Tensions and approaches within the context of a failed EHR implementation program

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PREFACE

I would like to take this opportunity to thank several people who were involved and/or contributed to process of this research. First, I would like to thank dr. J.F.J. Vos for her guidance during the whole process, especially when flexibility of all parties was needed. I would also like to thank the other researchers involved, which are dr. M.A.G. van Offenbeek and prof. dr. A. Boonstra. Furthermore, I want to express my thankfulness to MSc. J.J. van Burgsteden, M.E. Gols and M.V. Hulscher who provided me with feedback along the process. Finally, I want to thank the involved employees from the LTHN, especially the ones that guided me and made it possible to realize this research despite the termination of the program.

CONTENT

ABSTRACT

The electronic health record (EHR) became a key instrument over the last ten years within healthcare. Despite the increased popularity, the failure rate of implementing an EHR is still around 70%. Within each planned change, tensions arise which need to be dealt with. In order to provide a deeper understanding of these processes, this research explores which poles are dominant within 'what' and 'how' tensions in the context of a failed EHR implementation program and which approaches are used towards tensions on a departmental level. This research focused on the tensions customized versus standardized system, small scope versus large scope, bottom-up versus top-down and big bang versus incremental. The approaches towards tensions are selection, separation, integration, transcendence and connectedness. This case study was conducted within a large teaching hospital that recently decided to terminate the EHR implementation program. The study focused on four departments, at each department three respondents were interviewed which were the end-users of the EHR. Eleven interviews were held and there were a total of twelve respondents. They had several functions within their department (e.g. doctor, nurse, manager). It turned out that the dominant poles were standardized system, large scope and top-down. The tension incremental versus big bang had no dominant pole. The main approaches towards tensions were selection and separation. Four sub tensions became visible; (1) share information versus adjust information, (2) collaborate with partners versus work independently, (3) develop own EHR versus purchase existing EHR and (4) department-based segmentation versus profession-based segmentation.

2

1 INTRODUCTION

Healthcare cannot operate without ICT nowadays (Ammenwerth et al., 2004). This is due to the development of healthcare related IT systems. An example of an IT system that is in development is the electronic health record (EHR), which became a key instrument within healthcare over the last ten years (Jensen & Aanestad, 2007). An EHR can be described as a storage place where all kind of patient related information is saved within a digital environment (ISO, 2004). Although information systems (IS) are upcoming, the failure rate of implementing these systems within healthcare institutions has not changed over the last thirty years and is still around 70% (Doherty, Ashurst, & Peppard, 2012). There are several explanations for this large failure rate. To start with, Murray (2006) and McGinn et al. (2011) state that many project failures occur due to the involvement of multiple types of groups, called stakeholders of the EHR. Furthermore, McGinn (2011) also states that stakeholders have concerns towards the design or technic of the EHR, privacy and security, costs, productivity, patient and health professional interaction and lack of time and the increasing workload. Inconsistencies between these concerns can lead towards tensions during the development or implementation of an IS which can ultimately lead towards failure. The influence of tensions within organizations is widely supported (Benson, 1977; Cameron & Quinn, 1988; Smitz & Graetz, 2011; Smith & Lewis, 2011; Ashforth & Reingen, 2014). According to Stohl and Cheney (2001), a duality is a similar term for tensions. Dualities refer to oppositional poles related to a conflict that concerns the perspective, actions or values of others (Seo, Putnam, & Bartunek, 2004). In relation to a failed EHR implementation program, tensions might be the mechanism that causes the high failure rate.

There are multiple types of tensions mentioned in the literature in all kinds of contexts. Tensions focused on the implementation of an EHR are for example described by van Duijn (2013). Tensions, which resulted from his study, were based on the conceptual framework of Smith and Lewis (2011). Furthermore, McGinn (2011) discusses barriers of stakeholders towards the use of an EHR, which are at the end also tensions. Van Duijn (2013) elaborates upon the

tensions customized system versus standardized system, small scope versus large scope, top-down versus bottom-up and incremental versus big bang. Another way to categorize the same tensions is to use the distinction between 'what' and 'how' (Cawsey, Descza, & Ingols, 2012). The 'what' implies the content of the change and the 'how' implies the process of the change. This categorization is not explicitly focused on tensions, but often used. The combination of the categories of both van Duijn (2013) and Cawsey et al. (2012) results in the following distinctions; the 'what' focuses on the tensions customized system versus standardized system and small scope versus large scope. The 'how' category focuses on the tensions bottom-up versus top-down and incremental versus big bang. Because these tensions have been studied before in the context of an EHR implementation program, the combination of Cawsey et al. (2012) and van Duijn (2013) will be the conceptual framework of this research.

When tensions appear during a change process, stakeholders often use defensive mechanisms as a reaction. Due to disappointments, defensive mechanisms can be strengthened within a failed context, as is stated by Standing and Cripps (2013). They argue that the history of the employee needs to be taken into account when there is an initiative to implement an IS. Shephard, Haynie and Patzelt (2013) support this and argue that project failures have complex consequences for the emotional wellbeing of employees. Examples of defensive mechanisms are denial or repression (Vince & Broussine, 1996), humor (Hatch & Ehrlich, 1993) or being paralyzed (Smith & Berg, 1987). Next to a reaction, a stakeholder also has an approach towards a tension. Seo et al. (2004) and Barge, Lee, Maddux, Nabring and Townsend (2008) together describe five approaches towards tensions. These approaches became present within planned organizational change and are focused on the behavioral practices and assumptions of stakeholders (Seo et al., 2004). The approaches are selection, separation, integration, transcendence and connectedness. Respondents can use these approaches deliberately or not and are able to influence the success of the change. As these approaches

are able to influence the success of the change, they might also cause failure. Furthermore, this research adopts the dialectical theory of Benson (1977), which explains how organizational changes happen due to tensions and how these tensions evolve over time. Because of the context of this research, a failed EHR implementation program, it can be assumed that tensions already existed within the program. The approach towards tensions might change as Benson (1977) states that contradictions, again a similar term for a tension, are developed in a social construction-production process and show how conflicting interests evolve over time and are continuously redefined. Therefore, this process can be seen as a mechanism of why IS implementations fail.

This case study is part of a longitudinal research and is held within a large teaching hospital within the Netherlands (LTHN). This provides the opportunity to study what the dominant poles are within 'what' and 'how' tensions within the context of a failed EHR project and which approaches are used towards these tensions on a departmental level. Smith and Lewis (2011) call for further research in the direction of the dynamics of tensions. Building on these dynamics, Saberwal and Newman (2003) explicitly mention the need for further research in the context of the dialectical theory in order to understand the dynamics when an IS is implemented. Finally, Heeks (2006) mentions that research in the field of project failures is underdeveloped. Building upon this statement, Ben-Zion, Pliskin and Fink (2014) argue that negative findings are not published that often as positive findings. A possible reason for this is that potential negative results are not always discovered. Therefore, the main goal of this research is to examine the combination of which tensions arise and which approaches are used towards these tensions within the context of a failing project. The research question during this paper will be:

'Which are the dominant poles within 'what' and 'how' tensions and how are these tensions approached on a departmental level in the context of a failed EHR implementation project?'

Next to the theoretical value of this study, there is also practical relevance. First of all, the dialectical perspective recognizes that change is shaped by contradictions. Under-

standing these contradictions will help organizations and therefore change agents to manage different demands and expectations (Cho, 2007). Second, due to the context of this research the results can conclude the lessons learned from a failed EHR implementation. These lessons can be taken into account during future initiatives. Third, as the dialectical perspective showed, an approach towards tensions evolves over time. This needs to be taken into account by practitioners and calls upon a proactive attitude in order to know what the approaches are and if possible guide them into the direction that leads towards the implementation of a new EHR or IS program. Finally, this research will contribute to provide deeper insights in how tensions and approaches towards tensions contribute towards the failure of change initiatives.

The remainder of this paper is outlined as follows. The first section concerns the literature review, which provides a deeper understanding of the central concepts of this research. The second section describes the methodological part of this research, which focuses on the research approach, research site, data collection and data analysis. The fourth part presents the results of this research. The main focus here is on presenting a within case analysis and a cross case analysis. The fifth part focuses on the discussion of the findings and describes the theoretical implications, the managerial implications, the limitations and suggestions for further research. Finally, this paper will end with the conclusion.

2   LITERATURE REVIEW

This section is divided in four parts. First, the focused is on the EHR in order to give a deeper explanation of what this system entails and sets the scene of this research in a failed context. Second, the dialectical theory will be elaborated upon, which is the underlying perspective of why tensions can differ when contexts evolve. Third, the tensions are discussed and the categorization between what and how will be elaborated upon. Finally, the approaches towards tensions will be the subject.

2.1   Context of EHR

Information systems (IS) are coalesced with the healthcare sector (Ammenwerth, Gräber, Herrmann, Bürkle, & König, 2003). In the literature, several advantages of an EHR are mentioned and are reasons for a healthcare institution to implement such a system. First of all, an EHR can help to store several types of clinical, administrative, and financial data about patients. Second, an EHR often interacts with other systems, for example with the system of a health insurance company (Ben-Zion, Pliskin, & Fink, 2014). This enables collaboration between multiple healthcare institutions. Third, digital access can save administrative time and creates an efficient way to manage patient information (Erstad, 2003), which allows professionals to spend more time with patients. Fourth, from the perspective of the patient, an EHR is able to empower the patient and provides the opportunity for them to participate in the decision-making, which increases patient satisfaction (Erstad, 2003). Fifth, an EHR is able to provide information that is relevant, up to date and timely which at the same time contributes to knowledge exchange between multidisciplinary teams of health care professionals who need to make a collaborative decision regarding a patient (Delpierre et al., 2004). Despite these advantages, the implementation process of an EHR is complex due to several organizational and technical factors. According to the study of Heeks (2006) and Jha et al. (2009) these factors include organizational structure, culture, technical infrastructure, financial resources, coordination and human skills. Furthermore, Grimson,

Grimson and Hasselbring (2000) state that it is more complex to implement an IS within hospitals than within other types of companies due to data entry problems, security and confidentiality concerns, complexity of medical data and a lack of interest towards the benefits of the system among employees. In order to increase the probability of a successful implementation, Standing and Cripps (2013) mention multiple factors. These aspects are (1) having a vision or a plan regarding the role of ICT, (2) create goals and objectives during the project, (3) align the project with the mission of the organization, (4) stakeholder and user involvement, (5) communication with users and reporting the benefits of the project and (6) a process for implementation that includes an integration and migration path from the old to the new system.

Another important aspect mentioned by Standing and Cripps (2013) is the context of the healthcare institution. They found that success factors within an EHR implementation are the levels of expectations from stakeholders, the needs and expectations of clients and their level of resistance and the scope of the project (Standing & Cripps, 2013). Next to this, Heeks (2006) found that implementations often fail when they are highly structured and the IS is confronted with a loosely coupled and complex reality. Considering that different approaches and tactics are needed for different contexts makes it understandable why the implementation and adoption of an EHR is so difficult. This is also why ICT development within health care often leads to failure terms of costs, time and satisfaction (Standing & Cripps, 2013). The dialectical theory shows how needs and expectations of stakeholders mentioned by Standing and Cripps (2013) evolve over time (Benson, 1977; Sabherwal & Newman, 2003). A deeper understanding of this theory will be given in the next paragraph.

2.2   Dialectical theory

Originally, dialectic comes from the Greek, meaning the option to choose, talk or read between the lines (Mason, 1996). This implies that there are at least two parties involved that communicate or exchange information and

differences are involved. The dialectic theory acknowledges contrast, contradictions and oppositions (Lourenco & Glidewell, 1975). In the study of Sabherwal and Newman (2003), IS implementation is researched from the perspective of the dialectical theory and stated that the dialectical theory demonstrates how persistence and change guide how stakeholders act and react. In their research, they argue that unexpected changes in technology and goals can be used to explain this persistence and commitment towards the present state. The present state is comfortable and is compared to the unknown future. Berg (2001) supports this and argues that it is socially negotiated if an implementation is perceived as successful or not. Furthermore, the study of Boonstra and Govers (2009) showed that the implementation of an ERH system is very dynamic. They state that the interpretations by stakeholders continuously change during the implementation for several reasons. These reasons can be cognitive, political or opportunistic. Returning to Sabherwal and Newman (2003), they make the distinction between a thesis and an anti-thesis (see Figure 1). Where the former represents multiple assumptions that together with facts and data form the current opinion (Mason & Mitroff, 1981), the latter contains the development of opposing assumptions towards the former thesis (Sabherwal & Newman, 2003). This process influences the current thesis and over time this can lead towards an anti-thesis, which can be a separation from the former thesis. By the influence of organizational events and the combination of the thesis and the antithesis, a new synthesis is developed. This synthesis can be the former thesis, the antithesis or a combination of both.

Complementary to Sabherwal and Newman, Benson (1977) states that the world is social and in a continuous state of becoming. Within a social world, there are arrangements, which seem fixed and permanent but in reality are temporary. The dialectical theory, according to Benson (1977),
focuses on the transformation through which one set of arrangements gives way to another, which is important when one tension follows upon another. Having defined what the dialectical theory entails, the following section will elaborate upon the meaning of a tension and which types

of tensions there are within the context of an EHR implementation program.
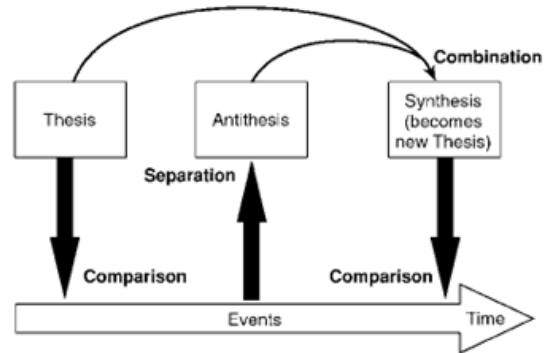
Figuur 1 **GT**he dialectical approach - Sabherwal & Newman (2003: 72).

2.3 TENSIONS

It is important to know what a tension entails, before the types of tensions are further outlined. As was pointed out in the introduction of this research, the term tension can be described in multiple ways and has similar terms, for example contradiction, paradox or duality (Cameron & Quinn, 1988). These terms differ in several ways, although they are often used interchangeably and coexist next to each other, which create and resolve tensions in a story, expose new insights and create humor (Robey & Boudreau, 1999). Due to our society being more complex and dynamic, tensions arise more often and become more common (Ashforth & Reingen, 2014). Since there are multiple descriptions of what a tension entails, Table 1 provides an overview of the most common definitions present in the literature to describe a tension or a similar term.

For the remainder of this paper, the descriptions of Benson (1977) and Ashforth and Reingen (2014) are followed. Both mention the interplay between the two opposites, however the difference between the two is that Benson (1977)

describes this interplay more as a social process, whereas Ashforth and Reingen (2014) approach the concept more objectively and describe a process.

Although this difference, both descriptions touch upon the dialectical theory by stating that a tension can be dynamic and change over time. Furthermore, both descriptions describe how tensions arise and develop over time.

This perspective is essential within the context of a failed EHR implementation program where tensions, according to these descriptions, already existed due previous stages and developed over time. The development of tensions can lead towards different outcomes, among other failure. A tension can be the mechanism of why EHR implementations fail.

Author	Description
Benson (1977: 16)	Contradictions feed into the social construction-production process in more ways. First, contradictions are a continuing source of tensions, which shape consciousness and action to change the present state. Second, contradictions set limits and establish opportunities for the reconstruction according to a given period. Third, contradictions can produce crises, which create opportunities for again, reconstruction. Fourth, contradictions are defining limits of a system.
Cameron & Quinn (1988: 89)	Some 'thing' that is constructed by individuals' oppositional tendencies are brought into recognizable proximity through reflection or interaction.
Robey & Boudreau (1999: 168)	A logic of opposition explains organizational change by focusing on opposing forces that respectively promote and oppose social change.
Seo, Putnam & Bartunek (2004: 74)	Dualities refer to polar opposites that often work against one another, thus they represent oppositional pulls that vary in degrees.
Lewis & Smith (2011: 390)	Tensions are either latent or salient. The former means contradictory, yet interrelated elements embedded in an organizational process that persist because of organizational complexity and adaptation and the latter means that the tensions are interrelated elements experiences by organizational actors.
Smith & Graetz (2011: 188)	A paradox represents a contradictory yet interrelated elements such as perspectives, feelings, messages, identities, interest or practices. A paradox makes sense of the complexities and uncertainties in the work environment.
Ashforth & Reingen (2014: 476f)	Dualities have various characteristics. First, the oppositional tendencies that define a duality are simultaneously present. Second, the oppositional tendencies are relational and interdependent in that each tendency and entity associated with it (1) is defined at least in part by the other, often like a mirror image (e.g. decentralization & centralization), (2) at least seemingly contradicts the other and (3) is complementary. Third, the ongoing tension between ostensible opposites indicates that the interplay between the tendencies is typically dynamic.

Tabel 1 Description of tensions or similar terms ordered chronological.

Having discussed the meaning of a tension for this research, the following part will elaborate upon the types of tensions that were also mentioned within the introduction of this research.

TYPES OF TENSIONS
In order to identify the tensions, this research relies on tensions recognized during earlier research (van Duijn, 2013) and the categorization made by Cawsey et al. (2012). The categories made by Cawsey et al. (2013) are 'what' and 'how'. In their opinion, the former means the content of change and the latter the process in order to realize the change. Seo et al. (2004) support this distinction as they use the same within their research. The tensions discussed in the research of van Duijn (2013) are among others customized system versus standardized system, small scope versus large scope, bottom-up versus top-down and incremental versus big bang. Combining both aspects, the 'what' category entails the tensions customized system versus standardized system and small scope versus large scope. The tensions focused on the 'how' category are bottom-up versus top-down and incremental versus big bang.

Customized system versus standardized system. Van Eekeren et al. (2010) emphasizes that individual medical specialists would like to have a customized system, whereas the hospital and therefore the board would like to have a standardized system. In the study of van Eekeren et al. (2010), it is stated that this divided opinion is due to the medical specialist who does not want to share their information, while the hospital would like to compare costs and lead times.
This tension can be compared with the dilemma of a package embedded structure and an organizational structure that is described by Soh and Sia (2005). A compromise can be found in either adjusting the package or the structure of the organization. Consultants and project managers often want the organization to adapt towards the system while the users want the system to be modified (Soh & Sia, 2005). A related tension recognized by Huymans (2012) is the discussion whether the EHR should be a best-of-breed or a best-of-suite software package. The best-of-suit is more standardized in a way that this type of EHR enfolds each aspect of the organization. Another facet is that only one vendor provides this EHR and the scope of the package

is large. The best-of-breed package is more customized in a way that it is focused on one facet of the organization. Therefore, the scope of the system is smaller and multiple vendors can provide an EHR within one healthcare institution. Huymans (2012) argues that it
depends on ambition, experience, positioning and quality of the software packages which option needs to be chosen. The difference between the tension acknowledged by van Duijn (2013) and the tension acknowledged by Huymans (2012) is that the former suggests that both scopes are hospital wide and the latter suggests the option to include multiple vendors and EHR's within one hospital.

Small scope versus large scope. Ramirez, Melville and Lawler (2010) state in their research that the design and process is more effective when the change is implemented in a manageable scope. Furthermore, Balogun and Hope Hailey (2004) state that the end result determines if there is a small or a large scope. A small scope indicates a change that is substantial, but not fundamental (Balogun & Hope Hailey, 2004). An example mentioned by them is restructuring. Balogun and Hope Hailey (2004) state that a large scope is needed when the existing paradigms and organizational routines cannot be handled and need to be changed. Together with the end result, Balogun and Hope Hailey (2004) also argue that the breadth and depth of the change is important. These two aspects determine if the scope of a change is small or large. The breadth of change implies the whole organization or a department and the depth of change implies the type of change.
According to van Eekeren et al. (2010), the basic thoughts of a scope regarding an EHR are basic assumptions, boundary conditions and a functional vision combined with insights of installed based IT-services. Subjects that can raise issues for the scope of a new EHR concerns the type of files, functionality, range of departments and end-users. These issues can develop into tensions if the stakeholders create two opposites. Whereas this view is objective and measurable, the perspective of Huymans (2012) is more focused on social-technical aspects that need to be considered. He states that the scope depends on the goal of the healthcare institution. The social-technical aspects mentioned by Huymans (2012) are the external environment, processes, the organization, technology and people in general.

Bottom-up versus top-down. This tension has two different perspectives. The first perspective entails where the initiative of the change comes from, the second perspective involves the execution of the change. To start with, Burnes (2014) defines bottom-up change as change that comes from shop floor initiatives and responses towards threats and opportunities stakeholders see within the environment (Burnes, 2014).

Another perspective from Balogun and Hope Hailey (2004) is that within a bottom-up initiative the responsibility of the change is passed down into the organization, which increases the employees to be self-generating. Furthermore, Sabatier (1986) argues within earlier research that a bottom-up approach comes from actors that deal with the change. This perspective differs from Balogun and Hope Hailey (2004) in a way that they state that the initiative can come from the top and then passed down towards to employees, where Sabatier (1986) argues that the entire initiative to change comes from the employees.

Within a top-down approach, the board determines the direction and has control over the change (Balogun and Hope Hailey, 2004). Furthermore, Sabatier (1986) argues that a top-down approach starts with developing a program and determine afterwards to what level the users are consistent with the program and how deviations can be obviated. In the remainder of the research, the meaning of this tension enfolds if the initiative of the change is either bottom-up or top-down.

Incremental versus big bang. Huymans (2012) points out that there should be a distinction between replacement and innovation when an IS will be implemented. If a healthcare institution replaces their former system and works with new types of functionalities for the first time, an incremental approach would apply. At the same time, the main challenge within the incremental approach is to keep employees convinced of the change over a long period of time (Cawsey et al., 2012). When the organization is already familiar with functionalities similar to an EHR, a big bang approach would work more successfully (Huymans, 2012). The main challenge during a big bang implementation is to keep the organization working while significant changes are made (Cawsey et al., 2012).

Balogun and Hope Hailey (2004) state that the incremental approach entails change over a certain period of time and uses step-by-step approach. Next to this, Cawsey et al. (2012: 167) states that 'by starting small and minimizing the incongruence with existing systems, the change leader can move in a systematic fashion in the desired direction, learning and modifying systems and structures in ways that look incremental in the short term, but have a significant long-term effects'. This suggests that although an incremental approach can be the way to implement an EHR, this does not mean that the scope is smaller. Furthermore, Burnes (2014) points out that incremental change concerns dealing with one problem and goal at the same time. The big bang approach implies change all at once (Balogun & Hope Hailey, 2004). In the same vein, Senior and Swailes (2010) state that a big bang approach entails maximizing the speed of change.

2.4 Approaches towards tensions

As was pointed out in the introduction of this research, each stakeholder has an approach towards a tension. These approaches give a deeper understanding of the rationale behind the dominant poles of the stakeholder. According to Seo et al. (2004) tensions can be approached in four different ways. These approaches are selection, separation, integration and transcendence. Barge et al. (2008) add one approach, which is connectedness. Barge et al. (2008) state that tensions between two opposites creates choices for an organization. They can choose one pole over another, or try to manage both through a transition period. Therefore, change can be defined as a movement from one tension to the other. Each time a strategy is chosen, another tension will follow until the change is completed (Reeves, Duncan, & Ginter, 2000).

First, selection entails denial in which a party denies the opposite site and therefore selects one pole over the other (Seo et al., 2004). An example of selection mentioned by Seo et al. (2004: 76) is the following: 'many theorists recognize that change can be both proactive and reactive. But rather than explore the relationship between these tensions, theorist may threat them as discrete and threatening to each other and privilege either the reactive or the proactive processes.' This indicates that one pole is chosen over the other and is seen as the correct pole, while both poles are recognized. Second, separation recognizes both poles but separates them based on the level of analysis, viewing

the poles as current temporal processes and domains that can change over time (Seo et al., 2004). An example mentioned by Seo et al. (2004) is that the amount of employee involvement can differ within each stage of the change. In the beginning of the change, the system can be closed and less employee involvement is needed while in a later phase an open system is created an employee involvement is needed. Another example is to differentiate between the individual level, group level and organizational level. Therefore, a difference can be made of how the
individual is managed and the group or organization. The third approach is integration. This approach recognizes both poles, but tries to combine them to build bridges and neutralize the two poles (Barge et al., 2008). Most often this is seen as the 'middle of the road' approach where the tensions are neutralized and merge with one another. An organizational change where this approach is often used is within a merger. The fourth approach is transcendence, which reframes the current opposites and constructs a new opposite (Barge et al., 2008). This approach is related to the dialectical perspective in a way that it is able to replace the thesis with a synthesis. The former thesis is changed over time and no longer exists. Fifth, connectedness aims to build a bridge between the two poles and recognizes that both are important and are able to contribute towards the change (Barge et al., 2008). The difference between the two poles is recognized, but the combination of both poles creates synergy and makes both poles mutual beneficial towards the change (Barge et al., 2008).
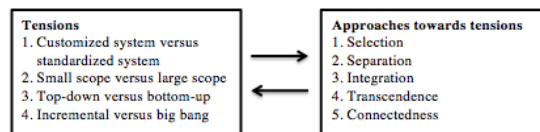
2.5 Linking tensions and approaches towards tensions

This literature review began by describing the context of the EHR. This was done to in order to set the scene of this research in the context of a failed EHR implementation program and provide a deeper understanding of what an EHR enfolds. The following section described the dialectical theory, which explained how tensions evolve over time due to organizational events by creating a synthesis. The next section described the meaning of a tension and the types of tensions. Tensions have been an interesting topic and are studied in multiple researchers (Benson, 1977; Cameron & Quinn, 1988; Robey & Boudreau, 1999; Seo et al., 2004; Lewis & Smith, 2011; Ashforth & Reingen, 2014). In view of

all that have been mentioned so far, on may argue that tensions are a mechanism of how EHR implementations proceed. The work of Cawsey et al. (2012) and van Duijn (2013) is important for the purpose of this research, as this research studies what the dominant poles are within a failed EHR implementation program. The final section elaborated upon the approaches towards tensions in order to give a deeper understanding of these dominant poles. Despite the study of van Duijn (2013), almost each study focused on the perspective of the program, change agent or management strategies. Building upon these researchers, a shift is made towards the perspective of the end-users and the approaches they use towards the tensions mentioned by van Duijn (2013) instead of the perspective of the change agent. The combination of tensions and approaches towards tensions contribute to the explanation of how and why failure occurs.
In summary, the tensions that this research elaborates upon are customized system versus standardized system, small scope versus large scope, top-down versus bottom-up and incremental versus big bang (van Duijn, 2013). Next to this, the approaches towards tensions are selection, separation, integration, transcendence and connectedness (Seo et al., 2004; Barge et al., 2008). Figure 2 provides the theoretical model of this research. This theoretical model shows the interaction between the two concepts in the context of a failed EHR implementation program. As is stated by Cameron and Quinn (1988), the development of a tension influences
organizational change. As suggested by the dialectical theory, realities are socially constructed. Through this process, the energy provides opportunities to change. Furthermore, a tension arises and is approached in different ways by stakeholders that can lead towards among other failure. An additional explanation is that different approaches arise among stakeholders due to events that can lead towards shifts in poles within a tension.

Tensions	Approaches towards tensions
1. Customized system versus standardized system	1. Selection
2. Small scope versus large scope	2. Separation
3. Top-down versus bottom-up	3. Integration
4. Incremental versus big bang	4. Transcendence
	5. Connectedness

Figuur 2 Theoretical model

3 METHODS

Within this section the methods that are used during this research are outlined. First, the research approach will be described, which is theory development in the form of a single case study. Afterwards, the research site, data collection and data analysis are discussed.

3.1 RESEARCH APPROACH

The research approach within this study is theory development, which is done by a single case study. Eisenhardt (1989) has built an eight-step roadmap for case study research with the aim to develop theory. The first step mentioned by Eisenhardt (1989) is 'getting started', which creates a research focus and provides better grounding of the measured constructs. During this research, the research focus is to study which the dominant poles are within 'what' and 'how' tensions in the context of a failed EHR implementation project and which approaches towards these tensions are used. In order to answer this question, the descriptions of Benson (1977) and Ashforth and Reingen (2014) are the main perspective of what a tension enfolds due to the perspective of how tensions arise and their evolvement over time, which correlates with the dialectical theory. The second step Eisenhardt (1989) mentions is 'selecting cases'. It is important to select a specific case in order to make it theoretically useful. The case that is followed during this research is part of a
longitudinal research within a LTHN. Therefore, this case is not selected randomly and is theoretically useful. The third step is 'crafting instruments and protocols'. This step is important to create triangulation (van Aken, Berends, & van der Bij, 2012). During this research, multiple types of data collection are used, which are interviews, newsletters and weekly updates. The fourth step is 'entering the field'. This is to collect the actual data from the case during interviews and the other types of data gathering. Both Eisenhardt (1989) and Miles and Huberman (1994) mention that during this step the researcher is able to adjust questions if the study benefits from it. Furthermore, Miles and Huberman (1994) point out that early analysis helps to think back and forth between existing data, filling missing gaps. During this research, the data was collected over a period of two

months. This created the opportunity to start analyzing and adjusting the interview protocol where necessary. For example, during two
interviews the timeline has been used in order to help the respondent to memorize events. The fifth step is 'analyzing data'. There are two types mentioned by Eisenhardt (1989), which are within-case analysis and cross-case analysis. The former is to create familiarity with the data and the latter enables the researcher to look beyond initial impressions. Within this research, both types of analysis are executed. Within-case analysis is used to explain each tension and approaches on a departmental level and cross-case analysis is used to gain an overall result of which approach is used most often towards a certain tension. The sixth, seventh and eight steps are 'shaping hypothesis', 'enfolding literature' and 'reaching closure'. These steps are elaborated upon during the discussion and conclusion of this research.

3.2 RESEARCH SITE

The research site of this study is part of a longitudinal research and therefore not a random chosen case (Eisenhardt, 1989). Former researchers followed earlier phases of the same EHR program and therefore this follow up creates unique insights and is able to develop theory. This is in line with Eisenhardt (1989), who points out that it is important to select a case, which increases the focus and is theoretically useful.
The start of the collaboration with the latest vendor started in 2011 and was the kick-off to create a new EHR. In the case of the LTHN, most of the information about patients can be found in paper files. The goal of implementing an EHR within the LTHN is to increase the quality, safety and efficiency of the patient files. Furthermore, the board of the LTHN stated that the current IT-landscape is complex and fragmented. Each department had their own applications that served their primary process. With the new EHR current IS applications of departments would be replaced by one information system for the entire hospital. The healthcare professionals are supposed to substitute the paper files with the EHR and use it on a daily basis. Along the process of the new EHR, each department was asked to

deliver an overview of their current procedures. These overviews showed that processes of each department were substantially different. Next to this, multiple departments had representatives who were hired by the program. This could be either full time or part time. These employees were

detached from their original departments towards the EHR program. Not each department had a representative within the program. These representatives collaborated within project groups or fulfilled another function within the program. At the time of this research, the pre-implementation phase had a delay and the board of the hospital decided to quite the implementation of the EHR and terminated the program. This resulted in a failed implementation of the EHR and provided the opportunity to study which poles are dominant within 'what' and 'how' tensions in the context of a failed EHR implementation project and which approaches towards these tensions are used.

3.3   DATA COLLECTION

Data has been collected in two ways in order to create triangulation (Eisenhardt, 1989; van Aken et al., 2012). First of all, the primary data was gathered through interviews. In order to create standardization among the interviews (van Aken et al., 2012), a semi-structured protocol was developed (See Appendix I). Due to this standardization, the possibility to replicate this research is improved and therefore reliability and validity increased (Eisenhardt, 1989; van Aken et al., 2012). In total, 11 interviews with multiple types of healthcare professionals were conducted, spread over four departments (A, B, C, and D). In one interview, two respondents were interviewed at the same time. This resulted in twelve interviewees. The functions of the interviewees differed from a nurse, a physician, a manager or an IT-employer. To guarantee anonymity these respondents have a code during the rest of the paper. These codes are A1/2/3, B1/2/3, C1/2/3 and D1/2/3. During the result section, anonymity is created by referring to the respondents with his/her and he/she.

The secondary data sources are weekly updates (32) and newsletters (40). On the basis of these sources a timeline was created to provide an overview of the most important events that happened throughout the project (See

Appendix II). These weekly updates were sent from the communication department of the program to the employees directly linked towards the project. Newsletters were sent also sent by the program to each employee of the hospital if they were subscripted.

Interviews. The interview questions were based on the literature described earlier that focused on the tensions and the approaches towards tensions. Furthermore, interviewees were asked to reflect upon the process. We assumed that reflecting upon the process would provide further insights in the tensions and approaches towards tensions. This resulted in an interview protocol based on four main topics: (1) the retrospective view from the department on the process, (2) tensions that occurred during the project, (3) consequences of the failed implementation for the department and (4) suggestions for future interventions. The interview questions were developed by multiple researchers, four in total, and checked by the change manager of the EHR program.

Before the interviews were held at the four departments, the protocol was tested during a pilot interview. Based on this pilot, minor adjustments were made to avoid overlap between questions. The complete interview protocol can be found in Appendix I.

The interview questions were ordered chronological which made the questions more logical and easier for the respondent to understand. Throughout the interviews, it was discovered that it would make more sense to ask the questions related to the consequences for the departments after the first topic. Therefore, small adjustments were made after reflecting on the interviews half way. Each interview was conducted in pairs of two researchers. Three researchers shifted during each interview, one researcher was always present. The advantage of interviewing with two researchers is the opportunity to complement each other by, for example, probing (Miles & Huberman, 1994). The interviews were held in Dutch, which is the native language of the four researchers and the respondents. Furthermore, each respondent gave approval for recording the interview and each interview lasted between 40-70 minutes. This increased validity of this research and avoided losing important information (Eisenhardt, 1989). The

transcripts of the interviews were written in Dutch and are not translated. This is due to the complexity and the risk of losing important information (Davidson, 2009).

After each interview, the respondents were asked if they would like to receive the transcripts. This increased validity (van Aken et al., 2012) in a way that respondents could give minor adjustments to make sure the interpretations are right. Only two of the respondents replied positive towards these questions and these respondents made minor adjustments and filled in missing gaps that were unintelligible on tape.

Timeline. The created timeline were based on weekly updates and the newsletter. Both the weekly updates and the newsletters contained information about the status of the EHR and the progress that the program made. Therefore, the main events could be filtered from updates and a timeline could be made. This timeline is chronological (Yin, 2009) and is also used this way. Next to this, the primary and secondary sources together create multiple sources of evidence (Yin, 2009) to determine and check tensions. Finally, the timeline supported the respondents as a memory device to reflect on the process. The complete timeline can be found in Appendix II.

3.4 DATA ANALYSIS

The data analysis was divided in two steps. First, the within-case analysis is conducted to see which poles are dominant by the different departments and which approaches the respondents used. Subsequently, the second part is a cross-case analysis that was used to give an overall view of the dominant poles within 'what' and 'how' tensions and the dominant approach towards each tension.

In order to conduct both types of analysis, the computer program Atlas.ti was used to code each transcript. To code in a systematic way, the coding process of Eseryel and Eseryel (2013) was followed. First of all, each transcript has been read multiple times to create familiarization (Eisenhardt, 1989; Yin, 2009; Eseryel & Eseryel, 2013). Second, deductive coding (Miles & Huberman, 1994) took place in order to see if the tensions and approaches described by the literature arose. These codes are the key variables, which Miles and Huberman (1994) advice to base a coding list on. This list was discussed with another

researcher and these discussions resulted in adjustments that have been made. This increases the reliability of the coding and therefore this research (Miles & Huberman, 1994; Yin, 2009). Once these deductive coding's were finished, inductive coding took place in order to see if other tensions arose and other types of approaches were used by respondents. The complete codebook can be found in Appendix III.

14

4   RESULTS

This section describes the results of this study and is divided in two parts. First of all, the dominant poles of departments for each tension and the approaches used will be described. This can be seen as the within case analysis (Eisenhardt, 1989). Second, a cross-case analysis (Eisenhardt, 1989) provides an overall view of the tensions and their most dominant approach.

4.1   WITHIN CASE ANALYSIS

The following part describes the within case analysis of this research and has two main subjects. These subjects are the tensions of van Duijn (2013) categorized by 'what' and 'how' (Cawsey et al., 2012) and the approaches towards these tensions (Seo et al., 2004; Barge et al., 2008). Each tension is discussed separately with first, the positioning towards the tension and second, the approaches that respondents used towards that particular tension.

4.1.1 TENSION 1. CUSTOMIZED SYSTEM VERSUS STANDARDIZED SYSTEM

Positioning towards the tension. The departments have contrasting opinions when they discussed their experiences with the tension customized system versus standardized system. Each department based their opinion on experience and made different conclusions. First of all, the dominant pole of department A is the standardized system. This is due to their work processes and their involvement/collaboration with multiple departments. Furthermore, this department trusts their colleagues to build an EHR system and is not that involved. One remark made by respondent A3 is that he/she would find it very annoying if someone can adjust the information he/she wrote within the EHR that concerns a patient. Respondent A3 explains this: 'I think that the amount of exchange of information should be very large. Everybody can read everything of me. But I would find it very annoying when you have a standardized file where I have to work in and where someone else can change stuff in.' In that sense, a sub tensions is created; share information versus adjust information.

Within department B, all the respondents agreed on a standardized system. This is because this department has two subparts. Whereas one subpart can work with a standardized system, the other subpart cannot be replaced by any hospital wide EHR system, because the current system is used nationwide. Therefore, this system can only be replaced if each hospital in the Netherlands starts to work with that particular system. The subpart that can work with a standardized EHR more successfully, stated: 'I do think we fit in. You should take a look at what the program offers and what is possible. I think that these impossibilities are less than you think. You should see the benefits of the whole' (B3).

The dominant pole of department C is the customized system. Although the respondents stated that the pursued EHR system was more focused on standardization, they agreed that their department could not function with such a standardized system. This is due to the amount of patients this department sees on a daily basis, their unique way of planning, the way they work with the status of the patient and other wishes and needs within a new EHR. As respondent C2 mentions: 'as a department we need a more customized system than the hospital wants.' To be sure that the system would become customized enough, this department became highly involved during the project. Department D was divided towards this tension. The first respondent leans towards a more customized system; the second respondent more towards a standardized system and the third respondent had a mixed opinion. This mixed opinion is nicely illustrated in the following statement: *'you do have department specific aspects that you want to keep which you cannot deny. You have to try to make it as standardized as possible, but you do need the specific aspects for your department. So you do want your own aspects in the EHR.'* (D1). This opinion can be explained by the mixed feelings the respondents have towards a new EHR. Each respondent realizes that it is necessary to work with an EHR in the future, but experienced the past project in different ways. As noticed, some respondents argue that it is not possible to work with a standardized system and therefore a customized system is more suitable. The other way

around is that the EHR that was intended to build during the failed project was too customized and a more standardized system would work better. An overview of the dominant poles by the departments is given in Table 2.

	Dominant pole	Sub tension
A	Standardized	Sharing information versus able to adjust information
B	Standardized	-
C	Customized	-
D	Standardized/customized	-

Tabel 2   Overview tensions 1: customized system versus standardized system.

Approaches towards tension 1. The approaches used towards tension 1 differ per respondent and therefore department. Nevertheless, each department used the approaches selection and separation towards tension 1. As was stated in Table 2, the dominant pole of department A is standardization. In order to come to this decision, the respondents used all five approaches. First off al, respondent A1 used the approach connectedness and argued: *'in my opinion it should be standardized, although there should be options for specific aspects. That's how it should be at the moment, because if the system is too specific it would become unworkable. But there have to be possibilities to make it your own.'* Furthermore, respondent A2 used the approaches selection and connectedness. He/she stated that their department could function with a standardized EHR, but understood the tension of professionals who wanted a customized EHR. Respondent A2 also stated that if the EHR would be customized for each professional, he/she wondered how workable it would become for his/her department. Contrary to respondent A1 and A2, respondent A3 used the approaches separation, integration and transcendence. These multiple approaches started with the approach separation: *'my ideal way of working, is not my colleagues ideal way to work. But you do have the criteria of your professional association and you have legal aspects. Because if a problem occurs, you need to know who did what.'* An addition made towards this response, is the dilemma of sharing information and being able to adjust

information. This addition is the transcendence approach and a new sub tension is created. Respondent A3 ended with the thought that it would probably a hybrid, a blend of standardization and customization, which implies the approach integration.

Approaches used by the respondents of department B are selection, separation and integration. Mixed approaches are used due to the two subparts of this department. One subpart is able to work with a standardized EHR, which resulted in the approach separation: *'we can adjust ourselves easily with other disciplines, this is different when it comes to the other subpart of our department'* (B3). The other subpart works with a national system and therefore the respondents also used the approach selection: *'the vendor could not deliver what was important for our department, namely system X. […] And at a certain point, it became visible that the vendor did not have the intention nor the capacity to come up with a solution'* (B1). Furthermore, respondents B1 and B3 also used the approach connectedness: *'I do think we fit in. You should take a look at what the program offers and what is possible. I think that these impossibilities are less than you think. You should see the benefits of the whole.'* (B3) This statement shows how willing department B is to compromise and see what the possibilities are instead of focusing on the impossibilities.

The respondents of department C used the approaches selection and separation. The respondents of department C do recognize both poles, but are certain that a standardized system is not an option for them to work with. In their opinion, the work processes of their department are different from other departments and they see a lot more patients on a daily basis. This is illustrated in the following example: *'if the hospital decides to work with a standardized EHR, we will run into problems'* (C2). One respondent tried to make a different kind analysis of their department and argued: *'our department thinks that they cannot work with a customized EHR and I really tried to convince them that they could. We make an appointment with a patient, but other departments do the same.'* This implies the use of the approach separation.

Department D also used multiple approaches towards tension 1. These approaches are selection, separation and connectedness. To start with, respondent D1 preferred a standardized system and argued that you should have one system and employees need to adapt towards that system.

Furthermore, respondent D2 used the approaches selection, separation and connectedness. On the one hand, he/she used the approach selection and wondered why the hospital decided to create their own EHR while multiple hospitals in the Netherlands already have a successful EHR. On the other hand, he/she used the approach separation and argued that the departments do know how their EHR would look like, but the problem is the technology that is not able to create such a system. Respondent D3 ended with the approach connectedness and stated that at the end it is probably a combination of a standardized system and a customized system. Respondent D3 only used the approach connectedness. He/she argues that both poles are important and mutual beneficial towards for departments. This is illustrated in the following example: '*there are department specific aspects that you do want to keep and cannot escape from. At the same time, you have to create an EHR that is standardized as possible.*' The use of multiple approaches shows the contrasting thoughts of the respondents towards this tension. An overview of each approach used by the departments is given in Table 3.

	Selec-tion	Separa-tion	Integra-tion	Tran-scend-ence	Conn-ected-ness
A	X	X	X	X	X
B	X	X			
C	X	X			X
D	X	X			X

Tabel 3 Overview approaches towards tensions 1.

4.1.2 TENSION 2. SMALL SCOPE VERSUS LARGE SCOPE

Positioning towards the tension. In most cases, the dominant pole of the respondents and therefore departments for an EHR is a large scope. Although the respondents had a common view, they realized how difficult it is to develop a large scope with the amount of systems that are used nowadays and different opinions among employees. Within department A are the most mixed opinions when it comes to the tension small scope versus large scope. The small scope was discussed in combination with the tension big bang or incremental. An incremental approach can be used by starting with a small scope and built step-by-step towards a large scope. The other respondents of department A would like to see a large scope from the beginning, as one respondent replies: '*sooner or later, it will become more comprehensible for patient groups if they are all in one system. Otherwise you will get leaping frogs out of the wheelbarrow*' (A2).

In all cases, the respondents of department B started to discuss their current national system. With the scope of the failed program, this department still needed to work with this national system and therefore questions were asked what the benefit of an EHR would be for a part of their department. Currently, employees have to open multiple systems to enter administrative data of patients. According to the respondents, an EHR would only create another program where data have to be administrated instead of working with one program. Respondents B1 and B2 nicely illustrate this issue: '*then it became clear that system X and system Y needed to exist. So the problem of working with multiple systems remained.*' Building on this issue, two respondents mention that the service level of the intended EHR would not be the same as the current systems in use. Each department has developed a system especially for their department. Therefore, the respondents argue, the service level of this system will not be reached by a new system with a large scope. Although this department raises this issue, they do plead for a scope as large as possible, preferable on a national level. This is because different disciplines increase their collaborations and the exchange of patient information, also between different hospitals. In that sense, another sub tension is created which is the dilemma of collaborating with other partners to develop a new EHR or not. This is summarized as the following sub tension: collaborate with partners versus working independently. This is illustrated in the following lines: '*I do think we should have the ambition. But if you have to realize it on your own or should the hospital seek for partners?*' (B3).

Department C is not very outspoken about the tensions small scope versus large scope. Each respondent acknowledged that working with an EHR is a 'must' and if it is possible to create a large scope, the new program should strive for it. The most important aspect mentioned by the respondents is that work should not be done twice, meaning

to enter administrative data in different systems. Another issue raised by this
department is that the intended EHR was developed in collaboration between the vendor and the LTHN. The hospital could have chosen to purchase an EHR-package that already exists. With the experience of this failed project, the respondents wonder if the right package was chosen, as respondent C3 argues: *'I have said it before, we are trying to create our own EHR, but we bought an existing EHR. I would recommend for a new program that if you want a new tender, choose a product and then search for options and see what is possible in combination with the wishes of each department.'* Therefore, the discussion should be held again to see what suits best. Therefore a new sub tension is created; develop own EHR versus purchase existing EHR.

Department D is very clear about their opinion when it comes to this tension. The respondents argue that the scope of a new EHR should be large. They would like to see multiple subjects covered within a new EHR; people management, patient care and order management. The respondents do realize how difficult it is to realize a large scope and reactions are for *example 'we need to give and take and try to work it out together'* (B3) and '*I prefer one system, but can I can imagine that there is no supplier that develops the whole pallet'* (B1 & B2). Table 4 shows an overview of the dominant poles within tension 2.

	Dominant pole	Sub tension
A	Small scope/large scope	-
B	Large scope	Collaborating with partners versus working independently
C	Large scope	Develop own EHR versus purchase existing EHR
D	Large scope	-

Tabel 4   Overview tension 2: small scope versus large scope.

Approaches towards tensions 2. The approaches used towards tension 2 differ per department. Each approach is used, except integration. To start with department A, the respondents used the approach separation. For example, respondent A1 stated that he/she would like to have as less different systems as possible. Furthermore, respondent A2 made an analysis and kept the management perspective and the financial perspective in mind. This can be linked with a separation approach.

The respondents of department B used the integration approach and the transcendence approach. Integration is based on the growing collaboration between departments and therefore more common to work together, which can be within and between hospitals. Therefore, it is necessary to maintain a large scope. As respondent B3 argues: *'specialists collaborate more based on evidence-based treatments and discuss which treatment is best. That means you should strive for generic solutions.'* Next to this, respondent B3 also used the transcendence approach when he/she wonders if the LTHN should develop or buy a new EHR alone or seek for partners. In that sense, he/she created a third pole within the discussion whether the new EHR should have a large scope or a small scope. A large scope could mean hospital wide, but in the meaning of respondent B3 it could also include multiple hospitals.

Department C was not very concrete regarding this tension. This is due to not knowing how the system would have functioned, as respondent C2 argues: *'that is hard to say, because we have not seen much from the failed system.'* Furthermore, respondent C2 used the approach selection and stated that it would be great if the program can realize a large scope. Next to this, respondent C3 used the approach separation. He/she made a difference between what they would like to have and what the hospital is capable to realize. This is illustrated in the following example: *'a large scope would make it a lot easier, but I believe the hospital is unable to realize a large scope.'*

Department D is more clear about their opinion towards this tension. The respondents used the approaches selection, separation and connectedness. Selection became visible through respondent D1, which stated that there should be fewer systems than there are now. Next to this, the separation approach is also used by respondent D1. He/she made a difference between entering administrative data into the EHR, the possibilities to study different kinds of research related questions and their justification towards health insurances. The other two respondents made a connection between the small scope and the large scope and

argued how hard it is to create a large scope and it is a matter of 'give and take'. Furthermore, one respondent mentioned that it could be difficult for one vendor to deliver a program with a large scope. An overview of the approaches towards tension 2 is given in Table 5.

	Selection	Separation	Integration	Transcendence	Connectedness
A	X	X			
B			X	X	
C	X	X			
D	X	X			X

Tabel 5 Overview approaches towards tension 2.

4.1.3 TENSION 3. TOP-DOWN VERSUS BOTTOM-UP

Positioning towards the tension. The discussion during this tension had two sides. On the one hand, the respondents discussed how the previous implementation was initiated and executed. On the other hand, respondents mentioned how they would like to see a future initiative. Both aspects will be elaborated upon.

Department A had no representatives within the program and therefore they saw the new EHR as a top-down initiative. Although they had no representatives attached to the program, they did help to deliver an overview of the processes of their department. After presenting this overview, it became very quiet in their view and the department had no control of what happened with the development of the new EHR. This resulted in statements like *'that is something from the top, falling upon us'* (A2) *and 'you do not have an influence on big aspects. Sometimes you are placed left, right or in the middle. And when you know where you are, you can move on'* (A3). According to the respondents, it cannot be avoided that a future program will also have a top-down structure. This is due to the size of the project and the large amount of employees who are involved. Therefore, they assume that there will not be any representatives from their department next time either.

Department B was less clear about their statement when it comes to this tension. Whereas the respondents did not express if they preferred a bottom-up approach or a top-

down approach, they did mention between the lines that the failed program had a top-down approach. This can be concluded from statements *like 'if I am asked'* (B1) and '*I am wondering if there was enough steering' (*B3). Although each respondent argued that they were or have been actively involved with the program, it felt like a top-down approach. The impression is that the program initiated a structure, which was supposed have a top-down approach, but with collaboration of representatives from departments and employees being hired by program.

The respondents of department C argued that the failed program had a top-down approach. The respondents mentioned words like *'the board of directors', 'chairman' and 'what has been said by the program group'.* Each expression implies direction from 'a top'. During a future program, respondent C2 would like to see a combination of both approaches. As he/she states: *'no matter what, I think it is useful to discuss with the end-users and that at least a decision will be made.'*

Department D also found that the approach used within the failed program had a top-down structure. They did not even mention that the program could have a bottom-up approach. The respondents felt like they were not able to influence the program. As respondent D3 mentioned: *'what we had to do, we did.'* And respondent D3 argued: *'I did not have an influence during the process of choosing a system. But that's okay. At one point you have to make a decision. […] So I do get it if you want to centralize that process and make a decision.'* Although the respondents saw the program as a top-down initiative, they tried to influence it. For example, employees from department D arranged an internal project group and one employee was recruited from outside to be a representative for their department. Respondent D1 explains the rationale behind this: *'join them, not beat them. You have to be there.'* The respondents did not mention anything about a future program when it comes to the approach they would like to see. An overview of each department is presented in Table 6.

	Dominant pole	**Sub tension**
A	Top-down	-
B	Top-down	-
C	Top-down	-
D	Top-down	-

Tabel 6 Overview tension 3: top-down versus bottom-up.

Approaches towards tension 3. The approaches used towards the tension top-down versus bottom-up are selection, separation and integration. To start with department A, their approach was dyadic and used the two approaches selection and separation. On the one hand, the respondents argued that a lot was going on within the hospital when it comes to the development of a new EHR and that they do not need to know each detail. On the other hand, when it concerns their own department, they do want to know what is happening. This resulted in the approach selection and is illustrated in the following example: *'you do not have to know everything, but you do when it concerns you own department'* (A1). Furthermore, respondent A3 used the approach separation and argued that he/she there was some 'learned helplessness' within the hospital. There is a difference between how the initiators behave towards the change and the departments. This is underlined in the following example: *'psychology mentions the term learned helplessness. It is not exactly that, but I have the same kind of feeling. The employees learned to have an awaiting attitude when it concerns certain processes. Oh there is yet another initiative, whatever. We will wait and see what will really happen.'*

The respondents of department B argued that it was not explicitly mentioned if they would collaborate with the program. This resulted in the approach selection from respondent B3. Furthermore, the approach separation became visible due to the difference between the structure of the program and the content of the EHR. This is mentioned by respondent B3: *'you could not influence the structure of the program, but you could influence the content of the new EHR. Especially the employees who were detached towards the program.'*

Department C used the approach integration. This is due to their wish of the program being a combination of a top-down approach with a bottom-up structure. The failed pro-

gram had a top-down approach, but as respondent C2 argued he/she would like to integrate both approaches to maintain intensive contact between the 'top' and the end-users.

Department D used the approaches selection and separation. Respondent D2 mentioned that he/she had no say in which system was chosen at the beginning of the process. He/she also argued that it was understood why this was arranged at the 'centre', because the variety of opinions of employees. This implies a separation approach. Furthermore, respondent D3 used the approach selection and stated that the initiative lies with the board of directors. Both perspectives are remarkable due to their active part in the program. As was also mentioned earlier, department D recruited an employee from outside the hospital to become a representative for their department and created an internal project group who discussed subjects that concerned their department and their work processes. An overview of each approach that is used towards tension 3 is given in Table 7.

	Selec-tion	**Separa-tion**	**Integra-tion**	**Tran-scend-ence**	**Conn-ected-ness**
A	X	X			
B	X	X			
C			X		
D	X	X			

Tabel 7 Overview approaches towards tension 3.

4.1.4 TENSION 4. INCREMENTAL VERSUS BIG BANG

Positioning towards the tension. For the respondents, the most doubts became present when this tension was discussed. The program intended to implement the new EHR using a big bang approach and some respondents hesitated if this was the right approach.

Starting with department A, which indeed had doubts if the big bang approach is the right way. The dominant pole of the respondents is the incremental approach, although they do see advantages of the big bang implementation. During the discussion of this tension, respondent A3 created a sub tension of the incremental approach. This regards the con-

tent of the incremental approach, as respondent A3 states: *'than you might segment on the level of professionals. Who starts to use the EHR and who is not? Than the doctors could use the EHR first, but the nurses not yet.'* Therefore, the sub tension is; department-based segmentation versus profession-based segmentation.

The dominant pole of department B regarding this tension is divided. Two respondents would like to see the incremental approach, while the preference of the third respondent is the big bang approach. Respondent B1 and B2 argue that until now each project implemented by the big bang approach became a disaster. Both respondents acknowledge that in theory this is the best approach, but practice proves otherwise. The third respondent states that if there is ready-made EHR, the big bang approach suits best.

Within each department, several opinions were expressed. This is also the case within department C, where each respondent had a different dominant pole. Two respondents preferred the big bang approach and one respondent preferred the incremental approach. What is noticeable is that this department discussed what each scenario would mean for them and their work processes. They tried to anticipate upon the changes made by the program, as respondent C3 mentioned: *'because we had a digitalization group, we discussed several scenarios. What does it mean if the big bang approach is used and what does it mean if we go incremental?'* In this way, the digitalization group tried to prepare their department for each scenario.

Within department D, the dominant pole of each respondent big bang. According to the respondents, any adjustment hurts: *'it hurts anyway and everybody is upset and frustrated. Because the things you used to have are not there anymore and you have to adjust to the new situation. But the experience from other hospitals is that after a few months, people get used to the new system and it all works out fine.'* (D2). An overview of the tensions incremental versus big bang is given in Table 8.

	Dominant pole	Sub tension
A	Incremental	Department-based segmentation versus profession-based segmentation
B	Incremental	-
C	Big bang	-
D	Big bang	-

Tabel 8 Overview tension 3: incremental versus big bang.

Approaches towards tension 4. The approaches used towards tension 4 are selection, separation and transcendence. Department A used the approaches selection, transcendence and connectedness. Both respondents A1 and A3 used the approach selection, but in opposite ways. Whereas respondent A1 stated that he/she preferred a step-by-step approach,
respondent A3 stated preferred a big bang. Furthermore, respondent A3 also used the approach transcendence and created the sub tension department-based segmentation versus profession-based segmentation. These are content poles within the discussion how an incremental approach can be fulfilled. Furthermore, the approach connectedness is used by respondent A2 who acknowledges the advantages and disadvantages of each pole and tries to connect them. He/she can understand why the program chooses the pole big bang but as he/she said: 'it feels very stirring'. Overall, respondent A2 tried to remain aloof towards expressing a dominant pole.

Department B used the approaches selection and separation approach. To start with the approach selection, respondent B1 stated that the incremental approach should apply for this type of change: *'in my opinion you should implement step-by-step, it is just not real to implement at once. You cannot close the hospital for a week to implement an EHR.'* Next to this, respondent B3 argues that it depends if the big bang approach is the right way. This is the right approach if you have a ready-made system. Therefore, respondent B3 analyses on different levels if an approach is suitable or not and used the approach separation. The other two respondents also had a separation approach. Both argued that until now the big bang did not work as intended within the hospital. They do argue that in theory,

this is the best way to implement a new system. But practice proved otherwise. Therefore, they analyzed this tension on multiple levels.

Department C had divided approaches towards tension 4. Respondents used the approaches selection and separation. The approach selection is used by respondent C1 and C2, but with different starting points. Respondent C1 stated that the incremental approach would apply to implement a new EHR and respondent C2 argued that only a big bang approach would work. The following example emphasizes this argument: *'we already implemented in a stepwise manner once and that did not work. Because if you work with two systems at the same time, you postpone the transition. This transition period is the hardest for employees.'* Connectedness is also used by respondent C2 who argues that if you know the concerns of each department and find a solution for these concerns then you have the right approach. Therefore, it becomes less important which approach is dominant and both could be suitable. Finally, respondent C3 used the approach separation due to the fact that department C initiated an internal project group that discussed what both poles mentioned for their department. In that sense, the departments tried to make an analysis for themselves on multiple levels.

Department D used the approach selection towards this tension. Each respondent recognized both poles, but their preference was the big bang approach. The following statements illustrate this approach: *'I could live with multiple scenarios, if it is thought through. But I prefer a scenario where it hurts one time really hard than five times a little bit of pain'* (D1*), 'I think that the incremental approach will not work'* (D2) and '*I would strive for a big bang'* (D3). An overview of the approaches towards tension 4 is given in Table 9.

	Selection	Separation	Integration	Transcendence	Connectedness
A	X			X	X
B	X	X			
C	X	X			X
D	X				

Tabel 9 Overview approaches towards tension 4.

4.1 Cross-case analysis

Comparing the perspectives of each department and their approaches towards these tensions, several differences and similarities can be recognized. First, the dominant pole of tension 1, customized system versus standardized system, is the standardized system. The most dominant approaches used towards tension 1 are selection and separation. Both approaches are used four times and therefore, they are equally dominant. Second, the dominant pole of tension 2, small scope versus large scope, is the pole large scope. Although the implementation of the EHR failed, the departments do want an EHR that covers as much as local applications as possible. Besides, a new EHR enables collaboration between departments. The dominant approaches towards tension 2 are selection and separation. Third, the dominant pole of tension 3, top-down versus bottom-up, is the pole top-down. According to multiple departments, this approach is needed in order to make decisions. Each healthcare professional has an opinion and in order to keep up the velocity of the initiative, a top-down approach is needed. Therefore, the dominant approaches towards this tension are selection and separation. Finally, there is no dominant pole within the tension incremental versus big bang. Two departments preferred the incremental approach and two departments preferred the big bang approach. This result shows the current discussion of what is necessary to implement a new EHR successfully. The dominant approach towards this tension is selection. This equal dominance of poles shows the influence of approaches towards tensions and how these can affect the discussion. Future development of this pole can result in either a success or will lead towards another failed EHR implementation program.

Finally, when a respondent used the transcendence approach, a sub tension was created. This results from the nature of this approach where current opposites are reframed and a new opposite is constructed. Overall, the transcendence approach is used four times and therefore four sub tensions are discovered within this research. The transcendence approach shows the interaction between a tension and the approach towards this tension. When a sub tension is created, again respondents approach this particular sub tension. Therefore, the influence is vice versa. An

overview of the most dominant poles and approaches towards each tension is given in Table 10.

Tension	Dominant pole	Dominant approach
Customized system vs. standardized system	Standardized system	Selection & separation
Small scope vs. large scope	Large scope	Selection & separation
Top-down vs. bottom-up	Top-down	Selection & separation
Incremental vs. big bang	Incremental/ Big bang	Selection

Tabel 10   Overview dominant poles and approaches.

5   DISCUSSION

This study set out to determine which poles are dominant within 'what' and 'how' tensions and which approaches are used towards tensions in the context of a failed EHR implementation project. In order to get answers, a case study has been conducted within a LTHN. Tensions were divided within two categories; 'what' and 'how' (Seo et al., 2004; Barge et al., 2008; Cawsey et al., 2012). This distinction created the opportunity to separate the discussion of the failed EHR implementation into content and process. The combination of the tensions and the approach used towards a specific tension, resulted in a deeper understanding of the rational behind dominant poles and approaches and how both aspects influence each other. Finally, due to the failed context of this research, it could be possible that tensions evolved over time. Therefore, the dialectical theory (Benson, 1977) was important to understand the process of how an approach can change.

The remaining part of the discussion is organized as follows. First a discussion of the findings discussion will be held which is divided in two parts; tensions and the approaches towards tensions. Second, the theoretical and the managerial implications will be elaborated upon. Third, possibilities for further research and the limitations of this research will be outlined.

5.1   Discussion of the findings

The purpose of this part is to discuss the existing literature compared with the results of this research. Therefore, this part is divided into subparts, which are the tensions and the approaches towards tensions.

5.1.1 Tensions.
The tensions studied in this research are based on former research by van Duijn (2013) or revisited from his research. It turned out that the newfound tensions that occurred within this research were sub tensions of the 'main' tensions studied. Furthermore, it appeared that tensions influenced each other or discussed simultaneously. For example, the small scope versus large scope is discussed at the same time with the tension incremental versus big bang. Lluch (2011) supports this and already stated that tensions do not stand-alone; they interact with one another. This makes it more complex to discuss single tensions when it affects other tensions.

The categorization 'what' and 'how' made by Cawsey et al. (2012) is made more often, for example by Seo et al. (2004) and Barge et al. (2008). Another well-known categorization is made by Smith and Lewis (2011). Within their research they made a categorization based on organizational tensions. These were learning, organizing, performing and belonging. Together, they form a dynamic equilibrium model. While Smith and Lewis (2011) based their research on a paradox perspective and mention how the paradox theory relates to tensions that are synergetic and persistent, this research is focused on tensions and which poles are dominant. These poles can be synergetic when respondents use the approach connectedness, but that is not the goal. Furthermore, Smith and Lewis (2011) do mention that further research is necessary to see how paradoxes can change over time, but do not mention the dialectical theory.

The dominant pole within the standardization versus customization tension was standardization. Dower, Moore and Langelier (2013) and Ajami and Arab-Chadegani (2013) recognize this tension within healthcare. Although one result of this research is that most departments would like to work with a standardized EHR, there is still a lack of standardization within the applications of EHR systems (Ajami & Arab-Chadegani, 2013). They state that this lack of standardization might affect the end-users who will work with the system and results in creating workarounds. Another discussion is whether the vendor is able to create a customized system. According to the study of Ford, Menachemi and Phillips (2006) this is one of the main reasons why an IT project fails. So even if a healthcare institution chooses to create a customized system, the question is whether the technology is advanced enough.

The discussion within the tension small scope versus large scope concerns if the new EHR should substitute a large

amount of applications or not. Whereas this research resulted in the dominant approach large scope, other studies (Heeks, 2006; Jha et al., 2009) argue that the bigger the scope, the more side effects there are. Next to a new EHR, which is an IT change, organizational changes are needed to implement the EHR successfully. These organizational changes include human skills, culture, infrastructure, financial resources, coordination and the organizational structure.

The tension bottom-up versus top-down comes from the managerial approach chosen by the project team. This tension had to perspectives; on the one hand it involved were the initiative of the change comes from, on the other hand it involved the execution of the change. In this research, the initiative of the change was top-down. The implementation of the EHR was arranged through the introduction of a temporary program. This program was a combination of a top-down approach and a bottom-up approach. This is due to the employees detached towards the program, either part-time or fulltime. According to multiple studies, it is crucial to have a strong leadership style in order to outweigh the dominance of medical professionals (Poon et al., 2004; Rivard, Lapointe, & Kappos, 2011). This suggests that if there is a strong leadership style, the top-down approach is more suitable to implement an EHR. Contrary to this perspective is the study of Lorence and Churchill (2005) who states that when the implementation is forced upon the organization it will lead to failure. This is due to the attitudes that a bottom-up approach creates, which are dedication, commitment and enthusiasm. These different perspectives suggest that another factor determines which approach is most suitable. This is confirmed by Coeira (2009), who states that it depends on the type of healthcare system that a country has. A fragmented healthcare system would fit a bottom-up approach, whereas a top-down approach is more suitable within a nation-scale healthcare system.

The tension big bang versus incremental is another managerial approach which helps to decide how the EHR should be implemented. While the results of this study state that both poles are equally dominant, most studies plead for an incremental implementation. For example, Thakur, Hsu and Fontenot (2012) who suggest the implementation of a new EHR by a roll out plan, which starts with one department or another type of segmentation. Based on this research, an-

other type of segmentation could be the sub tension department-based segmentation versus profession-based segmentation. Furthermore, Aarts et al. (2004) state that emergent change is the key approach of an EHR implementation project within hospitals. Another type of incremental approach is suggested by Cresswell, Worth and Sheikh (2012), who introduced the use of parallel systems as a kind of transition period.

5.1.2 APPROACHES TOWARDS TENSIONS.

The perspective of combining the approaches of Seo et al. (2004) and Barge et al. (2008) provided the insights of the rational behind dominant poles in the context of a failed EHR implementation program. Next to this, these approaches towards tension could have played a role in the failure of the EHR implementation program. For example how the respondents approached the tension customized system versus standardized system. Department C was determined to develop a customized EHR, whereas the other departments preferred a standardized EHR. Over time, this tension could lead towards another failure depending on the applied management strategies.

The approaches towards tensions applied in this study are based on Seo et al. (2004) and Barge et al. (2008). Another way to approach tensions is the categorization of Poole and van de Ven (1989). They use the term paradox and created four ways to approach a paradox: (1) accept the paradox and use it constructively, (2) clarify level of analysis, (3) temporally separate the two levels and (4) introduce new terms to resolve the paradox. The main difference between the categorization of Poole and van de Ven (1989) and Seo et al. (2004) and Barge et al. (2008) and this research is that the former has the perspective of the organization and how practitioners can manage certain paradoxes, while this research is focused on the perspective of the respondents within departments.

According to the results of both studies, the approach selection is applied most often. This can be confirmed by this research, because the dominant approach of each tension was among other selection. The other most dominant approach was separation. This result can be explained by the fact that the researchers mentioned both poles when a certain tension was discussed. Another explanation can be that respondents realize what did not work within the failed project and try to search for other options. Furthermore,

Seo et al. (2004) argue that tensions and approaches become visible because they are linked towards planned change. The implementation of the EHR was a planned change and therefore explains why the results of this research confirm the results of their research.

While the results of this study show that the approaches selection and separation are the dominant approaches towards tensions, Seo et al. (2008) argue that both approaches have their shortcomings. Seo et al. (2008) state that the separation approach can become problematic when shifts take place between dominant poles. One pole can become dominant and conditions for the other pole can be formed. Furthermore, when a certain pole is ignored or segmented, the approaches selection and separation can result in the loss of creativity and energy. These characteristics are crucial when a complex change situation needs to be managed. Applying these statements on the results of this study, it becomes essential for practitioners to monitor how the dominant approaches of respondents develop.

The study of Barge et al. (2008) state that tensions differs within each culture or institution. Some tensions do emerge in certain contexts and some will not. The context of this research can be a reason why certain poles were more dominant than the other and why certain approaches towards tensions became dominant. For example, each department stated that the dominant pole within the tension small scope versus large scope was the pole large scope. This can be a consequence of the context of the research and the experiences of the respondents due to this failed context. Having discussed the results of this research with the existing literature, the following part will elaborate upon the theoretical implications.

5.1.3 LINKING TENSIONS AND APPROACHES TOWARDS TENSIONS.
Although tensions are widely recognized within organizational change (Benson, 1977; Cameron & Quinn, 1988; Smitz & Graetz, 2011; Smith & Lewis, 2011; Ashforth & Reingen, 2014), the main approaches used towards these tensions are management strategies. For example, the study of Smith and Lewis (2011) made a distinction between early organizational theories, contingency theory and paradox theory. Early organizational theories (Taylor, 1911; Fayol, 1949) state there is one best way and therefore one pole is dominant. The contingency theory, of among other Woodward (1965) and Galbraith (1973), states that

certain conditions determine the approach towards a tension. Finally, the paradox theory where Smith and Lewis (2011) base their research and wonder how both poles can be managed simultaneously. These management strategies can be compared with the approaches described by Seo et al. (2004) and Barge et al. (2008). For example, selection can be compared with early organizational theories and connectedness and integration with the paradox theory. The difference between both concepts is the perspective. The theories described in the study of Smith and Lewis (2011) describe strategies to manage tensions and this study describes the approach of a stakeholder towards a tension and not how to handle tension.

These management strategies again also show how tensions and approaches towards tensions are related. Furthermore, management strategies can be further optimized when they are combined with the approaches of the employees. In the light of this research, the approach transcendence resulted in sub tensions. This deepens the debate and can optimize the management strategies chosen by the practitioners. As is stated by Cameron and Quinn (1988), the process of constructing a tension already results in an approach towards this subject and can bring about organizational change.

5.2   THEORETICAL IMPLICATIONS

This research has shown which tensions are dominant within the categories 'what' and 'how' and how these tensions are approached within the context of a failed EHR implementation project. Therefore this research enhances a deeper understanding of tensions and approaches towards tensions. Next to this, this research elaborates upon the gap mentioned by Heeks (2006), which is more research within a failed context, and Smith and Lewis (2011), which is more research towards tensions and the evolvement of tensions.

First of all, the chosen tensions to study are based on former research (van Duijn, 2013) in the context of EHR. Therefore, this research built upon known tensions within the EHR context and adds to the growing body of knowledge within this field. The categorization made by Cawsey et al. (2012) created the opportunity to split the tensions into content and process, which made the discussion and results more focused. The combination of both

has led towards theory development since multiple sub tensions arose. These sub tensions are (1) share information versus adjust information, (2) collaborate with partners versus working independently, (3) develop own EHR versus purchase existing EHR and (4) department-based segmentation versus profession-based segmentation. These sub tensions broaden the discussion within specific tensions, which can lead towards even more contradictions. Second, the approaches towards tensions (Seo et al., 2004; Barge et al., 2008) created a deeper understanding and unique insights of the dominant perspectives that departments take towards a certain tension. The research of Seo et al. (2004) already stated that the approach separation is the most common approach towards a tension. This can be confirmed by the results of this research with the addition that the approach selection is also dominant approach towards each tension.

5.3   Managerial implications

This research has a number of managerial implications that can be useful in practice. To start with, this research enables EHR implementers, and more in general IS implementers, to benchmark which tensions arises within the context of a failed EHR implementation project and creates awareness of which subjects are important. Due to the 70% failure rate of implementing information systems (Doherty et al., 2012), this research provides the opportunity to create a lessons learned perspective. When practitioners know what the dominant poles are of certain tensions and which approach
towards these poles are dominant, a management strategy can be made to implement a system more successfully. This management strategy can be more successful due to a deeper understanding of why poles and approaches are dominant and the relationship between the two concepts. Furthermore, the results could be a starting point for the LTHN where this case study is held. This starting point can be used when another EHR will be implemented. Moreover, earlier research showed that tensions interact with each other (Lluch, 2011), which is confirmed by this research. This means that managers need to take this interaction into account when an EHR program is implemented. Finally, as the dialectical perspective showed, the approaches towards tensions evolve over time. This calls up-

on a proactive attitude of managers in order to know what the approaches are and if possible guide them into the 'right' direction that leads towards the implementation of a new EHR or IS program.

5.4   Research limitations and further research

Certain limitations need to be mentioned that occurred during this research. First of all, this research was a qualitative study and therefore included multiple interviews. These interviews were held with four different researchers, which can lead towards discontinuity in questions asked during the interviews, despite the interview protocol. Also, during the interviews the respondents reacted mostly on how the process went and focused less on their own view. This could have an influence on the results. Building on this, the tensions were discussed in a way that the researchers mentioned both poles of the tension. The consequence was that each time, both poles were recognized and the approach selection became dominant. Furthermore, the research site was in the Netherlands and interviews were held in Dutch. This resulted in translating quotes, which could lead to a potential bias in objectivity (Davidson, 2009). Finally, this research was a single case study, which is useful and gives a unique inside (Yin, 2009). Although the appropriateness of this single case study, it limits the generalization of the results to other healthcare institutions or industries.
Next to the limitations, there are also options for further research. First, future research could usefully explore how tensions evolve within a failed EHR project within other healthcare institutions in order to increase generalization and confirm the results within this research. Second, another failed IS project within another industry could be a research possibility to see if results can be generalized across multiple types of ICT systems and industries. Within an ideal situation, continuation of this longitudinal research would create the opportunity to invest how tensions evolve even further. For example during a re-launch. Third, this research had a departmental view and other types of stakeholders were left out, but they can have a significant effect on a tension. Therefore, the focus can also be on other stakeholder groups within the context of a failed EHR program. Fourth, it would be interesting if future research would focus more on the approaches that are used by re-

spondents in order to see if the relationship between the two concepts can be strengthened. This side is underdeveloped and could give more background insights into why certain poles are dominant. Finally, the results of this research can be compared with the results of van Duijn (2013) to map how the same tensions within the same EHR implementation program evolved over time.

30

6   CONCLUSION

This study was undertaken to map which tensions poles are dominant within the categories 'what' and 'how' and how these tensions are approached within the context of a failed EHR implementation program. First of all, this study showed dominant poles within three tensions. These dominant poles were standardization, large scope, top-down. The tension big bang versus incremental had no dominant pole. Next to this, the dominant approach towards this tension was selection. The dominant approaches towards the other tensions were selection and separation. Finally, the results showed that the respondents created sub tensions. First, the sub tension within standardized system versus customized system was share information versus adjust information. Second, the two sub tensions within small scope versus large scope were collaborate with partners versus working independently and develop own EHR versus purchase existing EHR. Third, the sub tension within incremental versus big bang was department-based segmentation versus profession-based segmentation. Taken together, the results of this study imply that each tension based on former research also appeared with a failed context, with the addition of sub tensions.

REFERENCES

Aarts, J., Doorewaard, H., & Berg, M. (2004). Understanding implementation: The case of a computerized physician order entry system in a large Dutch Universal Medical Center. *Journal of American Medical Informatics Association*, 11(3): 207-216.

Aken, van J. E., Berends, H., Bij, van der H. (2012). *Problem solving in organizations – A methodological handbook for business and management students*. Cambridge: University Press.

Ajami, S. & Arab-Chadegani, R. (2013). Barriers to implement Electronic Health Records (EHRs). *Mater Sociomed*, 25(3): 213-215.

Ammenwerth, E., Brender J., Nykänen, P., Prokosch, H.U., Rigby, M. & Talmon, J. (2004). Visions and strategies to improve evaluation of health information systems: reflection and lessons based on the HIS-EVAL workshop in Innsbruck. *International Journal of Medical Informatics*, 73(6): 479-491.

Ammenwerth, E., Gräber, S., Herrmann, G., Bürkle, T. & König, J. (2003). Evaluation of health information systems – problems and challenges. *International Journal of Medical Informatics*, 71(2-3): 125-35.

Ashforth, B.E. & Reingen P.H. (2014). Functions and Dysfunctions: Managing the Dynamics of an Organizational Duality in a Natural Food Cooperative. *Administrative Science Quarterly*, 59(3): 474-516.

Balogun, J. & Hope Hailey, V. (2004). *Exploring Strategic Change* (2nd eds.). Essex: Prentice Hall.

Barge, K.J., Lee, M., Maddux, K., Nabring, R. & Townsend B. (2008) Managing Dualities in Planned Change Initiatives. *Journal of Applied Communication Research*, 35(4): 364-390.

Benson, J. K. (1977). Organisations: a dialectical view. *Administrative Science Quarterly*, 22(1): 1-21.

Ben-Zion, R., Pliskin, N. & Fink, L. (2014). Critical Success Factors for Adoption of Electronic Health Record Systems: Literature Review and Prescriptive Analysis. *Information System Management*, 31(4): 296-312.

Berg, M. (2001). Implementing information systems in health care organizations: myths and challenges. I*nternational Journal of Medical Informatics*, 64(2-3): 143-56.

Boonstra, A., & Govers, M.J.G. (2009). Understanding ERP system implementation in an hospital by analysing stakeholders. *New Technology and Work employment*, 24(2): 177-193.

Burnes, B. (2014). *Managing Change* (6th eds). Harlow: Pearson Education Limited.

Cameron, K., & Quinn, R. (1988). Organizational paradox and transformation. In R. Quinn & K. Cameron (Eds.), *Paradox and transformation: Toward a theory of change in organization and management*: 1–18. Cambridge, MA: Ballinger.

Cawsey, T.F., Deszca, G., & Ingols, C. (2012). *Organisational Change: An Action-Oriented Toolkit*. Thousand Oaks, CA: Sage Publications Ltd.

Cho, S., Matthiassen, L., Robey, D. (2007). Dialectics of resilience: a multi-level analysis of a telehealth innovation. *Journal of Information Technology*, 22(1): 24-35.

Coiera, E. (2009). Building a national health IT system from the middle out. *Journal of the American Medical Informatics Association,* 16(3): 271-3.

Cresswell, K.M., Worth, A., & Sheik, A. (2012). Integration of nationally procured electronic health record system into user work practices. *BMC Medical Informatics and Decision Making*, 12(15): 1-12.

Davidson, C.R. (2009). Transcription: Imperatives for Qualitative Research. *International Journal of Qualitative Methods*, 8(2): 36-52.

Delpierre C., Cuzin L., Fillaux J., Alvarez M., Massip P., Lang T. (2004). A systematic review of computer-based patient record systems and quality of care: more randomized clinical trials or a broader approach? *International Journal for Quality in Health Care*, 16(5): 407-416.

Doherty, N.F., Ashurst, C. & Peppard, J. (2012). Factors affecting the successful realisation of benefits from system development projects: findings from three cases. *Journal of Information Technology*, 27(1): 1-16.

Dower, C., Moore, J., & Langelier, M. (2013). It is time to restructure health professions scope-of-practice regulations to remove barriers to care. *Health Affairs*, 32(11): 1971-1976.

Duijn, van T. (2013). Contradiction in electronic healthcare record implementation. *Change Management, Rijksuniversiteit Groningen: Groningen*.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4): 532-550.

Eekeren, van P., Ginneken, van J., Houben, J, Luxemburg, van A., Polman, E., Roelofs, J., & Zoetekouw, M. (2010). *EPD is een werkwoord*. Deventer: Kluwer.

Erstad T.L. (2003). Analyzing computer based patient records: a review of literature. *Journal of Healthcare Information Management*, 17(4): 51-57.

Eseryel., U.Y. & Eseryel D. (2013). Action-embedded transformational leadership in self-managing global information systems development teams. *Journal of Strategic Information Systems*, 22(2): 103-120.

Fayol, H. (1949). *General and Industrial Management*. New York: Pitman.

Ford, E.W., Menachemi, N., & Phillips, T. (2006). Predicting the adoption of electronic health records by physician: When will health care be paperless? *Journal of the American Medical Informatics Associaton*, 13(1): 106-112.

Galbraith, J. R. (1973). *Designing complex organizations*. Reading, MA: Addison-Wesley.

Grimson, J., Grimson, W., & Hasselbring, W. (2000). The SI challenge in health care. *Communications of the ACM*, (43)6: 49-55.

Hatch, M. J., & Ehrlich, S. B. (1993). Spontaneous humor as an indicator of paradox and ambiguity in organizations. *Organization Studies*, 14: 505–526.

Heeks, R. (2006). Health information systems: Failure, success and improvisation. *International Journal of Medical Informatics*. 75(2): 125-137.

Huymans, J.C. (2012). *Ziekenhuizen EPD-implementatie in de praktijk beter maken*. Amsterdam: Reed Business.

ISO. (2004). Health informatics - Electronic health record - Definition, scope and context. *Draft Technical Report ISO/DTR20514*.

Jensen, T.B. & Aanestad, M. (2007). How healthcare professionals 'make sense' of an electronic patient record adoption. *Information system management*. 24(1): 29-42.

Jha, A.K., DesRoches, C.M., Campbell, E.G., Donelan, K., Rao, S.R., Ferris, T.G., Shields, A., Rosenbaum S., & Blumenthal D. (2009). Use of Electronic Health Records in U.S. Hospitals. *The New England Journal of Medicin,* 360(16): 1628-38.

Lluch, M. (2011). Healthcare professionals' organizational barriers to health information technologies – A literature review. *International Journal of Medical Informatics,* 80(2011): 849-862.

Lorence, D.P, & Churchill, R. (2005). Clinical knowledge management using computerized patient record systems: Is the current infrastructure adequate? *IEEE Transactions on Information Technology in Biomedicine*, 9(2): 283-288.

Lourenco S.V., & Glidewell, J.C. (1975). A Dialectical Analysis of Organizational Conflict. *Administrative Science Quarterly*, 20(4): 489-508.

Mason, R.O. (1996) Commontary on Varieties of Dialectical Change Processes. *Journal of Management Inquiry*, 5(3): 293-299.

Mason, R.O., & Mitroff, I.I. (1981). *Challenging Stategic Planning Assumption: Theory, Cases and Techniques,* New York: John Wiley.

McGinn, C.A., & Grenier, S., & Duplantie J. & Shaw N., & Sicotte C., & Mathieu L., & Leduc Y., & Légaré F., & Gagnon M.P. (2011). Comparisons of user groups' perspectives of barriers and facilitators to implementing electronic health records: a systematic review, *BMC Medicine*, 9(46): 1-10. Miles, M.B., & Huberman, A.M. (1994). *Qualitative Data Analysis.* Thousand Oaks London: Sage Publications.

Murray, J.P.M. (2006). Recognizing the responsibility of a failed information technology project as a shared failure. *Information System Management*, 18(2): 25-29.

Poole, M.S., & Ven, van de A. (1989). Using paradox to build management and organizational theories. *Academy of Management Review*, 14(4): 562-578.

Poon, E.G., Blumenthal, D., Jaggi T., Honour, M. M., Bates, D.W., & Kaushal, R. (2004). Overcoming Barriers To Adopting and Implementing Computerized Physician Order Entry Systems in U.S. Hospitals. *Health Affairs*. 23(4): 184-190.

Ramirez, R., Melville, N., & Lawler, E. (2010). Information technology infrastructure, organizational process redesign, and business value: An empirical analysis. *Elsevier*, 49(2010): 417-429.

Reeves, T., Duncan, W.J., & Ginter, P.M. (2000) Leading change by managing paradoxes. *The Journal of Leadership Studies*. 7(1): 3-30.

Rivard, S., Lapointe, L., & Kappos, A. (2011). An Organizational Culture-Based Theory of Clinical Information Systems Implementation in Hospitals. *Journal of the Association for Information Systems*. 12: 123-162.

Robey, D., & Boudreau, M.C. (1999). Accounting for the contradictory consequences of information technology: theoretical directions and methodological implications. *Information System Research*, 9(2): 167-182.

Sabatier P. (1986). Top-down and bottom-up approaches to implementation research: A critical analysis and suggested synthesis. *Journal of Public Policy*, 6(1): 21–48.

Sabherwal, R., & Newman, M. (2003). Persistence and change in system development: a dialectical view. *Journal of Information Technology,* 18: 69-92.

Senior, B., & Swailes S. (2010) *Organizational Change* (4th eds.). Essex: Prentice Hall

Seo, M., Putnam, L.L. & Bartunek, J.M. (2004). *Dualities and tensions of planned organizational change*. Oxford: University Press.

Shephard, D.A., Haynie, J.M. & Patzelt., H. (2013). Project Failures Arising from Corporate Entrepreneurship: Impact of Multiple Project Failures on Employees' Accumulated Emotions, Learning and Motivation. *Product Development & Management Association*, 30(5): 880-895.

Smith, K., & Berg, D. (1987). *Paradoxes of group life*. San Francisco: Josey-Bass.

Smith, A. C., & Graetz, F. M. (2011). *Philosophies of Organisational Change*. Cheltenham: Edward Elgar.

Smith, W. K., & Lewis, M. W. (2011). Toward a Theory of Paradox: A Dynamic Equilibrium model of Organising. *Academy Management Review,* 36(2): 381-403.

Soh, C., and Sia, S.K. (2005). The Challenges of Implementing "Vanilla" Versions of Enterprise Systems, *MIS Quartely Executive*, 4(3): 373-384.

Standing, C., & Cripps, H. (2013). Critical Success Factors in the Implementation of Electronic Health Records: A Two-Case Comparison. *System Research and Behavioral Science*, 32: 75-85.

Stohl, C., & Cheney, G. (2001). Participatory processes/paradoxical practices. *Management Communication Quarterly*, 14(3): 349-407.

Taylor, F. W. (1911). *The principles of scientific management.* New York: Harper & Brothers.

Thakur, R., Hsu, S.H.Y., & Fontenot, G. (2012). Innovation in healthcare: Issues and future trends. *Journal of Business Research*, 65(2012): 562-569.

Yin, R.K. (2009). *Case Study Research: Design and Methods,* Thousand Oaks: SAGE Publications Inc.

Vince, R., & Broussine, M. (1996). Paradox, defense and attachment: Accessing and working with emotions and relations underlying organizational change. *Organization Studies*, 17(1): 1–21.

Woodward, J. (1965). *Industrial organization: Theory and practice*. London: Oxford University Press.

1.	On March the 9th, it was announced that the pro-gram 'New EHR' would be stopped.	A. What was your own reaction when you heard about this deci-sion? Did you expect this to happen and in the way it hap-pened?
		B. What was the reaction of the department in relation to the program being terminated?
2.	How/in which way did you look at the program over the last year (2014/2015)?	A. By yourself?
		B. By your department? Was there are shared opinion within the department? Are there any differences between functions?
3.	In what way were representatives of your department involved during the implementation of the program? In which phase were they involved and in which phase were they not involved? What are the activities and efforts undertaken by your department?	
4.	To what extend did you have confidence in the program in the period of 2013 until 2015 that it would be completed?	A. Did the confidence vary during the project? Why yes/no?
		B. If there is a variation, which events or experiences is this based on?
5.	To what extend is your view on the program changed over time?	
6.	One of the issues was whether the EHR needs to be more customized or standardized. What is your vision on this issue? Did your vision changed over time? Why yes or no? As a result of what?	
7.	The EHR was supposed to substitute most systems. Is your vision similar and should it be approached in the same way during a follow up project?	
8.	How do you look at the way the program was guided? To what extend was the department able to influence the pro-gram?	
9.	How did you experience the information services?	A. From the program 'New EHR'.
		B. From the board.
10.	To what extend do you assess the participation of your department being awaiting, active or proactive? What is your opinion about this attitude? Would you recommend this attitude during a follow up project?	
11.	The program tried to implement the EHR by a big bang.	A. What is your view on this approach and would you recom-mend this during a follow up project?
		B. At a certain moment, the scope got limited. What is your opin-ion on this subject? Is it necessary to define consequences and be aware of them in the future? What are these consequences?
12.	How did you experience the relationship with the vendor? Did the vendor what you expect them to do?	

13.	What is in your opinion the reason why the program is stopped?	
14.	What are the consequences of program being stopped for you department? How profoundly are these consequences?	
15.	Are there different perspectives on these consequences within your department?	
16.	Which activities are undertaken to meet with objections?	A. By your department.
		B. By the program.
17.	Which emotion does evoke the ending of the program at your department?	Which persons/groups within your department will be supportive during a follow up project? Why these persons or group(s)?
18.	Which persons/groups within your department will resist more now the program has stopped? Did you already notice this? In which way?	
19.	In which way has the ending of the program an influence on the confidence of the department in an EHR for the entire hospital? How did you notice?	
20.	What needs to happen considering the current situation to realize another EHR?	A. Do you see a role for yourself?
		B. A role for you department?
21.	In which way can the support be as big as possible during a follow up project?	
22.	What is, according to you, the biggest lesson that this large teaching hospital can learn from this situation?	
23.	Do you have any questions or other subjects you want to discuss?	

APPENDIX II TIMELINE

Date	Event
2010 t/m 2012	Strategy phase
	Several vendors start to tender for the EHR
	ICT Company is invited for the Proof of Concept
2013	Starting to create process descriptions
	ICT Company starts with the Proof of Concept
	The board decides to give the project to the ICT Company
	Start contract negotiations between the LTHN and ICT Company
	Vacancies are open within the program
2014	Implementation phase
	Phase 1 is officially completed
	Postponement 'go-live' date
	Focus and acceleration plan is presented by the ICT Company
2015	ICT Company present a global adjusted plan to complete the product
	ICT Company is acquired by an foreign company
	ICT Company presents a detailed plan to complete the product
	The LTHN ends the collaboration with the ICT Company

CODEBOOK

Category	Codes	Inductive (I)/ deductive (D)	Description	Example	Reference(s)
Types of tensions: what	Customized system versus standardized system	D	A <u>customized system</u> means that the system is modified towards the demand of the users.	*'As a department we were very sarcastic about the standardized part of the system. In our opinion, this department does not fit the standardized part of the EHR.'*	(Soh & Sia, 2005)
			A <u>standardized system</u> means that the users adapt their work processes to-wards the system.	*'I do think we fit in. You should take a look at what the program offers and where things are pos-sible. I think that these impossibil-ities are less than you think. You should see the benefits of the whole.*	
	Share infor-mation versus adjust infor-mation	I	A sub tension of customized system versus standardized system, which encourages the discussion if end-users just share information or if they can adjust each other's information within the EHR.	*'I think that the amount of ex-change of information should be very large. Everybody can read everything of me. But I would find it very annoying when you have a standardized file where I have to work in and where someone else can change stuff in.'*	-
	Small scope versus large scope	D	<u>Small scope</u> implies a type of change that is substantial, but not fundamental. For example restructuring.	*'Or try to work with some depart-ment specific applications.'*	(Balogun & Hope Hailey, 2004)
			<u>Large scope</u> implies change that cannot be handled with-in the existing paradigm and organizational routines.	*'I would prefer one system.'*	
	Collaborating with partners versus work-ing inde-pendently	I	A sub tension of small scope versus large scope, which indicates how large the scope should be.	'*I do think we should have the ambition. But if you have to real-ize it on your own or if you should seek for partners?'*	-
	Develop own EHR versus purchase ex-isting EHR	I	A sub tension of small scope versus large scope that con-cerns the discussion if an organization should strive to develop their own EHR or should by an existing pack-age.	*'I have said it before, we are try-ing to create our own EHR, but we bought an existing EHR. I would recommend for a new pro-gram that if you want a new ten-der, choose a product and then search for options and see what is possible in combination with the wishes of each department.'*	-
Types of tensions: how	Top-down ver-sus bottom-up	D	<u>Bottom-up</u> means that the responsibility of the change is passed down into the or-ganization that supports the employees to be self-	*'That the perspective is really more from the shop floor. Pro-cess books are okay, but from there take a look more at the front of project.'*	(Balogun & Hope Hailey, 2004)

			generating.		
			Top-down means that the center of the organization initiates, determines the direction and has control over the change.	*'What we are about to do next, is up to the board of directors.'*	
	Incremental versus big bang	D	Incremental change indicates change over a certain period of time using a step-by-step approach.	*'In my opinion, if you are realistic, than you have to implement it slowly. A big bang is possible, but not realistic.'*	(Balogun & Hope Hailey, 2004)
			The big bang approach implies change all at once.	*'I do think that a big bang approach has my preference.'*	
	Department-based segmentation versus profession-based segmentation	I	A sub tension of incremental versus big bang, which indicates the content of the incremental approach.	*'Than you might segment on the level of professionals. Who starts with using the EHR and who is not? Than the doctors could use the EHR first and the nurses not yet.'*	-
Approaches towards tensions	Selection	D	Selection concerns denial in which a party denies the opposite site and therefore select one pole over the other.	*'I would like to see a more step-wise approach. But only if it is possible.'*	(Seo et al, 2004)
	Separation	D	Separation recognized both poles but separates them by 'the level of analysis, topical domains or temporal processes'.	*'It would make it a lot easier, but I do not think that the hospital is capable to create such an EHR.'*	(Seo et al, 2004)
	Integration	D	Integration 'recognizes that both poles of a duality exist but combines them in ways that may neutralize them or bridges the opposites in confounding ways'.	*'I do think that it would some kind of hybrid at the end. A blend of some standardized aspects and a little bit for everybody.'*	(Barge et al., 2008)
	Transcendence	D	Transcendence refers to reframing the current opposites and construct a new opposite.	*'I think that the amount of exchange of information should be very large. Everybody can read everything of me, but I would find it very annoying when you have a standardized file where I have to work in and where someone else can change stuff in.'*	(Barge et al., 2008)
	Connectedness	D	Connection aims to build a bridge between the two poles and recognizes that both are important and are able to contribute towards the change.	*'In my opinion it should be standardized, although there should be options for specific aspects. That's how it should be at the moment, because if it is too specific it would become unworkable. But there have to be possibilities to make it your own.'*	(Barge et al., 2008)