# Contextualising Capability Development

## Configurations of Knowledge Governance Mechanisms in Project-based Organizations

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# Contextualising capability development: configurations of knowledge governance mechanisms in project-based organizations

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**ABSTRACT**

Given the project-based organization's (PBO) strong focus on autonomy and temporary decentralisation, it faces unique challenges with regard to long-term organisational learning and capability development. To address how PBOs cope with these challenges, we address the role of knowledge governance (KG) mechanisms to foster capability development. The present paper reports on a multiple case study comprising 23 PBOs and demonstrates the importance of 'configurations of KG mechanisms' for facilitating learning and capability development. This paper develops four distinct configurations (balanced, formalistic, interactive, and fragile) that promote three principal organisational-level learning processes: shifting, leveraging and adapting. This research underscores the close relationship between knowledge governance mechanisms and capability development and the importance of designing the appropriate configuration of KG mechanisms to foster capability development.

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Project-based organization; knowledge governance; capabilities; organisational learning; shifting; leveraging; adapting

## Introduction

Much research has investigated the nature and dynamics of organisational capabilities and their significance for innovation and firm-level competitive advantage (Teece, Pisano, and Shuen 1997; Eisenhardt and Martin 2000; Zollo and Winter 2002; Casselman and Samson 2007; Easterby-Smith and Prieto, 2008; Peteraf, Di Stefano, and Verona 2013). Previous studies show that the firm's contextual characteristics affect its capability development (Shamsie, Martin, and Miller 2009; Wang, Senaratne, and Rafiq 2015). Most notably, knowledge processes and innovation activities of firms engaged in high-volume production differ markedly from those of firms engaged in project-based or one-off production (Pavitt 1984; Hobday 2000; Söderlund and Tell 2009). These differences significantly influence learning processes and hence the development of distinct capabilities (Woodward 1958; Davies and Brady 2000; Hobday 2000; Brady and Davies 2004; Lindkvist 2004; Davies and Hobday 2005).

Recent years have seen a surge in the literature on project-based organizations (PBOs) (Hobday 2000; Sydow, Lindkvist, and DeFillippi 2004; Whitley 2006; Lampel, Scarbrough, and Macmillan 2008; Nightingale and Brady 2011; Winch 2014; Lundin et al. 2015; Söderlund 2015). This scholarly interest in PBOs as a particular kind of organisational form (Hobday 2000; Söderlund and Tell 2011) reflects the growing economic importance of these organisations across a range of sectors – especially for integrating complex knowledge across organisational and disciplinary boundaries

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(Nightingale and Brady 2011). Yet, one of the PBO's greatest obstacles to developing capability is associated with its non-integrated structure of autonomous and temporary projects (Whitley 2006; Cattani et al. 2011). The design of the PBO creates fundamental challenges for internal knowledge transfer and capability development (Söderlund and Tell 2011) – challenges that are well documented in prior research (e.g. DeFillippi and Arthur 1998; Hobday 2000; Prencipe and Tell 2001; Whitley 2006; Geraldi 2009; Söderlund 2015). These studies acknowledge that PBOs represent a unique empirical phenomenon (von Krogh, Rossi-Lamastra, and Haefliger 2012), and an ideal setting to address, not only the development of capabilities (Lampel 2001; Lindkvist 2004; Shamsie, Martin, and Miller 2009; Swan, Scarbrough, and Newell 2010; Grant 2013), but also the specific challenges associated with how learning and capability development are orchestrated more generally in dynamic and changeful organisational settings (Lampel 2001; Nightingale and Brady 2011; Loufrani-Fedida and Saglietto 2016).

This paper reports on a multi-year study comprising 23 PBOs that rely on projects for implementing and coordinating strategic and tactical business and development activities (Lindkvist 2004; Lundin et al. 2015; Söderlund 2015). These PBOs typically undertake a variety of project types, including projects delivered to client specifications and those aimed at developing new technologies, systems, or products in a wide spectrum of industries: construction, telecom, shipbuilding, mining, information systems, oil and gas, and power systems (Gann and Salter 2000).

Thus far, research has documented the importance of capabilities and the difficulties associated with their development (see for instance Söderlund 2005). To a lesser extent has research addressed how these capabilities are developed and what organisations and their management actually can do to foster capability development. To an even lesser extent, has research focused on the governance issues of organisational practices and competence development within the knowledge-based view of the firm (Dosi, Faillo, and Marengo 2008). In this paper, we seek to fill this void by drawing on the notion of *knowledge governance* (KG), which accounts for how micro-level interactions steer knowledge processes in the organisation (Foss 2007) to attain macro-level effects. Studies on KG differ from the mainstream work on capability building by putting greater emphasis on the role of individuals in the process of achieving knowledge-related goals (Foss 2006). A basic premise is that individuals are affected by organisational conditions via governance mechanisms that direct and may alter their behaviour towards the achievement of organisational goals (Felin and Hesterly 2007; Foss, Husted, and Michailova 2010). These governance mechanisms tend to be 'clustered' into different kinds of configurations of KG mechanisms (Foss 2002).

Knowledge governance involves choosing mechanisms to advance the process of creating, using, sharing, and integrating knowledge (Foss, Husted, and Michailova 2010, 456), which, in essence, triggers the development of organisational capabilities. However, the nature of and differences among various configurations of KG mechanisms have not been accounted for, and their link to the development of capabilities has not been well established. Despite recent scholarly contributions into the application of KG mechanisms to various organisational conditions (Heimeriks 2010; Pemsel, Müller, and Söderlund 2016), research has not addressed in what way KG mechanisms drive capability development, what specific capabilities are being promoted, and how these KG mechanisms are clustered to achieve capability development and learning within PBOs. Thus, the aim of this paper is to *identify configurations of KG mechanisms specific to the PBO context, and to demonstrate how various configurations influence learning and capability development in the PBO*. This paper focuses on the KG mechanisms that trigger three main organisational-level learning processes (shifting, leveraging, and adapting), which are critical for capability development in PBOs. We address three specific research questions: (1) How does KG contribute to the development of capabilities in PBOs? (2) What different kinds of configurations of KG mechanisms can be identified in PBOs? (3) How do those configurations trigger learning and capability development in PBOs? In more general terms, we seek to contribute to the research on capability contextualisation and to our understanding of the relationship between knowledge governance and capability development.

We proceed by first discussing current research on capabilities and learning processes in the PBO, after which we describe the research design and methods employed in this study. Finally, we present and discuss the main findings from our examination of 23 PBOs operating in eight different industry sectors.

## The nature and dynamics of capability development

An organisational capability implies an ability to perform specific operations and knowing how to collectively transcend from intention to outcome (Dosi, Faillo, and Marengo 2008). The notion of 'dynamic capabilities' goes one step further. Dynamic capabilities grapple 'the capacity of an organization to purposefully create, extend, or modify its resource base' (Helfat et al. 2007, 4). Firms with superior dynamic capabilities have learned to adjust to changing environments, and to shape their business environment (Teece 2014).

There is a positive relationship between a firm's dynamic capabilities and its likelihood of maintaining its competitive advantage (Eisenhardt and Martin 2000; Teece 2009), especially in fast-moving and dynamic industries. In that respect, the idea of capabilities and the firm's ability to learn multiple capabilities concurrently has become a central tenet of the knowledge-based theory of the firm to explain both the existence of the firm likewise its competitive advantage over time (Bingham et al. 2015). However, research has shown that executives often bias activity towards one particular growth process, which tend to produce internal asymmetries. This, in turn, weakens the organisation's ability to learn a variety of capabilities (ibid.).

Comparatively little research has addressed the actual development of capabilities and its variation across empirical settings and industries. There is some notable research on the microfoundations demonstrating the role of individual managers and their cognitive capabilities (Teece 2014; Helfat and Peteraf 2015) as linked to building dynamic capabilities of the firm. However, research has not fully addressed how managers can encourage the variety of capability development; the micro- and macro-foundations of capability development so remains scares. Research has singled out the specific nature of capabilities in the context of PBOs. Despite recent progress, systematic reviews of the literature on dynamic capabilities indicate that limited research discusses project-related antecedents of dynamic capabilities (Eriksson 2014). The framework developed by Davies and Brady (2000) show that dynamic project capabilities play a significant role in explaining how PBOs move into new lines of business. The authors identify two core elements: the interactions among strategic, project, and functional levels of the organisation; and the path-dependent and cumulative process of organisational learning as affecting capability development in the project-based context.

In a follow-up study, Brady and Davies (2004) find that PBOs typically engage in two interacting levels of learning: the bottom-up, project-led learning that mainly involves exploratory activities; and the top-down, business-led learning that focuses on exploiting extant knowledge in order to develop new routines and practices. Their study generally demonstrates the significance of both dynamic and operational capabilities likewise top-down and bottom-up driven processes to cope with the balance to explore and exploit in the PBO. In several respects, this study adds to the idea of dynamic capabilities by emphasising that also other more operational and bottom-up processes are central for capability development in the PBO.

In a parallel study, Söderlund (2005) addresses two dimensions of the PBO's capabilities labeled as 'project competence': (1) the organisation's ability to generate (shape, create, select) high-value projects; and (2) the ability to execute (organise and lead) those projects effectively and efficiently. Hence that notion reflects not only tactical performance (keeping costs down, avoiding mistakes, etc.), but also strategic performance in terms of creating superior value in projects (Nightingale and Brady 2011; Slevin and Pinto 1988; Williams and Samset 2010). Söderlund's study emphasises the centrality of investigating both the front-end processes and the execution processes to fully comprehend the nature of capabilities in PBOs.

In positing a broader analysis for how PBOs develop their capability to generate and execute projects, Söderlund (2008) presents a framework encompassing three critical organisational learning processes: shifting, leveraging, and adapting.

*Shifting* is a process that involves changing the design and content of the project operations of the firm, moving the firm to a new modus operandi concerning what projects to carry out and/or how to carry out projects. In Söderlund and Tell (2009, 2011), that movement entails a shift to another 'project epoch,' which might imply a change of business model or a new delivery model for the firm (Wikström et al. 2010). Shifting necessitates major changes in the organisation's project activities; such changes are often triggered by new types of projects, new client requirements, and/or new technological challenges (Davies and Brady 2000), which is closely resembles the idea of base-moving projects (Davies and Brady 2016).

*Leveraging* is a process that facilitates cross-project learning; one example is applying established solutions to subsequent projects of a similar type (Prencipe and Tell 2001; Swan, Scarbrough, and Newell 2010). Leveraging is more often associated with continuous improvements across projects and with incremental changes over the course of subsequent projects. Prior research has documented that the transfer of experience and knowledge from one type of project to another is essential for the improvement of the firm's overall project capability/competence (Davies and Brady 2016; Söderlund 2005; Söderlund and Tell 2009). Leveraging is often triggered by the sharing of management guidelines and best practices among different units engaged in different kinds of projects and it often involves an ongoing process of learning (Söderlund 2008).

*Adapting* is a process that involves minor, but recurring changes and management of the continual interplay and tensions among organisational and managerial elements (Söderlund 2005; Söderlund and Tell 2009). Adapting represents a single-loop kind of learning (Argyris and Schön 1978) and refers to the learning derived from generating, organising, collaborating on, and leading projects (Söderlund and Tell 2009). Failure in either one of these elements would likely cause significant problems for the entire organisation; at the same time, success at one element usually still requires modifications of the other elements to attain system-wide efficiencies and improvements in overall firm performance (Söderlund 2005). In that respect, adapting illuminates the systemic nature of project capabilities.

These three learning processes (shifting, leveraging, adapting) offer a useful framework to address various aspects of capability development. Research in that field have demonstrated the importance of addressing different kinds of project-oriented capabilities at the project as well at the firm level (e.g. dynamic project capabilities, firm-level project competence, etc.) for understanding how a PBO enables major and incremental change (Söderlund, Vaagaasar, and Andersen 2008; Davies and Brady 2016; Davies, Dodgson, and Gann 2016). However, scholars have not yet examined closely the organisational triggers of capability development in PBOs. In this paper, we pursue that goal by engaging with the literature on knowledge governance to unveil how organisations might trigger learning and capability development in PBOs.

## Knowledge governance and capability development

A firm's ability to create new knowledge and reconfigure or leverage existing knowledge for new purposes has been singled out as an important part of dynamic capabilities (Jantunen et al. 2005; Prieto and Easterby-Smith 2006; Cepeda and Vera 2007). An alternative for gaining a better understanding of how capabilities are developed is by investigating the vital role of powerful actors in purposefully implementing various knowledge-enabling mechanisms to foster organisational capabilities, which is the idea of knowledge governance (Salunke, Weerawardena, and McColl-Kennedy 2011).

The goal of KG is to implement 'organizational structures and mechanisms that can influence the process of using, sharing, integrating, and creating knowledge in preferred directions and toward preferred levels' (Foss, Husted, and Michailova 2010, 456) A main focus of the KG literature is consequently the mechanisms that facilitate and steer the development and sharing of knowledge in

organisations, that jointly foster growth processes emanating in macro-level constructs, such as capabilities (Foss 2007; Michailova and Foss 2009). Accordingly, a *governance mechanism* is an apparatus deployed to influence organisational members' behaviour and interaction patterns – especially concerning their involvement in knowledge processes (Michailova and Foss 2009). The central postulate is that mechanisms must be adjusted to fit not only the particular knowledge-related objectives, but also the context in which the organisation operates (Pemsel, Müller, and Söderlund 2016); that context includes, *inter alia*, its culture, norms, and environment (Wang, Peng, and Gu 2011; Husted et al. 2012). Based on this, our argument is that a KG mechanisms form in specific configurations that are required to enhance learning processes and thus contribute to capability development in the PBO.

Knowledge governance mechanisms are categorised as being formal or informal. *Formal* mechanisms include goal setting, planning, directives, rules and regulations, and residual rights of control; *informal* mechanisms include trust, management style, organisational culture, and communication flows and channels (Grandori 2001). Both types are often applied simultaneously, yet the combination of formal and informal mechanisms may either reinforce or weaken the ensuing effects (Cao and Xiang 2013). Antonelli, Barbiellini Amidei, and Fassio (2014) further stress the importance of adjusting the mechanisms to the kind of knowledge (if it is tacit, explicit or codified), its context and the users.

Some studies show that various types of mechanisms should be combined to improve their efficiency, whereas others indicate that they are more usefully viewed as substitutes (Foss and Michailova 2009; Scarbrough and Amaeshi 2009). That is, knowledge-related issues are complex and interdependent with other organisational issues, such as organisational culture and context. On this note, Foss, Husted, and Michailova (2010) assert that, with respect to knowledge sharing, the organisational culture tends to substitute for incentive payments. This suggests that certain cultures may boost knowledge sharing while others may hamper it (Wiewiora et al. 2013; Pemsel, Müller, and Söderlund 2016). However, an absence of intrinsic motivation among actors may result in a hostile knowledge environment with only modest knowledge sharing (Zhang and Cheng 2015), thus a lack of informal and culturally-based, mechanisms may harm the growth processes in the firm. The literature addressing related themes includes Bosch-Sijtsema and Postma (2010), Felin and Spender (2009), Gooderham, Minbaeva, and Pedersen (2011), Husted et al. (2012), Michailova and Foss (2009), and Wang, Peng, and Gu (2011).

These considerations commonly imply that synergies are most likely to be achieved by combining mechanisms in a way that triggers the generation of appropriate learning processes and hence foster the development of capabilities. For example Pemsel, Müller, and Söderlund (2016), demonstrate that the most successful organisations in their study had a variety of KG mechanisms in place, focusing both on informal and formal mechanisms. They further illustrate the impact of managers' mindsets, in relation to people's ability to learn and the effect of that on subordinates' engagement in knowledge processes. However, which will be addressed below, it is not clear which sets of mechanisms trigger development of knowledge and capabilities or how, and why, those sets vary across a spectrum of PBOs.

## Research methodology

Our objectives are to (a) investigate similarities and differences across a range of PBOs concerning the use of KG mechanisms and (b) identify configurations of KG mechanisms that influence learning and capability development in PBOs. The study encompasses 23 organisations, all of which were mature medium or large PBOs and either stand-alone firms or divisions/subsidiaries of larger corporations. The sectors in which these PBOs operate include construction/real estate, engineering, mining, logistics, telecommunications, and electrical equipment; see Table 1 for a complete list of the companies and their relevant characteristics. Differences among the cases enabled comparisons that allowed for greater generalisation of our findings (Eisenhardt 1989).

**Table 1.** Overview of the 23 case-study organistions.

| Case | Industry sector | PBO type | Size of projects | Number of customers |
|---|---|---|---|---|
| Alpha | Telecommunication | Stand-alone | Small | Many |
| Beta | Construction/Real estate | Subsidiary | Large | Few |
| Gamma | Construction/Real estate | Subsidiary | Small | Many |
| Delta | Construction/Real estate | Subsidiary | Large and small | Few |
| Epsilon | Construction/Real estate | Subsidiary | Large and small | Few |
| Zeta | Construction/Real estate | Stand-alone | Small | Many |
| Eta | Construction/Real estate | Subsidiary | Large and small | Few |
| Theta | Construction/Real estate | Subsidiary | Small | Many |
| Iota | Construction/Real estate | Stand-alone | Small | Many |
| Kappa | Construction/Real estate | Subsidiary | Large and small | Few |
| Lambda | Construction/Real estate | Stand-alone | Small | Many |
| Mu | Construction/Real estate | Subsidiary | Small | Many |
| Nu | Construction/Real estate | Subsidiary | Large and small | Few |
| Xi | Engineering | Subsidiary | Large and small | Few |
| Omicron | Mining | Subsidiary | Large | Few |
| Pi | Telecommunication | Subsidiary | Large | Few |
| Rho | Construction/Real estate | Subsidiary | Large and small | Few |
| Sigma | Construction/Real estate | Subsidiary | Large and small | Few |
| Tau | Construction/Real estate | Subsidiary | Large and small | Few |
| Upsilon | Construction/Real estate | Stand-alone | Large and small | Many |
| Phi | Electrical equipment | Subsidiary | Large and small | Few |
| Chi | Engineering | Subsidiary | Large | Few |
| Psi | Logistics | Subsidiary | Large and small | Many |

Our research design follows Miles and Huberman's (1994) methodology for collecting and analyzing qualitative data. Data collection comprised 118 semi-structured interviews lasting between 60 and 120 min, detailed field notes, and a large number of written documents from the case-study organisations (e.g. corporate presentations, strategic plans, and training material). The respondents represented different organisational levels that included top, middle, and project managers, project engineers, and personnel from project management offices.

The data analysis proceeded in three primary phases. First, we developed a set of *narratives*, i.e. a first step of data display and data reduction, (Miles and Huberman 1994), describing events that embodied our framework's three learning processes: shifting, leveraging, and adapting. We used these codes to categorise our observations and interview results and also to compare our findings with prior research. For each case, we summarised each firms' main characteristics, capability development processes, learning processes, and major actions taken to improve the ability to generate and execute projects. Second, we investigated the KG mechanisms used in each of the organisations in detail; here our goal was to identify 'clusters of KG mechanisms' (Meyer, Tsui, and Hinings 1993) and to describe how these clusters influence the pre-defined learning processes. We used a variety of tables and matrixes to display the use of formal and informal mechanisms in respective organisation for the three learning processes (see Appendix for an example). As illustrated in Table A1, we further searched for triggers and preconditions for those learning processes in each organisation. During the data analysis, we used techniques for cross-coding among the researchers to verify and triangulate our findings. Third, we searched for patterns across the cases with regards to the

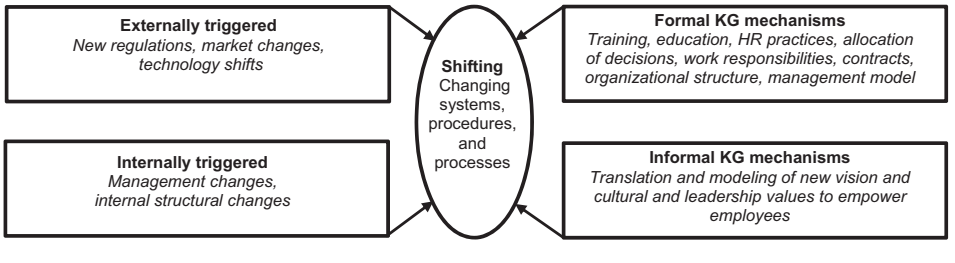


**Figure 1.** Elements of shifting.

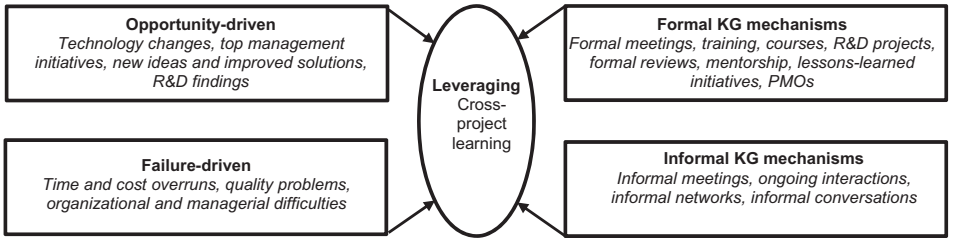


**Figure 2.** Elements of leveraging.

development of capabilities – in particular, we focused on patterns of learning processes and capability-development activities. This cross-case analysis was done through re-readings of the material, comparisons and discussions among researchers to ensure that the members of the research team agreed on the aggregated categories and patterns. We clustered our findings into a number of summarising figures (Figures 1–3) and tables (Table 3, Table A1), to provide an overview and display of emerging KG mechanism configurations for each of the learning processes.

Subsequently, we continued our search for overarching patterns across our 23 cases, using various techniques of 'pattern-matching', value-matrixes and tables (Miles and Huberman 1994). Themes and clusters now started to emerge in our data. We discovered that the firms could be grouped differently depending on their adherence to five main aspects: what KG strategy they were using, the degree of top management support for knowledge activities, the use of KG mechanisms, the general uptake of KG mechanisms, and the project managers' loyalty direction. We thereafter grouped our data into four primary configurations: balanced, interactive, formalistic and fragile. Finally, we built a framework that accommodated our findings and illustrated the elements and processes identified for capability development in PBOs (see Table 2).

## Findings

Our empirical findings indicate that applying various formal and informal KG mechanisms trigger the interplay between micro- and macro-level behaviours, which in turn drives the development of capabilities. The Appendix (Table A1) presents a detailed, case-by-case description of our findings. Below we summarise the different KG mechanisms that were used to stimulate the three learning processes discussed earlier.

### *KG mechanisms for shifting*

The process of shifting results in major reconfigurations of systems and procedures that fundamentally change the shaping and execution of projects (Söderlund 2008). Shifting was evident in a number of cases and was triggered by a range of situational factors, which we categorised as

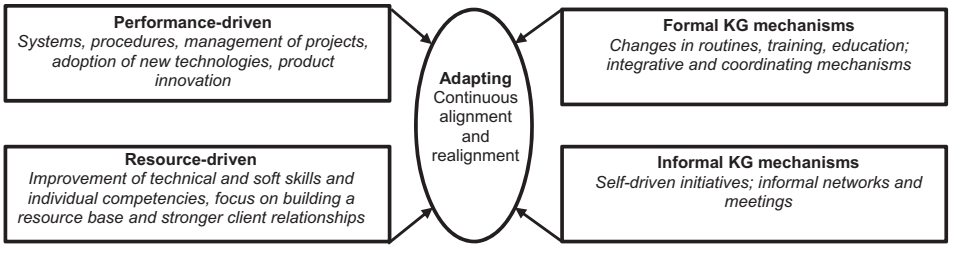


**Figure 3.** Elements of adapting.

**Table 2.** Configurations of KG mechanisms for capability development.

| | Configuration | | | |
|---|---|---|---|---|
| | Balanced | Interactive | Formalistic | Fragile |
| KG strategy | Variation | Interactive | Document-based | Laissez-faire |
| Top management support | Strong | Semi-strong | Semi-weak | Weak |
| Use of mechanisms | Many and heterogeneous | Few and homogenous | Few and homogenous | Few and ad hoc |
| General uptake of KG mechanisms | Strong uptake of informal and formal mechanisms | Strong uptake of informal mechanisms | Strong uptake of formal mechanisms | Weak uptake of formal and informal mechanisms |
| Project managers' loyalties | Projects and PBOs | Projects, and partly PBOs | Projects | Projects |
| Cases | Zeta, Eta, Iota, Kappa, Lambda, Mu, Phi, Xi | Alpha, Epsilon, Theta, Rho, Upsilon | Pi, Sigma, Tau, Chi, Psi | Beta, Gamma, Delta, Nu, Omicron |

being either internal or external. The main organisational reconfigurations triggered by *internal* pressure included changes in top management, as when a new project director is hired or when the CEO introduces a new strategy and direction for the company, or structural changes, such as establishing horizontal integration across organisational units. For example, Xi recruited a new CEO who modified the existing rigid management system to managing project and introduced a more flexible management process. The *external* triggers that activated shifting were typically associated with changing regulations or new market and/or technology regimes, such as new governmental requirements for sustainable businesses. These external pressures affected more than half of our case-study organisations and were associated with the evolving customer requirements and unpredictable market conditions vis-à-vis competition, innovation, and increased market volatility. Overall, the shifts were either implemented because of a change in the types of projects that the organisation was pursing, or in the desire to carry out a different set of projects.

The mechanisms that fostered shifting were often relatively formal: implementing a new business model, initiating new contractual forms, implementing a management model, redesigning organisational structure, changing work responsibilities to empower staff, and implementing new human resources practices and strategies. Informal mechanisms were sometimes used to induce shifting, including reorienting the organisation's vision and major leadership sessions to involve and motivate employees.

Shifting seldom proceeded smoothly; top management often struggled to identify motivational techniques that would foster high levels of commitment to the admittedly major reconfigurations. In our data, shifting occurred mostly from the top-down. Even though individual employees often recognised the need for a major shift, they were rarely empowered to instigate the change. For example, despite lower-level management's assessment of Gamma's existing processes that demonstrated a need for change, the shift failed because embedded practices and routines led top management and senior employees to resist. Although Chi similarly identified the need for organisational structural changes, the firm's rigid processes – combined with top management's reluctance to change and to empower employees – doomed the attempted shift: 'I think if it's not from the top, we suffer a lot from cultural challenges because we've got a lot of people who have been here a long time and just don't like change … ' (Project Manager, Chi).

Internally driven shifting was triggered mainly at the individual level and was often initiated by a new CEO or change in the top management team, whereas externally driven shifting was induced by such macro-level elements as market changes and new government regulations. We conclude that organisations more capable of shifting were sensitive to both external and internal pressures and favoured formal KG mechanisms to induce change. Figure 1 summarises our analysis of the shifting process.

**Table 3.** Learning processes and knowledge governance mechanisms.

| Learning process | Preconditions and triggers | Formal mechanisms | Informal mechanisms |
|---|---|---|---|
| Shifting | *Major reconfiguration driven by external triggers:*<br>• Compliance with new regulations (Beta, Gamma, Delta, Epsilon, Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Nu)<br>• Changing customer requirements and unpredictable market conditions (Zeta, Iota, Lambda, Mu)<br>*Major reconfiguration driven by internal triggers:*<br>• Changes of project directors or CEOs (Epsilon, Xi, Rho, Sigma)<br>• Structural changes (Omicron, Rho, Tau) | • Guidelines and procedures for new ways of undertaking projects<br>• Implementation of new management models<br>• Implementation of new contractual forms<br>• New trainings and courses<br>• Human resources practices<br>• Redesign of organisational structure<br>• Change of work responsibilities<br>(Kappa, Xi, Rho, Sigma, Tau, Phi, Psi, Omicron) | • Implementation of new cultural values<br>• Translation and modeling of new vision<br>• Use of leadership strategies to empower and motivate employees<br>(Iota, Kappa, Rho, Sigma) |
| Leveraging | *Ability to stimulate cross-project learning in PBOs*<br>• Opportunity-driven (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Rho)<br>• Failure-driven (Beta, Nu, Sigma, Tau) | • Lessons-learned databases<br>• Formal reviews<br>• Formal meetings<br>• Mentoring<br>• Trainings and courses<br>• PMOs<br>(Alpha, Zeta, Iota, Lambda, Mu, Pi, Rho, Sigma, Tau, Upsilon, Chi) | • Informal meetings<br>• Coffee breaks<br>• Ongoing voluntary interactions<br>• Informal project manager networking<br>(Alpha, Zeta, Iota, Lambda, Mu, Nu) |
| Adapting | *Performance-driven triggers*<br>• Adjust to new technologies (Alpha, Epsilon, Eta, Mu, Rho, Tau)<br>• Incremental improvements of systems, procedures, and processes (all firms)<br>• Improve management of complex projects (Zeta, Eta, Rho, Sigma, Phi)<br>• Ensure continuous product innovation (Mu)<br>• Achieve excellence in project operations (Alpha, Zeta, Iota, Kappa, Lambda)<br>*Resource-driven triggers*<br>• Improve soft and technical skills (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Rho, Omicron)<br>• Improve customer relationships (Gamma, Epsilon, Zeta, Eta, Mu, Rho, Sigma, Upsilon) | • Employee orientation (Alpha, Zeta, Iota, Lambda)<br>• Facilitating remote meetings, reading sessions, and conferences (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Chi)<br>• Skills training (Alpha, Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu)<br>• Communities of practice (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Omicron, Rho) | • Self-driven initiatives for skills development (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Rho, Omicron)<br>• Informal meetings and project rooms (Zeta, Iota, Lambda, Pi, Chi) |

## *KG mechanisms for leveraging*

Leveraging involves cross-project learning (Söderlund 2008). Despite the potential of each project to detect and explore new trends and ideas, our research reveals that top managers often struggle to identify mechanisms that facilitate a balance between, on the one hand, undertaking a variety of projects and, on the other hand, sensing new opportunities similar enough to facilitate cross-project learning.

Our analysis reveals that the most effective leveraging outcomes were triggered organically. The drivers were of two types: either a *proactive* search for new solutions and ideas across projects; or a *reactive* search in response to project failures that forced a recognition of the need to identify solutions from past projects that could be successfully applied to address existing project issues.

Formal KG mechanisms that support leveraging include project management and organisational tools and approaches that were embedded in lessons-learned databases, cross-project meetings, incremental improvements in process templates, and various activities facilitated by the project management offices (PMOs). However, we find that managers are often reluctant to engage in knowledge sharing across projects via formal mechanisms. Many of the lessons-learned activities amounted to little more than 'checking the box' and did not contribute significantly to leveraging. A top manager at Mu said: 'It is a little hard to face and see the value of the information in a project you were not involved in. There is a lot more to explain than what is captured in the report.'

Most formal mechanisms proved to be ineffective as leveraging stimuli, but there was one exception: the PMO. The PMO plays a boundary-spanning role linking micro and macro levels and thereby facilitating cross-project learning. Although some of the PMOs focused solely on managing information, the proactive PMOs (Alpha, Zeta, Iota, Lambda, Mu, Rho, Sigma, Tau, and Upsilon) did not limit themselves to applying formal mechanisms for cross-project learning. These PMOs also facilitated informal gatherings – such as cross-team morning meetings and afternoon tea events, at which discussions often addressed work-related topics and helped to resolve misunderstandings – and organised management forums and 'discovery' meetings to explore completely new ideas on how to lead and organise projects.

In most of our cases, respondents consistently stated that – for leveraging purposes – informal mechanisms were most effective. The organisations that encouraged frequent interaction and collaboration created an environment for informal knowledge sharing reported that leveraging yielded positive outcomes. For instance, Alpha's strategy was to identify opportunities for improvement. All of Alpha's respondents agreed that project shortcomings 'are not failures, they're just opportunities to improve things,' and this environment encouraged cross-project learning. Similarly, the project director at Nu noted: 'I don't think databases teach us lessons learned. We learn through collaboration in different forums and exchanges of experience.'

Leveraging was mostly initiated at the micro level by PMO-staff or project managers. Cross-project learning initiatives included anticipating and evaluating new opportunities in the course of informal meetings, coffee-break seminars, ongoing interaction, and informal networking among project managers. For the project managers in our study, 'learning by doing' and experiential learning were more highly valued than learning from documents. A project director at Lambda well represent the attitude of such managers: 'There are things that you cannot really learn except from having been in that situation before … you make mistakes and you learn from it and from my view that is the best experience … '

As noted previously, leveraging was triggered by either *opportunity-driven search* or a *failure-driven reactive responses*. Although top management carefully selected the KG mechanisms that ensured projects would contribute to overall organisational goals, project managers were usually (though not invariably) more loyal to the project than to the PBO. We also find that top and middle managers were more committed to the PBO than to particular projects. Yet these managers lacked mechanisms for redirecting project managers' loyalty from their projects to the organisation and its overall strategic goals. Figure 2 summarises our main observations on the elements of leveraging.

### *KG mechanisms for adapting*

In our cases, adapting led to incremental improvements initiated by a desire to make continuous improvements in project performance and to adjust resource acquisition and expenditures in

response to changes in the organisation's internal or external environment. For example, adapting was triggered by organisational objectives to improve customer relationships (Gamma, Epsilon, Zeta, Eta, Mu, Rho, Sigma, and Upsilon), accommodate new technologies (Alpha, Epsilon, Eta, Mu, Rho, and Tau), ensure continuous product innovation (Mu), improve the management of relatively complex projects (Zeta, Eta, Rho, Sigma, and Phi), win awards (Theta and Lambda), and achieve excellence in operations (Alpha, Zeta, Iota, Kappa, and Lambda).

Our findings indicate that adapting often requires combinations of internal and external KG mechanisms facilitating cross-functional integration within the PBO and external collaboration with customers, universities, and other external experts. Success depends to a great extent on identifying mechanisms that keep employees motivated to develop their skills. Mechanisms for adapting include fostering project teamwork through specially designed programmes and initiatives – such as skills training, project rooms, knowledge-sharing meetings – in addition to incremental improvements in systems, procedures, and processes as well as remote meetings, reading and reflection sessions, and conferences.

Furthermore, self-motivated and voluntary micro-level initiatives – for example, reviews of the recent technical literature – exemplified proactive learning and development initiatives (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Rho, and Omicron). Communities of practice that focused on the improvement of technical skills were in many cases used successfully to foster adapting (Zeta, Eta, Theta, Iota, Kappa, Lambda, Mu, Omicron, and Rho). These initiatives emerged from lower levels in the organisation but were supported by top and middle managers. However, one disadvantage of this approach was that PBO-related skills received short shrift because project managers were less motivated to develop their abilities in other subject areas. Top managers did not identify mechanisms that would motivate project leaders to develop other project management skills.

The process of adapting observed in our case studies often benefited from relational KG mechanisms that fostered long-term commitment and alignments (Hotho, Becker-Ritterspach, and Saka-Helmhout 2012). Managers enjoyed learning new technical knowledge. Yet, there was little development of knowledge related to soft skills (e.g. managerial styles and customer relationships), which ultimately led to declines in long-term capability building. The adapting process is summarised in Figure 3.

We find that shifting and adapting are triggered mainly by external or internal pressures and tend to capture the attention of top managers and the CEO, which increases the acceptance of these processes throughout the organisation. In contrast, leveraging seems to occur on a different level; it is driven primarily by ad hoc responses to opportunities or failures and finds the most support from middle managers and project managers. Thus leveraging does not enjoy the formal and organisation-wide acceptance of shifting and adapting, so the advancement of these respective processes both reflects and gives rise to different political environments. This result establishes that different management levels exhibit unequal interest in our three learning processes, which translates into varying degrees of legitimacy for the different modes of learning. In short: mechanisms driving the processes of shifting and adapting typically include *formal* tools, structures, and processes; whereas those driving leveraging are, for the most part, relationship-based and relatively *informal*.

## Discussion

Our study demonstrates that the *types and configurations of KG mechanisms* applied to stimulate shifting, leveraging, and adapting differ quite significantly across the studied cases. Even so, we did discern some notable patterns. Our analysis revealed that capability development is influenced by the ability and willingness of individuals to engage in knowledge processes and by internal and external pressures (Wang, Senaratne, and Rafiq 2015).

Our main contribution is the identification of four KG configurations stimulating capability development. After searching for patterns in our PBO cases, we conclude that it is primarily management's and employees' level of *readiness* for learning, rather than more general contextual aspects (including

the organisation's size, type, and industry sector of operations), that determine capability development outcomes. These results support our positing of four PBO types – balanced, interactive, formalistic, and fragile – that constitute four distinct configurations of governance mechanisms. The case studies are accordingly grouped in terms of their approaches to capability development; see Table 2.

In the *balanced* PBOs, managers clearly envision and strongly support continuous learning. These PBOs exhibit a high level of readiness for learning and are generally well aware of how to best combine formal and informal mechanisms to achieve their desired capability outcomes. They know when to mobilise efforts to trigger incremental improvements in adaptive capability and when to invest more heavily in major organisational changes via the process of shifting. These 'ambidextrous' PBOs respond effectively to what the conditions require; support and develop capabilities for routine projects or invest more in innovative projects (Davies and Brady 2016). Among such firms, commitment-based mechanisms are used to ensure that project managers are loyal both to their projects and their company. In general, organisational members demonstrate high levels of trust in peers and management likewise faith in the attitude of learning from others. Such mechanisms are much less prevalent in the other groups.

In order to encourage learning processes, the *interactive* PBOs rely mainly on informal mechanisms to stimulate learning; these mechanisms include social interaction, the use of personal networks, and/or flexible management systems. Using informal mechanisms triggers bottom-up exploration – through experimentation and development of new ideas – that supports development of capabilities for innovative projects (Davies and Brady 2016). Firms of this type are generally the most successful at leveraging, and they tend to favour informal interactions and networking to encourage cross-project learning.

In contrast, our sample PBOs of the *formalistic* type predominantly use formal mechanisms to stimulate codified knowledge sharing, favour the top-down approach to learning, and employ fairly rigid and controlled systems and processes. Through its ability to exploit an existing knowledge base and utilise proven practices, the formalistic PBO supports capabilities development mostly of 'routine projects' (Davies and Brady 2016).

Finally, the *fragile* PBOs were weak learners and generally struggled to find suitable mechanisms to encourage learning processes. Overall, their implementation of mechanisms proceeded in a laissez-faire and ad hoc manner. The use of knowledge mechanisms was highly irregular and their learning processes were, as a consequence, significantly impaired.

Our study supports the results reported in previous research by demonstrating that the effectiveness of KG depends on a combination of formal and informal mechanisms. The Balanced PBOs are the most facile in terms of shifting, leveraging, and adapting. They consistently rely on a variety of mechanisms, and their project managers demonstrate a higher level of commitment and loyalty to both the project and the PBO than are managers of other PBO types. Yet in the interactive, formalistic, and fragile configurations, the processes of shifting, leveraging, and adapting are all encumbered by an unwillingness to change and learn. The approach of formalistic PBOs – whereby formal mechanisms are implemented without establishing either individual commitment to the organisation or motivation for the tasks at hand – proved to be unsuccessful. Fragile PBOs demonstrate the weakest uptake of suitable mechanisms, and whatever learning they generate is mainly of the ad hoc variety.

Our second main contribution is the *operationalization of capability development*, specific for the project-based context. Table 3 summarises the results of our study and presents examples of capability development stimuli.

PBOs in general seem challenged to accumulate gained learning from projects. For instance, the quality of learning may be insufficient when individuals are rapidly switching their attention across projects with little time for reflective and exploratory learning activities (Sense 2008). The ill effects of these circumstances are magnified by the inherent difficulty of transferring, sharing, and integrating knowledge across project domains (DeFillippi and Arthur 1998; Davies and Hobday 2005; Ivory et al. 2007). In this respect, the PBO serves as a means to support projects in their learning processes

and to apply the benefits of information gained from past projects. Examples of the latter function include knowledge concerning improvement of operational project work – through project teamwork and leadership, for example higher-level strategic qualities, such as project shaping and the design of project hierarchies (Söderlund 2005) and various kinds of 'base moving' projects (Davies and Hobday 2005).

Our paper adds to the query put forward by Davies and Brady (2016) – how project-based firms realise the trade-offs between innovative and routine project capabilities. We found that the balanced PBOs combine formal and informal KG mechanisms to manage the compromise between the exploration and exploitation, assisting innovative and routine projects to develop their capabilities. The other forms of PBOs seem to be weaker to perform this balancing act, with the fragile PBO being least equipped to drive any kind of systematic organisational-level learning. This confirms and further builds on the findings in Bingham et al. (2015) related to the importance of establishing the firm's symmetry and synergy among various kinds of organisational learning processes and dynamic capabilities to remain flexible and competitive in the longer run. That is, executives favouring a certain growth trajectory and a particular set of KG mechanisms may end up excelling in only a limited number of capabilities in a situation when the organisation would benefit from being competent in managing at all three learning processes. Bingham et al. (2015) postulate the importance of being strong in multiple learning capabilities concurrently. Our study confirms this. The most successful organisations were those who were strong in developing all three learning processes concurrently.

## Conclusions

This paper demonstrates the close link between KG mechanisms and capability development in PBOs. To generate and execute projects well, PBOs must occasionally shift project epochs, they need to continuously adapt to improvements in different parts of their organisations, and they have to constantly strive to learn across similar recurrent projects Likewise, PBOs must understand how KG mechanisms should be used to drive the learning processes and thereby foster the development of capabilities. Our study offers evidence that PBOs rely on a range of formal and informal KG mechanisms to engage in three main learning processes: *shifting*, *leveraging*, and *adapting*. These mechanisms are clustered in different 'configurations' to drive learning and capability development; we proposed a typology – comprising four distinct configurations – balanced, interactive, formalistic, and fragile. These configurations provide a more robust framework that explains how capabilities are developed in PBOs and how organisations and their management can work to stimulate capability development. Our study, in particular, addresses the significance of configurations of KG mechanisms to achieve the best effect on capability development.

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## Appendix

The following table describes, for each organisation, the core elements and mechanisms that triggered *shifting*, *leveraging* and *adapting*.

**Table A1.** Patterns observed in the case-study organisations.

| PBO | Triggers of shifting | Mechanisms that facilitate or hinder shifting | Triggers of leveraging | Mechanisms that facilitate or hinder leveraging | Triggers of adapting | Mechanisms that facilitate or hinder adapting |
|---|---|---|---|---|---|---|
| Alpha | New managing director | Increased control and centralised decision making | Proactive search for ideas; environment for sharing rather than blaming | Informal and formal meetings, PMO, lessons-learned, informal chats | The need to introduce uniform procedures and project management processes | New enterprise project management system, buddy programmes for employee orientation, frequently scheduled informal meetings to break down cross-departmental silos |
| Beta | New regulations on the market | New contracts and regulations | Major failures in project execution w.r.t. budget overruns, quality, and schedule | New contracts and regulations | Major failures in project execution w.r.t. budget overruns, quality, and schedule | New contracts and regulations |
| Gamma | New regulations on the market | Formal; enforced by top management | Employee experience; a need for improved knowledge sharing | Enabled by bottom-up–driven initiatives of lessons-learned meetings among young employees (often women); hindered by elder men in the organisation with a hostile attitude toward knowledge activity | Customer complaints, major failures in project executions w.r.t. budget overruns, quality, and schedule | Working in pairs (from different departments) when meeting customers and during the whole project process to ensure both cross-functional knowledge sharing and long-term quality of the end product |
| Delta | New regulations on the market; new project director | New directives and enforced authority; quitting by people with a different mind-set – managing by fear | Reactive, ad hoc, on an as-needed basis | Formal meetings; informal chats with trusted colleagues | Major and repeated failures in project execution w.r.t. budget overruns, quality, and schedule | Updating of guidelines, procedures, and policy documents |
| Epsilon | New regulations on the market; new CEO | New enforced directives and procedures; hindrance by politicians and difficulties in recruiting appropriate staff | Reactive; lessons-learned | Hampered by project participants forusing mainly on delivery and then moving on; not prioritising lessons-learned activities | Major failures in project execution w.r.t. huge budget overruns, quality, and schedule; new customer requirements and new technology | Updating of guidelines, procedures, and policy documents; rigour in formal evaluation processes of both internal and external reviewers |
| Zeta | New regulations on the market; company merger | New directives; change in organisation culture | Proactive internal search for new and improved ideas | Working in pairs, training, lessons-learned meetings, workshops; attempts to foster stronger identification (among project managers) with the PBO than with the project | New customer needs and new technology; new complex projects | *External:* collaborations with experts and close customer relationships; actively searching feedback from customers; careful match of personalities between customers and project managers. |

(*Continued*)

**Table A1.** Continued.

| PBO | Triggers of shifting | Mechanisms that facilitate or hinder shifting | Triggers of leveraging | Mechanisms that facilitate or hinder leveraging | Triggers of adapting | Mechanisms that facilitate or hinder adapting |
|---|---|---|---|---|---|---|
| | | | | | | *Internal:* working in pairs; reviews, meetings, and attempts to foster a flexible environment that motivates employees to develop competencies |
| Eta | New regulations on the market | Implementation of new standards, courses, and training; hiring of motivated and curious individuals; not allowing a hostile knowledge environment – training of values | Proactive and internal search for new and improved ideas | Reviews, value engineering, value management sessions, mentoring; attempts to foster stronger identification (among project managers) with the PBO than with the project | Proactive and cross-functional search for new ideas; new customer needs, new technology, and new complex projects | Knowledge-friendly environment; knowledge sharing as a responsibility; no tolerance of selfish behaviour (share both mistakes and successes); formal, rigorous, and comprehensive annual reviews of employee performance and contributions to improving the business |
| Theta | New regulations on the market | Implementation of new standards and project processes | Proactive and internal search for new and improved ideas | Meetings, training, company conferences, workshops, informal chats; attempts to foster stronger identification (among project managers) with the PBO than with the project | Desire to win awards in the market | Close relationship with customers; training, courses, and conferences; learning culture |
| Iota | New regulations on the market. | Development of new skills and a culture characterised by respect, knowledge development, and innovation | Proactive and internal search for new ideas. | Meetings, training, company conferences, workshops, informal chats | Desire for excellence | Mentoring, continuous process updates, training, reviews; close relationships with customers and universities |
| Kappa | New regulations on the market; requirements of shareholders and customers | New processes, procedures, and guidelines for project execution; internal research department | Transfer findings from R&D projects to business projects | Focus sessions, guidelines, formal reviews, training, courses | One of the largest players in the market | Cross-functional involvement in projects throughout the project process; close relationship with customers and universities |
| Lambda | New regulations on the market | New sustainability regulations; striving to create a sustainable and healthy environment | Transfer of technical solutions across projects to provide the best outcome | Face-to-face meetings, not focusing on lessons-learned; incentivizing teams rather than individuals; a potential hindrance to overall performance is the strong | Desire to win awards for providing high-class end products and services based on sustainable and environmentally friendly solutions for customers | Close collaboration with universities; attending research conferences, workshops, and focus meetings; implementing incentives to promote the |

(*Continued*)

**Table A1.** Continued.

| PBO | Triggers of shifting | Mechanisms that facilitate or hinder shifting | Triggers of leveraging | Mechanisms that facilitate or hinder leveraging | Triggers of adapting | Mechanisms that facilitate or hinder adapting |
|---|---|---|---|---|---|---|
| | | | | focus on technical aspects and a weak focus on 'soft' issues such as leadership and human relations | | learning of sustainability-related aspects |
| Mu | New regulations on the market | New structures, cultures, processes, and guidelines | Same mistake is only allowed once in the organisation | Pressure on employees to avoid the same mistake twice and to avoid the mistakes of their colleagues; informal meetings and chats; formal training sessions and workshops | Providing innovative products | Focus groups with customers; national meetings and study tours; training of values and skills; courses, rigorous post-project reviews |
| Nu | New regulations on the market; a need to improve customer relationships | Decentralized organisational structure, new policy and guidelines; decreased organisational silos by merging five departments; process and outcome controlled by top management | Reactive need to share more experiences between project managers | Implementation of office support to improve project-to-project learning; open-office landscape; improved intranet | Reactive need to improve processes and relationships with customers | Implementation of office support to improve cross-functional knowledge sharing; improved intranet; new standards |
| Xi | New CEO; implementation of modified management logic with more emphasis on flexibility and speed | Improved process-orientation with more formal review and administrative systems to align the organisation | Rotation of project management responsibility among business and development projects | Skills, training, procedures, culture | The need to align the organisation for greater efficiency – externally driven | Change of project management team organisation; establishment of cross-project team model |
| Omicron | The need to improve coordination and transparency across divisions | Change of organisational structure toward a more project-oriented and matrix-type configuration | Search for technical solutions; a need to improve collaboration among projects | Informal interactions, collaboration, chats, wiki | The need to improve collaboration among departments | Collaborative tools such as corporate repository, remote meetings, internal conferences |
| Pi | * | * | Reactive need to share knowledge among project managers – driven from the top | Lessons-learned database, intranet, formal meetings, wiki | The need to improve project processes | New environment to improve knowledge sharing within the organisation |
| Rho | New CEO; a need to improve efficiency and effectiveness; a | Implementation of new networks and improved collaboration between six business districts; | Technical solutions driving development needs | Improved project manager networks; technical experts in the PMO allowing knowledge to prosper between projects; | The need to align the organisation | New 'gate control' system of project performance; new courses and new network structure to bridge silos; |

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**Table A1.** Continued.

| PBO | Triggers of shifting | Mechanisms that facilitate or hinder shifting | Triggers of leveraging | Mechanisms that facilitate or hinder leveraging | Triggers of adapting | Mechanisms that facilitate or hinder adapting |
|---|---|---|---|---|---|---|
| | need to align the organisation | implementation of a PMO and new guidelines; improved process orientation | | formal reviews; strong technical focus | | hindrances include employees that have no incentive and hence are reluctant to change |
| Sigma | New project director; new customer requirements | Implementation of a PMO and new project processes; implementation of a new project role (facilitator) to improve relationships between customer and projects during programming and design phases | Reactive need to share more experiences among project managers | Informal meetings; formal initiatives not successful owing to dominant project culture | The need to improve project process and customer satisfaction | One human-oriented project manager for early phases and one technical-oriented project manager for execution phases; hindrances include not enough cross-functional collaboration with other departments |
| Tau | Internal employee pressures; new marketing director | New organisational structures and processes | Reactive need to share more experiences among project managers | Project meetings; informal chats and meetings | The need to improve cross-functional knowledge sharing | Establishment of review sessions with employees across departments; improved intranet |
| Upsilon | Need to improve project business to stay competitive nationally and internationally | New contract forms; increased number of turnkey projects; separate division for special projects | A need to find innovative solutions in the project business to meet customer demands | Transfer of project management team model from development project to business projects | The need to improve customer satisfaction and risk management across the organisation | Modified project organisation with a revised gate model and risk management procedures |
| Phi | New technological innovation; different types of projects; extended responsibility of projects | New management logic and organisational structure for project business | The need to handle uncertainties in business projects | Transfer of development project practices | The need to generate and manage complex projects | Change of project management team organisation |
| Chi | * | * | Reactive need to share knowledge among project managers – driven from the top | Face-to-face meetings; wiki; use of intranet to share data and information; lessons-learned databases | The need to improve cross-functional knowledge sharing | Process improvement projects; formal meetings organised between project managers and with functional departments; establishment of PMO |
| Psi | External and internal needs to improve efficiency and become more innovative | Change of business model with greater emphasis on speed and shorter lead times | The need to improve management of complexity and cooperation across projects | Transfer of strategic project managers from change projects and development projects to business projects | The need to improve project skills for managing different types of projects in the organisation | Forming a pool of strategic project managers; new organisational logic with dedicated project teams |

*The empirical data yield no evidence of shifting in Pi or Chi.