relation of key people support to performance score*	*No*
5C9	*Readiness fully mediates the relation of communication climate to performance score*	*No*
5C10	*Readiness fully mediates the relation of need for change to performance score*	*No*
5C11	*Readiness fully mediates the relation of benefits and rewards to performance score*	*No*
5C12	*Readiness fully mediates the relation of management support to performance score*	*No*

The direct effect of system quality to customer satisfaction is positive and significant (b = .486, p < .001). The indirect effect of system quality via readiness (IE = 0.030) to customer satisfaction is not significant, because the interval includes zero (LLCI = -.102, ULCI = .134). The total effect is .516 and significant. 6% of the total effect is explained by the indirect effect.

The direct effect of change agent to customer satisfaction is positive and significant (b = .294, p < .001). The indirect effect of change agent via readiness (IE = 0.018) to customer satisfaction is not significant, because the interval includes zero (LLCI = -.062, ULCI = .106). The total effect is .312 and significant. 6% of the total effect is explained by the indirect effect.

Need for change has no direct effect to customer satisfaction, therefore there is no mediation effect, only a non-significant indirect effect (IE = .009). Management support has no direct effect to customer satisfaction, therefore there is no mediation effect, only a non-significant indirect effect (IE = .019).

In conclusion, it appears that none of the mediation analysis is significant. So readiness does not mediate the relationship between the independent variables and change success. In addition, the indirect effect percentage of the total effect indicates that these are quite low. As a result, the noticeable effect of the mediation will be low.

5.5   Analysis open questions project teams

The open questions from the survey were analyzed using coding. The codes are determined as follows. After studying the answers, it became clear that several subjects were mentioned several times by the respondents. These answers were marked per respondent. For example, if a respondent gave an answer on the subject of communication, then this answer was marked as a communication code. After all the answers were coded, they were assigned to one or more of the subjects to which they related. The subjects could be satisfaction, project success, customer satisfaction and improvement factors. The coding indicates how often they are mentioned inside a subject. This attempts to provide insight into the most important coding per subject. The subjects project success and customer satisfaction relate to the general attitude of a respondent with regard to the success of and satisfaction with a project. The subjects of satisfaction and improvement factors apply to this case study, since they ask specific questions about Van Meijel's performance. After a quick scan of the answers, codes are created per subject. Table 5.11 shows these codes per subject. Appendix B gives the description of these codes. The codes have the same definitions in each subject.

5.5.1   General Factors

The topics support of the customer (52%) and reliability of the supplier (38%) are, according to the project teams, the most important to generate customer satisfaction (Figure 5.5). According to the respondents, support has to do with two important factors. The quick fix of problems

Table 5.11: Coding-names per subject questionnaire project team

Satisfaction	Project Success	Customer Satisfaction	Improve factors
Collaboration	Collaboration	Support	Project definition
Application	Satisfaction	Quality	Support
Support	Cost	Reliability	Share experiences
Communication	Lead time	Communication	Standardization
Added value	Added value	Lead time	Evaluation
Expectation management	Achieve objectives	Expectation management	Tendering process
Availability		Collaboration	Layout
Satisfaction end users			Knowledge
Lead time			Communication
User support			No improvements
Branch knowledge			

(73%) and the availability of suppliers' employees to ask questions or offer support (45%) are mentioned as the most important points of support. This concerns the support that is offered at the end of an implementation process. In all cases, reliability is about how reliable and honest the supplier is to the customer. This means that the supplier complies with his agreements and is committed to a long-term relationship with the customer.
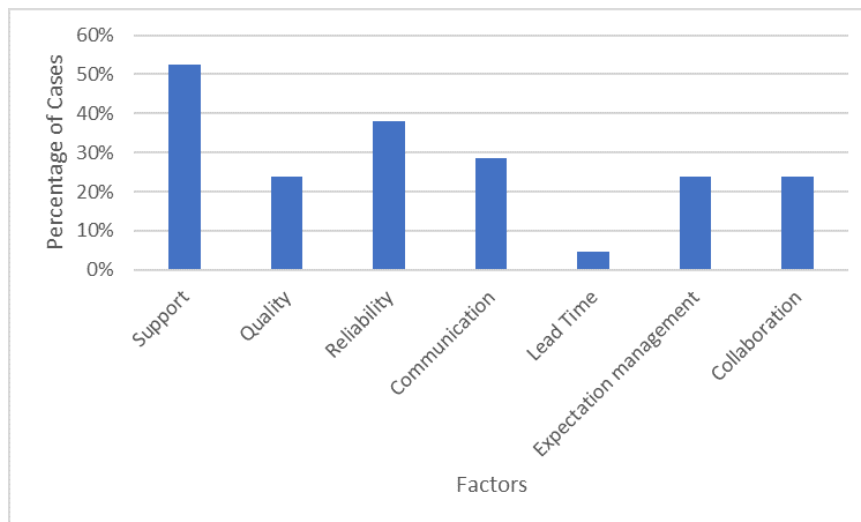
Figure 5.5: Factors Customer Satisfaction (N=21)

Figure 5.6 shows the factors about project success. The figure shows that satisfaction of the implementation project (81%) and the achievement of objectives (62%) are the most important topics when it comes to project success. According to the respondents, satisfaction mainly relates

to the satisfaction that the end users have with the working method in the new situation (82%), so the application functionality should enable to perform well. In addition, 41% indicate that the satisfaction of all stakeholders is important for project success. The achieved objectives relate to the quality (92%), the costs (54%) and the lead time (38%) of an entire project. The quality requirements that are set prior to a project must be realized afterwards in order to be considered successful. Minimal overruns of the lead time and costs are important because the respondents consider it important that a project is finished on an agreed date, though respondents also indicated that they understand that the implementation of new technologies sometimes takes longer or that the costs are higher than estimated.
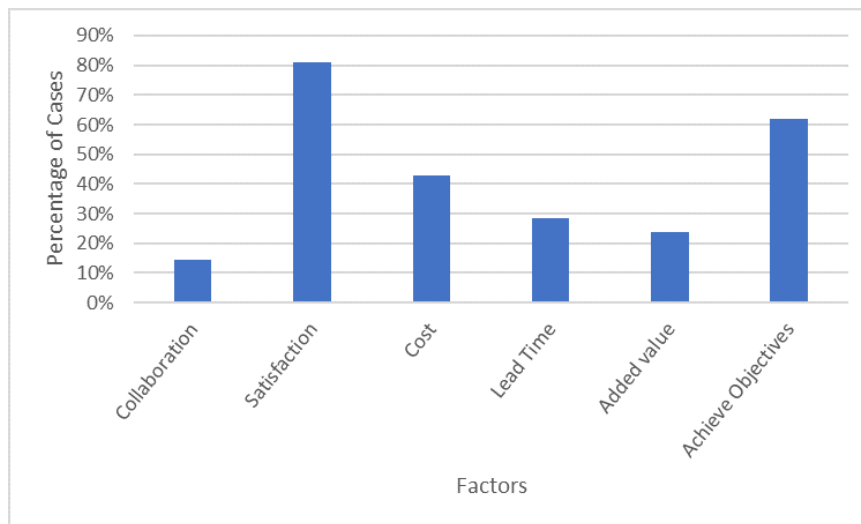
Figure 5.6: Factors Project Success (N=21)

5.5.2 Case specific factors

Figure 5.7 shows the topics respondents are satisfied and dissatisfied about. Three factors, added value (68%), working of the Metacom online application (52%) and collaboration between supplier and project teams (40%), are often mentioned by the respondents as factors that they are satisfied with. The added value indicates that the customer sees Van Meijel's application as an improvement to the current situation. This can be explained by the fact that many customers indicate that they have moved from a paper environment to a digital environment, whereby processes became faster and the amount of errors decreased.
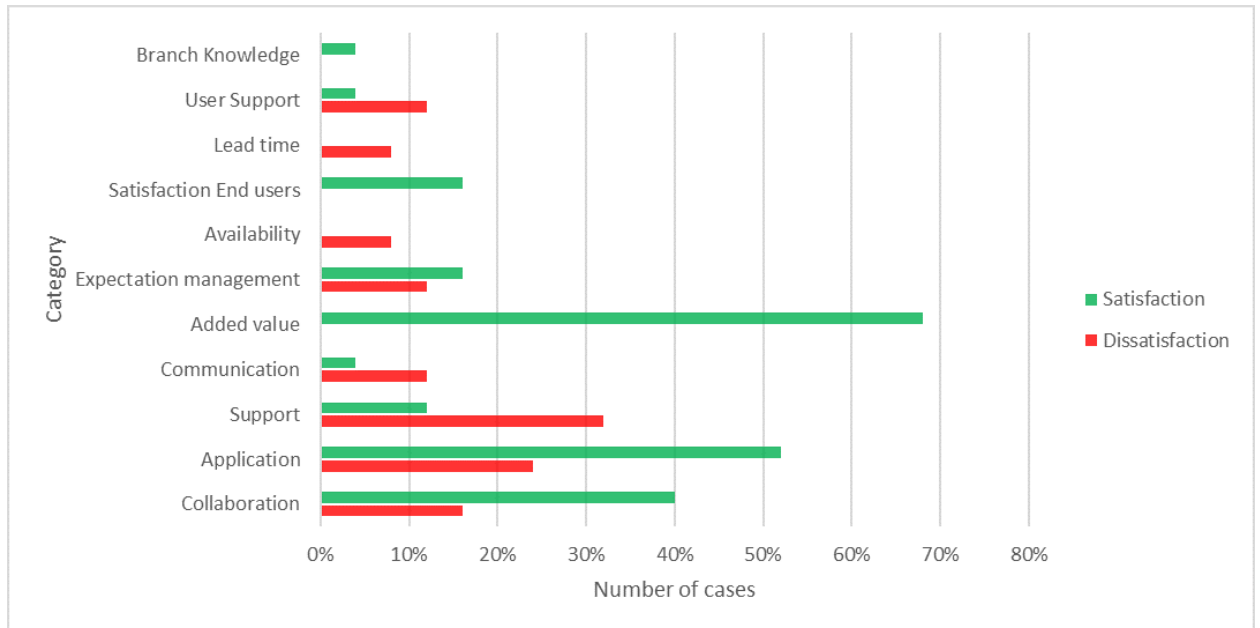
Figure 5.7: Satisfaction and dissatisfaction categories current situation (N=25)

Half of the respondents are satisfied with the operation of the application. The reasons given by this group are that the program is easy to learn and is user-friendly. However, 24% of respondents are not satisfied with the operation of the application. This group argues that errors often occur and that the application sometimes does not fulfill all functions that the customer would want.

The collaboration factor indicates how satisfied the respondents are with the cooperation with the supplier. This cooperation mainly concerns the implementation process. Some customers indicated that a good relationship was established and there was confidence in a good outcome of the project. Figure 5.5 shows that this reliability is seen by customers as an important general factor for increasing customer satisfaction. Van Meijel can therefore improve in this regard as (16%) of the respondents indicate that they are not satisfied with the collaboration during the implementation phase.

Support is the most common topic of dissatisfaction (32%). The reason given by this group is that problems are solved slowly (75%) and that there is little availability of the consultants to

support the customer in the follow-up phase (63%). However, Figure 5.5 shows that support can lead to an increase in customer satisfaction, since 52% of the respondents think this is important. The support after the implementation phase should therefore be improved at Van Meijel.

Figure 5.8 shows the most important factors that Van Meijel can improve in order to increase customer satisfaction. It appears that especially the support factor (57%) can be improved. Based on the analysis of Figures 5.5 and 5.7, this is no surprise. According to the respondents, the support is too slow and the availability of the consultants is too low. The other factors have a maximum score of 14%, there is not much to be gained by improving these factors.
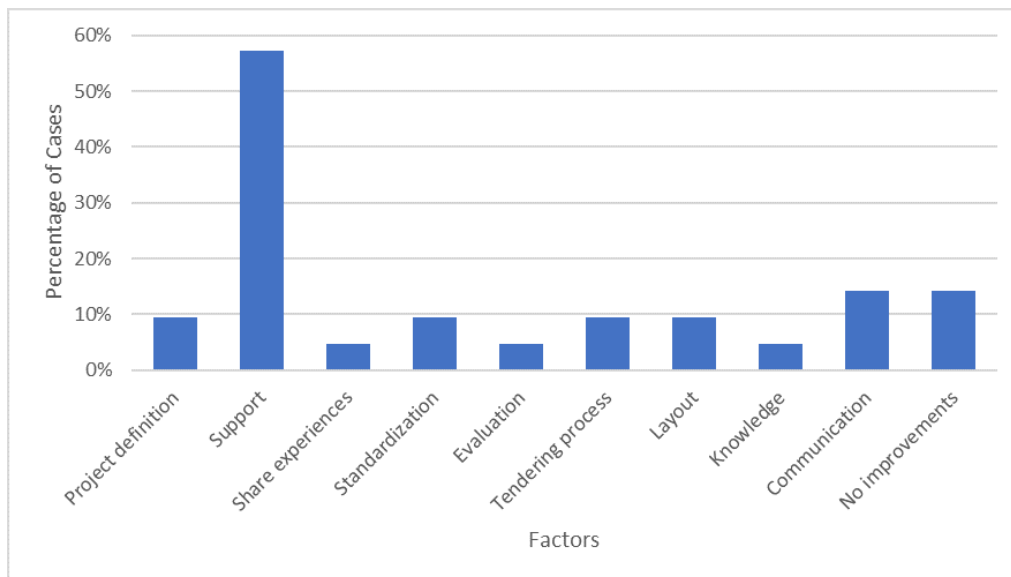
Figure 5.8: Improvements factors Van Meijel (N=21)

6 Conclusion and Discussion

6.1 Conclusion

The aim of this study was to investigate how an application supplier can best support the client during the implementation of a new working method for their employees. Based on the findings in the current literature, a model was developed for this research in which the most important factors are considered predictors for the variable readiness. These independent variables were training, self-efficacy, attitude, system quality, change agent, key people support, communication climate, benefits and rewards, need for change, management support, provider quality, benchmarks, project management, teamwork and time frame. Furthermore the variables readiness and commitment were considered predictors of the success of the change.

Two target groups were investigated to test these relationships, the end users and project teams. The model of the project teams turned out to be invalid. Based on the results of the regression analysis, the end users indicated that a number of independent variables had a significant relationship with readiness. The variables behavioral attitude, system quality, management support, need for change and change agent were positively significant related to readiness. On the other hand, cognitive attitude was negatively related to readiness. The regression analysis also showed that there was no significant relationship between readiness and performance score and customer satisfaction, despite the high correlations between readiness and the factors of change success. There was even a negative relationship between readiness and performance score. Affective commitment turned out to be positively related to performance score and customer satisfaction.

The SEM analysis confirmed the relationships between the independent variables and readiness. However, this analysis also indicated that there is no significant relationship between readiness and change success. This meant that readiness did not mediate the relationship between the independent variables and change success.

The qualitative research showed that the project team members considered support, reliability, satisfaction of stakeholders and achieving objectives as the most important when it comes to project success and customer satisfaction. Furthermore, they indicated that Van Meijel can improve especially on the support aspect.

In conclusion, the supplier must ensure a high value of affective commitment, behavioral attitude, system quality, management support, need for change and change agent in order to achieve an increase in change success. These values mainly relate to the satisfaction of the end users. To also satisfy the project team, the supplier must be reliable and reach its goals as much as possible. In addition, the supplier of the application should provide a high quality service level.

6.2 Limitation

6.2.1 Power

The developed model cannot be examined for the project team because there are no significant correlations between the different variables. The cause of the lack of significance of these correlations is probably the low number of respondents. There were 29 valid respondents who completed the project team survey. These respondents came from 19 different companies, which means that there has been a response from 66% of the companies. However, every company has an average of only 1.5 respondents. While according to Van Meijel employees, an average project team of a client consists of 3 to 4 people. This means that a total of at least 83 respondents were approached, so there is only a response rate of 33%. According to Dey (1997), a low response rate leads to poor representation of the population. As a result, it is possible that the results due to the low response rate show large differences between the respondents, this makes it more difficult to draw conclusions. However, there is no clarity in the literature to the minimum acceptable response rate. A common number for a representative sample is 70% (Johnson and Owens, 2003). In the case of the project team, the response rate is far too low, to be considered representative.

To test this assumption for the project teams, an ad hoc G*power analysis was performed (Appendix C). This analysis shows that none of the variables has a power of more than 54%, where at least 80% is desired (Faul et al., 2009). This percentage is based on the absolute correlation found in correlation analysis. The results confirm that the sample size was too small to carry out decent analyzes for the project teams.

The G*power analysis of the sample from the end users shows that only the correlations between affective attitude (power = 6%) and key people support (power = 48%) with readiness have

a too low power. The other correlations all have a power of 95% or higher. This means that the sample size of 73 end users is large enough for the correlation analysis. The power for the two regression models is 100% (Appendix D). So the sample size is acceptable for the regression analysis. The minimum number of respondents in a sample for an SEM analysis with an effect size of 0.3 and a power of at least 80% is 400 (Westland, 2010). This means that the sample size of the end users is too low to perform a reliable SEM analysis.

In conclusion, it appears that the power for the project teams is much too low and that reliable SEM analyzes cannot be performed with these sample sizes the project teams. The sample size is also too low for the end users, therefore the results of the SEM analysis of the end users must be carefully interpreted.

6.2.2 Qualitative research project teams

The quantitative research that was conducted during the project teams survey contained of several open questions. The respondent was not required to complete these questions. As a result, only 21 respondents ultimately completed these open questions (response rate is 25.3%). This means that there is a chance that these respondents are not a proper representation of the population. In addition, it is better to conduct personal interviews with the project teams to collect more and complete information. Respondents are more willing to tell their opinion during an interview because there is a relation between researcher and respondent (Marelli, 2008). In addition, the interviewee can also be questioned in more detail about the exact meaning of the answers. With open questions, the interpretation of an answer lies with the researcher. As a result, errors can be made in the interpretation that decrease the validity and reliability of the research. To increase reliability, a second researcher should also have conducted his/her own analysis of the open questions. The analyzes and coding of the first and second researcher would then be compared and an agreement on the best coding method could be reached. This would increase reliability.

6.2.3 Cross-sectional study

The study that has been conducted is a cross-sectional study. The questions were asked to all respondents at the same time. The results show that, for example, readiness was not positively

related to the factors of change success. The cross-sectional investigation can be a reason for this. Because the questions were asked to the respondents at the same time, there may have been a difference in interpretation of the questions. Respondents who have been working with the application for two years may be more inclined to say that they were ready for the changes after the training and during the implementation process. However, it is likely that this group has forgotten how they really felt about the change a few years ago. Due to positive experiences with the application, they may be much more positive about the change than they actually were at the time of implementation. Respondents who have just completed the change process, and who have had a negative experience with it, can in turn respond more negatively to the questions than they were at the start of the change. A longitudinal study might therefore fit better with the aim of this study.

6.3 Discussion and Theoretical Implications

The results of this study show that a large number of the hypotheses have been rejected. In this paragraph, these results will be discussed and new insights will be derived.

According to the literature, all independent variables from the categories people, system quality and project should have been positively related to readiness. However, the regression analysis shows that only the independent variables behavioral attitude, system quality, change agent, need for change and management support are positively related to readiness. This partially confirms the investigations of Bouckenooghe (2010), Amini and Sadar Safavi (2013) ,Lines and Reddy Vardireddy (2017) and Self (2007). The cognitive attitude, on the other hand, has a negative relationship with readiness. This is contrary to the research of Bouckenooghe (2010), who claims that cognitive attitude also is positively related to readiness. The other independent variables are not significantly related to readiness. However, current literature shows that the factors training (Chunningham et al., 2003), self-efficacy (Lines and Reddy Vardireddy, 2017), affective attitude (Bouckenooghe, 2010), key people support (Self, 2007), and communication climate (van den Heuvel et al., 2015) are positively related to readiness. Various reasons may have caused these contradicting findings. It has been demonstrated for the key people support and affective attitude variables that the G*Power is too low to consider it a reliable measurement. This means that the sample size is too low for these variables. A reason for all variables may be that a cross-sectional study has been performed, instead of a longitudinal study. Because of

this there can be a difference between the answers of the respondents, based on the time period during which they have already worked with the application. Another cause may be that for the variables training, self-efficacy, cognitive attitude, key people support and management support there are demonstrable differences between the answers of the respondents from different companies. However, these answers have been combined, while they differ significantly, which may have influenced results.

The investigations of Weiner (2009) and Golembiewski (2000) claimed that readiness is positively related to change success and, are in contrast to the results of this research. According to the SEM model and the regression model, readiness is not positively related to change success. An explanation for the difference can be that the response rate is too low or that the items about readiness have been translated incorrectly. A reason for this may be that the merging of individual readiness and organizational readiness should not have happened, while the Cronbach's alpha score allowed this. The definitions of these concepts are so different that by combining them, an unreliable variable may have arisen. Another reason could be the significant difference between the answers of the respondents from different companies. However, these answers are combined to get one dataset. As a result, the ratio in the data set have changed in such a way that the variable readiness has become less useful. The reason that the SEM analysis does not show a clear significant relationship is partly due to a low number of respondents. As described earlier, there should have been at least 200 respondents to give the SEM model a power of 80%. However, there were only 73 respondents, so the power of the model was too low to actually produce reliable analyses.

When only readiness is used as predictor to change success in the regression model, readiness is positively significantly related to change success. An explanation for this may be that there is a statistical artifact, which can partly be caused by the high correlation between readiness and commitment and the previously proven reciprocally relationship between these two variables (Madsen et al., 2005; Santhidran et al., 2013). After all, it seems unlikely that the construction sector differs so much from many other sectors where this connection has already been demonstrated. So follow-up research may prove these connections.

This research focused entirely on the construction sector. This sector is not very innovative and little research is availablee about managing changes in this sector (Winch, 1998). The avail-

able literature shows that there are several important variables that can influence the change. These variables are commitment of senior management, communication of benefits for employees, change agents, timescale and training (Lines and Reddy Vardireddy, 2017). The results of the current study show that top management support, or commitment of management and change agents, indeed influence readiness. This partly confirms the research of Lines and Reddy Vardireddy (2017). However, the other variables have no significant influence on readiness, according to this study. One new variable appears to have an influence in the construction sector, in order to increase the readiness to change among end users, namely the variable system quality. Furthermore, the SEM analysis showed that system quality and change agent also directly influence the customer satisfaction, and thus the change success in the construction sector.

The conclusions of this study on the independent variable's provider quality, benchmarks, project management, teamwork and time frame is limited. This is because of the project team model showing no significant correlations due to a low power for each variable (maximum power = 52%). As a result, it cannot be demonstrated that these variables have an significant influence on readiness to change for the construction sector. However, when the non-significant correlations are studied, it appears that timeframe, benchmarks and communication supplier are all negatively correlated with readiness, which contrasts with what has been found in earlier literature. In addition, affective commitment also appears to be negatively correlated with the performance score for the project teams. The reason for this negative correlation may be the difference between a cross-sectional study and a longitudinal study. It is reasonable to assume that the respondents who have been working with the application for a long time, respond based on the experiences they have had with the application. This makes it difficult to find out if they would give the same answers compered when the change actually took place.

The quantitative data showed that project team respondents think that it is important that objectives, regarding money and time, are achieved and that the employees of the supplier must be reliable, must build an available application that meets the wishes of all stakeholders, especially to the requirements of the end users, and must be available to provide support during the follow-up phase. This suggests that the quality of the provider is important in order to make a well-functioning solution, while adhering to a previously drawn up implementation plan. It seems that in a study where the developed model is valid for the project teams, variables of the provider quality and implementation plan factors are certainly related to readiness and probably

also change success.

6.4 Practical Implications

The practical implications focus entirely on the case study of this research, namely on Van Meijel. Four recommendations are proposed to Van Meijel to make a change more successful.

6.4.1 The Closer

As a first recommendation, Van Meijel should appoint or accept a "closer". This person will be responsible for the follow-up phase. The role that the "closer" assumes will be as follows. (S)he is responsible for the follow-up phase of a project. This means that questions and problems with the application end up with him/her. The "closer" tries to come up with a solution him/herself and if this fails, (s)he asks help from a consultant. This avoids problems and questions being posed directly to the consultant, and faster first-line support is provided because the consultant usually has no time for this. In addition to solving first-line problems, the "closer" will also be involved in the other phases of the project. The "closer" will support the customer during the test and pilot phase and will check with the end user whether he is satisfied. In addition, (s)he is also responsible for supporting the entire change process of the customer. This means that after conversations with the client's stakeholders (s)he can decide about the best way to implement the application. As a result, Van Meijel retains control of the entire process and can make adjustments quickly if the situation changes. The appointment of a "closer" will ensure that support runs better, there will be a faster response and solutions will be put forward faster. In addition, this role ensures that Van Meijel has an influence on the smooth implementation of the application, as well as having an influence on the development of the application.

6.4.2 Change agent in project team

The composition of the customer's project team will have to be adjusted to ensure that a change agent can be deployed. According to earlier research by Rowland (2007) and this research, a change agent is important to increase the success of the change. The results of the end users show when experience of change agent increased, the readinessss, affective commitment and change

success also increased. The change agent should therefore be included as a standard member of the client's project team. The conditions that the change agent must meet is that (s)he will use the new application by him/herself after introduction and will be close to other users to provide them with information. In practice, this means that Van Meijel must insist on an end user cooperating from the start of the project at every customer. This allows the requirements of the end users about the new application to be considered immediately and them being able to influence the entire implementation process, i.e. there is a more user centered design method. This will also ensure that the end user fulfilling the role of a change agent can enthuse other end users and answer questions on the work floor. As a result, end users will notice the influence of the change agent more easily and will consequently label the change as success more quickly.

6.4.3 System quality

Another recommendation for Van Meijel is to improve system quality. This research has shown that system quality influences the readiness and customer satisfaction of the end users. Van Meijel must therefore ensure that the end users are satisfied with the application. Currently, the application often shows errors, is not entirely user-friendly and the layout is old-fashioned. Van Meijel, however, uses a platform of which they are not administrators themselves. This platform will be updated in the second half of 2020 and will, among other things, be given a new and more user-friendly layout. It is important for Van Meijel to properly monitor this update. This means that after the launch of the new version of the platform, Van Meijel must check with customers whether it meets their expectations. If the new update does not meet expectations, Van Meijel must approach the supplier of the platform and try to enforce new changes. Van Meijel will have to appoint a user experience designer to guarantee this quality. This person is responsible for designing a meaningful and pleasant user experience of a software application. Since the implementation of the update takes at least another six months, it is also advisable for Van Meijel to act now.

These actions relate to the errors and the user-friendliness of the application. By carrying out a better test phase, the errors will be reduced. This test phase now often depends on the customer, which is why Van Meijel will have to support the customer more often and take part of the test phase itself into account. In practice, this means that the pilots will take longer and that the projects run out time. However, big errors in the follow-up phase can be avoided. To make the

application more user-friendly, Van Meijel will have to offer different manuals to the end users of the customer for each delivery. By making basic manuals, every employee can quickly find out how to work with the application in the basic. Subsequently, in-depth manuals are available for end users who want to be able to do more with the application. In this way it must become easier for the end user to work with the new application. Van Meijel will be able to hire a technical writer to create manuals. This technical writer specializes in writing technical documents, such as manuals, attachments and instructions for use and maintenance. Another option is that the "closer" takes this role and possibly follows a training as a technical writer.

6.4.4 Communication need for change

The last recommendation for Van Meijel is to help the customer with communication within his company. The end users indicate that they consider a change more successful if a clear need for change is created within the company. Van Meijel can support the customer in this by offering a communication package. This communication package should contain information brochures for the employees of the customer. In addition, videos could be made, showing the benefits of the application quickly and easily for end users. The existing videos are mainly focused on the members of the project team, and therefore do not fit the end user target group. The marketing department will therefore have to record a new video clip together with the consultants for the end users. In addition, Van Meijel can also offer the customer to give a presentation together with the change agent to the end users in order to create more understanding for the change among the employees of the customer. These actions will make the need for change clearer for end users.

6.5 Future research

The first future research direction that can be performed is to increase the response rate for the same study and variables. This can be done by selecting larger project teams. In addition, consideration can be given to offering rewards to respondents who complete the survey. In this follow-up study it is also important that there are multiple measurements during the study. the predictors and outcomes should be measured on different points in time, to generate a better causal relationship between these variables

A longitudinal study will lead to better relationships being established between the independent variables and the dependent variables. Such a studies mean that research has to be done at companies that are going to start a transition process. During the entire change process, the respondents will be interviewed at different times, whereby the predictors and the outcome questions are separated. For example, the questions about the variable training can be asked after the training, while the questions about the satisfaction of the entire process are asked at the end. By doing this at several companies in this way, a better cause-and-effect relationship will arise between the predictors and the outcomes. However, this research will have to be conducted over a long period of time, since an average process at Van Meijel takes at least half a year to a year.

A further exploratory study can be conducted into the influence of the independent variables on affective commitment. The developed model predicted that there was no relationship between the independent variables of people, system quality and project with the dependent variable commitment. However, according to the strong relationship between readiness and commitment, it is possible that the independent variables of readiness also influenced the dependent variable of commitment. It is therefore interesting in a follow-up study to investigate which factors influence the affective, normative and continuance commitment.

Finally, more research can be done into the direct effect of the independent variables on the variables of change success. In this study, the focus was on the direct effect of the independent variables with readiness and the effect of readiness on change success. However, the SEM already show that there are direct relationships between the independent variables system quality and change agent to change success. These relationships can provide new insights into which variables are important to increase the chance of a successful change. Therefore, in a follow-up study, more research will have to be done into the direct effects of the variables of people, system and project to analyze whether more variables are directly related to change success.

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A Questionnaires

A.1 End user questionnaire

Table A.1: Questions End-User survey.

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
General					
Company		Which company do you work for	Voor welk bedrijf werkt u		1GE1
Function		What is your position within this company	Wat is uw functie binnen dit bedrijf		1GE2
Age		What is your age	Wat is uw leeftijd		1GE3
Worktime		How long have you been working for your company	Hoe lang werkt u al voor uw bedrijf		1GE4
Knowledge and Skills					
Training	Significant time and resources were invested in training employees on using the new system (Karim et al., 2007)	I have had enough time to follow training to work with Metacom Online	Ik heb genoeg tijd gehad om Metacom Online training te kunnen volgen	5	1TR1
	Adequate on-the-job training was provided to internal user groups to use the new system (Karim et al., 2007)	The training was of high quality	De training was van hoog niveau	5	1TR2
		In the training I learned to work with Metacom Online	In de training heb ik geleerd om met Metacom Online te werken	5	1TR3
		I was satisfied with the way of training on how to use Metacom Online	Ik was tevreden over de manier van training over het gebruik van Metacom Online	5	1TR4
Self-Efficacy	I have the skills that are needed to make this change work (Holt et al., 2007)	I have the skills to work with Metacom Online	Ik heb de vaardigheden om met Metacom Online te werken	7	1SE1
	When we implement this change, I feel I can handle it with ease (Holt et al., 2007)	I can easily work with Metacom Online	Ik kan gemakkelijk met Metacom Online overweg	7	1SE2

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
Attitude					
Affective Attitude	I usually resist a new idea (Dunham et al., 1989)	Normally I am against implementing changes	Normaal gesproken ben ik tegen het implementeren van veranderingen	5	1AA1
	Change frustrates me (Dunham et al., 1989)	Change frustrates me	Verandering frustreert mij	5	1AA2
	I don't like change (Dunham et al., 1989)	I don't like change	Ik vind verandering niet leuk	5	1AA3
Behavioral Attitude	I look forward to changes at work (Dunham et al., 1989)	I look forward to changes at work	Ik kijk uit na veranderingen op werk	5	1BA1
	Changes tend to stimulate me (Dunham et al., 1989)	Changes tend to stimulate me	Verandering stimuleren mij	5	1BA2
	Other people think that I support change (Dunham et al., 1989)	My colleagues think that I support changes	Mijn collega's denken dat ik veranderingen steun	5	1BA3
Cognitive Attitude	Change usually benefits the organization (Dunham et al., 1989)	Change usually benefits the organization	Verandering komt de organisatie meestal ten goede	5	1CA1
	Most of my co-workers benefit from change (Dunham et al., 1989)	Most of my colleagues benefit from change	De meeste van mijn collega's profiteren van verandering	5	1CA2
	I usually benefit from change (Dunham et al., 1989)	I usually benefit from change	Ik ben meestal gebaat bij verandering	5	1CA3
System Quality					
System Quality		Metacom Online is user-friendly	Metacom Online is gebruiksvriendelijk	5	1SQ1
		Metacom Online often shows errors	Metacom Online vertoont vaak fouten	5	1SQ2*
		The layout of Metacom Online is nice	De layout van Metacom Online is prettig	5	1SQ3
Communication					
Communication Climate	Information provided on change is clear (Bouckenooghe et al., 2009)	The information I received about the transition to Metacom Online was clear	De informatie die ik ontving over de overgang naar Metacom Online was duidelijk	5	1CC1
	Information concerning the changes reaches us mostly as rumours (Bouckenooghe et al., 2009)	I received most of the information of the implementation of Metacom Online through non-official channels (such as rumours)	De meeste informatie over de implementatie van Metacom Online kreeg ik via niet officiele kanalen (zoals geruchten)	5	1CC2*

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
	We are sufficiently informed of the progress of change (Bouckenooghe et al., 2009)	I always felt fully informed about the implementation of Metacom Online	Ik voelde me altijd volledig geïnformeerd over de implementatie van Metacom Online	5	1CC3
	I am regularly informed on how the change is going (Bouckenooghe et al., 2009)	I received information about Metacom Online on time	Informatie over Metacom Online ontving ik op tijd	5	1CC4
		I had the idea that my feedback on communication is being listened to	Ik had het idee dat er naar mijn feedback op de communicatie geluisterd werd	5	1CC5
Benefits and Rewards	This change makes my job easier (Holt et al., 2007)	I expected that Metacom Online made my work easier	Ik verwachtte dat Metacom Online mijn werk makkelijker zou maken	7	1BR1
	I am worried I will lose some of my status in the organization when this change is implemented (Holt et al., 2007)	I was worried about the impact of the introduction of Metacom Online on my position	Ik was bezorgd over de gevolgen van de invoering van Metacom Online voor mijn functie	7	1BR2*
Need for Change	There are a number of rational reasons for this change to be made (Holt et al., 2007)	Management gave clear reasons why we are switching to Metacom Online	Het management gaf duidelijke redenen waarom we moesten gaan werken met Metacom Online	7	1CN1
	It doesn't make much sense for us to initiate this change (Holt et al., 2007)	It was not clear to me why we as a company must switch to Metacom Online	Het was mij niet duidelijk waarom wij als bedrijf moesten overstappen op Metacom Online	7	1CN2*
Employee support					
Change agent		Within the organization there was always someone available who was open to ask questions and answer them immediately	Binnen de organisatie was er altijd iemand beschikbaar die open stond om vragen aan te stellen en deze meteen te beantwoorden	5	1CA1
		There was an employee who clearly took the lead during the transition to Metacom Online	Er was een medewerker die duidelijk het voortouw nam tijdens de overgang naar Metacom Online	5	1CA2
Key people support	Users have a negative opinion about the ERP system (Wang and Chen, 2006)	There were people in my team who had a negative view of Metacom Online	Er waren mensen in mijn team die een negatief beeld hadden bij Metacom Online	5	1KS1*

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
		There were people in my team who were able to convince me that Metacom Online is the best new way of working	Er waren mensen in mijn team die mij hebben kunnen overtuigen dat Metacom Online de beste manier van werken is	5	1KS2
Management					
Support	Senior executive demonstrated a lot of enthusiasm and interest throughout the project (Karim et al., 2007)	The management was enthusiastic about Metacom Online	Het management was enthousiast over de invoering van Metacom Online	5	1MS1
	Upper-level managers were personally involved in the project (Karim et al., 2007)	The management was personally involved in the implementation of Metacom Online	Het management was persoonlijk betrokken bij de implementatie van Metacom Online	5	1MS2
	Top management emphasizes managing and controlling the processes of ERP implementation and operation effectively (Wang and Chen, 2006)	Management was capable of steering the implementation of Metacom Online in the right direction	Het management was capabel om de implementatie van Metacom Online in goede banen te leiden	5	1MS3
		The management provided sufficient resources to implement the Metacom Online implementation	Het management stelde voldoende middelen beschikbaar voor de implementatie van Metacom Online	5	1MS4
Readiness					
Individual Readiness	I am willing to put energy into the process of change (Bouckenooghe et al., 2009)	I want like to put energy into Metacom Online to make it a success	Ik wilde graag energie steken in Metacom Online om het tot een succes te maken	5	1IR1
	I am willing to make a significant contribution to the change (Bouckenooghe et al., 2009)	I want like to make a significant contribution to the Metacom Online process	Ik wilde graag een zo groot mogelijke bijdrage leveren aan het Metacom Online traject	5	1IR2
	I am somewhat resistant to change (Bouckenooghe et al., 2009)	I am somewhat resistant to Metacom Online	Ik bood weerstand tegen de invoering van Metacom Online	5	1IR3*
Organizational Readiness	Staff understands that specific changes may improve outcomes (Claiborne et al., 2013)	Colleagues understood how the introduction of Metacom Online could contribute to an improved quality of our work	Collega's begrepen hoe de invoering van Metacom Online kon bijdragen aan een verbeterde kwaliteit van ons werk	5	1OR1

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
	Most staff is willing to try a new idea (Claiborne et al., 2013)	Most colleagues were open to work with Metacom online	Mijn collega's stonden er voor open om met Metacom online te werken	5	1OR2
	Staff adapts quickly when they have to shift focus to accommodate program changes (Claiborne et al., 2013)	My colleagues are able to learn how to use Metacom Online quickly	Mijn collega's waren in staat snel om te leren gaan met Metacom Online	5	1OR3
Commitment					
Affective Commitment	This change is not necessary (Herscovitch and Meyer, 2002)	I did not find the change to Metacom Online necessary	Ik vond de overgang naar Metacom Online niet nodig	7	1AC1*
	This change is a good strategy for this organization (Herscovitch and Meyer, 2002)	Metacom Online was seen as a good addition to my company	Metacom Online werd gezien als een goede toevoeging voor mijn bedrijf	7	1AC2
	I believe in the value of this change (Herscovitch and Meyer, 2002)	I believed in the value of implementing Metacom Online	Ik geloofde dat Metacom Online van toegevoegde waarde is	7	1AC3
Continuance Commitment	I feel pressure to go along with this change (Herscovitch and Meyer, 2002)	I felt pressure to go along with the change to Metacom Online	Ik voelde druk om mee te gaan met de overgang naar Metacom Online	7	1CC1
	It would be risky to speak out against this change (Herscovitch and Meyer, 2002)	I felt it was risky to speak out against Metacom Online	Ik had het gevoel dat het risicovol was om mij tegen Metacom Online uit te spreken	7	1CC2
	I have no choice but to go along with this change (Herscovitch and Meyer, 2002)	There is no other choice than to work with Metacom Online	Er was geen andere keuze dan te werken met Metacom Online	7	1CC3
Normative Commitment	It would be irresponsible of me to resist this change (Herscovitch and Meyer, 2002)	I felt no obligation to work with Metacom Online	Ik voelde mij verplicht om mee te werken aan Metacom Online	7	1NC1
	I do not feel any obligation to support this change (Herscovitch and Meyer, 2002)	I felt no obligation to support the transition to Metacom online	Ik voelde geen enkele verplichting om de overgang naar Metacom online te ondersteunen	7	1NC2*
	I would feel guilty about opposing this change (Herscovitch and Meyer, 2002)	I would have felt guilty if I had opposed Metacom Online	Ik zou me schuldig hebben gevoeld als ik me had verzet tegen Metacom Online	7	1NC3
Change Success					
Success		I am satisfied with Metacom Online	Ik ben tevreden over Metacom Online	5	1CS1

Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
I find the change refreshing (Bouckenooghe et al., 2009)	I find the change to Metacom Online refreshing	Ik vind de verandering naar Metacom Online verfrissend	5	1CS2
The change will simplify work (Bouckenooghe et al., 2009)	Metacom Online makes my work easier	Metacom Online maakt mijn werk makkelijker	5	1CS3
The change will improves my work (Bouckenooghe et al., 2009)	Metacom Online improve my work	Metacom Online verbetert mijn werk	5	1CS4
	I would rate the implementation of Metacom Online with a (between 1-10)	Ik zou de implementatie van Metacom Online beoordelen met een...(1-10)		1CS5

A.2 Project Team Questionnaire

Table A.2: Questions Project Team survey.

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
General					
Company		Which company do you work for	Voor welk bedrijf werkt u		2GE1"
Function		What is your position within this company	Wat is uw functie binnen dit bedrijf		2GE2"
Age		How old are you	Wat is uw leeftijd		2GE3
Worktime		How long have you been working for your company	Hoe lang werkt u al voor uw bedrijf		2GE4
Metacom Online		Have you fully installed Metacom Online in your company	Heeft u Metacom Online volledig geïnstalleerd in uw bedrijf		2GE5
		Have you installed Metacom in your company	Heeft u Metacom in uw bedrijf geïnstalleerd		2GE6
		What is the difference between Metacom and Metacom Online	Wat is het verschil tussen Metacom en Metacom Online		2GE7"
		Can you describe Metacom Online in your own words	Kunt u Metacom Online in uw eigen woorden beschrijven		2GE8"
Knowledge and Skills					
Training	Significant time and resources were invested in training employees on using the new system (Karim et al., 2007)	Considerable investments had been made in time and resources to train employees in using Metacom Online	Er was aanzienlijk geïnvesteerd in tijd en middelen om medewerkers te trainen in het gebruik van Metacom Online	5	2TR1
	Adequate on-the-job training was provided to internal user groups to use the new system (Karim et al., 2007)	The training was of a high level	De training die gegeven werd was van hoog niveau	5	2TR2
		After the training the employees were able to work with Metacom Online	Na de training waren de collega's in staat om te werken met Metacom Online	5	2TR3

Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
	The training that the employee have followed was given in a good way	De training die de collega's hebben gevolgd werden op een goede manier gegeven	5	2TR4
System Quality				
System Quality				
	Are you satisfied with the delivered version of Metacom Online	Bent u tevreden met de opgeleverde versie van Metacom Online		2SQ1"
	Why are you satisfied	Waarom bent u tevreden		2SQ2"
	Why are you unsatisfied	Waarom bent u ontevreden		2SQ3"
Extent to which the ERP system exactly performs its tasks as required (Wang and Chen, 2006)	Metacom Online meets the requirements that my organization has	Metacom Online voldoet aan de eisen die mijn organisatie heeft	5	2SQ4
	Metacom Online performs its tasks as required	Metacom Online functioneert zoals gedacht	5	2SQ5
Extent to which the ERP system can provide useful information and improve task-performing efficiency (Wang and Chen, 2006)	Metacom Online ensures that the organization can work more efficiently	Metacom Online zorgt ervoor dat de organisatie efficienter kan werken	5	2SQ6
Extent to which the ERP system can provide reliable precise, accurate, consistent information (Wang and Chen, 2006)	Metacom Online provides the correct information	Metacom Online verschaft de juiste informatie	5	2SQ7
Extent to which the ERP system can be maintained to operate without failure under abnormal conditions (Wang and Chen, 2006)	Metacom Online exhibits work without disruptions	Metacom Online werkt zonder storingen	5	2SQ8
	Metacom Online often shows errors	Metacom Online maakt vaak fouten	5	2SQ9*
	Metacom Online meets the expectations that I had	Metacom Online voldoet aan de verwachtingen die ik had	5	2SQ10
	Metacom Online is user-friendly	Metacom Online is gebruiksvriendelijk	5	2SQ11

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
Implementation Plan					
Responsibilities		What responsibilities did you have as an organization when implementing Metacom Online	Welke verantwoordelijkheden had u als organisatie bij het implementeren van Metacom Online	5	2RE1"
		What responsibilities did Van Meijel have with the implementation of Metacom Online	Welke verantwoordelijkheden had Van Meijel bij de implementatie van Metacom Online	5	2RE2"
		How did you like the collaboration between Van Meijel and your organization?	Hoe was de samenwerking tussen Van Meijel en uw organisatie verlopen	5	2RE3"
Project Management	Project managers in charge of the project were highly capable and experienced (Karim et al., 2007)	The project managers who were in charge from Van Meijel were capable and experienced	De projectmanagers die de leiding hadden vanuit Van Meijel waren capabel en ervaren	5	2PM1
	Formal project management tools and techniques were employed for this project (Karim et al., 2007)	The project techniques used to make the project a success were the right ones	De project technieken die gebruikt werden om het project te laten slagen, waren de juiste	5	2PM2
Time frame	The implementation schedule was realistic (Karim et al., 2007)	Implementing Metacom Online went at a good pace	Het implementeren van Metacom Online ging in een goed tempo	5	2TF1
Benchmarks		There were clear milestones in the implementation process of Metacom Online	Er waren duidelijke mijlpalen in het implementatie traject van Metacom Online	5	2BM1
Teamwork & Cohesion		The cooperation within the project team went well	De samenwerking binnen het projectteam ging goed	5	2TC1
	I have confidence in my colleagues (Bouckenooghe et al., 2009)	I had faith in the project team of Metacom online	Ik had vertrouwen in het projectteam van Metacom Online	5	2TC2
	It is difficult to ask help from my colleagues (Bouckenooghe et al., 2009)	I found it difficult to ask the project team for help	Ik vond het moeilijk om het projectteam om hulp te vragen	5	2TC3*
Communication					

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
Quality of Communication	Information provided on change is clear (Bouckenooghe et al., 2009)	The communication about Metacom Online to employees was clear	De communicatie over Metacom Online vanuit de organisatie naar medewerkers was duidelijk	5	2CQ1
	We are sufficiently informed about the progress of change (Bouckenooghe et al., 2009)	There was sufficient communication about Metacom Online from the own organization to the employees	De medewerkers waren altijd volledig geïnformeerd over het Metacom Online project	5	2CQ2
	My department's management team takes account of the staff's remarks (Bouckenooghe et al., 2009)	The project team listened carefully to the feedback about Metacom Online from the organization	Het projectteam luisterde goed naar de feedback over Metacom Online vanuit de organisatie	5	2CQ3
Communication with Van Meijel		The communication with Van Meijel went smoothly	De communicatie met Van Meijel verliep soepel	5	2CM1
		It was not always clear to me what the Van Meijel employees meant	Het was mij niet altijd duidelijk wat de medewerkers van Van Meijel bedoelden	5	2CM2*
Need for Change	There are a number of rational reasons for this change to be made (Holt et al., 2007)	The reasons for working with Metacom Online were clear	De redenen om met Metacom Online te gaan werken waren duidelijk	7	2CN1
	It doesn't make much sense for us to initiate this change (Holt et al., 2007)	It was not clear to me why we as a company had to switch to Metacom Online	Het was mij niet duidelijk waarom wij als bedrijf moesten overstappen naar Metacom Online	7	2CN2*
Provider Quality					
Provider Quality	Experienced consultants guided us throughout the course of the project (Karim et al., 2007)	The advisors who guided us during the project were experienced	De adviseurs die ons tijdens het project hebben begeleid waren ervaren	5	2PQ1
	External consultants brought considerable expertise and experience to our project (Karim et al., 2007)	Van Meijels consultants brought considerable expertise and experience to support the project	Van Meijel's consultants brachten aanzienlijke expertise en ervaring met zich mee om het project te ondersteunen	5	2PQ2
	The consultants treat us with respect (Wang and Chen, 2006)	The consultants treated us with respect	De consultants behandelden ons met respect	5	2PQ3

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
	The consultants get adequate support from their firm to do their jobs well (Wang and Chen, 2006)	The consultants received sufficient support from Van Meijel to do their job well	De consultants kregen voldoende ondersteuning vanuit Van Meijel om hun werk goed te doen	5	2PQ4
	The consultants try to maintain a lasting and trusting relationship with us (Wang and Chen, 2006)	The consultants tried to maintain a lasting and trusted relationship with us	De consultants probeerden een duurzame en vertrouwde relatie met ons te onderhouden	5	2PQ5
	The consultants really understand my needs(Wang and Chen, 2006)	The consultants really understood my needs	De consultants begrepen mijn behoeften echt	5	2PQ6
	The consultants give us personal attention (Wang and Chen, 2006)	The consultants gave us personal attention	De consultants gaven ons persoonlijke aandacht	5	2PQ7
	When we have a problem, the consultants are sympathetic and reassuring (Wang and Chen, 2006)	Whenever we had a problem, the consultants were sympathetic and reassuring	Wanneer we een probleem hadden, waren de consultants sympathiek en geruststellend	5	2PQ8
	When consultants promise to do something by a certain time, they do so (Wang and Chen, 2006)	When consultants promised to do something within a certain time, they did too	Wanneer consultants beloofden iets binnen een bepaalde tijd te zullen doen, deden ze dat ook	5	2PQ9
	The consultants return phone calls and inquiries promptly (Wang and Chen, 2006)	The consultants return phone calls and inquiries promptly	De consultants beantwoordden telefoontjes en vragen onmiddellijk	5	2PQ10
		Van Meijel responded quickly to questions	Van Meijel reageerde snel op vragen	5	2PQ11
Readiness					
Individual Readiness	I am willing to put energy into the process of change (Bouckenooghe et al., 2009)	I wanted to put energy into Metacom Online to make it a success	Ik wilde graag energie steken in Metacom Online om het tot een succes te maken	5	2IR1
	I am willing to make a significant contribution to the change (Bouckenooghe et al., 2009)	I wanted like to make a significant contribution to the Metacom Online process	Ik wilde graag een zo groot mogelijke bijdrage leveren aan het Metacom Online traject	5	2IR2
	I am somewhat resistant to change (Bouckenooghe et al., 2009)	I was somewhat resistant to Metacom Online	Ik bood enige weerstand tegen de invoering van Metacom Online	5	2IR3*

	Questions Literature	Question Van Meijel	Dutch Translation	Scale	Code
Organizational Readiness	Staff understands that specific changes may improve outcomes (Claiborne et al., 2013)	Colleagues understood how the introduction of Metacom Online could contribute to an improved quality of our work	Collega's begrepen hoe de invoering van Metacom Online kon bijdragen aan een verbeterde kwaliteit van ons werk	5	2OR1
	Most staff are willing to try new idea (Claiborne et al., 2013)	My colleagues were open of working with Metacom online	Mijn collega's stonden er voor open om met Metacom online te werken	5	2OR2
	Staff adapts quickly when they have to shift focus to accommodate program changes (Claiborne et al., 2013)	My colleagues were able to quickly learn how to use Metacom Online	Mijn collega's waren in staat om snel te leren omgaan met Metacom Online	5	2OR3
Commitment					
Affective Commitment	This change is not necessary (Herscovitch and Meyer, 2002)	I did not find the change to Metacom Online necessary	Ik vond de overgang naar Metacom Online niet nodig	7	2AC1*
	This change is a good strategy for this organization (Herscovitch and Meyer, 2002)	Metacom Online was seen as a good addition to my company	Metacom Online werd gezien als een goede toevoeging voor mijn bedrijf	7	2AC2
	I believed in the value of this change (Herscovitch and Meyer, 2002)	I believe in the value of implementing Metacom Online	Ik geloofde dat Metacom Online van toegevoegde waarde is	7	2AC3
Continuance Commitment	I feel pressure to go along with this change (Herscovitch and Meyer, 2002)	I felt pressure to go along with the change to Metacom Online	Ik voelde druk om mee te gaan met de overgang naar Metacom Online	7	2CC1
	It would be risky to speak out against this change (Herscovitch and Meyer, 2002)	I felt it was risky to speak out against Metacom Online	Ik had het gevoel dat het risicovol was om mij tegen Metacom Online uit te spreken	7	2CC2
	I have no choice but to go along with this change (Herscovitch and Meyer, 2002)	There was no other choice than to work with Metacom Online	Er was geen andere keuze dan te werken met Metacom Online	7	12CC3
Normative Commitment	It would be irresponsible of me to resist this change (Herscovitch and Meyer, 2002)	I felt obliged to participate in Metacom Online	Ik voelde mij verplicht om mee te gaan werken aan Metacom Online	7	2NC1
	I do not feel any obligation to support this change (Herscovitch and Meyer, 2002)	I felt no obligation to support the transition to Metacom online	Ik voelde geen enkele verplichting om de overgang naar Metacom online te ondersteunen	7	2NC2*
	I would feel guilty about opposing this change (Herscovitch and Meyer, 2002)	I would have felt guilty if I had opposed Metacom Online	Ik zou me schuldig hebben gevoeld als ik mij had verzet tegen Metacom Online	7	2NC3

Code	Scale	Dutch Translation	Question Van Meijel	Questions Literature
Change Success				
General Succes				
2GS1"		Wat betekent de term 'projectsucces' voor u	What does the term 'project success' mean to you	
2GS2"		Welke criteria gebruikt u om projectsucces te meten	What criteria do you use to measure project success	
2GS3		Vindt u dat het project Metacom Online geslaagd is	Do you think that the Metacom Online project was successful	
2GS4"		Waarom vind u het geslaagd	Why do you think it's successful	
2GS5"		Waarom vind u het niet geslaagd	Why don't you think it's successful	
Change Success				
2CS1	5	Metacom Online heeft onze operationele efficiëntie verbeterd	Metacom Online has improved our operational efficiency	ERP implementation has improved our efficiency of operations (Karim et al., 2007)
2CS2	5	Metacom Online heeft onze operationele kwaliteit verbeterd	Metacom Online has improved our operational quality	ERP implementation has improved our quality of operations (Karim et al., 2007)
2CS3	5	Ik ben tevreden met Metacom Online	I am satisfied with Metacom Online	
2CS4	5	Ik vind de verandering naar Metacom Online verfrissend	I find the change to Metacom Online refreshing	I find the change refreshing (Bouckenooghe et al., 2009)
2CS5	5	Metacom Online maakt mijn werk makkelijker	Metacom Online makes my work easier	The change will simplify work (Bouckenooghe et al., 2009)
2CS6	5	Metacom Online verbetert mijn werk	Metacom Online improve my work	The change will improve my work (Bouckenooghe et al., 2009)
2CS7		Ik zou de implementatie van Metacom Online beoordelen met een...(1-10)	I would rate the implementation of Metacom Online with a (between 1-10)	
Customer Satisfaction				
2SA1"		Wat is voor u het meest belangrijke als het gaat om klanttevredenheid	What is most important to you when it comes to customer satisfaction	
2SA2"		Wat zou Van Meijel volgens u kunnen veranderen om de klanttevredenheid te verhogen	What do you think Van Meijel should change to increase customer satisfaction	

B Coding Descriptions

Table B.1: Coding Descriptions

Code Name	Description
Achieve Objectives	The application meets the defined objectives
Added value	The application results in a better operation and / or financial situation for the company
Application	The operation of the application in general
Availability	The availability of the supplier's employees
Branch Knowledge	The knowledge of the supplier in the industry
Collaboration	The cooperation between the supplier and the customer
Communication	The communication from the supplier to the customer
Cost	The total costs of the project
Evaluation	The evaluation with the supplier after the end of the project process
Expectation management	The expectations that a customer have received after discussions with the supplier's employees
Knowledge	The knowledge that the consultants of the supplier have with regard to the implementation process
Layout	The layout of the application
Lead time	The duration time of the project
No Improvements	The supplier does not have to implement improvements
Project Definition	Creating a clear definition of the project and its compliance
Quality	The quality of the end product
Reliability	The trust that the customer has in the supplier
Satisfaction	The satisfaction of all stakeholders
Satisfaction End users	The satisfaction of those who actually have to use the application
Share Experiences	Sharing experiences between customers from the supplier
Standardization	Generalizing processes or solutions from the supplier to the customer
Support	The support that the supplier provides after taking the application into process
Tendering Process	The tendering phase of the process
User Support	The support that the end users give during and after the introduction of the new application

C Ad Hoc Power Analysis Project Teams

Table C.1: Ad Hoc Power Analysis Project Teams

Variable	Effect size ($|r|$)	Power (%)	Minimum response rate (Power = 80%)
To readiness			
Training	0.31	40%	76
System Quality	0.05	6%	3134
Communication Climate	0.36	52%	55
Communication Supplier	0.12	10%	540
Need for Change	0.36	52%	55
Time Frame	0.18	16%	237
Benchmarks	0.12	10%	540
Teamwork	0.03	5%	8716
Project Managament	0.09	8%	964
Provider Quality	0.11	9%	643
To Customer Satisfaction			
Readiness	0.37	54%	52
Affective Commitment	0.34	47%	63
To Performance Score			
Readiness	0.12	10%	540
Affective Commitment	0.28	33%	95

D   Ad Hoc Power Analysis End Users

Table D.1: Ad Hoc Power Analysis End Users

Variable	Effect size ($|r|$)	Correlation Power (%)	Minimum response rate (Power = 80%)	Regression Power (%)
To Readiness				100%
Training	0.39	95%	46	
Self-efficacy	0.69	100%	11	
Affective Attitude	0.03	6%	8716	
Behavirioal Attitude	0.39	95%	46	
Cognitive Attitude	0.52	100%	24	
System Quality	0.73	100%	10	
Communication Climate	0.47	99%	30	
Need for Change	0.59	100%	17	
Change Agent	0.62	100%	15	
Key People Support	0.22	48%	157	
Managament Support	0.68	100%	12	
To Customer Satisfaction				100%
Readiness	0.73	100%	10	
Affective Commitment	0.83	100%	7	
To Performance Score				100%
Readiness	0.41	97%	41	
Affective Commitment	0.64	100%	14	