How Do You Perpetuate IT-Enabled Change When Top Management Participation and Involvement Diminish?

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Abstract

Background: *Research has demonstrated that sustained top management participation and involvement are important for IT-enabled change. However, this is not always possible. How IT-enabled change can succeed when top management participation and involvement diminish is an unsolved, but important research question.*

Method: *We perform a 5-year exploratory longitudinal case study.*

Results: *Our data is presented in two parts. We first present the contextual elements (goals, people, structures/processes, and artifacts) during the two years top management was actively participating and involved. For the three-year period where top management participation and involvement diminished, we present the contextual elements, and middle management's enactment of traditional middle management roles (information broker, mediator, facilitator, change agent) on three kinds of threats to the change (deviations from change vision, emergent issues, involving new stakeholders).*

Conclusions: *We find IT-enabled change can succeed when top management participation and involvement diminish if middle management engages in joint action, i.e., intentional collective activity where members consciously choose to coordinate to achieve a goal. We identify three kinds of joint action: Constraining, where actions of the group limit the ability of individual middle managers to deviate from shared goals, Enabling, whereby a group of middle managers adapt the project to changing circumstances, and Extending, where groups of middle managers engage with others not in their functional areas. Joint action emerges when top management embeds, in the project context, (1) key influential stakeholders who are involved in the change, (2) a common goal, (3) structures and processes that promote collective work, and (4) artifacts inscribed with the common goal and collective work.*

Keywords: IT-Enabled Change, Top Management, Middle Management.

Introduction

One class of high risk, IT-enabled organizational change involves the implementation of enterprise systems (ES) to enable increased integration and standardization across the organization. Such organizational change is often large and complex. Such change is enterprise-wide, and therefore involves large numbers of diverse stakeholders who must cross functional lines. It is complex, as those in charge cannot anticipate all issues and challenges that arise as technology, people, structures and processes interact over time.

It is recognized that top management participation and involvement are critical for successfully completing such major change. Top management participation is, "substantive personal interventions in the management of IT… related to information systems planning, development, and implementation." Top management involvement "is concerned with the psychological state of [the executive], reflecting the degree of importance" placed on the project's successful outcome (Jarvenpaa & Ives, 1991). Top management is needed for boundary spanning (Akkermans & van Helden, 2002; Liang et al., 2007), trust formation (Dixon et al., 2009; Li et al., 2013; Mahajan et al., 2012; Soulsby & Clark, 2012), and organizational restructuring (Orlikowski et al., 1995; Purvis et al., 2001). Furthermore, top management participation and involvement must be sustained throughout the project (Ascari et al., 1995; Kotter, 1996; Kotter & Cohen, 2002; Sarker & Lee, 2003). Generally, when top management participation and involvement decline, change initiatives fail (Robey et al., 2002). Indeed, multiple studies have documented IT-enabled changes that fail due to a lack of top management oversight, or top management turnover (Keil, 1995; Orlikowski, 1993; Robey & Sahay, 1996; Sarker et al., 2006).

While the literature on IT-enabled change leads to the conclusion that sustained top management participation and involvement are needed for IT-enabled change to succeed, the multi-year nature of large-scale IT-enabled change initiatives makes it challenging to sustain top management participation and involvement over time. Top management may turnover or their attention is diverted to other new strategic initiatives. How then might IT-enabled change succeed when top management participation and involvement diminish?

The important role of middle managers is increasingly being recognized (Beer & Nohria, 2000; McCrimmon, 2009; Meyerson, 2001). In large, cross-functional change, it is not possible for top management to do all the work. Middle managers must step in to close the gap. However, work exploring what middle management does to create successful IT-enabled change is scarce, and usually does not consider the situation where top management participation and involvement have diminished significantly. We, therefore, explore the question of "Whether and how IT-enabled change can succeed when middle managers take over after top management participation and involvement diminish?"

Our analysis suggests the answer is joint action among middle managers. Joint action is intentional collective activity where members consciously choose to coordinate to achieve a goal. We argue that middle management can sustain IT-enabled change when they consistently engage in joint action. We identify three kinds of joint action: Constraining, where actions of the group limit the ability of individual middle managers to deviate from shared goals, Enabling, whereby a group of middle managers adapt the project to changing circumstances, and Extending, where groups of middle managers engage with others not in their functional areas.

Joint action can be fostered if top management puts in place four contextual elements in the project prior to their diminished presence and involvement: key influential stakeholders who are involved in the change, a common goal, structures and processes that promote collective work, and artifacts inscribed with the common goal and collective work.

The next section explores literature on top and middle management participation and involvement in IT-enabled change. We describe our methodology and present the successful five-year IT-enabled change initiative where top management involvement diminished after two years due to turnover. Discussion and conclusions follow.

Related Research

It is well recognized that IT-enabled change is difficult and risky. Enterprise system change is particularly difficult, with some reports suggesting that over 50%, and sometimes over 70% of such projects are not successful (Bucy et al., 2016; Ellis & Heneghan, 2016). The literature generally agrees that top management support is a necessary ingredient for successful enterprise-level IT-enabled change (Chong & Tan, 2012; Dong, 2008; Green, 1995; Huy, 2001).

Top Management

Top management support entails not only provision of resources needed for the change initiative, but also enabling psychological commitment (i.e., involvement) to the change vision and participation in the initiative (Dong, 2008; Jarvenpaa & Ives, 1991). Within IS, the critical success factors (CSF) literature also argues that top management involvement and participation are CSFs for change (Bradley, 2008; Holland & Light, 1999; Soja, 2006). Involvement is manifested in such actions as promoting the benefits of a new IT system (Parr & Shanks, 2000), publicly identifying a project as top priority (Nah et al., 2003; Thakurta, 2017), and providing guidance in planning, design, development, and implementation (Bassellier & Pinsonneault, 1998; Sharma & Yetton, 2003; Thong et al., 1996). Participation is enacted through a range of activities such as being on the project's steering committee (Thong et al., 1996), appearing at the project site at least five percent of the time (Grohowski et al., 1990; Willcocks & Sykes, 2000), cutting through red tape (Maidique, 1980), resolving cross-functional disputes (Akkermans & van Helden, 2002), and bridging gaps across functional lines (Chatterjee et al., 2002; Liang et al., 2007).

Studies have also documented that lack of top management participation and involvement are associated with failure of the IT-enabled change initiative (Young & Jordan, 2008). For example, Orlikowski (1993) highlights how a CASE tool implementation at a petroleum company did not succeed, partly because of a lack of senior management buy-in. Sarker et al. (2006) document how turnover in top management and a perception that a project threatened the empires of certain top managers caused an IT project to fail.

Furthermore, top management participation and involvement must be sustained throughout the change life cycle (Ascari et al., 1995; Kotter, 1996). Sarker & Lee (2003) state, "strong and committed leadership at the top management level, at the project management level, and of the IS function must be given significant priority *throughout the life* of an ERP implementation project" (emphasis added). For example, the CONFIG expert system project was abandoned when the top manager pushing for it suffered a heart attack (Keil, 1995).

A key challenge is that project team members may attempt to deviate from the change vision during the course of the change project. Conflicts can arise among members of the project team about their varied interpretations of the change vision (Canato et al., 2013; Currie, 1999; Savaneviciene & Stankeviciute, 2011). Top management must continue to provide leadership and resolve attempts to deviate from the change in a manner that supports the ES implementation and change vision (Tanniru et al., 2018).

Next, challenges from emergent issues and concerns may arise over time. These could be addressed in multiple ways with each solution having different implications on the future of the

project. Top managers must manage these emergent issues in ways that are consistently aligned with the change vision (Yeh & Walter, 2016). The literature argues that when this decision making is delegated to others, large complex projects suffer from paralysis, and eventually fail. Emery (1990) tells a story where top management delegated supervision of the project to a middle manager, who was not enthusiastic about the project. It was difficult to get firm decisions from anyone and, as a result, the project failed.

Finally, as IT-enabled change extends to other groups within the organization, these groups may not be as willing to participate in the project. Top management can address this by providing the hierarchical authority and strategic partnership to link the project team and other organizational stakeholders (Loonam & McDonagh, 2005). Liu et al.'s study (2015) recount a cross-case analysis where in one case, a project team managed to successfully recruit a top manager who in turn got users to test how changes to processes caused by an ERP system would affect them. In the other case, a top manager refused to get involved and, as a result, a newly implemented ERP module caused chaos in organizational processes.

Besides directly managing such project challenges that may crop up over the course of the project, top management may enact actions that affect organizational structures to indirectly shape project team behaviour (Boonstra, 2013) and user behaviour with regards to new systems and processes (Dong et al., 2009; Sharma & Yetton, 2003). Top management could introduce new contextual elements within the project (collective team structures) to guide project members' work so as to successfully implement new systems (Boonstra, 2013). In post-implementation, top management could also change contextual elements by redeploying resources, crafting new policies and guidelines, and changing structures to guide and improve user adoption and system use (Kulkarni et al., 2017; Orlikowski et al., 1995; Sharma & Yetton, 2003). However, such contextual elements do not automatically determine project team members' or users' behaviours. Orlikowki et al. (1995) shows that in order for these contextual elements to become accepted, users and project team members have to continue enacting and reproducing these new structures. This process of legitimizing and accepting structures through ongoing human actors' activities is called reification (Giddens, 1976, 1979, 1984). Yet it is not clear how middle and low level managers will continue to enact these structures after top management are no longer there to support these practices (Sharma & Yetton, 2003; Young & Jordan, 2008).

In sum, we note that while sustained top management participation and involvement are important to project success, it is often impractical for top management to maintain constant focus on a change initiative for a long period of time. Some reasons include: top management participation and involvement are expensive (Butler & Gray, 2006; Swanson & Ramiller, 2004), or good managers are highly mobile and may move to other jobs (Carnahan et al., 2012; Zenger, 1992). In some cases, company policy requires business units to rotate senior managers, so senior managers may only stay for a couple of years with each group. This paper seeks to explore the possible ways in which change would succeed in situations where top management support is high initially, but declines over time.

Middle Management

Extant literature recognizes the importance of middle management in change initiatives (Huy, 2001). This is partly due to middle management's proximity to both top management and the operational teams, which enables them to assist in managing change initiatives (Balogun & Johnson, 2004; Beck & Plowman, 2009). The project champion literature, for example, identifies the technical champion (i.e., middle management) as being as important as top management (Chakrabarti, 1974; Day, 1994; Howell, 2005; Madique, 1980).

Middle management complement top management's role and enable change in several ways. First, they can complement top management by taking an information broker role to share

information within the project team and organization to positively influence their subordinates and peers with regards to change initiatives. Middle managers often have stronger communication networks with particular stakeholders than top management. Recent studies show that because of their direct ties with both functional teams and top management, middle management become a conduit to ensure information about the change project from top management is effectively shared among teams (Leidner & Milovich, 2014; Leidner et al., 2017).

Second, middle management could assist with change initiatives in a mediator role through clan control or peer pressure (Chua et al., 2012; Kirsch, 1996; Kirsch et al., 2010) and socialization (Bicchieri, 2006; Kern & Blois, 2002). Both IS and management studies show that part of middle management's job is to exert social influence to help the rest of the organization buy into change initiatives (Chua et al., 2012; Leidner et al., 2017; Teulier & Rouleau, 2013). This may involve middle management negotiating with the rest of their team concerning aspects of change and helping to rally support from the team for the change initiative (Leidner et al., 2017; Teulier & Rouleau, 2013).

Third, middle management help their teams in a facilitator role to develop a coherent and shared understanding of change. Beyond just sharing knowledge, middle management help change initiatives by building coherent narratives of change to manage the views and understanding of their subordinates. Shared understanding is distinct from mediation as a shared understanding of change is forward looking- it is about a shared vision of what the future will be like and how to get to that future (Kaplan & Orlikowski, 2013; Sandberg & Tsoukas, 2015; Stigliani & Ravasi, 2012). For example, Balogun and Johnson (2005) studied how middle management made sense of and helped other teams to implement change interventions. In some cases, middle management can help influence their teams' divergent interpretations (Balogun & Johnson, 2004, 2005) and emotional responses (Huy, 2002) through formal (hierarchical) and informal interactions. The goal is for middle management to help their teams understand top management's change initiatives and to ensure that everyone has a similar interpretation and view of change.

Finally, middle management serve in a change agent role at their functional level by developing or amending aspects of the local organizational structures that become a precondition for change to take place—e.g., Conway and Monks (2011)) found middle management changed old models of workflows and implemented pilot projects to test change initiatives locally before pushing them to the rest of their functional areas.

One particularly important middle management change agent activity is reification— when new structures created by top management are enacted (Giddens, 1976, 1979, 1984), middle management behave as if the new structures are acceptable. This helps legitimize the change to the middle manager's subordinates (Suchman, 1995). Conversely, when middle managers circumvent these new structures, they signal these structures' illegitimacy (Agócs, 1997; Prasad & Prasad, 2000).

These findings help explicate middle management's role and behaviors in change initiatives when top management participation and involvement are present in the change project. However, they do not provide a good answer for how middle management can sustain an enterprise-level IT-enabled change if and when top management participation and involvement diminish. One, middle management is often associated with functional work (Currie, 1999) and may not have direct contact with employees outside their function. Even if they have informal contacts, these are informal networks and tend to be fragmented and focused on personal rather than work issues (Conway & Monks, 2011). Middle management therefore do not have the organization-wide boundary-spanning structures available to management (Akkermans & van Helden, 2002; Liang et al., 2007). As such, much of middle management's work as information broker, mediator, facilitator, and change agent is limited

to within the boundaries of their subunits. Two, given their limited influence, middle management do not have the formal hierarchical authority to deal with institutional sources of resistance. Three, middle management may not have bought into the change vision before top management involvement wanes (Kothandaraman & Agnihotri, 2012). As such, some middle management actively resist change (Agócs, 1997), while others could be half-hearted about it (Beranek et al., 2014; Kothandaraman & Agnihotri, 2012). Even middle managers who accept and embrace top management's vision may interpret it differently from top management. Each middle manager adapts the vision to his or her specific functional context (Canato et al., 2013; Currie, 1999; Savaneviciene & Stankeviciute, 2011).

Hence, while the literature suggests the possibility of relying on middle management to continue the change, it does not offer strong insights on how middle managers can bridge the gaps when they have so many challenges to deal with. Our research aims to close this gap.

Methodology

Given our focus on change management over time, we performed an exploratory longitudinal case study (Klein & Myers, 1999; Walsham & Sahay, 1999). This allowed us to acquire a deep contextual understanding of the project, and observe how the environment and IT-enabled change initiative influenced each other (Walsham, 1995).

Case Site

Our case site is a revelatory case (Yin, 2003). In our study, a project succeeded, and change occurred despite the obvious diminishment of top management involvement. The specific project we explore is an IT-enabled change initiative in a large logistics firm— Logco. Logco employs over 400,000 employees and has an operating budget of over US$ 8 billion dollars. It focuses on logistics—moving cargo—and has three business units (BU), which we call Sea, Land and Air.

The change initiative spanned five years. Top management was involved for the first two (requirements gathering and implementation in the Sea business unit), and were not involved in the last three years (implementation in the Land and Air business units and corporate HQ). Because the implementation for corporate HQ was headed by Finance, it is called the Finance implementation. See Figure 1 for the project timeline.
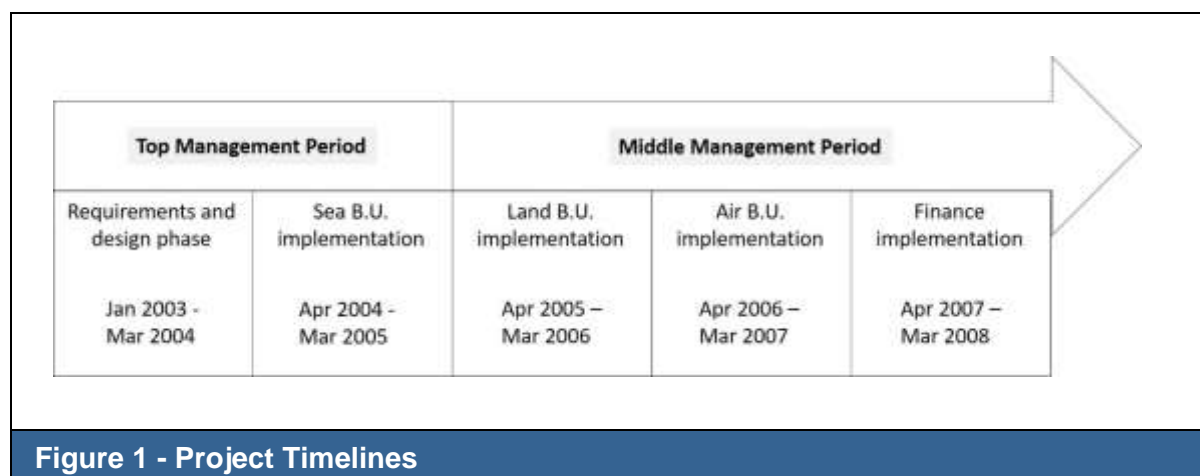

Top Management Period		Middle Management Period		
Requirements and design phase	Sea B.U. implementation	Land B.U. implementation	Air B.U. implementation	Finance implementation
Jan 2003 - Mar 2004	Apr 2004 - Mar 2005	Apr 2005 – Mar 2006	Apr 2006 – Mar 2007	Apr 2007 – Mar 2008

Figure 1 - Project Timelines

Project phases were defined by the project team to align with the company's financial reporting cycle. Each implementation phase had, as its product, a physical IT artifact which had to work, because the IT artifact communicated with external financial reporting systems. If the

implementation was delayed or faulty, the company's financial reports would have material errors. For the purpose of this paper, we simply categorize the project as the top management period, and the middle management period.

Data Collection

We were invited by the IT department to observe the enterprise system-enabled change initiative from the start of requirements gathering, and to develop case reports for internal project management training. Over the five years, consistent with case study best practices, we obtained data from three separate sources (Klein & Myers, 1999; Miles & Huberman, 1994). First, we collected written project documentation including contracts, milestone review presentations and minutes of meetings, and interviews with project participants. Second, we collected interview data. Interview data was collected over the five-year life of the project. Third, we visited the organizational offices and spent days at the worksite copying documents and conducting interviews.

We interviewed top management, middle managers engaged in the change, users and vendor consultants. While top management is generally considered the CEO and the CEO's direct subordinates (Dong, 2008; Green, 1995; Huy, 2001), top management participation and involvement require the top manager to be physically engaged with the project (Dong, 2008; Jarvenpaa & Ives, 1991), such as being present at the project site (Grohowski et al., 1990; Willcocks & Sykes, 2000). There was only one top manager directly involved with the project. Specifically, the VP of Corporate Logistics reported directly to the CEO and was on-site as project champion. The VP Technology Procurement and VPs of the BUs were peripherally involved. We know this, because we had access to meetings of minutes of this project which explicitly stated who was invited, attended and were absent. The Chief Financial Officer, while actively involved, did not report directly to the CEO, but to a VP of Administration, and therefore is not considered top management. Figure 2 presents substantive components of the organizational chart, with the key actors shaded.
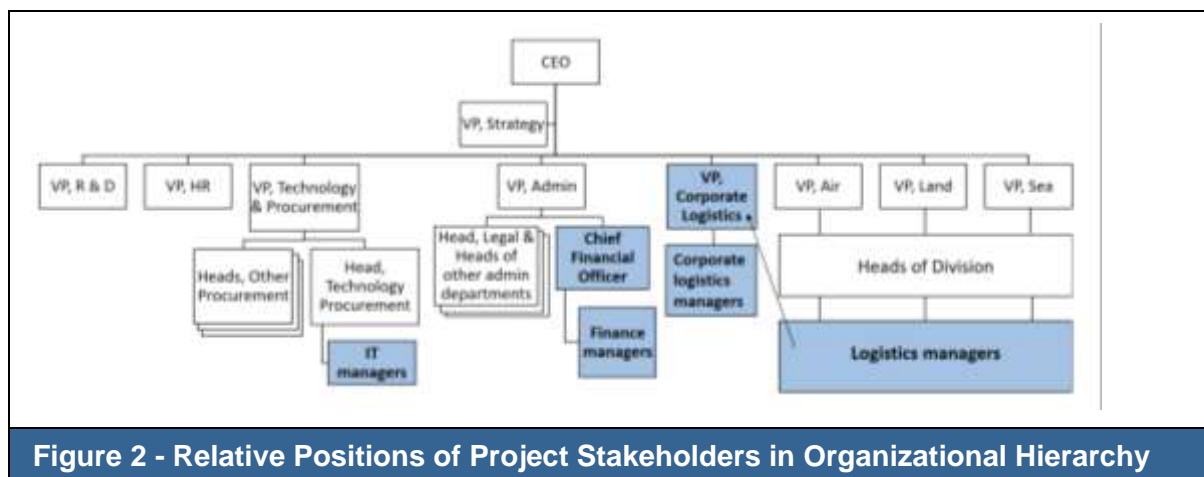

Figure 2 - Relative Positions of Project Stakeholders in Organizational Hierarchy

The three BU VPs reported to the CEO, but in practice, essentially ran their specific operations. Under each VP were various heads of divisions who would run ships, warehouse complexes, airport facilities, etc. Heads of specialty, one of whom was a logistics manager, reported to each head of division. The logistics manager in turn had a small staff of logisticians. Each logistician thus reported through their divisions to the heads of BUs. They also had a dotted line report to the VP of Corporate Logistics.

In addition to top management, we interviewed the middle managers who were actively involved in the project as members of the core team. They included Corporate Logistics managers, IT managers, Finance managers, and the BUs' logistic managers. These were

invested full-time into the project. To better understand how the change initiative was unfolding, we also interviewed users—members of the three business units (Sea, Land, and Air) and administrative divisions (e.g., Legal and other departments) that were not on the core team—and vendor consultants.

We developed an interview protocol where each interviewee was first asked about his or her project role, the tasks they were involved in, and the deliverables they were responsible for. We then asked the interviewee to recount specific experiences in the project, focusing on problems, issues, and steps taken to resolve problems. We followed by asking them about their perceptions of the project. We would ensure that issues which we had noted from our review of recent project documentation were also raised with each interviewee to get different perspectives. Appendix A presents our typical interview question sequence.

Most interviews were at least an hour long. During interviews, at least two, and more commonly, three researchers were on hand to take notes. Interviewers adopted a specialized role strategy (Adler & Adler, 1988). One interviewer was the primary interviewer, who asked the majority of questions. This interviewer took fewer notes, and focused on maintaining eye contact with the interviewee. The other two attempted to take verbatim notes. A tape recorder was not used, as interviewees were more comfortable discussing issues without one. To ensure interview quality was not compromised by fatigue, we restricted ourselves to conducting no more than three interviews per day. The interview notes from all researchers were consolidated and typed within twenty-four hours by a researcher present at the interview. Differences in interview notes were quickly resolved through discussion. Field notes were taken to record our observations (e.g., physical office arrangement, informal notices pasted along hallway) (Miles & Huberman, 1994; Strauss & Corbin, 1990).

We visited the project site once every six weeks. Prior to each visit, we reviewed the most recent project documentation and previous interviews, and identified interviewees and issues we needed to raise. We closed interviews by asking for recommendations for additional interview subjects to supplement our list of interviewees identified from the documentation. Such snowball sampling is typical in exploratory research (Kuzel, 1992). We conducted over a hundred and seventy interviews. Because of the very large number of stakeholders involved, the vast majority of interviewees were interviewed only once. However, senior project leadership (i.e., the person leading each phase, the most senior IT manager involved, and the consultant leading the consultant team) were often interviewed at least twice per phase—once during the early stage of a phase, and once as the phase was completing. Table 1 summarizes the interview breakdown.

Table 1 - Breakdown of Interviews						
	Phases					
Stakeholder	**Requirements and Design**	**Sea**	**Land**	**Air**	**Finance**	**Total**
Core Team – Corporate Logistics managers	7	7	3	4	4	25
Core Team – Corporate IT managers	5	10	5	11	14	45
Core Team – Finance managers	1	1	0	1	9	12
Core Team – BU logistics managers	6	6	5	14	4	35
Userss	0	2	1	2	8	13
Consultants	12	12	3	8	8	43
Grand Total	31	38	17	40	47	173

We have reported on this project site previously (Chua et al., 2012; Chua et al., 2012; Soh et al., 2011; Yeow et al., 2018). Our earlier studies looked at project controls and boundary spanning practices for collaboration whereas this study specifically examines how middle managers sustain change in the absence of top management.

Data Analysis

At the end of each of the five phases shown in Figure 1, a detailed case study of between 50-70 pages long was written. Each case described in detail what happened, key challenges, steps taken to address the challenges, and ongoing issues that would continue into the next phase. The minutes and other project documentation provided information regarding project timelines, key issues discussed at meetings, and decisions and outcomes. The interviews provided different stakeholder perspectives on the challenges and actions taken. Important quotes from interviews and project documents were also included in the case. Each case was read and validated by several key members of the core team. These detailed cases helped us to identify the key challenges, top management and middle management actions that are described in this paper. Where we needed further clarification, we went back to the transcripts of the interviews, and project documentation such as meeting minutes.

For this paper, we reread the detailed case studies, and began our analysis with the project challenges that emerged from the point where top management participation and involvement declined (i.e., the Land BU implementation onwards). Project challenges were the analytical anchors of this study (Miles & Huberman, 1994) as they could potentially derail the change initiative if not adequately addressed. In the absence of top management action, project challenges would have to be addressed by middle managers. When we prepared each case study, the major project challenges were identified by reading through the interviews and noting those that were repeatedly brought up by the middle managers from various stakeholder groups. We cross-validated these challenges in two ways. We reviewed the minutes—project challenges were those that could not be resolved within a single meeting, were raised repeatedly and involved multiple stakeholder groups. We also validated our identification of the major challenges by having members of the project team read and vet the case reports to ensure that the project challenges were accurately captured.

Our analysis of project challenges led us to identify three distinct types of project challenges—consistent with challenges identified in the top management support literature—that are traditionally handled by top management *and* that could have derailed the change initiative. These three types of challenges are (1) change requests that deviated from the change vision, (2) emerging, unanticipated issues, and (3) external parties who were unwilling to participate in the change. We also tracked the outcomes of the project challenges. These were identified from minutes of the meetings and triangulated with interviews. For example, from project documentation and interviews, we were able to determine how many and which of the change requests were acceded to.

Notably, the project continued successfully despite these challenges, which makes this an interesting revelatory case. Project success was triangulated across several indicators. First, multiple interviewees from diverse stakeholder groups said the project was successful. Second, the after action reports that are a routine procedure for projects in this organization were positive, and detailed benefits and new capabilities the BUs received from the project. For example, the Sea BU report detailed how they were now able to accurately calculate trade-offs between fuel consumption and the number of knots a ship sailed. The Land and Air BU report detailed how the system enabled the transfer of vehicle maintenance responsibilities across BUs while preserving ownership of vehicles. Third, both internal newsletters and articles in the trade press featured the implementation positively. Finally, the financial reports generated by the system fed directly to a government reporting IT system. If there was a failure,

the blowout would have been featured in the trade press, and there were no such negative reports.

Once we identified project challenges and outcomes, we sought to articulate why, in this case, the change was able to continue successfully despite the challenges, and diminished top management participation and involvement. Initially, we focused on the "who, what, when, where, why and how" for each challenge and that helped to set the foundation for data analysis. From this step of our analysis, we surfaced various project *contextual elements* (people, structure and processes, goals) put in place by top management that directly influenced the way middle managers interacted with each other, which in turn influenced resolution outcomes. For example, processes such as having the BU middle management sign off on the enterprise system design, and BUs having to pay for customization if they could not get other BUs to agree to their proposed changes, influenced middle managers' way of addressing change requests. It also became clear to us that artifacts were particularly salient in our IT-enabled change context and we coded that as part of contextual elements. In this study, we found that the design documents, implementation budgets, and the ES itself were important influencers of resolution of challenges and were likewise impacted by structures and processes. For example, the implemented enterprise system shaped how change requests were resolved, while the change requests in turn influenced the enterprise system and associated organization processes and structures.

We then iterated with extant literature and noted the interlocking nature of these contextual elements as well as the process by which they became legitimate or "reified" (Giddens, 1976, 1979, 1984). Reification, as noted in the literature, is linked to ongoing interactions among social actors. This led us to re-focus on the interactions among the middle managers as they resolved the project issues. Drawing on our extensive longitudinal interview, archival, and observation data, we were able to understand the various stakeholders' positions and trace the back and forth interactions among the middle managers. We coded middle management actions based on the four types of *roles* identified in the literature—information broker, mediator, facilitator and change agent. We coded middle management actions that help one or more stakeholder groups obtain information they did not previously have as performing the "information broker" role. Such knowledge could have been initially produced elsewhere in the project, or could have been created via discussions. An action was coded as of the "mediator" role if the intent of an interaction between middle managers involved someone having to give

something up (e.g., a negotiation). We coded actions as of the "facilitator" role if the objective of the middle manager action was to build consensus. Finally, "change agent" was a role that resulted in the creation of new artifacts or structures in the project.

After coding these four types of middle management roles, we observed that while each helped reproduce the contextual elements, they did not explain how middle managers resolved project issues by themselves. We iterated our analysis on the project issues and reflected on how the four different middle management roles dealt with the project issues together. From this second-order thematic analysis, we surfaced the key notion of middle management "joint action" that characterized how the stakeholders worked to resolve project issues. We coded three types of joint actions—constraining, enabling, and extending—that we discuss in detail below. The coding protocols are summarized in Table 2 below.

Table 2 - Coding Protocols	
Code	**Identified By**
Project Challenges	
Deviation from change vision	One group within the project team wants to do something opposed to cooperation.
Emerging challenges	Events and problems not anticipated by the project team of a technical nature.
External parties	Challenge arises as a result of groups not within the project team.
Outcomes	
Positive/Negative	Use of positive or negative words to describe effects of the system post go-live
Contextual Elements	
Goals	Explicitly documented during project launch
People	Explicitly identified on project organization chart
Artifacts	Documented as deliverables on contract and minutes of meetings
Structures/Processes	Formal structures and processes are documented in the contract and minutes of meetings
Middle Manager Roles	
Information Broker	Action that leads to someone receiving new information
Mediator	Action that leads to someone agrees to give something up
Facilitator	Action that leads to at least two parties achieving an agreement
Change Agent	Action that leads to documented change in the artifact, structures or processes
Middle Manager Joint Action	
Constraining	Set of middle manager actions that collectively result in project team resolving the challenge of deviating from the change vision
Enabling	Set of middle manager actions that collectively result in project team coordinating their actions to address emerging issues in line with the shared vision
Extending	Set of middle manager actions that collectively result in project team working around stakeholders and groups beyond their normal organizational reach

Findings

The major change initiative we examined was the standardization and integration of business processes across previously autonomous BUs through the implementation of an enterprise system across a large logistics firm. The decision on logistics integration and standardization was made by the CEO, and VP Corporate Logistics was a strong supporter of this. The VPs of the three BUs, somewhat reluctantly accepted the rationale for the need to be integrated as a result of cost and competitiveness. However, given the three BUs had traditionally operated quite independently of each other, the BU middle managers were slow to accept the new direction for change.

The VP, Corporate Logistics from the top management team led the change initiative, with the help of managers from Corporate Logistics, IT, Finance and the BUs.

> *… a change in the way [Organization] was organised: Previously, we were organised by [BUs]. Now the idea is to integrate [Organization]* (Corporate Logistics)

Each BU had distinct processes and information systems, including three separate enterprise systems. The vision was to integrate across BUs and functions, which required replacing over 60 existing systems with one massive enterprise system. That enterprise system would have a single common database, with three separate versions of the enterprise application running on the common database.

To enable integration across BUs, the target was to have 60% common processes across the three versions of the application. This necessitated major changes to the BUs' business processes. The common code base across the three enterprise system instances would also be easier to maintain. Below are excerpts from meeting minutes during the project conceptualization showing the organization's intent:

> *Start from strategic intent of harmonizing and commonality to save costs in the long run… standardized processes are completely identical except for approval workflows… goal is 60% common, not harmonized… intent of project is that 60% of processes were available in the [common structure] and only 40% to be built locally for each [BU].* (excerpts from various minutes from 16 Dec 2002 to 06 May 2003)

The enterprise system would cover three principal areas: supply chain management, engineering management, and financial control. Supply chain management dealt with procurement, allocation of resources to business units and consumption thereof. Engineering management tracked the serviceability of the logistics equipment (such as whether airplane engines and car radios were operable), and their location (e.g., whether the equipment was in an organizational depot or sent to a third-party contractor for repair). Financial control related principally to the management of logistics-related costs and expenditure.

The changes would be extensive, not only in terms of the IT, but also because the goal was to standardize the business units' business processes. For example, a warehouse that stored parts for ships would have the same processes as one that stored medical supplies. Ship and Land vehicle engines (which undergo routine inspection every few months) would be maintained using the same process as aircraft engines (which undergo inspection before and after every flight). BU managers were unhappy with the proposed changes:

> *Instead of simple harmonisation, they want to do standardisation. This is overkill! We only need to do so if the benefits exist* (Sea BU manager when the vision was first announced)

This was the very first time in this organization that they implemented an administrative change project, much less an IT system, of this scale across all three BUs. It was therefore the first time the BUs had to work together to realize an IT system.

> *ES is the first time all 3 [BUs] are working together. It is the first integrated project across all areas.* (VP Corporate Logistics)

The project had a substantial number of stakeholders, and the project organizational structure changed across the two periods. Table 3 summarizes the organizational structure and changes and highlights how top management involvement diminished.

Table 3 - Project Organizational Structure Across Project Phases		
Structure	**Top Management Driving Change Period**	**Middle Management Period**
Top Manager	N=1 • Ensured BU Managers represented at all decision making forums • Helped identify non-project BU managers to be kingpins • Signalled commitment to change vision • Assigned accountability for scenario design to specific BU managers • Required scenarios to be signed off by all BUs • Incentivized BU managers to negotiate and converge through "blue/pink" rule for funding • Created escalation process when agreement could not be reached • Tore down physical walls so core team could sit together and work • Got middle managers to respect the design document and budget	N=1 • Attends monthly meeting • Approves annual project budget (no changes made to budget) • Does not mediate cross-functional disputes or negotiate with external stakeholders
Deputy Top Manager	N=1	Position disestablished
Steering Committee	N=18 Comprised top manager, deputy top manager and managers from BUs, admin, technology & procurement.	N=18 Refocused on maintenance of components of enterprise system that have gone live.
Core Team		
Project Management Team	N=7 Exclusively people from technology procurement department. Primarily administrative- they update the network diagrams, Gantt charts, etc.	N=6 Now comprises senior BU managers, the admin, technology and procurement managers. Issues that used to be at the steering committee level are now addressed here
Change Management Team	N=16 Coordinate change management activities. Representation across BUs, admin, technology & procurement	N=15 Same purpose
BU Managers	N=8 Coordinate subject matter experts and training	N=10 Same purpose
Finance	N=29 Develop specifications for financial module. Representation across BUs, admin, technology & procurement	N=30 Same purpose
Engineering & Maintenance	N=41 Develop specifications for engineering & maintenance module. Representation across BUs, admin, technology & procurement	N=40 Same purpose
Supply Management	N=39 Develop specifications for supply management module. Representation across BUs, admin, technology & procurement	N=40 Same purpose
Technology, Cross-Application & QA	N=14 Vendor consultants	N=15 Same purpose

In the next section, we describe the top management period, in particular what they did with regard to people, goals, structures and processes, and artifacts, in order to influence middle managers to adopt a shared vision and to jointly work with each other.

Top Management Driving Change

The first two years of the change initiative were driven by VP, Corporate Logistics. These involved the requirements gathering and design phase and the implementation of the enterprise system in the Sea BU. At the time, this was one of the largest ERP implementations ever conducted. Top management (VP Corporate Logistics) chaired the Steering Committee that oversaw those directly involved in the project—in practitioner project management parlance, the "core team" (Kähkönena et al., 2013). The core team comprised over one hundred people[1].

The first few months of the project did not go smoothly, as each BU attempted to maintain its own interests at the expense of other BUs. The vendor noted:

> *If you satisfy any one* [BU]*'s requirements, there are problems with the other* [BU]*s.*

To resolve disagreements and get the BUs to work with each other, VP Corporate Logistics instituted various contextual elements for the project, which we have categorized as people, goals, structures and processes, and artifacts.

People: VP Corporate Logistics recognized very early on there would be disagreements across the BUs. He therefore made the critical decision that all BUs were represented across the major forums and groups, by managers who were influential within their BUs.

> *The core user groups are from every [BU], full time seconded to the project, as well as a [senior manager] for each [BU]... [BU]s realize that the system is here to stay, and it is better for them to get involved up front and influence it. Also, it is funny that across [BUs], when one found out that another [BU] had a [management position] representing them, the first [BU] also upped their representative.* (IT manager)

That all BUs had representation at all decision-making committees meant, for example, that even though the first implementation focused on the Sea BU, the other BUs were present. This was important for the design of the common processes and data—the other BUs were able to raise concerns regarding design decisions that impacted them.

The other important "people" decision top management made was the creation of the role of "kingpin" to manage user resistance during implementation. A kingpin was a junior manager in charge of a small group of users. Kingpins were recruited across the BUs and rigorously trained so they understood what the system was going to do, and what the changes to the organization were going to be. Because the project team had a large number of kingpins managing every small set of users, user concerns could be quickly identified and managed before they manifested as active resistance. Partly as a result of this level of detailed planning, user resistance across the project was minimal.

> *At least all kingpins have to be "good".… We conducted last minute training to beef up their knowledge and awareness. We provided a quick reference guide to the kingpins. For users – we pay them [vendor] by outcome. People must be ready to use the system.*

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[1] The core team does not include the people performing data entry, subject matter experts who were brought in on a per-consultation basis, users who were trained for or performed testing, kingpins (discussed later), or literally the hundreds of people who engaged with the project peripherally.

We compiled the percentage of trained users vs. licensed holders. At least 80 to 85% are ready or trained to use the system… After go-live we will have continuous training for the [managers]. We made a stand – if you are not trained, your license will not be turned on. (Corporate Logistics manager)

Goals: The BU representation however was not in itself, sufficient. Core team members were unable to converge on common design, and the project was significantly behind on deliverables in the first six months.

[BUs] were mutually suspicious and so no-one listened to anyone else… disagreements on basically everything. (Sea BU Logistics manager)

VP Corporate Logistics, his deputy, and the project manager (a middle manager from the IT department) stepped up actions that signalled their commitment to standardization. They met with core team members to impress on them the need to pull together to achieve standardization.

He [VP Corporate Logistics] said, if we sink, we all sink together. (Deputy Head Logistics)

They led by example, putting in long hours, and not taking leave. All long leave for the core team (except on compassionate grounds) was denied until the design blueprints were developed. VP Corporate Logistics became very hands on and was at the project site frequently (three times a week) to make sure everyone was aligned.

…therefore, I had to step in and change things… The lessons I learned were that senior leadership must direct the project from start to finish. (VP Corporate Logistics)

Top management's visible actions impressed core team members of his commitment to the change vision. Other people we interviewed agreed that VP Corporate Logistics was engaged and focused on ensuring the project was successful.

[VP Corporate Logistics is] very solid, strategic, focused… [He] saw problems, but never flipped. [He is] very supportive. [He] has taken all my other duties away, and asked me to focus on ES… (Corporate Logistics manager)

Structures and Processes: To further address the initial inability of BU representatives to work together, the VP, Corporate Logistics, changed the design process so that specific business scenarios were assigned to pairs of core team members (scenario owners), comprising a BU representative and a consultant. Each pair was responsible for getting inputs from the other BU representatives and negotiating for agreement on the scenario design. The process further required all BUs to sign off on every scenario designed. Each BU representative now had clear accountability for a scenario. The requirement that the other BUs had to sign off on the scenario design also provided some incentive for the BU representatives to exercise some give and take—representative A was more likely to work on getting his BU to sign off on B's scenario, knowing that he would need B's help to get B's BU to sign off on his scenario.

To further incentivize the BUs to converge on a common design, top management mandated that if two BUs agreed on a process, development would come from Corporate Logistics' budget (a blue box in the design document). Otherwise, it would come from the BU budget (a pink box).

> *People were initially unwilling to change their processes to benefit another [BU]. In such situations, [corporate] asked them to choose. If two [BUs] agree, then it's a blue box and the other [BU] will be a pink box.… Now there's greater readiness to let go of their less critical requirements. (Air BU Logistics manager)*

Top management also supported the hiring of building contractors to tear down walls and housing everyone in one big room so that team members would not stay in their office "silos."

Finally, VP Corporate Logistics created a dispute resolution process, in the event that the above joint design processes failed. When disputes arose, issues were escalated upwards towards unbiased arbiters. While he was around, VP Corporate Logistics served as the final source of decisions. In the text below, the executive owners were VP Corporate Logistics and the individuals in charge of the Finance, Engineering, and Supply Tracks, and the Technical-in-charge (vendor).

> *Executive owners are final decision makers. If scenario owners [the project term for a use case] can't decide, then it's escalated up… [VP Corporate Logistics] comes in about 3 mornings a week nowadays. Having executive owners has helped substantially to push things, and get things going.* (IT manager)

Artifacts: The result of the joint decision making among the BU managers resulted in a design document. VP Corporate Logistics got everyone on the project team to recognize the sanctity of the design document. Because of the processes and structures described above, to produce the design document, the BUs had to horse trade, where one BU sacrificed requirements in one area to obtain buy-in in others. The design document thus represented a complex set of negotiations the BUs had made with each other to achieve standardized business processes.

With regard to budget, while VP Corporate Logistics was present, there were continuous requests for an increased budget. Invariably, he refused all such requests. Eventually, people stopped asking. "Leadership group" in the quote refers to VP Corporate Logistics, the heads of the finance, engineering, and supply management tracks, and the vendor lead.

> *Things I am looking out for: ES delivers its stated benefits on schedule and within budget… [leadership group] stepped in to emphasise the priority is placed on budget and timing.* (VP Corporate Logistics)

Because of these actions, a mindset had developed among the project team members that altering the design document and budget were decisions of last resort.

Transitioning to Middle Management Driving Change

VP Corporate Logistics, and the senior project leaders that drove the change initiative left the organization at the start of the Land BU implementation, creating a leadership vacuum. VP Corporate Logistics left to become the CEO of another major logistics firm. The Corporate Logistics Deputy Head and one IT Deputy Head, who both provided significant project leadership were headhunted into two different vendor organizations. A new VP Corporate Logistics and senior IT individual filled those vacancies. The Deputy Head of Corporate Logistics role was removed.

Although the new VP Corporate Logistics had moved over from the Land BU to take up this top management position, he took a back seat in the integration project, as he had never been convinced about the project. He had gone on record earlier as being opposed to the project.

> *[Logco] was willing to change the organisation to fit the system, never mind what it needed… This began as a standardisation project. If it was taken as something else, for example, change management, then I might have taken a different tone* (New VP Corporate Logistics)

He performed the administrative elements of his role like approving the budget, and attended the highest level meetings, but did not take an active role in decision making, nor did he intervene to address problems that arose. The new VP Corporate Logistics' minimal participation and involvement were noted by the project team:

> *There's a lot of scale down. Senior management was involved during [initial requirements] and [Sea implementation]. Everyone put up a good show. The interaction was more intense. There were more social events… Here it's scaled down. The push is not there.* (Vendor manager)

Indeed, the project team felt that having a top manager around would have greatly simplified addressing some problems they encountered.

> *It's sometimes difficult at our level to drive certain things across. You need [top] management to help to drive* (IT manager).

This was especially worrisome, given that the implementation was less than half completed. Substantial additional work remained. For example, one element of the Land BU implementation involved 420,000 master data records and a total of over 17 million records.

> *In terms of single data, 420,000. Each [of these] data [elements] is master data with many fields. During DM1 [the second round of data migration], the number of records that go through is 17 million.* (Land BU logistics manager)

The implementation for the Air BU was essentially triple the size.

> *For [Air BU], there's 50 to 75 million records* (Vendor)

At this point, while top management participation and involvement had diminished, key contextual elements previously established by top management remained intact. Stakeholders continued to be represented at all decision making forums (People); the core team continued to embrace the change vision (Goals); any changes to the design would have to be signed off by all stakeholder groups, Corporate would only pay for customization if the majority voted for it, and issues that could not be resolved through negotiation would be escalated upwards (Structures and Processes); and the design and budget documents were respected (Artifacts).

Nonetheless, some adjustments had to be made given that top management involvement was now greatly diminished. To fill the leadership vacuum, a logistics manager from Land BU stepped up to lead the project team and drive the implementation of the Land BU system. That the stakeholder most affected would lead the project became part of the project culture, carrying on in the Air BU and later, the Finance implementation.

The steering committee meetings refocused their attention on coordinating between the maintenance and support team,[2] who were supporting the existing ES Sea system and new development. Major project decisions were moved to the project management team level. As Table 3 demonstrates, the project management team originally comprised only members of the IT group and focused on administrative elements of project management (e.g., updating

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[2] Like many organizational project structures, maintenance and support is not considered part of the project. The maintenance and support team are the IT team responsible for managing all the organization's IT systems.

Gantt and network diagrams to reflect current status). By the Land BU implementation, the project management team comprised senior middle managers from all the BUs, Corporate Logistics, Finance and IT. Middle management actions are described and summarized in the following three sections.

Attempts to Deviate from the Change Vision

A critical challenge that arose after top management stepped back was attempts to deviate from the change vision. During the Land BU's implementation, each BU, especially the Land BU sought to impose their own particular vision, specific to their needs, for the enterprise system project—recall standardization was the vision, and so sole-BU-initiated changes were contrary to the vision. During this period, 38 new use cases were raised, the majority of which were Land BU specific. Note that while 38 appears to be a small number, each of these represents an entire use case, and the costing of each one can be hundreds of man-days. For specialized ES projects, each man-day costs over a thousand dollars.

Below is one example of such a dispute. The Land BU wanted to implement a business process in a particular (simple) way, but the Air BU insisted this simple way of doing things would not work for them.

> *[Land BU] only has 4 accounts and deal directly with [named logistics organization]. Ours [Air BU] have to be 2-step. In [our] setup, we have many units but they are supported by one retail outlet [RO]. They have to go to the RO who fire out the indent, if the source is [named logistics organization] …. When we configure, we need to configure 2 modes and we would not allow the [type of] users to fire directly to [named logistics organization].* (Air BU logistics manager).

When Land BU put up its change requests, the IT and Finance managers on the project team, tasked with tracking the budget, flagged that the change requests were far in excess of the budget allocated for customization.

> *[Land BU] exhausted and busted their buckets (about 500 man-days) and engaged in additional negotiation to have another 65 [man-days], of which they also exhausted* (IT manager)

While some leeway was given in terms of a little additional budget, in the main, the mindset where budget and design documents were respected held. Land BU did not dispute the budget constraints, and accepted that the list of requests had to be agreed to by the other BUs' managers, in keeping with the mindset and processes of majority consensus. The Land BU managers had to explain to the other BU managers their change requests. The other BU managers were not keen on the changes, as they were concerned about the impact on their systems.

> *Additional requirements from [Land BU] … that may impact [Sea BU] must be managed accordingly and agreed between parties before inclusion into the production environment.* (Minutes of meeting 16 Jun 2005)

After many rounds of negotiation and voting among the middle managers across the BUs, the BU middle managers converged on a set of changes.

The mediated outcome of these negotiations was that of the 38 new use cases requested during the Land BU implementation, only five were approved, of which only two were Land BU specific.

> *On [new requirements] status. There are 5 critical [new requirements] to be implemented… 33 additional [new requirements] will be prioritized if adopted by more [BUs].* (Minutes of meeting 1 Sep 2005)

These changes agreed to by the BU managers did not affect the core of the system but were more "surface" in nature. For example, Land BU wanted to build a more user-friendly, graphical interface intended to mimic screens their users had previously used. Thus, users would work on the enterprise system, but face screens they were "comfortable" with. This was particularly important for Land BU, because their users had high turnover and were relatively unskilled (compared to Sea and Air BUs).

> *[We] developed the MMI [Man-machine interface]. It's a separate program that is [enterprise system] compliant. They click on icons, and it will allow them to do all they need to. We wanted users to have minimal learning… [to] minimize differences between [enterprise system] and old system.* (Land BU logistics manager)

The interface was approved because (1) it required minimal modification of the enterprise system application—the interface was a layer on top of the application, (2) it did not affect other BUs' operation—they continued using the regular enterprise system interface and (3) it was felt that the interface would reduce resistance to enterprise system adoption among Land BU users. However, the user interface was a non-trivial implementation—the two approved Land BU change requests were estimated as costing almost 600 man-days' worth of effort.

Interestingly, as the middle managers began to negotiate among themselves during the Land BU implementation, they recognized that the previous escalation path to top management would not work as well because the top manager was now less engaged in the change initiative. However, escalating to the person leading the BU implementation was also problematic as that person was from Land BU and would naturally favour his or her BU over the others.

> *In [Sea BU implementation]– [Corporate Logistics is] your project manager to help you get a good deal. In [Land BU implementation] – [Land BU] has swung to the other extreme. They talk directly to [vendor].* (Corporate Logistics manager)

The other BUs sought to retain their rights and privileges in decision-making. This issue was resolved by middle managers keeping the process of escalation but changing the escalation path. Based on their collective experience of the design and Sea BU implementation phases, they identified three broad categories of decisions that often needed escalation and created three committees. Going forward, instead of the project manager making decisions when there were potential conflicts of interest, escalated decisions were adjudicated by committees staffed by representatives of the BUs. They created new governance committees to manage these escalated decisions.

> *So we established [committee name] for the operational level working body. There are three control boards: (1) Business process (BPB) – any conflicting requirement are to be arbitrated by the BPB. (2) System Resources and Scheduling (SRS)– there's global competition for resources and hardware and people, and scheduling of go-live. The SRS helps so that people don't compete for the same window as you move into regression testing… and (3) Technical Solutions. This is staffed by solution owners and consultants. There tend to be conflicts of opinions with respect to professional solutioning. The TS board arbitrates to be fair.* (Vendor Consultant)

Table 4 below summarizes how middle management helped constrain deviations from the change vision, and the contextual elements that influenced how middle managers acted. The goal of a common standardized enterprise system (one of the contextual elements) was the same for all the instances below and hence is not repeated.

MM Roles	Instances	Contextual Elements
Information broker	Finance and IT monitor change requests against budget and flag deviations – they share information of how change requests are affecting the budget	Finance and IT representation (people), budget (artifact), common meetings (structure)
Mediator	Brokered change across three BUs so only a handful were allowed because they are noncore – decisions were made via consensus	BU representation (people), change documents (artifact), common consensus and voting-based decisions (structure)
Facilitator	Disputes are managed through persuasion, negotiating, voting, and converging – all are guided by the shared vision of a common enterprise system	BU representation (people), change documents (artifact), common consensus and voting-based decisions (structure)
Change Agent	New committees created to decide on escalated issues.	BU representation (people), escalation path (structure), new committee (new structure), common consensus and voting-based decisions (structure)

Table 4 - How Middle Management Constrained Deviation from Change Vision

Emerging Issues Common to BUs

The second type of challenge is major emergent issues that may undermine the change. This differs from the BU-specific attempts to deviate from the change vision described in the above section. Rather, major emergent issues are common to all the BUs. How they are resolved can affect the trajectory of the change. In this study, the middle managers realized by the end of the Sea BU implementation that:

> *[Sea implementation] had problems with data, interface quality[3] and authorization.* (vendor)

We describe in detail the issue of authorization, to illustrate the approach taken by middle managers to deal with this category of challenge. System access security configuration (within the project, called authorization) emerged as a significant problem during the Sea implementation. This had not been resolved when top management left and had consumed a significant portion of budget and time during the Sea implementation. The previous security configuration mapped permissions in the enterprise system directly to users. Each BU had its own list of users with unique permissions. In this organization, user accounts tended to be linked to real world positions. So, people would log in with an account like "Manager of division X" rather than with a login linked to their personal name. When they moved to a new position, they gave up their old account, and took up the new one. Each account was given permissions specific to itself. Because there were so many accounts (over 12,000), with so many possible permutations, creating new accounts (i.e., authorization) had been an administrative bottleneck in the Sea BU implementation.

> *Authorisation should have started earlier... It is very time consuming and in the end, I had to use temporary staff to key in authorization.* (Sea BU logistics manager)

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[3] Note that interface quality here refers to XML-based interfaces to other organizations, and not to the user interface described in the previous section.

It was widely recognized that the existing authorization system was unworkable. Because permission setting was so complicated, accounts were being created with permissions set to "*.*" to allow everything. The security department of the organization was not happy with this, to the extent that they threatened to close the system down.

> *Authorisation caused 50% of the problems [in the implementation for Sea BU]. They were caught late… It was tail-end work and it wasn't driven right. All parties are at fault... A lot of *.* values were given. We need a lot of time to fix the values manually. There are 23,000 values in authorisation.[4] There are missing objects.* (Vendor)

Managers across BUs sought a simplified security configuration. Their discussions with consultants surfaced a different approach, where each user account would map to two kinds of roles—a job, and an organization role, which in turn would be granted permissions. The managers from the three BUs explored what would be needed to adopt the proposal. For this to work, the BUs had to co-define job roles, in effect accepting that accounts in the system across the BUs would perform similar tasks. They would have to collectively define standardized job roles for about 600 job roles.

While this promised to alleviate the effort required for the Land and Air BU implementations, it would require Sea BU to rework its already implemented system's security configuration. Given the project mindset where existing design and implementation was respected, they could not proceed without Sea BU's agreement. While the Sea BU had to invest time and effort in redesigning the job roles together with the other BUs, they also realized their current complex authorization system was difficult to maintain in the long run. Discussion over these new tasks therefore proceeded fairly smoothly. All BUs recognized that the existing authorization structure was not working. Also, they continued to uphold the standardization goal and were used to the governance structures and processes that supported it. The BU managers therefore worked to converge on a new authorization structure.

Table 5 below summarizes how middle management and the contextual elements worked together to direct the project in the direction of the change vision.

Table 5 - How Middle Management Enabled Project to Align with Change Vision		
MM Roles	**Instances**	**Contextual Elements**
Information broker	Disseminate alternative approaches to authorization	BU representation (people), authorization approaches (artifact), meetings (structure)
Mediator	Sea BU has to redo existing structure. Middle management negotiates the change between Sea and other BUs	BU representation (people), common consensus and voting (structure), Sea BU system (artifact)
Facilitator	Codefine authorization roles. Middle managers share a vision of what the common roles will be.	BU representation (people), common consensus and voting (structure), new authorization roles (new artifact)
Change Agent	Created new authorization structure	BU representation (people), common consensus and voting (structure), revised authorization design (new artifact)

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[4] Note this is for the Sea BU implementation alone.

Involving parties outside the Project Team

A third type of challenge is when the change needs to be extended to additional stakeholder groups who were not present when top management was involved. This is challenging, as extant literature informs us that it is top management's job to enrol new users into the project. In this study, by the end of the fourth project year, the system had been successfully implemented for all BUs, but not yet in the corporate headquarters. The implementation in corporate headquarters differed from other implementations in that most departments in corporate headquarters (other than Logistics, Finance and IT) had not been involved in the design or implementation of the project until this point—the project focus had been on implementation in the BUs. They were therefore not involved in and were not familiar with the contextual elements of the change project.

The work processes in corporate headquarters were very different from the BUs, and indeed from each other. For example, one headquarters unit had a media-facing role, while another focused on R&D. Unlike the BUs, the orientation of these departments did not focus on moving product from one location to another. Nonetheless, these 19 departments needed to be included in the change initiative to provide a complete picture of the organization's financial control and supply chain management.

The middle managers initially proceeded with these 19 corporate departments as they had with the other implementations. They invited representatives from the 19 departments to the various meetings. However, this did not work well. In these 19 departments, the finance and supply chain management duties were performed as a "secondary appointment" by someone who did not necessarily have a background in those areas. Doing these jobs well did not result in any form of reward. As a result, when it came time to implement the system in corporate headquarters, there was poor motivation on the part of the 19 departments' representatives to participate. Many department representatives failed to attend requirements meetings.

> *The [nominated users] are nominated, but they're not full time. For most, this is a secondary appointment. We initially planned sitting space for them but no one came. User participation is a risk.* (IT manager

Representatives who attended meetings often did not come prepared.

> *[IT Manager] and [IT Manager] highlighted that the many [nominated representatives] did not come prepared for the [requirements] sessions with the "As-Is" processes. [Finance manager] wanted the [nominated representatives] to be reminded of the preparation work.* (Minutes of meeting 26 April 2007)

The Finance, IT and BU middle managers found they could not rely on existing contextual elements that had been developed earlier to influence these 19 corporate departments. Managers of these new departments were not part of the project team and did not embrace the goals of the enterprise change vision, nor the various governance structures and processes. There was a very real risk that the change initiative would fail with the 19 HQ departments, as it was a struggle to even get clear requirements from them.

> *The user base comes from various departments, and it's difficult to get concurrence for specific issues. The user base is not focused. It spans across [different departments], and they take care of their own interests. No doubt we have sessions to confirm design, but there are differing views and the solution is not finalized, because the interests differ.* (IT manager)

Because the project team had only middle managers, they lacked the boundary spanning ability to convince users from the new departments to participate. As a result, discussions with middle managers from these external departments were not yielding results. Table 6a summarizes the initial failure to extend change to these other groups.

Table 6a - Failure to Extend the Change to Other Groups		
MM Roles	**Instances**	**Contextual Elements**
Information broker	Asked departments to provide "As-Is" processes, but these were not done.	The corporate departments did not buy into the contextual elements. The usual instances of middle management behaviours therefore did not work.
Mediator	Wanted departments to streamline business processes, but interests differed and the negotiations to develop common processes was unsuccessful.	
Facilitator	Wanted to bring departments together to discuss enterprise system vision, but people did not show up.	

An unusual solution was adopted to address the lack of user participation. The Finance and BU managers offered these departments a proposal to restructure finance and procurement roles. Departmental finance and procurement functions were pooled under Finance and the individuals in the departments dropped their secondary appointments. This meant a reduction of job scope at the same pay. A small number of departmental staff (principally accountants supportive of the change) were then moved to Finance or Corporate Logistics. There were no job losses.

> *Each [department] is still accountable for result utilization. It's just the work is done centrally.... Previously 5 people do procurement. Now we eliminate four [secondary roles] and one person we bring into [Finance].* (Finance)

The departments agreed to the restructuring, especially since their staff would be relieved of an onerous secondary appointment. In short, tensions between the middle managers in the change initiative project team and the other organizational groups were resolved by a trade—Finance would do most of the financial work in exchange for better accounting quality and tighter control over procurement. Table 6b below summarizes how middle management together helped to extend the change to new stakeholder groups.

Table 6b - How Middle Management Extended the Change to Other Groups		
MM Roles	**Instances**	**Contextual Elements**
Information broker	Learned from their failure that the key driving factor underlying the malaise was the secondary appointment issue. This and the solution to reorganize was communicated across the project team.	The middle management behaviors were to have the corporate departments relinquish control of the Finance tasks (structure), and to move some Corporate staff (people) into Finance. This brought the necessary actors within the boundaries within which the contextual elements operated.
Mediator	Negotiations for departments to give up their secondary appointments was successful. Volunteers from departments (principally accountants) integrated with Finance department in exchange for Finance doing the enterprise system work.	
Facilitator	Everyone understood that the future state arising from the change would be an onerous administrative process would be taken away from departments in exchange for loss of control by departments over the administrative process.	

Change Agent	Redesign finance and logistics processes so they can be done centrally. Explain and get department buy-in	

The strategic reorganization and centralization meant Finance could mainly target Finance personnel, many of whom used to belong to other departments, to obtain requirements and complete the integration project. This dramatically reduced the number of new users in the Finance implementation from 600 to 248, and this facilitated the Finance implementation.

> *I saw all the [departments] in 1 month. In one week, I go out and see 3-4 [departments]. To me, the reorganization is a relief. By the end of the visit, they told us there is a centralization. I can talk to my one group. I was really happy. They took about 2/3rd centralized. 1/3rd are still in the process or are not coming in. When it is centralized, I have less work. To me, it is better.* (Corporate Logistics)[5]

Also, because Finance, rather than the departments, were now handling all processes, they could streamline and standardize processes more easily. Wherever possible, they simplified the finance processes within the requirements of internationally accepted accounting practices. The corporate HQ implementation was a success, and financial information in the organization was successfully integrated.

Discussion

Our case study presents a situation where top management involvement in a large IT-enabled change project diminished. Halfway through the project, with the majority of the organization yet to implement the new systems and processes, as well as with issues emerging from the first implementation, top management departed, and the new top manager evidenced little interest in either participating or involving himself.

The top management support literature suggests that this would greatly increase the likelihood that the change would not succeed (Dong, 2008; Green, 1995; Huy, 2001). Indeed, we observed typical challenges associated with IT-enabled change, projects arising after top management stepped back. Middle managers sought to appropriate the project for their own ends. For example, the BUs tried to introduce new requirements specific to their BUs in contravention of the change vision of standardization and integration. Emergent issues arose that traditionally required top management to address. For example, the issue of authorization could have led to three separate, incompatible instantiations of the system. Finally, there were issues with getting new stakeholders to support the project. For example, participation in requirements and design by the representatives from the 19 corporate departments was poor, and threatened the extension of the change initiative to their departments.

In traditional large IT-enabled change projects, top management wields significant formal power, and can use it to overcome challenges. However, given that it is not always possible to sustain top management involvement, the question arises as to how challenges to IT-enabled change can be overcome when top management involvement diminishes. In our case, middle management were able to address the challenges through what we term "middle management joint action." Further, we found that middle management joint action is enabled by certain contextual elements in the project that were put in place by top management before their involvement and participation diminished.

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[5] Note that while the person uttering the quote belongs to Corporate Logistics, the person served in a systems analysis role throughout the project.

Middle Management Joint Action

The key factor for enabling IT-enabled change when top management involvement diminishes is middle managers' joint action. Joint action refers to intentional collective activity where members consciously choose to coordinate to achieve a goal (Brownell, 2011). Joint action is a special kind of coordination where decision-making that facilitates coordination is not due to hierarchical authority, but instead occurs in coordinating parties (partly due to common understanding and shared beliefs). Examples of joint action are improvisational jazz ensembles or pick-up basketball games (D. Meyerson et al., 1996). In our study, we identified three categories of joint action—constraining, enabling, and extending—that enabled middle management, in the absence of top management, to overcome the lack of organization-wide boundary-spanning structures and guide enterprise level change efforts in the face of challenges that could have undermined that change. At the same time, we observed that contextual elements that enable joint action were an important condition. Top management's role in establishing the contextual elements is critical for fostering middle management joint action. As shown in Figure 3, our study suggests four contextual elements: people, common goals, structures and processes, and artifacts that together enable middle management joint action as the middle managers enacted their roles within the project. Further, we found that middle management joint action reified the contextual elements. We discuss below how each of the middle management joint actions addressed specific challenges in IT-enabled change, and how they are enabled by and in turn also reify the contextual elements.
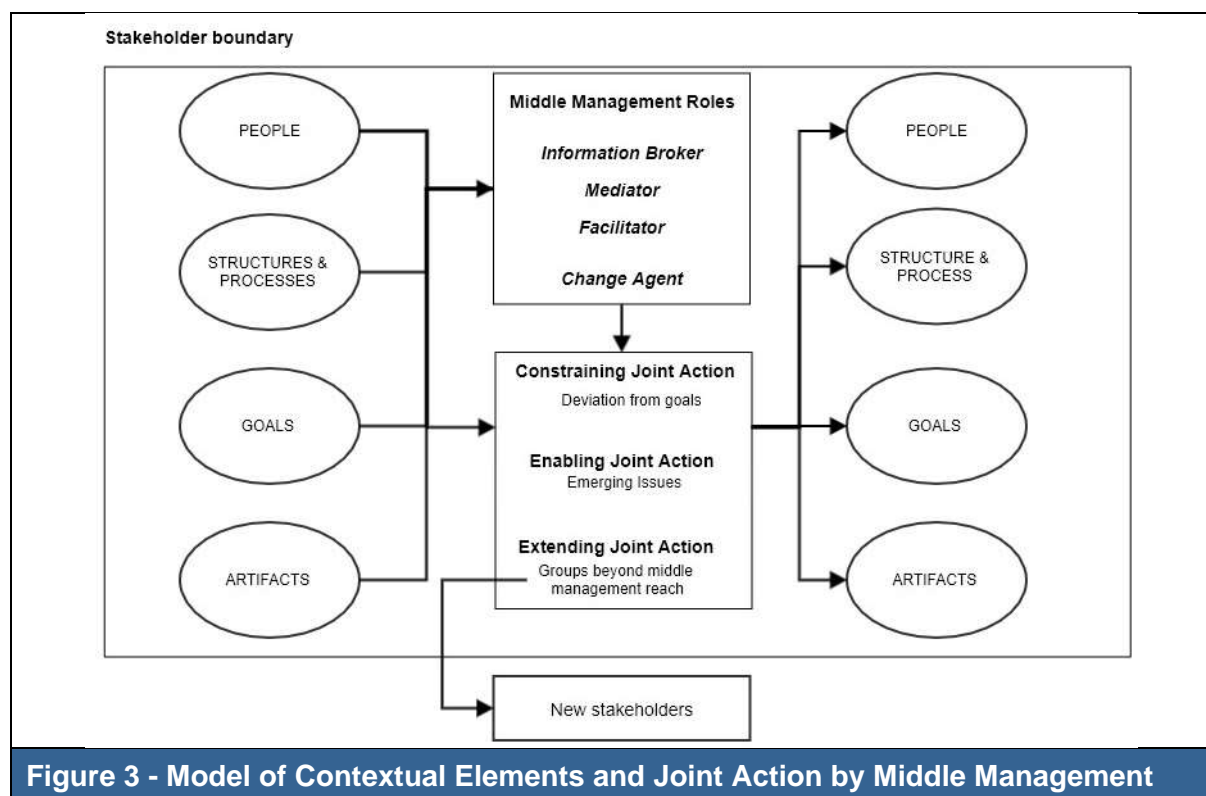

Figure 3 - Model of Contextual Elements and Joint Action by Middle Management

Constraining joint actions occur when middle managers enact joint action to resolve the challenge of deviating from the change vision. As *information brokers*, they facilitated constraining joint actions by providing information so the group could enact the constraint. For example, revealing to the group that a list of changes would break the budget galvanizes the group to cut changes. Middle managers also acted as *mediators* to exercise clan control and peer pressure so as to constrain divergent behaviour. As *facilitators*, they helped develop shared understanding among the group that determined what should be constrained-i.e.,

anything outside that shared understanding. Finally, middle managers as *change agents* pushed for the new committees that manifested the constraining joint action.

In terms of *people*, top management had included influential middle managers from the various decision-making bodies. These included not only the working bodies like the kingpins, and engineering and maintenance group, but also leadership bodies like the steering committee. By working closely together with top management during the top management period, these middle managers had developed *common goals* that were aligned with top management's change vision, i.e., the idea of common and standardized processes (Carson et al., 2007; Gioia et al., 2012). In our case, the change vision was publicly stated by top management in the top management period, and the governance practices clearly promoted the idea of common, standardized processes, i.e., the change vision. Thus when certain groups attempted to deviate from the previously agreed common design, the middle managers used existing *structures and processes* such as the peer voting process to collectively negotiate and converge on which requests to approve. Middle managers further adapted existing structures and processes, for example, changing the escalation path to new committees aligned with the change vision, when top management involvement diminished. By providing key middle managers from the BUs with a way to reconcile their differences (by sharing information and voting on change requests), these existing and adapted collective work structures and processes substituted some of top management's role of judging cross-functional disputes. *Artifacts* helped reinforce structures, processes and goals in that the design document and budget embedded the belief of common requirements. Artifacts such as the requirements document encouraged democratic discussion and problem solving as they had been developed over time through mutual compromises and discussions. They also served as symbols of middle managers' approval of the change vision as they had all signed the requirements document. In this joint action, the artifacts played an important part in the negotiation and peer voting in that Finance and IT monitored all change requests against the budget document. By drawing on all these contextual elements, the middle managers, through their roles, together enacted constraining joint action to address the challenge of deviation from goals and keep the project on track -only five (two from Land BU) of the 38 change requirement requests were approved (Table 4).

Enabling joint actions deal with emergent issues. In this case, when middle managers recognized there were emergent issues in the project, they were able to coordinate their actions to resolve these issues in line with the shared vision (Table 5). *Information brokers* provided the group with information necessary to agree on both the problem and solution (e.g., revised authorization structure to manage too many types of logins). The *mediators* were critical in negotiating a solution that required sacrifice by all groups- especially the sea BU in our case. *Facilitators* helped build the shared understanding of the future state, which provided the solution the group works towards. Finally, after agreeing on the solution, *change agents* helped implement the new initiative - in our case, the new authorization roles.

In terms of *people*, some middle managers worked as information brokers to disseminate alternative approaches to authorization. This resonates with extant literature that shows how middle managers can directly influence their specific constituencies (Leidner & Milovich 2014). At the same time, in line with the common *goals* and vision, the middle managers enacted collective *structures and processes* to build shared understanding on how to define and align the new authorization structure for all BUs. Also, top management had put in place structures and processes where nothing could be done by individual middle managers working unilaterally and because it was ingrained in their collective process where BUs only execute changes after all have come to a common consensus. Hence, various BU middle managers acted as mediators and helped persuade Sea BU to redo their existing structure before they moved forward with the new authorization structure. These roles and authorization structure were eventually embedded in the enterprise system i.e., *artifacts* reinforced these decisions and solution to the problem. In this way, the Enabling joint action enabled middle managers to

manage an unanticipated issue and jointly adopt a shared approach to positively resolve the emergent problem.

Extending joint action, the final type, reveals that joint action can enable middle management to work around stakeholders and groups beyond their normal organizational reach. Unlike the previous two joint actions, the new stakeholders were not selected as part of the project when top management was involved and did not fully share the common goals and visions. As such, it was difficult for the middle managers to enact these contextual elements to influence them. Their early attempts to involve these new stakeholders failed as new stakeholders were not willing to actively enact the existing project structures and processes (e.g., sharing of information and building shared understanding).

The successful middle management Extending joint action involved creative initiatives that worked around their boundary-spanning limits. In the findings, we show how middle managers strategically redesigned the logistic and finance processes and persuaded external stakeholders to agree with the new centralized structure (Table 6b). *Information brokers* were necessary to help those within the project team and the new stakeholders outside the boundary to understand what the changes were. *Mediators* were necessary to establish the trade- control over procurement and finance in exchange for the giving up of secondary appointments. Such mediation occurred in tandem with *facilitators'* actions to achieve the *shared vision.* Finally, the actual organizational change had to be done as a new initiative by the *change agents*.

This change of project organizational structure also helped re-establish the key contextual elements. First, it meant that middle managers could work directly with the finance and logistics personnel who were transferred in—this re-established the *people* element. As these new personnel were focused on finance and logistics functions, it was easier to inculcate the common *goals* and vision of standardization. The middle managers could then re-enact their existing *project structures and processes* with these transferees and thereby could jointly bring about changes that had enterprise-wide implications, e.g., organization structural changes.

Put together, our study shows that joint action amplifies middle management's role by bringing together different middle managers enacting separate roles (such as information broker, mediator, facilitator, and change agent) (Balogun & Johnson, 2005; Kirsch et al., 2010; Leidner et al., 2017) as a coordinated, cohesive, and coherent group. As a whole, these middle management behaviors often support each other and are aligned to help achieve the overall project goals. By acting in such a coherent and coordinated way, the impact of middle management joint actions is not constrained to each local, functional group, but also impacts the enterprise-level.

The key difference in roles under joint action is that middle management roles transform from being focused on narrow functional needs to the needs of the entire enterprise. Traditionally, middle managers are information brokers, mediators, facilitators and change agents within their own functional teams. By leveraging on the four contextual elements, middle managers can work together in their different roles to enact change across functions. This is because the contextual elements of a goal of commonality, structures and processes that encourage cooperation, artifacts that embed commonality and people who are willing to work together create a new environment that transcends functional boundaries. Thus, the contextual elements enable the middle managers to enact their roles in a way that enable joint action to take place.

Our analysis of these joint actions shows that each contextual element did not just enable joint action by itself but in an interlocking way. Thus, the contextual elements are intertwined. No contextual element is more important than the other, because they rely on each other to foster joint action. To illustrate, consider the example where the BUs agreed on a new way of doing

authorization which materialized because of (among other things) a goal of cooperation, an authorization matrix design where permissions were common across BUs, meeting structures and processes that supported cooperation, and a set of project team members acculturated with project norms (people). The goal of cooperation and commonality was embedded in the authorization matrix and in meeting structures. The people respected and viewed these structures as legitimate. These structures and artifacts in turn were created by the people in the meeting- one reason they viewed these structures as legitimate. Disentangling any one contextual element makes all the contextual elements less effective. For example, both an authorization matrix where the individual BUs would independently define their permissions or a meeting structure that promoted disagreement would have made perpetuating a goal of cooperation more difficult. The intertwining of the contextual elements encouraged middle management to believe and share the common goals rather than resist or reject individual elements after top management's role diminished (Keil, 1995; Orlikowski, 1993; Robey & Sahay, 1996; Sarker et al., 2006).

More importantly, for the joint action to work through these four contextual elements, middle managers and stakeholders had to continually enact them throughout the project. In other words, the contextual elements of people, structures and processes, and common goals, were *reified* through their ongoing performances and actions (Giddens, 1976, 1979, 1984). This is a critical point since literature informs us that structures only partly constrain human behavior and agency as humans have the ability to reject these structures (Giddens, 1976, 1979, 1984). In our study, when middle management manage a threat (e.g. BUs deviate from goals), they do so in a collective manner. These collective actions legitimize and reify the contextual elements of people, structures and processes, and goals.

At the same time, reification of people, structures and processes, and common goals is linked to the reification of artifacts (Latour, 1996; Latour & Woolgar., 1979; Law, 1987, 2000). Specifically, every time middle managers enact and reify these three elements, aspects of those elements are embedded in artifacts, which in turn shape the beliefs and behaviours of the middle managers (Latour, 1996; Latour & Woolgar., 1979; Law, 1987, 2000). For example, as middle managers support the change vision, they physically embed these principles in the project artifacts and reify these principles. In another example, when a new issue arose and middle management worked together to address it in a way that was aligned with the change vision, both the enterprise system design and physical implementation became more standardized. In short, reification of the contextual elements often resulted in artifact reification in the form of changes embedded in physical reality.

Scope of Middle Management Joint Actions

Whereas extant research shows how middle managers actively work to complement top management during change initiatives (e.g., Balogun & Johnson, 2005; Leidner & Milovich, 2014), we show that middle managers can also take an active role to compensate for top management's diminished involvement by minimizing disruption or changes in contextual elements. Yet there is one key limitation to middle managers' actions, i.e., they cannot effectively influence groups beyond the project team due to their lack of formal enterprise-wide hierarchical authority that top management possess (Akkermans & van Helden, 2002; Liang et al., 2007). When middle managers interact with external parties, the contextual elements were not effective on external stakeholders. Thus, external stakeholders' behaviour is not constrained, and it is difficult to work jointly with these parties. Our final situation illustrates this with painful clarity—the middle managers could not get external parties to participate willingly in the IT-enabled change project, because they did not share the ways of doing things and were not bound by existing project artifacts.

However, our research demonstrates that this does not necessarily mean IT-enabled change fails. Instead, middle managers can be flexible to adapt to the situation. In our case, the BUs and Finance attempted to identify commonalities between themselves and external parties and found them in external parties' finance/procurement secondary appointment role. The BUs and Finance were able to trade their spare capacity (created as a result of standardization) by absorbing external parties' roles (and some employees from these parties) in exchange for external parties not challenging the change. Notably, for this exchange to take place, Finance absorbed external parties' finance role, and BUs absorbed their procurement role. Finance and BUs had to agree on a common proposal to external parties. They also had to agree on how the procurement/finance separation would be operationalized.

Again, ours is a single case, and it is unlikely that all such changes involving external parties without top management will result in this specific outcome. Nonetheless, our research demonstrates that joint action has limits. When top management involvement diminishes, it is difficult for middle managers to span across boundaries they are not represented in. However, they are not completely helpless. Middle managers can enact extending joint action that provides creative solutions to problems of spanning boundaries. We can conjecture that this will often involve bartering or horse-trading, where middle managers leverage some strength of theirs in exchange for the cooperation of external parties. For example, if middle managers involved in a change have unusually strong coercive, legitimate or informational power (French & Raven, 1959), we would expect those to be leveraged to obtain agreement from external parties. In this way, we extend current work on middle management that tend to narrowly focus on specific types of middle manager actions (e.g., cognitive, sensemaking, discursive) and its limited domain of the middle manager's functional team (Balogun & Johnson, 2004; Conway & Monks, 2011; Kirsch et al., 2010). We show that it is possible for middle managers to work as a group to develop new structures and processes beyond their individual teams and to enact political and strategic actions as part of the change initiative.

Limitations

As with any study, ours has several limitations. First, this was a revelatory case. Given the solitary nature of the case, it is difficult to generalize to the population. Nevertheless, such cases add critical data points for understanding theory. In our case, we found that while top management participation and involvement are important, it is possible, once top management has set up key contextual elements that support the change vision, for the change project to succeed even when top management participation and involvement diminish. In our study, the contextual elements enabled middle managers to drive the change through joint action. Studies in other organizations would be helpful in further articulating the conditions and mechanisms for change to succeed even when top management steps back.

Second, the nature of a revelatory case is that one cannot fully isolate all factors influencing project success. In our case, the project was initiated and continued in an Asian organization facing external financial pressure—hence the desire to standardize and rationalize financial processes. However, because this is but a single case, and we principally studied it at a project level, these extra-organizational factors were a constant, and thus not explored in our analysis. Future work using other kinds of methodologies, perhaps exploring other units of analysis and cultures may be necessary to isolate these factors.

Third, when the original top management project initiator departed, the new top management elected to not interfere with the project. However in other contexts, a change of top management may bring a change in organizational and therefore project vision (Lee & Myers, 2009). Alternately, the reason top management involvement diminishes is because there is some urgent matter elsewhere in the organization. Top management may later return to a project after the urgent matter has been addressed to reposition the project in light of changes

to the organizational context arising from the urgent matter. How do our findings inform such situations?

We are unable to definitely answer this question as these were not the circumstances we studied. Clearly future research is warranted. However, we conjecture such situations would lead to a "project reset" where as a result of top management's new goals, new structures, processes, artifacts and perhaps people must be introduced into the project to direct the project team's existing capability for joint action towards top management's new goals. Furthermore, the more aligned top management's new goals are to the original ones, the easier these changes will be. Conversely, if top management's new goals are not well aligned, middle management's capability for joint action will make it very difficult for top management to realign the project.

Fourth, the question arises as to whether our three identified joint actions (constraining, enabling, extending) constitutes the universe of joint actions. Given this was a single revelatory case, we remain open to the possibility that new types of joint action will emerge from other studies exploring distinct forms of IT-enabled change. However, we suspect our three kinds of joint action are necessary for all IT-enabled change where top management involvement diminishes. Future research is necessary to confirm our hypothesis.

Conclusion

This paper explores a longitudinal case study of a large IT-enabled change to unpack a situation which begins with strong top management participation and involvement that diminish about halfway through the project. Nevertheless, the change project succeeded, and genuine change permeated and transformed the organization.

These findings also have implications for practice. Our research highlights the importance of top management developing a project context, through instituting a range of interlocking contextual elements of people, goals, structures and processes, and artifacts that promotes relationship and consensus building among middle managers. When top management support diminishes, middle managers must be able to work collectively with each other to move change forward. Top management needs to have middle managers believe in the change so that when challenges that inevitably arise threaten the change vision, middle managers will work together to address the challenge. Finally, middle managers' actions, while perpetuating the context that enables them to act jointly to move change forward, must also be flexible. For example, middle managers in the extending joint action recognized that the contextual elements would not work with the new stakeholder groups, and flexibly took action to redefine stakeholder roles.

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Appendix A: Interview Question Sequence

Prior to the interview, we explain our context and role. We highlight that we are working with the organization's IT department to capture important lessons associated with the project. We then begin the interview proper with:

- Tell us a little about your previous experience and your role in this project.
- What is the current status of the project and how is it progressing?
- What are the major issues in the project and how are they being addressed?

We would ask for elaboration on these points. Often, further questions were based not only on what the interviewee said, but we would also cross-index the interviewee's role and comments against other interviewees' comments and minutes of the meeting.

We would close our interview with

- Is there anything we haven't talked about that you think is important?
- Who else should we contact for more information?

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