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# Tension Awareness of Stakeholders in Large Technology Projects: A Duality Perspective

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## ABSTRACT ■

This article analyzes the tensions evolving from project management dilemmas and how they relate to stakeholders in large technology projects. The study addresses an organization-wide electronic health record implementation in a large hospital. It adopts a duality lens in exploring whether and how these tensions materialize through stakeholder voices. In contrast to traditional linear and unitarist thinking in project management, duality thinking may lead to project management practices that acknowledge, appreciate, and accommodate the tensions originating from dilemmas inherent in complex projects. We propose three stakeholder roles that can contribute to project managers' tension awareness and inform duality management.

**KEYWORDS:** project stakeholder management; tension awareness; project management dilemma; duality; technology; electronic health record

## INTRODUCTION ■

Project management approaches based on a linear rationality and unitarist thinking are still common in large technology projects. Linear rational approaches view projects as a consecutive series of directed and planned activities that lead to predetermined results. Unitarist thinking expects participants to contribute harmoniously to the project goals (Goodman & Griffith, 1991). At the same time, evidence shows that project failure can often be attributed to social, cultural, and political factors and processes (Alderman & Ivory, 2007; Boonstra & Van Offenbeek, 2011; Constantinides & Barrett, 2006; Doolin, 2004; Greenhalgh, Potts, Wong, Bark, & Swinglehurst, 2009; Jensen & Aanestad, 2007; Lapointe & Rivard, 2005). It has, therefore, been argued that the complexity of large projects requires pluralist approaches (Flood & Jackson, 1991; Robey & Boudreau, 1999; Van de Ven & Poole, 2005) that recognize diversity in beliefs, values, and interests among stakeholders (Senior & Swailes, 2010). Although organizational scientists have long recognized plurality as an essential ingredient for performance (Cyert & March, 1963; Thompson, 1967), project management prescriptions (e.g., Project Management Institute, 2013; Van Donk & Riezebos, 2005) are often still based on assumptions of common interests among the actors involved, shared goals (Cicmil & Hodgson, 2006), and predictable means to achieving them (Williams, 2005).

Authors, including Robey and Boudreau (1999), Cicmil and Hodgson (2006), and Greenhalgh et al. (2009) suggest playing down this deterministic logic. They argue that the complexity inherent in large technology projects can better be grasped through concepts such as dialectics (Saberwhal & Newman, 2003), paradoxes (Bresnen, 2007), managerial dilemmas, and opposing views among stakeholders (Cho, Mathiassen, & Robey, 2007). In this article, we take up this challenge by applying Smith and Graetz's (2011) dualistic perspective on organizational change to the management of a large technology project. Duality is the central concept in one of the four basic theories that explains change in organizations (Van de Ven & Poole, 2005) and is considered significant in understanding change dynamics (Barge, Lee, Maddux, Nabring, & Townsend, 2008; Cameron & Quin, 1988; Seo, Putnam, & Bartunek, 2004). Duality theory acknowledges the inherent ambiguity and complexity in organizational change. It asserts that to understand change, it is necessary to recognize the dynamics among apparently incompatible change elements (Van de Ven & Poole, 2005), such as top-down versus bottom-up management or radical versus incremental change steps. Dualities are not necessarily mutually exclusive alternatives—for example, adopting a top-down or a bottom-up

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approach—but they signal that emphasizing one pole “creates a tension and difficulty to enact both ends at the same time” (Seo et al., 2004, p. 76). The apparently opposing elements should, rather, be seen as complementary and coexisting, and the tension that this coexistence creates needs to be managed in order for projects to be successful. A top-down initiated project can, for example, be fruitfully enriched by adaptations from various organizational units (Burnes, 2004).

In this study, we use the duality perspective to explore how tensions evolving from project management dilemmas materialize in practice. In doing so, we focus on large technology projects, as they would seem to require a duality perspective for three reasons. First, managing large technology projects implies a need to consider dilemmas regarding the why, what, and how of a project. That is, these projects will have to meet multiple objectives and requirements, a number of which may be contradictory or incompatible with the available capabilities and resources, leading to the aforementioned project management dilemmas. Second, we expect the views on these dilemmas to be stakeholder dependent and, if that is the case, abstract dualities will become visible as emerging tensions among stakeholders with opposing views. For example, a study of 13 enterprise resource planning (ERP) projects revealed that actors differed in their preferences for either a piecemeal or a concerted approach toward the integration of technology and work (Robey, Ross, & Boudreau, 2002). The duality was managed in such a way that all 13 projects featured a combination of both approaches. Robey et al.’s (2002) study provides some evidence that tensions between opposing elements or forces may be embodied in relevant stakeholders. Given this presumption, a large technology project will involve inherent tensions among stakeholder groups. Finally, technology can be configured, implemented, and integrated into an organization in different ways depending on the views of the stakeholders involved and the dynamics

among them (Barley, 1986; Boonstra, 2006; Orlikowski, 1992; Robey et al., 2002). This diversity generates tensions.

Our narrative study, therefore, focuses on tension awareness (Smith & Graetz, 2011) as a core ingredient of a pluralist approach to project management. This raises the question as to what the tension landscape looks like in a large technology project and what implications this has for project managers and their strategies. We study whether and how project management dilemmas materialize through opposing stakeholder views and demands by answering the following research questions: (1) How are the tensions that emerge in large-scale technology projects related to stakeholders’ views, and (2) how are these tensions addressed by project managers?

This study contributes to the project management literature by translating duality thinking to project management in large technology projects and by explicating bridges between a duality perspective and stakeholder management. Through this, we add to the critical project management literature and complement the positivist and empiricist research that dominates the discipline (Smyth & Morris, 2007). Our practical contribution is that project managers’ tension awareness can lead to a more productive interplay between managerial dilemmas concerning project goals (“why” and “what”) and means (“how”). Such tension awareness also involves understanding that tensions will naturally emerge, given the different goals, roles, expectations, and resources that stakeholders bring to the project.

This article is organized as follows. First, we introduce the duality perspective and link it to the project management literature. Next, we describe the case studied and methods applied. Our case concerns the pre-implementation stage of the electronic health record (EHR) system. In this stage, stakeholders come to understand what a project entails, therefore, it has a critical role in shaping attitudes (Herold, Farmer, & Mobley, 1995), and this shaping might give rise

to tensions. Likewise, the project comes into being through early project managers’ choices on the dilemmas faced. The results section reports on the tensions that emerged between stakeholders or were voiced by stakeholders, in terms of typical project management dilemmas. We also analyze project management’s awareness of and reactions to the tension landscape as it emerged over the early project phases. In the discussion, we reflect on the possible bridges between project managers’ tension awareness and stakeholder management.

### Theoretical Background

In the project management literature, it is commonly accepted that stakeholders are key to project success (Boonstra, Boddy, & Bell, 2008; Eskerod & Vaagaasar, 2014; Project Management Institute, 2013; Turner, 2006). Large technology projects concern a wide range of stakeholders with different interests and varying perceptions of the project at hand (Davis, 2014). Stakeholder management theory offers widely used (see, e.g., Aaltonen, Kuhjala, & Oijala, 2008) models to map stakeholders, such as the salience model (Mitchell, Agle, & Wood, 1997) and the power-interest grid (Ackermann & Eden, 2011). Yet, these stakeholder classification models do not enable mapping of the tensions that arise from managerial dilemmas in large technology projects.

Typical management dilemmas, such as integration versus differentiation and control versus commitment, exist in all organizations (Jaffee, 2001). In project management, such dilemmas point, for instance, to goal clarity (clearly defined versus ambiguously defined) or a project’s success measures (quantitative versus qualitative) (Atkinson, Crawford, & Ward, 2006). These choices constitute a dilemma because a measure of both is needed for organizational endeavors to be effective (Morgan, 1987). Cameron’s (1986) and Cameron and Quinn’s (1988) classic studies show that the best-performing organizations somehow manage to meet contradictory performance criteria. That is, they

are both flexible and stable, both internally and externally focused, and both ends and means oriented. The temporary nature of projects may put additional pressures (Turner & Müller, 2003) on linking such conflicting criteria.

Duality theorists, thus, acknowledge that both poles of a managerial dilemma have their benefits and, from this observation, argue that managers do not need to choose between the opposing elements, nor “do the contradictions need reconciliation” (Cameron & Quinn, 1988, p. 13). In short, they posit that the poles of a dilemma in fact complement each other and that the “dual tension” (Lewis, 2000) between the two is healthy: Overemphasizing one pole at the expense of the other threatens performance. Though contingency theorists seek to resolve a managerial dilemma by deducing the optimal position on the continuum of possibilities in a given situation (Donaldson, 1996; Dunphy & Stace, 1993; in project management, Atkinson et al. [2006] represents this perspective), the more recent duality theory (Smith & Graetz, 2011) recognizes that the evidence from multiple failed implementations indicates that the reality of managing large technology projects defies simple, planned approaches that lead to predictable outcomes. Duality theory reasons that, because of the multiple external influences and internal conditions that may all interact, “organizations exhibit changes difficult to trace to logical causes” (Smith & Graetz, 2011, p. 179). As a consequence, the tensions among all kinds of contradictory forces can only be accepted and acted upon as they emerge. Smith and Graetz (2011) discerned five important duality characteristics in balancing managerial dilemmas in change settings: (1) simultaneity—although defined as mutually exclusive, both ends of a dilemma can be present; (2) relational—change management dilemmas are interdependent; (3) minimal threshold—both ends of a dilemma need a minimal presence in a change process to enable the benefits that each brings; (4) dynamism—the tension between the two poles (e.g., freedom and order) has a mobilizing force that change

managers need to continuously address, and (5) improvisation—given the emergent nature of the tensions in change processes and their inherent unpredictability (following from the first four characteristics), change managers need to improvise to achieve balance.

Transposing this reasoning to a project setting confronts project managers with a challenging task. Complex, ongoing project management practices will face multiple and at least partly conflicting goals—even if they remain implicit and unobserved by project managers (Van Offenbeek & Vos, 2016; Weick, Sutcliffe, & Obstfeld, 2005)—and the means available may be unclear. Further, both goals and means will be subject to change. The tension between the opposite ends of a dilemma is, thus, also dynamic, depending on the evolving mix of goals and means and the ways in which the stakeholders involved manage and react to them (Lewis, Welsh, Dehler, & Green, 2002). Following Smith and Graetz’s (2011) logic, project managers need to learn how to exploit the creative potential of the emerging tensions within a relatively short time span.

In our study, we wondered whether this task would sound to project managers like “squaring the circle,” or whether exploring, accommodating, and exploiting the dualities or “dual tensions” (Lewis, 2000) that exist is actually what experienced ones do. Because there is limited understanding about project management dilemmas, their dynamics, and what managers actually do (Lewis et al., 2002), we question how project management dilemmas surface—that is, grow into tension that project managers (may) become aware of, thereby presuming that they materialize through tensions among the opposing views that stakeholders voice. This proposition formed the starting point for our empirical study.

We use duality thinking (Smith & Graetz, 2011) as our evaluative frame of reference (Van de Ven & Poole, 2005) to bring meaning to our narrative study (Hodgson & Cicmil, 2006). The study describes how typical project management dilemmas,

in connection with stakeholder views, emerge as tensions in a large technology project. The study also analyzes project management’s awareness of the evolving tension landscape. Such a narrative study entails focusing on the interpretations (Weick et al., 2005) of stakeholders, and especially of project managers as the actors responsible for stakeholder management in a project setting. As authors, we develop their interpretations into a narrative (Van de Ven & Poole, 2005) that provides a plausible answer to the research question. We recognize that the insights we provide can only be partial and probably do not apply to all large technology projects in all phases and under all circumstances. We follow Smyth and Morris (2007) in seeing this as inevitable. They call this the epistemological dilemma in project management research “the pursuit of explanations that rely upon identifying general patterns based upon cause and effect marginalizes the particular, while a focus upon the particular frustrates the emergence of common patterns, shared meanings and normative recommendations” (p. 423). Nevertheless, we feel confident that the systematic confrontation of existing duality theorizing with the practices in a complex project will deepen understanding of the merits of this theory for project management.

## Context and Method

### *Context: Implementation of an Electronic Health Record*

The empirical basis of this article stems from a case study of a multi-stakeholder implementation of an EHR system in an institutionalized hospital environment. Electronic health records (EHRs) are increasingly common and are seen as essential technological systems for modern healthcare provision. EHRs are software platforms that healthcare providers use to create, store, update, maintain, and share medical information about patients. They range from isolated databases with records managed by individual doctors to departmental, organizational, inter-organizational, or even nationwide interconnected systems.

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Through EHRs, healthcare providers can seamlessly share and exchange patient data, enabling clinical decision making to be based on an all-encompassing view of patient data. The main claim for these systems is that their use improves patient service and the quality and safety of healthcare (Øvretveit, Scott, Rundall, Shortell, & Brommels, 2007). Additionally, EHRs promise cost-effectiveness by more efficient flows of patient data (Thouin, Hoffman, & Ford, 2008).

Nevertheless, the transition to EHRs use is seldom trouble-free. Studies report a range of implementation problems in terms of delays, high costs, and user resistance (e.g., Jensen & Aanestad, 2007; Van Akkeren & Rowlands, 2007). EHR implementation requires the involvement of multiple stakeholders with different expectations from the EHR (Boonstra et al., 2008). When EHRs are implemented in healthcare organizations, the clinical and organizational adjustments to the EHR are often expensive, slow, and complex (Avison & Young, 2007; Boonstra, Versluis, & Vos, 2014). The complexity of these systems in connecting with the adopting organizations can be better grasped through considering the contradictory and opposing views on EHR among its stakeholders (Greenhalgh et al., 2009). EHR implementation can be considered an excellent research context in which to apply a duality perspective on project management.

### **Research Approach and Setting**

A single case study approach enabling an in-depth examination of the pre-implementation stage of an EHR fits well with our goal of applying a duality perspective to investigate how project management dilemmas emerge as tensions among stakeholder views. Because these tensions are initially unclear, they need to be studied and interpreted in their natural setting in order to understand their nature and the complexities involved (Myers, 2009). The research poses “how” and “why” questions in exploring the views of stakeholders (Gerring, 2004; Yin, 2009) on the emerging tensions.

We conducted our case study within the context of a program initiated within a large teaching hospital in the Netherlands. The hospital had developed a vision of organizational IT that implies a move from fragmented information systems to a single, integrated IT architecture. This vision included the adoption of an organization-wide EHR system to replace the multiplicity of departmental and individual legacy applications that were, to an extent, linked through a complex network. This complexity was vulnerable and the core system was in need of replacement because its maintenance contract would shortly expire. The new EHR was expected to cover frontline operations such as patient and service management and back-office activities such as planning. The system would connect departmental working processes and feed education and research. From the outset, the program was seen as a multi-stakeholder project and was expected to take at least four years to complete.

As explained, we focus on the pre-implementation stage that lasted more than two years (autumn 2012 through early 2015). Here, this stage could be divided into two phases. Phase 1 focused on project preparation, requirement specification, organizing the tendering procedure, and vendor selection during the spring of 2014. Phase 2 started once the vendor was chosen, and involved the design, its integration, training, and testing of the system. During this phase, the program organization consisted of three main pillars: functional, technical, and education and implementation, each with its own project team and workgroups. This program organization, consisting of both hired external and internal staff, was directed by a steering committee and program managers, and was set up separately from the hospital yet located on its premises. Within the hospital, each department had its own EHR team, delivering requested information ( $n = 47$ ). This first phase took an enormous effort. Toward the end of it, an interviewee commented: “Millions have been spent in that process. And even now we haven’t finalized our choice”

(Project Manager). In Phase 2, the staff was further extended, and partly replaced, with personnel from the supplier and hospital staff with functional expertise.

### **Data Collection**

For this study, the internal stakeholders were considered the prospective users of the EHR system (McGinn et al., 2011). Department managers, who would become indirect system users themselves, were responsible for initiating the required local change processes and aligning these changes with the EHR. During a plenary information meeting (PIM), project management stressed: “This is not an ordinary IT project, it is an organizational change project” (briefing for personnel). The impact would differ by department: Some had already been fully digitalized with highly customized functionality, whereas others were still paper-based. Departments’ work interdependencies and data exchange with external stakeholders also differed. As to the doctors, they all were expected, unlike before, to register and consult all patient data online themselves. For the nurses, the EHR implementation would coincide with the introduction of a new patient data recording approach. The extent to which interfaces, accounts, and authorization would differ across professional roles was subject to discussion.

Data collection was multi-method. In the two-year period, we conducted 29 interviews, five interviews with project managers (covering the steering committee and two pillars of the program management, see above), and two rounds in four medical departments (A, B, C, and D) in each of which we interviewed three prospective users with a medical, nursing, and managerial role, respectively. The interviews were semi-structured, lasted between 60 and 90 minutes each, and were recorded and then transcribed. These interviews covered the department’s characteristics; their involvement in the change; the expected impact of the EHR; plus the support, resistance, and tensions the departments had experienced during the process. The interviews also addressed the interviewees’ views on the implementation process, the cooperation

between the departments and the project team, and their ideas for future interventions. After the first round of interviews, feedback sessions with interviewees and some of their colleagues were held in order to verify the correctness and accuracy of the data gathered (Johnston, Leach, & Liu, 1999). Further, we met every six weeks with two to four project managers within the education and implementation pillar to discuss the project's progress. Minutes were taken. The interviews and meetings enabled us to interpret how tensions emerged and evolved over time. To triangulate the data and ensure construct validity, additional data sources were used, including weekly newsletters, written reports, and policy plans (Dubé & Paré, 2003).

**Data Coding and Analysis**

Various tensions surrounding project management dilemmas have been mentioned in the literature (see Theoretical Background section), but not every tension needs to emerge in a specific project. Therefore, we started with an inductive coding approach, and then went back to the literature to label the identified tensions in line with existing conceptualizations. The procedure was as follows: After the data collection, the three authors first re-familiarized themselves with the data (Eisenhardt, 1989). Next, we sat together and asked ourselves what we had witnessed in terms of emerging tensions. This led to a first set of tensions. In parallel, a research assistant scanned the data to identify tensions. The two sets were confronted and combined. This included carefully reading the data to develop a contextualized understanding. Based on the literature, interview and meeting transcripts, and project documents, we then developed coding categories (see the Appendix for the codebook) that reflected the tensions that had emerged during one of the two phases of the pre-implementation stage. These quotes were combined in a table to ease comparison (Hennink, Hutter, & Bailey, 2011; Miles & Huberman, 1994). After iterations, during which the data were consulted, we were not only able to identify seven emerging tensions

WHAT Tensions: Related to Project Content		
<i>Technological system</i>	Standardized	Customized
	Large scope	Small scope
<i>Work organization</i>	High impact	Low impact
	Integration	Differentiation
HOW Tensions: Related to Project Process		
<i>Project organizing</i>	Top-down	Bottom-up
	Big Bang	Incremental
	Differentiated	Integrated

**Table 1:** Summary of the emerging tensions in project management.

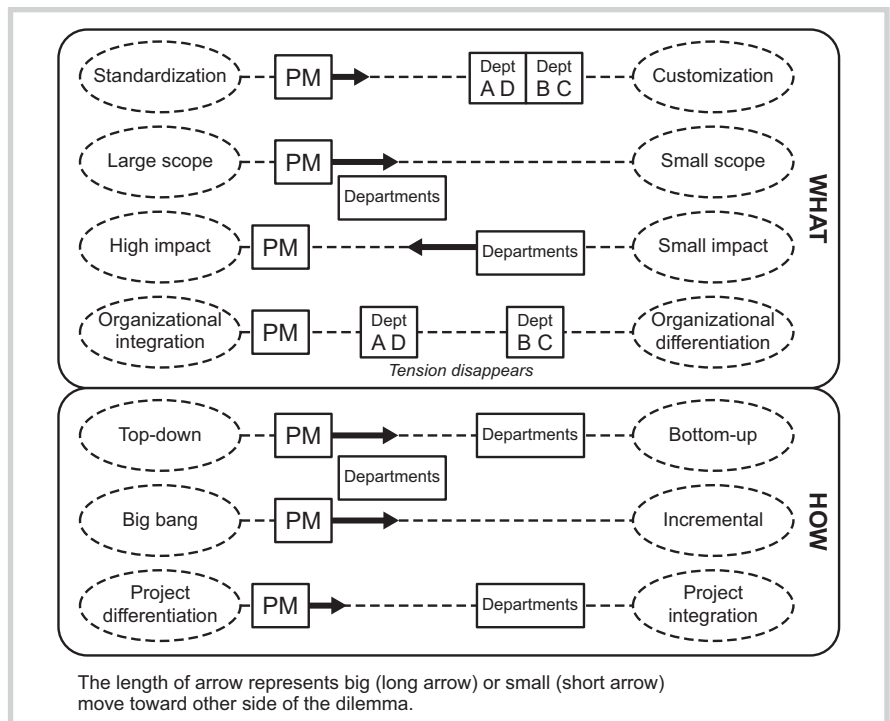
(four “what” and three “how” tensions), but also were able to analyze the relations among the tensions and their evolving connection with stakeholders.

**Results**

In this section, we present the seven project management dilemmas and the resulting tensions in the two phases explored (see Table 1 and Figure 1). For each tension, we analyze (1) how the tension materialized through opposing stakeholders' views, and (2) how the tension was

interpreted and addressed by the project management team.

The interviewees espoused a shared urgency concerning the “why” of the project as they deemed integrated digital registration to be a prerequisite for future high-quality patient care and innovation. Moreover, the supplier of their legacy system had announced that it would cease its maintenance. Despite the shared urgency, the stakeholders felt confronted with a number of “what” and “how” dilemmas during the studied phases of the project.



**Figure 1:** Stakeholders' positioning on the project management dilemmas.

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### *“What” Tensions*

#### *Tension 1: Balancing between standardized and customized EHR systems*

The standardization end of this tension amounts to a uniform hospital-wide system where the various users adapt their processes to the system. The customization end is where the system allows modifications to match the specificities and particularities of different medical specialties. Both ends of the tension are associated with benefits and drawbacks. For example, a standardized system supports collaboration, promotes user-friendliness, and may reduce the number of manual errors, but can result in misfits with specific information needs and established working practices.

A project goal was to replace the many different systems with generic processes supported by a single system. This implies, from the outset in Phase 1, that the project team’s perspective was that the EHR system should enforce uniformity. A member of the project team said: “Many departments still have their own applications, sometimes completely tailor-made. Those are private designs and must be replaced. Departments need to move towards generic processes, which make information accessible to others” (Project Manager).

Though the departments acknowledged the rationale of a uniform EHR system, they also believed that standardization should not be an end in itself: “It [the EHR system] must also be flexible. The EHR has many goals including uniformity, but also the improvement of medical practices” (Department A, interviewee 3). Various departments supported this view by stating that EHR-enforced uniformity could also have negative effects on the quality of their activities: “There are concerns about the quality of healthcare and the EHR system” (Department B, interviewee 1). Some departments feared that the emphasis on standardization might impede the sometimes innovative practices they had developed. As a result, these departments were advocating for a more customized EHR—a single standardized system that incorporates customized modules to meet specific demands: “An

EHR can be implemented in all departments, but each department must be able to modify the system to their own needs” (Department D, interviewee 1).

On the departmental level, there was awareness of the two poles to this tension. A manager stated that “it would be nice to have a completely customized system; however, that is unworkable” (Department A, interviewee 1), and a doctor of the same department was also aware of this tension: “Each department hopes that its specific needs are acknowledged. As a department, you probably believe in achieving the most workable system. However, this raises contradictory interests. We also expect a generic system that enables efficient information exchange. I am aware of these two sides of the coin” (Department A, interviewee 2). One department warned that an internally standardized system might conflict with the external standardization efforts within their particular medical specialty across healthcare providers in the Netherlands and abroad.

In Phase 2 of the program, the poles remained present in similar ways across the departments. At least one unit was allowed to keep its current system “for now,” because its functional requirements were highly advanced. To more generally reduce the tension, the project team specified the ambitions of the project as aiming for 80% of the system’s functionalities to be standardized. This not only set the ambition, but also offered leeway for customization requests. A project member put this percentage in perspective and commented that “this percentage was just a figure; it wasn’t that exact; it was meant to set a clear ambition for the system” (meetings with project managers). Project managers aimed for connection by giving a voice to proponents of customization and standardization. They argued that standardization among medical units and customized functionality within units might go hand in hand.

#### *Tension 2: Balancing between large and small scopes*

Scope concerns the range of functionalities that the system covers, the systems

it replaces, and the number of involved departments and users. The hospital management aimed for a large scope: A large majority of the existing systems should be replaced by a single, organization-wide EHR. This view was taken for granted by many stakeholders during the first phase of the project.

However, in Phase 2, the large scope, in combination with the pressure of a clear deadline (referred to as a Big Bang), became a major tension. There were serious doubts as to whether the range of system functionalities that was initially intended could be implemented. When this tension between the project management and the departments became more widespread, the board of directors intervened and decided to reduce the pressure by postponing the go-live date and by limiting the range of functionalities. In particular, the delivery date of the more advanced functionalities and customized subsystems was postponed. At that time, the project management also tried to tone down the high expectations: “One of the project certainties is that we will indeed have one single patient file. However, first we will have a basic file, and later there will be room for improvement and customization (meeting with project managers).”

Though departments tended to still favor a large scope during Phase 2, they became aware of the complexities related to the sheer number of systems to be replaced and the range of stakeholder opinions: “We need to give and take and try to work it out together” (Department B, interviewee 3) and “If one succeeds in replacing all systems in one go, that would be good” (Department C, interviewee 2). An interviewee from Department A reluctantly accepted the project’s reduced scope: “An option would be to start with a small scope and then build stepwise towards a large scope” (Department A, interviewee 1). A doctor argued: “You need to have one patient file for the entire hospital. Otherwise it will be like herding cats” (Department A, interviewee 2). A doctor from Department C commented on the project decision to reduce the scope: “I understand that they had to reduce the scope, but this is not a good signal.

This means that you end up with a number of sequential deliveries, and that is very annoying indeed. Moreover, it leads to the extension of the project” (Department C, interviewee 2). This opinion was shared by a doctor from Department D: “The first part of the system that you want to implement needs to have a sufficiently large scope, otherwise this leads to a series of small ‘Big Bangs;’ surely I may hope you are not going to carry out six implementations in a row” (Department D, interviewee 1).

### *Tension 3: Balancing between high and low impacts on work processes*

This tension refers to the degree that the system would change work processes. From the start of the program, the project team considered the EHR system a way to alter the way of working (project documentation) and optimize hospital-wide work processes through making many small processes part of interdepartmental chains of healthcare delivery. Hospital management’s vision was to use the new EHR as a means to change the departmental “silo-view” of health to a process-oriented, hospital-wide view. Such a view could potentially be extended to healthcare providers outside the hospital.

These ambitions were partly recognized at the departmental level. In particular, representatives from Department D acknowledged the advantages of hospital-wide processes supported by effective information exchange. However, there were also considerable doubts as to whether the system could have the kind of impact that the project was aiming for. These doubts were clearly expressed by interviewees from Department A: “The new system is just a patient file. In essence it doesn’t affect how we do our work” (Department A, interviewee 2) and “That we are going to work in a different way, well, I think that’s just management talk to sell the system. In our department, I don’t think that this will be the case. . . . I have also doubts whether this is the way [i.e., through the implementation of the system] to achieve such an ambition. Indeed, IT should facilitate our work, but it should not change how we need to do

our work” (Department A, interviewee 1). Staff members from Department C worried about the negative impact that the system might have on its core processes, particularly regarding the amount of time data entry would take: “compared to the other departments, we see many more patients per day. So, this really matters when you count processing time per patient.” Apart from that, this interviewee qualified the system’s expected impact as limited, similar to Department A: “Although we will probably work more with a computer. In terms of our professional work, it doesn’t change that much” (Department C, interviewee 2).

In the second phase of the project, the departments became disappointed that the implementation was taking longer than expected. Because the old systems were becoming increasingly obsolete, the focus of the tension shifted, especially when the go-live date was postponed, toward the impact of *not* obtaining an adequate EHR system. A representative of Department D commented: “we are very disappointed, important changes in our department have been postponed because of the system . . . it is like you wait for a party, you have prepared yourself for the party and others as well, and then at the ‘moment supreme,’ nothing happens” (Department D, interviewee 1). In sum, a tension arose between the project’s goals and some of the departments’ views on the matter. Awareness of the tension was present, but barely actively managed: “this is my personal irritation. From the outset of the project I thought we should have managed expectations in a much better way. There is so much diversity in what departments will gain or lose in their IT support. For some, it may even be a change for the worse. Communicate this message, immediately! As far as I know, this has not been done clear enough” (Project Manager).

### *Tension 4: Balancing between integrated and differentiated work systems*

The tension between integration and differentiation concerns how the new system

influences the work organization. Integration reflects changes in the identities of the various departmental units and the relationships among those units, leading to better alignment and collaboration. With differentiation, the units remain distinct without a movement toward converging identities and stronger relationships. The tension revolves around how departments seek coordination and collaboration while, at the same time, safeguarding their own specialties’ identities and practices. Differentiation is necessary for specialization within the organization.

In Phase 1, the project team advocated the need for greater integration. The board of directors described the organization as consisting of multiple “islands,” which needed to be linked through integration among departments. An example was the adoption of similar working procedures for handling patient administration. These practices were to be steered by implementing a single system and reallocating roles and responsibilities among its users.

The departments expressed various views on integration through the EHR implementation. Departments A and D were generally in favor of integration: “For us it is crucial that the system can be used in a multidisciplinary way. So that we have one integrated list of health problems for all disciplines” (Department A, interviewee 1). Department C, on the other hand, stressed its distinct character and did not aspire greater integration. Its interviewees strongly believed that their unique identity supported their work performance. Nevertheless, they appreciated the EHR system’s potential contribution to multidisciplinary work. Department B also favored differentiation and did not believe that integration would benefit their working processes. However, as with Department C, they recognized some advantages in the provision of better healthcare: “We’d hoped that all clinics would participate” (Department B, interviewee 1).

This tension emerging from divergent department views was not explicitly picked up by the project managers. Moreover, in Phase 2, this tension appeared to



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have faded away altogether. All the efforts were now focused on achieving a workable system. Because of the pressure to implement such system, the integration-differentiation tension had receded into the background.

### **“How” Tensions**

#### *Tension 5: Balancing top-down and bottom-up approaches*

An important “how” dilemma is how to direct the change process: top-down, providing centralized direction and control, or bottom-up, creating involvement and support through participation and negotiation. The tension revolves around the question as to what role the end users should have in the process. In Phase 1, the board of directors deliberately decided to adopt a top-down approach by creating an extensive central project organization responsible for the technology adaptation and implementation. A separate organization of more than 100 project members was concentrated in a central part of the building. The project board presided over the breaking down of the project into teams responsible for subsystems and subtasks.

Members of this central project organization readily acknowledged that the process was directed from the top. One project manager noted: “It was a deliberate decision to adopt a directive, top-down approach. The program had to meet the goals of the board. Only a limited number of internal experts were consulted” (Project Manager). This decision was also motivated by previous negative experiences where bottom-up involvement had resulted in a complex and slow process, shaped by a web of compromises, which ultimately resulted in “something no one within the entire hospital was pleased with” (Project Manager). This time, only approximately 25 clinicians, a small minority of the total, were involved. Although the approach was not challenged, participation practices within a partner hospital implementing a similar EHR system during the same period showed the project leaders that

it could have been done differently. The latter hospital adopted a participative bottom-up strategy that resulted in deeper involvement by more clinicians (>150) and shared ownership without apparent delays.

However, during Phase 2 of the project in our study, the project management did increasingly recognize the need to get medical professionals on board, not only to create a working system but also to develop new working practices: “It should now become more bottom-up in order to get the ‘hordes’ along” (Project Manager). Another member of the project organization said: “we must initiate a real conversation with staff members to compensate for their lack of involvement in the earlier stages” (Project Manager). However, at this point it appeared difficult to still get prospective users involved.

In response to the top-down strategy, many individual doctors and nurses developed a reserved attitude, with several departments not feeling any responsibility for the development and implementation of the system. A member of the project team commented: “user departments argue that the board, the project group, and the supplier are responsible, that it is their project, not ours” (Project Manager). The medical departments were all in favor of a more bottom-up approach and expected high levels of involvement in developing EHR modules that would impact on their work: “I assume that we will be involved with all decisions that affect our work” (Department B, interviewee 1). However, they acknowledged that they could not be involved in everything in the process: “Of course, it has two sides. The more people informed, the more opinions arise. That increases the complexity of the process. Sometimes it is better not to involve everyone” (Department A, interviewee 1). The general feeling of the departments was that they needed to “defend their own boundaries” (Department B, interviewee 1) against the dominant top-down approach of the

EHR implementation process. However, each department expressed different responses to this tension. For example, Department A became paralyzed by the top-down approach whereas Department C showed proactive behavior in order to influence the implementation process to fit with its wishes. A project team member illustrated this by stating: “Department C’s efforts are deliberately focused on creating an EHR system that is geared to their views; on how they think the system should be established.” (Project Manager)

#### *Tension 6: Balancing between Big Bang and incremental implementation*

Another “how” dilemma in this project relates to the implementation path: whether with a *Big Bang* (implementation of the whole system at once) or in an *incremental* way (step-by-step implementation). In Phase 1, the board decided to follow a Big Bang approach: A large majority of the more than 900 legacy systems in the hospital would be replaced by the new integrated EHR at one specific point in time, in the fall of 2015. After a sequence of preparatory stages over 18 months (initiation, specification, design, integration, and testing), the system would go live. During this period, the user departments would have to prepare to transfer to the new EHR system over a single weekend. An important motivation in adopting a Big Bang approach was related to the advantage of not having to support both the old legacy systems and the new EHR system, and would also avoid the technical costs of interfacing associated with the coexistence of many old systems and one new integrated system. Moreover, a perceived advantage was the relative speed of a Big Bang approach compared to an incremental approach. Speed was also expected to create determination and focus among developers and user departments. In the project management’s view, this need for urgency did not fit with an incremental approach, which was expected to be slow compared to a Big Bang.

However, in Phase 2, when further specifying the new system, the project management and supplier representatives were faced with the immense complexity of translating existing systems and working processes into one new working system. The supplier appeared to be unable to compose a system in accordance with the specified requirements and preferences by the user departments. As a result, the project management was faced with the reality that a Big Bang in the fall of 2015 would not be feasible. After intense deliberations in September 2014, the board decided to postpone the go-live date to “sometime in 2016,” and to distinguish three implementation levels. The Big Bang now only referred to the “going live” of Level 1. Level 1 essentially amounted to basic functionality in order to establish a working system. Later, after proven success at Level 1, and after having developed learning capabilities, experience, and confidence, the next two levels would be developed and implemented. These levels addressed more advanced functionalities, external links, and customized processes. As a result, the project management had implicitly proposed moving from a full Big Bang launch to a more incremental three-level implementation approach in which the first-level “Bang” would have a smaller scope (Tension 2).

The user departments had expected that their requirements, which they had defined in “design books,” would be translated into a working system. These expectations increased the required system complexity and created difficulties for the developers in meeting the time schedule of the proposed Big Bang implementation. Although three of the four departments did not explicitly criticize the Big Bang approach, they did so implicitly by asking for functionalities that could not be delivered within time. A representative of Department B said: “If we would have asked for a tailor-made product that could be delivered by the supplier, a Big Bang might have been an appropriate approach”

(Department B, interviewee 3). A colleague added “Transition periods with two systems in place are very cumbersome for users. So we are in favor of a Big Bang. I can imagine that the project management had to postpone and downsize the scope of Level 1, but this is not good. This leads to uncertainty and reduced confidence in the project as a whole. These three different levels actually imply an incremental and unstable approach, which means that we spend too long in a transition phase” (Department B, interviewee 2). As a result, we saw that the extended time frame and the prospect of only a basic functionality in Level 1 raised the awareness of the substantial impact on the work organization that could be expected (Tension 3).

*Tension 7: Balancing between a differentiated and an integrated program organization*

This tension relates to the project organization’s degree of differentiation versus integration. A project organization is differentiated when the various tasks are segmented into subprojects or teams that independently and fairly autonomously contribute to the project goals. Integration, on the other hand, reflects a degree of unity of effort and consistency among the various subprojects in accomplishing the goals of the project.

In the first phase of the project, a steering group and a project management team managed 15 core teams. These core teams focused on particular project dimensions, including the EHR tendering procedure, technical infrastructure, process design, system migration, digitalization of nursing, patient participation, and change management. Each core team was chaired by an expert from the hospital and was made up of between three and eight team members. The chairs were expected to share their insights with one another and to contribute to a cohesive implementation. However, as one project member observed: “it is very difficult to fit the pieces of the puzzle together” (Project Manager).

Project management balanced this differentiation by colocating project members in one part of the building to encourage informal communication, by weekly internal newsletters intended to share information within the project, and with a communal lunch on Thursdays to create an integrated culture and establish a space to share and discuss the project’s progress and outcomes.

In the second phase, after the vendor selection, the number of project members increased substantially—for example, with the entrance of vendor consultants. A new project structure was established. This structure was divided into functional and technical design teams, plus coordination teams for education and support. These three categories of teams were connected with different layers within the hospital: a high-level “leading coalition,” medical professionals who informed the functional design teams, and EHR medical department teams including coordinators. In this second phase, the implementation organization thus became even more differentiated in order to address the range of challenges. The project management stressed that EHR implementation was only partially an ICT project. The booklet about the project says: “This project is also related to process optimization, quality improvement and patient safety.” In this phase, the sheer scale and multidimensionality required the inclusion of many experts with different backgrounds working in specialized teams. Linking pins had to hurry between different meetings that required their inputs. A newly appointed project leader observed an imbalance in the strong focus on the technology, while ignoring dimensions such as the work organization. She observed a lack of coherence between the subprojects: “During a presentation of intermediate products I asked: where is the coherence in all of this? Then there was silence” (Project Manager). She argued that the project organization was compartmentalized with too much overhead, and proposed merging

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subproject teams and organizing the project around end-user entities rather than “themes.” An initiative to this end was started.

Various departments also expressed the view that the project consisted of largely stand-alone subprojects that could be implemented without their inputs. A representative of Department A said: “We started enthusiastically by contributing to the design books. We had to do this and that. But we did not receive feedback and we felt that we were not included in the project” (Department A, interviewee 3). Department B also complained about the project organization: “There were many meetings of 1.5–2 hours; it took so much time and the results were limited” (Department B, interviewee 2), and a colleague added, “we started enthusiastically but we became skeptical when we discovered that we would never get what we really needed” (Department B, interviewee 1). These quotes suggest that the project had become an entity of differentiated subprojects each with its own goals.

Table 2 summarizes the espoused views of the stakeholders and the project management, and Table 3 indicates how these views evolved over time and how project managers reacted to the emerging tensions.

### Discussion

In this study, we have applied duality thinking to project management in a large technology project. Our account of two pre-implementation phases demonstrates how tensions surrounding project management dilemmas, in other words, “dual tensions” (Lewis, 2000), materialize. Our main theoretical contribution lies in highlighting how dual tensions may directly and indirectly materialize through stakeholder voices, leading to the proposition of three roles for stakeholders in duality management. Our expectation was that dual tensions would materialize in practice as tensions between different stakeholder views, interests, and thus, demands. The results of this study support

our expectation, yet also show two other mechanisms. Based on these three identified mechanisms (see the bottom row of Table 2), we propose three possible bridges between duality management and stakeholder management. We will conceptualize these three bridges in terms of “stakeholder roles.”

### *Three Mechanisms through Which Tensions Materialize*

Through the first mechanism, tensions materialize when different stakeholders advocate opposing poles of a dilemma. The simultaneous presence of the poles of a dilemma becomes apparent through the stakeholders’ voices and actions, and project managers need to respond to these. In terms of the customized versus standardized dilemma, the project management in this case was trying to initiate a standardized system. Most departments tended to agree, while others sought customized functionality for their own medical specialty (see also the bottom row of Table 2 and Tensions 1 and 3).

Through the second mechanism, tensions materialize when the project management and the other stakeholders have opposing views. In such situations, project managers are not objective bystanders but rather active players in the evolving tensions of a project. In our study, the departments all shared a similar reaction to the clearly top-down approach that was imposed by the hospital board (see the bottom row of Table 2 and Tensions 2 and 7). They demanded an increase in bottom-up support to supplement the EHR implementation. This is in line with duality theory (Smith & Graetz, 2011): though one pole (top-down) was dominant, a minimal level of the other pole (bottom-up) had to be created.

Through the third mechanism, tensions materialize between the poles of different project management dilemmas rather than through opposing views on one dilemma. We found that dynamic interactions between project management dilemmas may intensify

(or alleviate) dual tensions. We observed that the salience of certain dilemmas may change over time as a result of the way another dilemma gets balanced (see the bottom row of Table 3). In particular, the “what” tensions appeared to be highly interrelated. For example, regarding the dilemma “low–high impact on working processes,” the project managers strove for a high impact to realize a new way of working, which was a major project goal and part of management’s strategic vision. However, the departments’ views varied, based on their position on the “standardization–customization” dilemma. Two departments believed the impact would be relatively low because they expected the EHR to be customized in line with their existing, already reengineered, working processes. Others expected a major change in working processes when a standardized system would replace their current customized systems. Similarly, tensions evolved from interdependencies between “what” and “how” dilemmas. For example, all stakeholders, including project management, favored a large system scope (“what”) and a Big Bang implementation (“how”). In Phase 2, the project managers had to accept that these interrelated choices were getting in one another’s way. Here, stakeholders were not the source of the tension. These two examples demonstrate how the interrelatedness of project dilemmas lead to dual tensions through the combined choices that project managers make. Stakeholders may experience the consequences and may voice these as concerns to project managers.

### *Three Stakeholder Roles in Generating Tension Awareness*

The three identified mechanisms through which dual tensions materialize are all directly or indirectly based on stakeholder voices, implying that stakeholders have pertinent roles in raising project management’s tension awareness. In this study, we propose three distinct roles: (1) providing direct feedback on project managers’ balancing of project management dilemmas, (2) providing

Tensions		1. Standardization– Customization of System	2. Large–Small Scope of System	3. High–Low Impact on Work Organization	4. Integration– Differentiation– Work Organization	5. Top-down– Bottom-up	6. Big Bang– Incremental	7. Integration– Differentiation– Project Organization
Stakeholders' voices, Phase 1	Department C emphasizes customization. Others view the relevance of standardization, but demand some customization for themselves.	Departments prefer large scope as they find it burdensome to work in parallel with (many) different systems.	Department A expects low impact. Other departments worry about the impact.	Departments A and D favor integration; B and C favor differentiation.	Departments favor a bottom-up approach; some more actively try to gain influence than others.	Departments favor a Big Bang; there should not be a long transition phase.	Departments dislike differentiation.	
Project managers (PM) in Phase 1	PM favors standardization.	PM favors large scope, especially in view of system maintenance.	PM seeks a high impact. In the strategic vision, "a new way of working" is envisioned.	PM favors hospital- wide integration to offer patients continuity.	Board orders PM to adopt a top-down approach.	PM aims at Big Bang implementation.	PM develops a highly differentiated, multilayered program organization.	
Opposing stakeholder views?	Yes, departments' needs diverge.	No, stakeholders' views converge.	Yes, departments' beliefs diverge, and tend to contradict PM choice.	Yes, departments' needs diverge.	Yes, departments' preferences contradict PM view.	No, stakeholders' views converge.	Yes, departments' preferences contradict PM view.	
Interrelated dilemmas	Dependent on 2, 3, and 4.	Dependent on 1 and 6.	Dependent on 1 and 4.	Dependent on 1, 2, and 5.	Dependent on 1, 3, and 4.	Dependent on 2.	Dependent on 5.	
Tension materializes through . . .	Opposing stakeholder voices ( <i>mechanism 1</i> ).	PM's choices on interrelated dilemmas, (6 hinders 2; <i>mechanism 3</i> ).	Opposing stakeholder voices ( <i>mechanism 1</i> ).	Opposing stakeholder voices ( <i>mechanism 1</i> ).	Stakeholder voices opposing PM's choice ( <i>mechanism 2</i> ).	PM's choices on interrelated dilemmas, (2 hinders 6; <i>mechanism 3</i> ).	Stakeholder voices opposing PM's choice ( <i>mechanism 2</i> ).	

PM = project manager

**Table 2:** Emergence of dual tensions as related to stakeholder views (Question 1).

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Tensions		1. Standardization– Customization of System	2. Large–Small Scope of System	3. High–Low Impact on Work Organization	4. Integration– Differentiation Work Organization	5. Top-down– Bottom-up	6. Big Bang– Incremental	7. Integration– Differentiation Project Organization
Phase 2: evolving tension pattern	Standardization remains the norm. Departments in the dark about fulfillment of their espoused needs.	Departments continue to prefer large scope, but become increasingly aware of the complexity in Phase 2.	Departments acknowledge the high impact as delays threaten to seriously affect the work organization: the SH-PM tension dissolves.	User experts work collaboratively on the design of generic processes	Departments still challenge the top-down approach.	Departments continue to prefer a Big Bang approach.	Challenges to differentiated project organization continue in Phase 2. System's design requires more hospital employees (see Tension 5): a push toward even more differentiation.	
PM's tension awareness	PM acknowledges problems, especially for certain departments.	Tension acknowledged and voiced by PM in Phase 2.	Present, but the technology absorbs PM's full attention.	The technology absorbs PM's full attention.	PMs acknowledge and voice the drawbacks of their top-down approach.	In Phase 2, PM feels confronted with the tension between manageability (PM) and workability (SH).	In Phase 2, a new project leader worries and considers a turn-around of the program organization.	
PM's balancing acts in managing dualities over time	PM gives in to a few units and otherwise balances through 80/20 rule.	PM downsizes the scope in Phase 2 to enable Big Bang implementation (Tension 6)	PM de facto deemphasize the "new way of working," while ironically, the departments are increasingly aware of the potential impact.	Tension disappears into the background in Phase 2: There appear to be more urgent matters.	In Phase 2, the tension leads to some balancing acts by PM: A leading coalition is installed and expert users are being "hired."	PM develops a preference for implementing smaller parts (Tension 2): "a few sequential Big Bangs."	PM balances a differentiated program with formal and informal coordination. At the start of Phase 2, the program organization is adjusted, and later on a turn-around is considered.	

PM = project manager; SH = stakeholder

Table 3: Evolving tensions, project managers' tension awareness and balancing acts (Question 2).

indirect feedback on the consequences of project managers' interrelated choices, and (3) participating in an in-depth dialogue to promote an early collective tension awareness.

First, as expected, much of the project managers' balancing amounted to reacting to tensions that materialized in the varied and opposing stakeholder reactions. Stakeholder voices provide project managers with direct feedback on their balancing of project dilemmas through the first two mechanisms. This first role accords with Robey et al. (2002) and with Petrakaki and Klecun's (2015) study of an EHR implementation project in the United Kingdom's National Health Service that highlighted the role of stakeholders in producing a package that meets both local and generic needs. We add the insight that opposing stakeholder views may contribute to project managers' tension awareness.

Next, in the third mechanism outlined above, stakeholders are not the source of the tension. As the dual tension materializes through the interrelatedness of project management dilemmas, the stakeholders have no direct role. However, some had a role in bringing the dual tension to project managers' attention through raising concerns that showed the negative consequences of project managers' interrelated choices. In this way, stakeholders contributed to project managers' tension awareness because their issues provided indirect feedback that dual tensions were emerging. The idea that a stakeholder issue may point to or act as a symptom of a dual tension enriches the literature on stakeholders' issue selling in project environments (Van Offenbeek & Vos, 2016).

Finally, our findings in this complex, multi-stakeholder project show that the stances adopted by stakeholders were multifaceted. Whereas Robey et al. (2002) reported that each respondent had a clear preference for one pole of the dilemma studied ("piecemeal versus concerted effort"), in our study this was not always the case. Depending on the dilemma, and the stakeholder

group, some interviewees had a clear preference, and others could see the merits of both poles of the dilemma. An explanation may be that, in our teaching hospital context, many participants had considerable experience with large technology projects. This finding points to a third possible stakeholder role of a different nature from the previous two. In such a context, project managers can grab the opportunity for establishing an in-depth stakeholder dialogue not only to promote early tension awareness, but also collective awareness.

### **Managing Evolving Tension Patterns**

Having thus proposed pertinent roles for stakeholders in the materialization of tensions evolving from project management dilemmas, we continue by reflecting on our findings regarding Research Question 2: "How are these tensions addressed by project managers?" Seo et al. (2004) and Barge et al. (2008) propose five ways to manage tensions: selection, separation, integration, transcendence, and connection. *Selection* amounts to project management selecting one pole and rejecting the other; in our case, this gave rise to Tensions 3, 4, and 7. *Separation* recognizes both poles, but separates them and uses each in different circumstances. In our case, Phase 1 shows a conscious top-down approach (inducing Tension 5), while the tasks in Phase 2 necessitated project management to work in a somewhat bottom-up manner. Also, though the majority of departments were to adopt the standard system, at least one unit was allowed to keep its own advanced system for the present (Tension 1). *Integration* combines the duality by compromise or by splitting the difference. Here, for Tension 1, the duality was further managed by communicating the "80/20" (80% standardized and 20% customized) rule of thumb. The study demonstrates how a simple choice, for standardization, would have resulted in the unacceptable loss of important advantages of customization. *Transcendence* manages dualities through transforming them

into a new perspective, or a reformulated whole, in such a way that the original tension no longer exists. The project managers in the studied case transcended Tension 6 about the implementation path dilemma by holding to a Big Bang approach but reducing functionalities for the first release and offering a time extension. This choice also forced project management to balance the dilemma between large and small scope (Tension 2) through separation in time. Finally, *connection* seeks ways to embrace and draw energy from, and give equal voice to, the bipolar positions. This last tension management strategy is not clearly present in our data. However, project managers did express the view that clear-cut choices do not work in this complex, multi-stakeholder environment, suggesting they would be open to a connection strategy as well.

Overall, as far as this case goes, these findings suggest the following: The first two relatively straightforward strategies to manage project dilemmas, in other words, selection and separation, are more readily adopted than the more complex ones. However, in this multi-stakeholder project, a reliance on these strategies induces dual tensions. In contrast, integration and transcendence, strategies adopted somewhat later, helped resolve tensions. This finding is in line with duality theory (Ashforth & Reingen, 2014; Lewis, 2000; Smith & Graetz, 2011).

### **Practical Implications**

First and foremost, the story that evolves from our data pulls away from linear-rational and unitarist perspectives on large technology projects because these fail to encompass the complexity of major implementations in multi-stakeholder settings. Based on our findings, we argue that an ability to identify, appreciate, and accommodate dual tensions in light of the unfolding stakeholder constellation (Barge et al., 2008) is an essential competence for managers of large technology projects. For example,

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standardized and integrated systems implemented in a top-down way compromise departmental know-how and user involvement. Conversely, implementing fully customized and differentiated systems in a bottom-up fashion will not only result in complex and time-consuming processes, but may also hinder future collaborations. The three mechanisms we identified in our study imply that duality management and stakeholder management should go hand in hand. Monitoring stakeholder tensions and the issues stakeholders raise can provide project managers with feedback on their balancing of dualities within a particular context. Further, stakeholder dialogue can contribute to early and collective sense-making of stakeholder tensions and issues, and can help project managers grasp how the underlying “dual tensions” play out in the specific context. Such tension awareness is needed if one is to make trade-offs in accommodating both poles of different project management dilemmas in a contextually sensitive way. Tension awareness in the early project phases may lead to project management strategies that allow a productive interplay among tensions (Seo et al., 2004).

### *Limitations and Future Research*

The context of this research was an EHR implementation in a large hospital. We acknowledge that both our research methodology (Van de Ven & Poole, 2005) and the specific case context limit the generalizability of the findings. Because contextual particularities are likely to preclude deterministic theorizing (Smyth & Morris, 2007), what patterns and mechanisms might still be sufficiently generic to warrant academic study? One suggestion for future research is to focus on other technologies and contexts. We would expect other stakeholder landscapes and other technologies to feature the same dilemmas but in different ways, leading to other tension patterns. The literature (e.g., Cicmil & Hodgson, 2006; Senior & Swailes, 2010) argues that complex multi-stakeholder

projects require a pluralist approach. Thus, we could expect a tension-aware perspective based on duality thinking to also benefit non-technological complex projects. Certainly, in other kinds of projects, the content (“why” and “what”) dilemmas especially will be different, and this warrants further study.

We also focused on a particular phase in the life cycle of a technology project. Other phases may introduce other tension patterns, and future research could investigate the life cycle relatedness of tensions in technology projects. Although we have hinted at possible strategies in tension-aware project management, we have not evaluated their effectiveness against alternative strategies. Based on our findings, an overreliance on selection and separation seems less efficacious in resolving tensions. This is an interesting issue for the research agenda on dualistic project management.

Even though our case study is, by nature, rich, our account does not fully cover the complexity (and its management). For example, we only included medical departments in analyzing differences in stakeholder views. From cross-group analyses, we are confident that we would have similar findings had we categorized respondents by occupational rather than departmental background. Nevertheless, the clustering of beliefs, norms, values, and interests would be different, and therefore, the particularities of the emerging tensions would differ. In fact, this reflects one of the dilemmas that the project managers struggled with in their communications: Do we communicate with employees based on their department or based on their occupational group (e.g., doctors, nurses, paramedics)? Over the course of the project, the balance was sometimes adjusted if tensions arose. Related to the previous point is that in our analysis of the emerging tensions, we did not account for well-known stakeholder attributes, such as salience (Mitchell et al., 1997). How stakeholder attributes influence the emergence of tensions, and project managers’ balancing of

the dualities involved, is an interesting research avenue.

### **Conclusions**

Through this narrative study of a large technology project, we have explored the roles of stakeholders in duality management. Project managers face difficult choices, such as whether to adopt top-down or bottom-up decision making. Duality thinking posits that both ends of such managerial dilemmas need to be accommodated in complex situations. Further, because the required balance depends on a context’s evolving particularities, simple prescriptions are unrealistic. Project managers need to improvise on the basis of surfacing dual tensions. For emerging tensions to serve as feedback, project managers’ tension awareness is important. We found that dual tensions materialize through varied and through opposing stakeholder voices, but also emerge as a result of interrelated choices made on different project management dilemmas. Project managers used different strategies to accommodate the evolving tension patterns. Based on these findings, we propose three roles of stakeholders in raising tension awareness: (1) direct feedback through variance or opposition in stakeholder reactions to project management’s choices on dilemmas, (2) indirect feedback through issues that stakeholders raise about the consequences of interrelated project management choices, and (3) in-depth stakeholder dialogue about the balancing of project management dilemmas. Proactive project stakeholder management can, therefore, help implementation practices that acknowledge, appreciate, and accommodate the tensions originating from dilemmas inherent in large technology projects. In turn, tension awareness can contribute to stakeholder management by informing the dialogue between project managers and stakeholders.

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# Tension Awareness of Stakeholders in Large Technology Projects

## Appendix: Codebook

<b>"What" Tensions</b>		
<b>Tension</b>	<b>Description</b>	<b>Sample Quote</b>
Standardized–Customized (e.g., Soh & Sia, 2005)	Standardized: One single system for all users. Users adapt their processes to the system as much as possible.	<i>"I believe that we do fit in. You should take a look at what the program offers and where things are possible. I think that the so-called impossibilities can be overcome. You should see the benefits of the whole."</i>
	Customized: The system is modified to the various users' needs as much as possible.	<i>"As a department, you could say we were rather critical of the standardized part of the system. In our opinion, this department does not fit the standardized part of the EHR."</i>
Large scope–Small scope	Scope: Describes the range of the system's functionalities, the number of systems that it replaces, and the number of end users involved.	(Large) <i>"Then it became clear that system X and system Y would also need to be in place. So the problem of working with multiple systems would still exist."</i>  (Small) <i>"We should work towards one basic system first."</i>
	High impact–Low impact (e.g., van Offenbeek & Koopman, 1996)	Impact: Refers to how much the new system is expected to change working processes.  (High) <i>"In our case, it really matters in terms of additional workload."</i>  (Low) <i>"In essence, it doesn't affect how we do our work."</i>
Integration– Differentiation (work organization)	Integration: Refers to changing the identity of involved units and the relationships between them, leading to greater unification.	<i>"It is crucial that the system can be used in a multidisciplinary way."</i>
	Differentiation: The involved units remain distinct; there is no increase in homogeneity.	<i>"Well, perhaps it is something to consider, i.e., a distinct system for our department."</i>
<b>"How" Tensions</b>		
Bottom-up–Top-down (e.g., Balogun & Hope Hailey, 2008)	Bottom-up: The responsibility for the project and the change is passed down to the organization that supports the employees so as to be self-generating.	<i>"I would prefer the perspective to be really more from the shop floor. Procedures are okay, but from that point take a look at the work to be done."</i>
	Top-down: The center of the organization initiates the project, determines its direction, and has control over the project and the change.	<i>"First of all, you do not need to have influence over the big aspects . . . when it (the system) is there, we can move on."</i>
Incremental–Big Bang (e.g., Balogun & Hope Hailey, 2008)	Incremental: Implementation takes place over a certain period using a step-by-step approach.	<i>"In my opinion, if you are realistic, then you have to implement it (the system) slowly. A Big Bang is possible, but not very realistic."</i>
	Big Bang: Implementation takes place all at once.	<i>"It depends, if you have a ready-made system, then a Big Bang is the right approach. You should do it all at once."</i>
Differentiated– Integrated (project organization)	Segmentation: This refers to a high (differentiated) or low (integrated) degree of segmentation of the project organization.	<i>"It was really difficult how to catch up with what was discussed in the various meetings."</i>
		A cry for greater integration: <i>"Where is the coherence in all of this?"</i>

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