

Projects as arenas for pragmatic management practices: Improvisation, capabilities and change

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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~UT AMEM ET FOVEAM~

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“Arriving at one goal is the starting point to another.”

John Dewey (1859 – 1952)

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Abstract

The purpose of my thesis is to investigate improvisational practices in projects and project-based organisations. Improvisation is a naturally occurring part of our daily actions. Improvisation is not a practice without structure, it is much rather a form of *doing* that utilises existing processes, experiences and other forms of knowledge to make things work if the existing structure fails to produce the aspired outcomes. It is often what practitioners *do* when they face unexpected challenges in their project work. At the same time, I emphasise the importance of existing theories and their underlying processes as potential starting points for improvisational action. Theories therefore become valid tools of practice that should be seen as enablers of practical actions.

The current project environment holds many challenges. Not only is the external environment uncertain, ambiguous and fast moving; the internal structure is becoming increasingly pluralistic and multifaceted. Hence, there is a high level of internal and external complexity. This is not necessarily a bad thing. However, the growing number of theories fails to translate into successful project management practices, as a large number of projects still fail to meet their stated objectives. There are numerous reasons that contribute to this problem. However, this doctoral work focuses on the theory-practice division within the field of project management. The multiple theories are not only incompatible; they also lack practical applicability as many propose rational, linear and universal processes. Hence, the practical aspect in regards to practical value and applicability is not sufficiently addressed in current project management theories.

My understanding of improvisation stems from pragmatic philosophy and thus serves as a practical theory that bridges existing project management theories and practical actions. Using a pragmatic mindset, I seek to overcome the distinction between theory and practice. My intention is to show that there is practical value and a level of sophistication in existing project management theories that are often undervalued in practice. Conversely, practitioners can also devalue the importance of good theory. This research uses improvisation to address this practice/theory divide by illustrating that practitioners can use theoretical knowledge as tools of practice that can be applied in multiple ways to solve different problems. My contributions are of practical and theoretical nature and help to develop a more comprehensive and context-dependent theory of project management.

Chapter 1

"There is nothing more practical than a good theory."

Kurt Lewin (1890 – 1947)

Over the past two decades the business landscape has changed dramatically. Stability and predictability have found their substitutes in ambiguity and complexity (Maylor et al., 2008), as modern management faces challenges that are dynamic, unpredictable, mobile, unique, and temporary (e.g. Feldman and Orlikowski, 2011, Maylor et al., 2008). This rollercoaster-like world is characterised by increasing speed in combination with constant changes in all possible dimensions. Standard organisations' rather static structures are often the very opposite of what is required to deal with complexity and therefore organisations struggle to operate effectively and efficiently. Projects are widely recognised as an adequate weapon of choice to address the existing complexity as projects' dynamic, unique, flexible and temporary qualities (Turner, 2009, Winter et al., 2006c) are supposedly well suited to meet the challenges of the modern business environment. The management of projects and the context-dependent alignment of this "*post-bureaucratic work order*" (Maylor et al., 2006) have attracted the interest of many management and organisational scholars.

Although research on project management has progressed markedly from firm-specific *ad-hoc* problem solving to structured project management guidelines, many projects still fail to achieve their stated objectives (e.g. Maylor et al., 2008, Flyvbjerg, 2007). Traditionally, project management has focused on the strict application of established processes for planning, monitoring and control, most of which are codified in various bodies of knowledge (Cicmil et al., 2006). These formal bodies of knowledge promote best practices (i.e. PMBOK) that describe the generic nature of a project (Besner and Hobbs, 2008). These universal 'recipes' for project management suggest a direct transfer from basic to applied science in which practice is "*conceived as essentially technical. Its rigor depends on the use of describable, testable, replicable techniques derived from scientific research, based on knowledge that is objective, consensual, cumulative, and convergent*" (Schön, 1986, p. 61). Project management and its methodologies are thus seen as being prescriptive, rational, linear and value-neutral, and stemming from positivist origins (Cicmil and Hodgson, 2006).

In recent years, the project management community has experienced an influx of alternative project management approaches, which challenge the rational assumptions of traditional project management (e.g. Bredillet, 2004, Cicmil, 2005, Blomquist et al., 2010). Although there are a variety of alternative streams (e.g. critical project studies, practice-oriented studies), the general research lens adopted has shifted from technical disciplines towards the social sciences. Here, project management is broadly established as a multidisciplinary and pluralistic field (Winch, 1998, Bredillet, 2010a) that includes political, strategic, social, environmental, and communicational aspects (Cicmil and Hodgson, 2006, Lalonde et al., 2010, Leybourne, 2006a). The main goal of these alternative project management approaches is to challenge traditional beliefs around projects as an objective reality; a reality that can be managed and controlled by applying linear, universal and rational project management methods, in which context becomes almost inconsequential.

Overarching Research Aim

Based on the fact that many projects still fail to meet their stated objectives, this thesis aims to contribute to the emerging stream of alternative project management theories that challenge the traditional notion of linear, rational and strict project management (Cicmil et al., 2006). More precisely, I aim to provide a better understanding of practice-based project management, which is essential considering the nature and complexity of the current business landscape. In the pursuit of expanding on traditional project management approaches to address the increasing complexity in current project environments, different project management schools of thought have emerged (Bredillet, 2007, 2008a, 2008b, 2008c, Söderlund, 2004, 2011). The different schools cover a wide range of topics and theories, also influenced by general management theories that range from rather traditional ways of managing projects, influenced by a positivist mindset, to more behavioural approaches, driven by a more postmodernist way of thinking. Despite this variety of project management approaches, which suggests a sophisticated understanding of the topic, there appears to be a misalignment between the proposed theories and their practical application.

Hence, the field of project management has recently proposed a move towards more practice-oriented studies with the aim of uncovering the actuality of project work (Cicmil et al., 2006). A focus on the underlying practices and practical validity helps to put existing theories to work, which may result in an increased success rate of projects, without making the field more complex (Whitty and Maylor, 2009). Hence, this thesis attempts to encourage project management scholars to see theories, the underlying processes and existing structures

as context-dependent, non-universal contributions to the toolkit of the practitioner. Project management then becomes an interplay of existing structures and contextual practices, directed towards delivering a successful project. I argue that project management possesses a sophisticated understanding of the existing structures. There is, however, a need to conceptualise contextual practices that are directed to solving a particular problem, which is the project. Hence, I use a pragmatic version of improvisation to describe this contextual means of project management practice, as any canon of research emerges from specific philosophical grounds, or in other words: “*all professions and sciences have an opening towards philosophy*” (Nyeng, 2004, in Dehlin, 2008, p. 134).

Research Lens

Classical pragmatism is the philosophical opening for this thesis, as it is constructed upon an anti-Cartesian maxim that rejects a separation between theory and practice. Practice is always informed by theory (and other forms of knowledge, such as practical experience and practical wisdom) and vice versa. Pragmatism is better described as a philosophical method for doing, rather than a philosophical theory *per se* (De Waal, 2005). At its centre is the problem to be solved, and pragmatism argues that our inquiries are directed towards finding practical solutions for those problems (Hickman, 2001, 2004). Inquiry is the reflective and iterative process of solving a particular problem. Throughout the process, consensus about both means and ends has to be established, which results in the co-ordination of (theoretical) knowledge and (practical) actions.

Building on this pragmatic mindset, my thesis describes improvisation as a spontaneous and creative act enabled by theoretical or practical knowledge that is directed towards solving a practical problem as it unfolds (Cunha et al., 2012, Cunha et al., 1999). More precisely, following Dehlin (2008), I perceive improvisation as a concept that helps to explain project management practices theoretically as problem-solving actions and practically as something that project managers *do* in their daily work. Improvisation is not an uneducated or *ad hoc* action that undermines the project manager’s ability to plan or diminishes the importance of structure; it is rather a spontaneous, creative and immediate act that is naturally performed when the existing structure breaks down or fails to provide a meaningful solution to the problem at hand (Cunha et al., 2012). In this version, improvisation has different facets and degrees, and is an everyday feature of managerial (project) work rather than being a rare or exceptional phenomenon (e.g. Tsoukas and Chia, 2002, Leybourne, 2006a, Leybourne, 2006b, Leybourne, 2009, Leybourne and Sadler-Smith, 2006, Moorman and Miner, 1998).

Improvisation occurs when other alternatives are expended, implying it coexists with more formal organisational processes (Dehlin, 2008). Hence, improvisation is about achieving a projected outcome while contextually using available resources, such as plans, schedules or Gantt charts (cf. Cunha et al., 1999). Improvisation is an inherent element of project work and a conscious pragmatic process that can occur in two ways: reactively and proactively (Dehlin, 2008). In a reactive form, improvisation is an immediate response when existing routines are deficient (Weick, 1998). In a proactive sense, improvisation is used to change existing organisational resources prospectively to avoid potential malfunctioning. Here, improvisation encompasses the ability of real-time foresight (Cunha et al., 2012) that enables immediate changes of existing project management practices. In both cases the driver for improvisation is the problem at hand. Despite the process-oriented and standardised nature of conventional project management, project managers often operate outside, yet through and with, these pre-given structures, making improvisation a particularly interesting phenomenon for a practical field such as project management (Cunha, 2005, Cunha et al., 2012). As such, improvisation is a naturally occurring practice in every project that happens almost on a daily basis to a greater or lesser degree (Dehlin, 2008).

Improvisation has little recognition in traditional project management, which is dominated by rationality and linearity, as the plan is taken for granted, as is its workability (Cicmil et al., 2006). Despite scholars' attempts to promote improvisation in the literature (e.g. Leybourne, 2009, Leybourne, 2010, Leybourne, 2007a, Leybourne and Sadler-Smith, 2006), it is still not sufficiently incorporated in our understanding of managing projects. We can even go one step further by arguing that improvisation is traditionally perceived as a negative practice (Leybourne, 2006a), since it seems to question a project manager's capability to precisely and analytically plan the project and the required work. However, these are societal, institutional and organisational norms that the project management community creates themselves, in which improvisation is nothing to be proud of. This paper aims to transcend this mindset and introduce improvisation as a normal trait in everyday project management. It is more than an *ad hoc* problem-solving practice, and does not portray project managers as unskilled workers.

My version of improvisation introduces projects as a toolbox that enables practitioners to utilise existing theories, methods and processes in a context dependent and situational manner (Worren et al., 2002). This toolbox provides certainty to practitioners and organisations, as they can choose from a pool of standardised approaches, but at the same

time it allows them to address complex project situations, where different resolutions are necessary (Blomquist and Müller, 2006). Tools can be defined by their structure, action, and the outcome that they produce (Dewey, 1967-72, 1976-83, 1981-90). Most importantly, however, tools are not limited to pre-conceived definitions (Hickman, 1990). Rather, they can be used in an improvisational fashion, meaning in a contextual way to solve a particular problem at hand (Dewey, 1929). Following the pragmatic premise *true is what works* (Schiller, 1913), practitioners should not care about whether something is scientifically or objectively true. It is more important if something works for them in their context, in their *reality* (Schütz, 1967). The goal in the current business environment must be to create sufficient theories and structures that provide certainty for people to work, while acknowledging that the world is uncertain and nothing should ever be taken for granted. This can be achieved via a pragmatic mindset, which allows practitioners to interrogate their old routines, habits or theories, utilised, however, as context dependent rather than universal tools (Worren et al., 2002).

Research Gaps

In this doctoral thesis, I have identified three main research gaps in the current project management literature that emerge from traditional, dualistic assumptions inherent in the project management literature. These were identified, articulated and developed with the support of my supervisors and co-authors and originated from a 2006 special issue in the *International Journal of Project Management*, “Rethinking Project Management”. Despite the emergence of practice-oriented studies in management and organisation studies in general, and its seepage into the project management literature, the field is still in its infancy in relation to developing theories with practical value. Hence, I outline the following three research gaps.

1. The need to develop theories *about* practice:

Due to the existence of varying definitions of what a project is and how it is supposed to be managed, multiple and often incompatible project management theories have emerged, all of which claim to provide the ‘right’ characterisation of a project and offer solutions to manage it successfully (Bredillet, 2007, 2008a, 2008b, 2008c, Söderlund, 2011). The different theories stem from different academic disciplines and schools of thought with often opposing fundamental beliefs (Kwak and Anbari, 2009). There is consensus that new methods and concepts need to be incorporated into modern project management theory to

address modern challenges, such as complexity in internal and external project environments, collaboration and value delivery. Hence, this doctoral research will examine the nature and evolution of project management as a field of study, and introduce traditional and newly emergent theories as context-dependent tools that help to master modern business challenges.

2. The need to develop theories *for* practice:

There is an overarching need to close the gap between project management theory and practice. Hence, it is necessary to develop theories *for* practice; theories that enable project managers to do their job successfully (Winter et al., 2006c). Currently, there is a multitude of project management theories to draw from (e.g. Bredillet, 2010b, Söderlund, 2004, Söderlund, 2011). Each theory represents a toolbox that explains a universal way of managing projects by proposing linear processes, tools and techniques, often assigned to different stages of the project lifecycle. On the other hand, project management practice is often quite messy and formal processes make way for spontaneous and intuitive applications of particular theories (Leybourne and Sadler-Smith, 2006). In this thesis I introduce improvisation as a practical theory that makes use of the broad spectrum of existing theories, in regards to their context-dependent nature and practical applicability. Improvisation binds the multiple images that existing theories claim can be used to develop a broader perception of what projects are and what project management is, and whether they can therefore reveal new ways of managing projects successfully (Morgan, 1997, Winter and Szczepanek, 2009).

3. The need to develop theories *in* practice:

The unique characteristics of projects and the project-based environment (Turner, 2009, Maylor et al., 2006) mean that projects frequently need to modify, transform or adapt their practices. The increasing size and complexity of projects further amplify the need for change in project management. Following the rational mindset of traditional theories, organisational change is often explained through formal processes that have to be applied rigidly. While these aspects of change help explain change from a structural perspective, they fail to provide much guidance regarding what actually happens *in* practice when immediate changes are necessary to navigate projects through complexity in respect to ever-changing events (Winter et al., 2006a). Hence, the project management literature requires empirical investigation of improvisational practices that help project managers to facilitate change in a spontaneous, intuitive and creative fashion, while acting within and through the project-based structure. This complementary way of describing change highlights project managers as

reflective practitioners whose actions and dispositional behaviours are influenced by their own identity and processes of sensemaking, in which daily practices are changed in accordance with the existing problem.

Key Research Questions

The overarching research question of this doctoral thesis is: *How can improvisation help to explain modern project management?* To answer this question and to meet the intellectual task of shifting the view of project management towards a more improvisational approach, it is essential to address the aforementioned research gaps with a practice-oriented mindset. This is attempted with four papers¹, all of which are concerned with different aspects of the journey to emphasise the importance of improvisation in project management. Following a pragmatic mindset, I choose a mixed methods research approach (Johnson and Onwuegbuzie, 2004, Williams, 1999) to address the different research questions and foci since all papers deal with a particular problem and therefore have an individual research question. The specific research questions for each paper are as follows²:

- Paper 1: *To what extent can the field of project management research be described as pluralistic?*
- Paper 2: *How can existing project management theories be used to address the increasing complexity of projects?*
- Paper 3: *How do project-based organisations change their existing capabilities at different organisational levels?*
- Paper 4: *To what extent do entrepreneurial and improvisational capabilities explain change and performance in do project-based organisations?*

Even though all papers were written in collaboration with my co-authors, my ideas and contributions were sufficiently more in comparison to my co-authors. Table 1 provides an overview of the papers that are part of this thesis including title, contributing authors, and my contribution, as well as other works that are related to my research but are not part of this doctoral thesis.

¹ All papers were written in collaboration with my co-authors and supervisors, which helped me shape and reflectively develop my theoretical propositions and assumptions. All papers have been submitted to conferences and/or journals, and have thus been reviewed by external researchers

² The terminology for improvisational practices varies across the papers, depending on the journal/conference each paper was submitted to. The underlying concept of improvisation and its pragmatic nature is however consistent throughout my thesis.

Table 1: Overview of research output

Papers for thesis	Contributing authors	Submitted to	My contribution ³
<u>Paper 1:</u> <i>Theories as tools: Reviewing the plurality of project management theory, research and the practice-turn</i>	Christopher Biesenthal Dr. Ralf Wilden	This paper was presented EURAM Conference 2013 in Istanbul	75%
<u>Paper 2:</u> <i>Towards a Praxeology of Resilient Project Management - A conceptual framework</i>	Christopher Biesenthal Dr. Louis Klein A/Prof. Erlend Dehlin	This paper was presented at IRNOP Conference 2013 in Oslo	70%
<u>Paper 3:</u> <i>The Differential Roles of Multilevel Change Capabilities in Project-Based Organisations</i>	Christopher Biesenthal Prof. Siegfried Gudergan A/Prof. Shankar Sankaran Prof. Veronique Ambrosini	An earlier version of the paper was presented at EGOS Conference 2012 in Helsinki	70%
<u>Paper 4:</u> <i>The Role of Entrepreneurial and Improvisational Capabilities in Project-Based Organisations</i>	Christopher Biesenthal Prof. Siegfried Gudergan	Journal of Management Studies (JoMS)	70%
<u>Additional Publications</u>			
<u>Scholarly Book Chapters</u>			
Biesenthal, C., Sankaran, S., Clegg, S., and Pitsis, T., 2013 (exact date to be decided by the editors), <i>Temporal Riffs in Organization Studies: Implications for Strategic Project Management</i> , Strategic Project Management, Ed. Blomquist, Haniff and Calabrese, Routledge, accepted 13/01/2013			
Biesenthal, C., 2014 (proposed publishing data is 4/30/2014), <i>Pragmatism</i> , in Encyclopaedia of Action Research, Ed. Coghlan and Brydon-Miller, Sage Publications, accepted 11/03/13			
<u>Refereed Journal Articles</u>			
Müller, R., Andersen, E. S., Kvalnes, Ø., Shao, J., Sankaran, S., Turner, J. R., Biesenthal, D. and Gudergan, S., 2013, <i>The Interrelationship of Governance, Trust and Ethics in Temporary Organizations</i> , Project Management Journal (in press), accepted 22/04/2013.			
<u>Other Refereed Conference Papers</u>			
Biesenthal, C., Vignehsa, K., Sankaran, S., Pitsis, T., Gudergan, S., and Clegg, S., 2012, <i>Tools of change: Exploring the Duality of Dynamic Capabilities in Project-based Organisations</i> , EGOS Conference, Helsinki, 2 to 7 th July			
Vignehsa, K., Biesenthal, C., Clegg, S., Gudergan, S., Pitsis, T., and Sankaran, S., 2012, <i>Double Moral Hazard in Projects – A Governance Perspective?</i> , EGOS Conference, Helsinki, 2 to 7 th July			
Müller, R., Andersen, E. S., Kvalnes, Ø., Shao, J., Sankaran, S., Turner, J. R., Biesenthal, D. and Gudergan, S., 2012, <i>The Interrelationship of Governance, Trust and Ethics in Temporary Organizations</i> , PMI Educational & Research Conference, Limerick, 15 to 18 th July			

³ My contribution have been discussed with and confirmed by my co-authors.

Structure and Methodology

The structure and mixed methods research approach of this doctoral thesis provides an appropriate means of investigating and explaining different aspects of the aforementioned research question. In the light of transcending existing dualisms in the field of project management with a pragmatic mindset a mixed methods research approach is vital, as it improves “*communication among researchers from different paradigms as they attempt to advance knowledge*” (Johnson and Onwuegbuzie, 2004, p. 16). Mixed methods research allows the researcher to choose the appropriate method to answer a specific research question meaningfully (Johnson and Onwuegbuzie, 2004, Hoshmand, 2003). This is especially useful in a pluralistic and complex field such as project management (Williams, 1999) in which both qualitative and quantitative aspects are used to describe project work and to operate accordingly. Mixed methods research fosters a pragmatic mindset as it allows the researcher to intersubjectively emerge in the context through abductive reasoning, which further enables transferability of the collected data in a context dependent fashion (Morgan, 2007). Accordingly, the overarching narrative of this thesis is as follows:

The first paper addresses the first research gap by providing a literature review of all papers published in three leading project management journals over a fifteen-year period using the textual data analysis tool Leximancer. We find that project management as a field of research is indeed pluralistic, and thus represents a sophisticated toolbox for contextual practices that can help practitioners to successfully master and manage the complex project environment. We also find evidence for more practice-oriented project management research.

The second paper, a conceptual paper, uses the explored plurality as a starting point to describe the variety of theoretical knowledge as tools of practice that enable contextual project management work and thus describes the inseparability of structural and practical aspects. The paper addresses the second research gap, as it introduces improvisation as a practical tool/theory *for* project management. The contextual application of existing theories is driven by different degrees of improvisation, which ultimately leads to resilient project management. Hence, the paper argues for an interplay between structural and less structural aspects that constitute everyday project work.

The third paper follows up on the argument of structural and less structural aspects of project work and qualitatively investigates the nature of operational and change capabilities on different levels in project-based organisations on the basis of three cases. This study

specifically differentiates between formal and less formal project capabilities across organisational levels, which represent structural and improvisational aspects. It addresses the third research gap, as it empirically investigates aspects of improvisation *in practice*. Our results confirm that both forms of change capabilities (structural and less structural) are present in project-based organisations.

The fourth paper provides a quantitative analysis, of formal and less formal change processes in project-based organisations and thus addresses the third research gap. To test our hypotheses we use SmartPLS, which is a structural equation modelling (PLS-SEM) software. More precisely, the paper picks up on the dual notion of change capabilities from the previous paper and specifically explores the relationship between higher-order change capabilities (entrepreneurial and improvisational), operational capabilities and performance through a large-scale survey. Our analysis shows that both forms of change are used to facilitate change in project-based organisations, which ultimately leads to better performance.

Finally, a general conclusion will specifically address the overarching research question and aforementioned research gaps. The outcome of this research will not be a universal theory about best project management practice, but rather will offer an enhanced understanding of practice-based project management that helps to bridge theory and practice.

Chapter 2

Theories as tools: Reviewing the plurality of project management theory, research and the practice-turn

Introduction

Projects – defined as post-bureaucratic organisational structures (Hodgson, 2004, Partington, 1996) – are often used as a response to address the challenging modern business environment, which has been described as complex, uncertain and fast changing (Feldman and Orlikowski, 2011). Since the 1960s, project management has developed into a sophisticated field of study (Bredillet, 2010a) that has received much attention from researchers and practitioners (Turner and Müller, 2003, Lundin and Midler, 1998). This research field has produced valuable insights into the nature of projects and how they should be managed, resulting in various project management theories and methodologies, including empirical, rational, historic, and pragmatic methods (Hjørland, 1998). As a result of this intensified attention, the research field has become very diverse and definitions of the core constructs are riddled with inconsistencies (e.g. Maylor et al., 2006, Hodgson and Cicmil, 2008, Bredillet, 2010b). Many of the existing theories claim universal applicability of the proposed tools and techniques and thus express a rational and dualist mindset (Cicmil et al., 2006). Proposing universal rules and strict theories that describe projects as an objective (or subjective) entity ready to be managed in a specific way fails to capture the importance of contextual practices to successfully manage and deliver a project (Geraldi et al., 2010), something that is particularly important in a practical and complex field such as project management.

In this paper we utilise a non-dualist, pragmatic mindset to introduce project management theories as tools of practice (Worren et al., 2002). Theories are mere starting points for project work that should be applied in a contextual fashion to meet particular requirements. Theories are not recipes that a project manager can follow strictly without examining and evaluating the contextual factors (Schön, 1986). The existing multiplicity of project management knowledge and theories in particular serve as a foundation for our argument. Despite the multitude of practical and theoretical knowledge, in the form of scientific theories, formal standards or tacit knowledge, project management is often criticised for not having a theoretical base (Koskela and Howell, 2002, Winter et al., 2006c).

In addition, a large number of projects still fail to meet their stated objectives, such as time, cost and quality (Flyvbjerg, 2007), indicating a gap between the so-called best practise and their application in practice to result in a successful project outcome. In this paper we therefore examine the pluralist nature of projects through a scientometric analysis and illustrate that existing project management knowledge provides sufficient tools and internal variety to form a solid theoretical base that can support successful complex project delivery (Whitty and Maylor, 2009).

This paper differs from existing literature reviews in multiple ways: it discusses projects from a pragmatist standpoint, while it further uses a textual analysis tool, Leximancer, which is a powerful device for interpreting and visualising complex text data (Campbell et al., 2011), to review project management-specific journals. Our particular contributions are as follows: First, we empirically illustrate the plurality of project management research by scientrometrically examining more than 2000 papers published in leading project management journals. We further provide an overview of the main concepts over the last five years of project management research to explore the proposed practice-turn (Cicmil et al., 2006, Schatzki et al., 2001, Blomquist et al., 2010). We theoretically conceptualise project management theories as tools that can and must be used in a contextual way to deliver a successful project.

The aim of this paper is two-fold: One, we will empirically re-explore and confirm the pluralistic nature of the existing project management literature in a novel way by using the textual analysis tool Leximancer. Furthermore, we aim to empirically investigate the proposed practice-turn in the project management literature. Theoretically, we propose that the theoretical multiplicity of the field serves as a sophisticated and diverse toolbox that can help managers to deliver projects successfully if applied in a contextual fashion.

The remainder of this paper is structured as follows: First, we provide a brief overview of the plurality of the field of project management by highlighting existing reviews and categorisations. Using these reviews as starting points for our discussion, we then introduce our pragmatic understanding of what a theory is and consequently apply this viewpoint to the field of project management. Then we provide a detailed description of the method used to analyse the dataset. An analysis and findings section follows, in which we provide a categorisation of the literature and discuss similarities and differences across our sample and existing reviews. Subsequently, we highlight the implications of our study

regarding the proposed plurality of the field. We finally conclude by summarising our findings and providing ideas for future research.

An overview of existing reviews

The field of project management research has produced a vast amount of knowledge, communicated in books, academic journals, formal books of knowledge (e.g., PMBOK) and practical project management tools (e.g., Prince2). The underlying literature has been described as multifaceted, as it stems from varying backgrounds, not only in regards to its practical and theoretical orientations, but also in regards to the underlying philosophical standpoints (Bredillet, 2010a). Many researchers have tried to summarise the often incompatible and competing theoretical frameworks to provide some clarity and direction with the aim to make managing projects in practice more successful (Morris et al., 2011, Garel, 2013). Some authors use a high-level analysis to illustrate the division between theory and practice in project management by highlighting philosophical underpinnings of each project management approach (Lalonde et al., 2010, Blomquist et al., 2010). More specific literature reviews show that projects are a heterogeneous construct in which success criteria and underlying capabilities constantly change depending on the context in which they operate (e.g. Crawford et al., 2006b, Shenhar and Dvir, 2007, Leybourne, 2007b). More recently, project management scholars have tried to combine the different literature reviews by proposing schools of project management thought (Bredillet, 2007, 2008a, 2008b, 2008c, Söderlund, 2011). The different categorisations and reviews provide a valid starting point for our study, as they specifically aim to uncover the multitude of project management theories.

Crawford and co-authors examined the trends in the project management literature over a ten-year period from 1994–2003 by using keyword analysis, a method of computational analysis from the field of corpus linguistics. Their findings suggest a “*clear reduction in focus on Interpersonal Issues and Quality Management*” (Crawford et al., 2006b, p. 183), as well as increased attention on the topic of ‘project evaluation and improvement’. To gain more insights, the scholars compared and triangulated their results with previous studies and identified common areas of project management that appeared to be consistent amongst all reviews, namely ‘relationship management’, ‘resource management’, ‘project and planning control’, ‘time management’, ‘cost management’ and ‘risk management’. Other aspects, such as ‘finalisation’, ‘scope’ and ‘marketing’, were often ignored in the project management literature. Crawford et al.’s (2006b) findings further

suggest a departure from social aspects of project management, despite the growing emergence of alternative project studies, such as critical project studies (e.g. Cicmil and Hodgson, 2006, Hodgson and Cicmil, 2008, Hodgson and Cicmil, 2006) and practice-oriented studies (e.g. Pitsis et al., 2003, Blomquist et al., 2010).

Similarly, Leybourne examined project management research by investigating the underlying epistemological and ontological perspectives and linking them to existing theoretical domains to transcend “*the practitioner-dominated understanding of the field*” (2007b, p. 62). The paper uses the output of various PMI sources as the starting point for the analysis. The contribution of the paper is twofold: First, the author investigated the evolution of the main focus of project management research. The findings suggest a move from traditional tools toward more behavioural aspects of project work; something that has been previously suggested by other authors (Cicmil, 2006, Crawford and Pollack, 2004). Second, the author analysed the multitude of theories that are applied in project management and examined their validity. The goal of this undertaking was to provide a starting point for future research that investigates the connection between theory and practice in more detail. Finally, Leybourne (2007) suggests a more comprehensive analysis of the literature that goes beyond the two main project management journals to develop a more robust understanding of the existing theoretical frameworks and their practical validity.

Kwak and Anbari (2008) expanded Leybourne’s (2007) research and linked project management to the main disciplines of management in an attempt to overcome the existing gap between general management and project management, as well as to develop project management into a more rigorous field of study. In particular, Kwak and Anbari (2008) investigated the field of project management on the basis of eighteen top management and business journals to establish the maturity of current project management research. The paper highlights project management as a multidisciplinary field in which it is problematic to identify a single core. More concerned with the evolution of project management as a field of study, Kwak and Anbari (2008) suggest that scholars and practitioners may need to further promote project management as an academic discipline “*by being more vigilant of other allied disciplines and continue to spread understanding of PM not only within the PM domain but more to other management fields*” (2008, p. 10).

In an attempt to put existing theories into a single framework, Söderlund (2011) and Bredillet (2010) introduced schools of project management that combine the existing trends

and underlying broader categories and link them to the philosophical perspectives. More precisely, Söderlund (2004, 2011) identifies seven schools of project management. He examines literature on projects published in the last five decades in 30 leading management and organisation journals. The seven schools of project management thought comprise: Optimisation School, Factor School, Contingency School, Behaviour School, Governance School, Relationship School and Decision School. Building on Söderlund (2004) and Kwak and Anbari (2009), Bredillet (2007, 2008a, 2008b, 2008c) proposes nine major schools of thought, namely Optimisation School, Modelling School, Governance School, Behaviour School, Process School, Contingency School, Success School, Decision School and Marketing School, in which he integrates previous frameworks. Bredillet (2010a) highlights a substantial number of differences between the different schools, while proposing inevitable interconnections as well. Hence, in line with Söderlund (2004, 2011), he argues that the schools are not mutually exclusive, as they are merely different perspectives to explain the same concept: project management.

Lalonde et al. (2010) highlight an overarching distinction between practical and theoretical project management knowledge; a separation that can contribute to poor project performance. In its purest practical form, project management has no objective to develop theoretical and formalised knowledge. It relies merely on tacit knowledge and is therefore not supported by a particular model. Hence, this type of project management describes “*what project managers do*” (Lalonde et al., 2010, p. 23). The authors further illustrate the pluralistic nature of existing project management theories, which emerged from the aim to standardise and professionalise the field. Scientific theories describe project management as a sequence of processes that have to be applied strictly and sequentially to achieve a successful outcome. This form of knowledge assumes a direct relationship between theory and practice, in which theoretical models can be directly applied in practical situations. It very much underlies an *objective* mindset. Contrarily, behavioural theories of project management focus on the social aspects of projects, and thus the actors in charge of the actions. These types of theories stem from social sciences and are therefore mainly concerned with the human factors of project management. It is mainly driven by a *subjective* mindset.

As a way to combine the existing project management theories and develop more practical solutions to managing projects, the field has experienced a turn towards more practice-oriented theories (Lalonde et al., 2012, Söderholm, 2008, Hällgren and Wilson, 2008). Practice theories are concerned with what is actually done by project managers to

achieve a successful outcome (Cicmil et al., 2006). Lalonde et al. (2010) describe this type of project management as reflective practices that are underpinned by an *intersubjective* mindset. Each of the types of knowledge proposes “*a different link between theory and practice, and [...] ways to consider the relationships at play (or that should be at play) between theory and practice*” (Lalonde et al., 2010, p. 24). Table 1 summarises the different forms of project management knowledge.

Table 1: Overview of multiplicity of PM knowledge

	<i>Pure Practice</i> (<i>Praxis</i>)	<i>Theory (Theoros)</i>		<i>Production</i> (<i>Poeisis</i>)
		Science	Social Science	
Philosophical Orientation	.	Objective	Subjective	Intersubjective
Description	PM as pure practice that merely relies on tacit knowledge.	PM as strict, linear and sequential application of project pre-determined processes	PM as a social process; focus on behavioural aspects and value creation	PM as reflective practices that are mainly concerned with the successful outcome (e.g. practical wisdom)
Dominant Research Stream	.	e.g. traditional project management	e.g. Critical Project Studies	e.g. Practice-based theories, Pragmatism
Focus	Theories are implicit in the practice itself and not theorisable	Prescriptive theories of planning and control tools (e.g. best practices)	Descriptive theories of behaviours and interaction (e.g. power, relationship)	Contextual theories of situated actions that are influenced by values, history and setting.
Supporting References:	e.g. Mintzberg (2004)	e.g. Turner (2009), PMI (2008)	e.g. Cicmil (2006), Hodgson (2008)	e.g. Blomquist (2010), Pitsis et al. (2003), Lalonde et al. (2010)

Following up on this practice-turn, we introduce pragmatism as a means to develop a meta-theory of project management that can unite existing theories without diminishing their individual importance (Shields, 2006). For pragmatists, theories are mere working hypotheses, tools or instruments that are constantly tested in practical situations and change with the context accordingly; they are not answers to enigmas (Shields, 2008, De Waal, 2005). In the next section, we will further introduce theories as tools of practice that can be used to *make it work*.

Theories as tools

In what follows, we will explain why we believe existing project management theories can be thought of as powerful tools for practice. Theories describe concepts and the causal relationship between those concepts (Whetten, 1989). Thus, project management theories traditionally are prescriptive revelations of the actions that contribute to achieving

the intended outcome independent of the context (Koskela and Howell, 2002). Traditional theories are therefore promoted as universally applicable, which means that other theories are perceived as false and are thus disregarded (Cicmil et al., 2006). The aim to standardise and professionalise the field entails that theoretical knowledge is seen as superior to practical knowledge or productive knowledge, fostering a division between the different forms of knowledge, and thus disregards the instrumentalities and procedures of productive workers (Dewey, 1938). More precisely, this view of project management is mainly concerned with theoretical knowledge and does not sufficiently incorporate and promote actual project management practices.

Drawing on Dewey's pragmatic philosophy and his treatment of the cause-and-effect relationship, we propose an interdependency between theory and practice. Dewey refuses to divorce theory from practice, as both are similarly important parts of being productive, or gaining practical wisdom (Hickman, 1990). Theory and practice are merely different types of knowledge, both of which contribute to achieving the intended outcome through, if necessary, creative and spontaneous actions (Joas, 1993). Dewey sees theory as 'the ideal' and practice as 'the executed insight' (Hickman, 1990). While both forms of knowledge potentially lead to the same outcome, one does not rely on the other. For instance, just because one might not know the exact theory of gravity, one learns how to live with it through experimentation and practical testing. This makes theories mere ideas or images (Alexander, 1990) of what is being done in a specific context, which lets Dewey conclude that there are no universal theories (1938). In other words, theories are mere tools that can be used as a starting point to solve a particular practical situation, and are thus experimental by nature (Schiller, 1911). Theories are, however, just one form of knowledge, and are complimented by practical knowledge and wisdom (Dewey, 2005, 1958).

The inclusion of experiments allows Dewey to bridge the gap between theoras (theory), praxis (practice) and poiesis (product) as proposed by the Greek philosophers. For Dewey (1929), theories are tools that guide actions and are therefore concerned with the production of new effects. Meaningfulness is achieved through deliberate actions towards an anticipated practical consequence (product); it is not the quality of some detached mind that blindly follows a particular theoretical framework (Scheffler, 1974). "*Experimental knowledge is a mode of doing*" (Dewey, 1929, p. 102) and therefore a procedure in which creative action is a vital component, rather than a corruptive factor. As such, theories are not foundational; they are more an instrument that mediates the reflective process of

experimental testing. In other words, *doing* is essential to *knowing*, while knowledge is shaped by meaningful practical and theoretical experiences. Hence, Dewey's (1929) notion of tools connects the different forms of knowledge through productive outcomes in a particular context, and shows that experiences are meaningfully gained through both theories and practical actions. Consequently, pragmatism can reject dualisms such as those between practice and theory, intellect and observation, and mind and body.

Dewey (1913) argues that the three different forms of knowledge, *theoras*, *praxis* and *poiesis*, contribute to achieving a successful outcome, and are therefore necessarily interrelated. These forms of knowledge are reflected within the field of project management (see Table 1). Following Dewey (1938), theoretical knowledge (*theoras*) and pure practice (*praxis*) are mutually important in informing reflective project management practices (*poiesis*), which means that scientific and critical project management theories are equally important as pure practical knowledge when managing projects (Shields, 2006, Flyvbjerg, 2006b). We therefore conclude that all existing theories are sufficient tools that can and should be used contextually to deliver a successful project. The more tools one possesses and knows the more one is prepared to master unexpected challenges (Geraldi et al., 2010). There is no one right theory or practice that can be used universally, as we are constantly testing existing knowledge in new contexts. Both theories and practical experience are mere sources of productivity that enable contextual actions and the creation of novel consequences (Hickman, 1990).

The proposed multiplicity of project management theories thus represents a large toolbox that project managers can draw upon. To better understand the pluralist nature of the project management research field and to examine the main theoretical focus of the project management literature in the last 15 years, we explore articles from the primary project management journals to identify trends and proposed tools. Moreover, the field of project management proposed a turn towards more practice-oriented studies that – similar to the pragmatic approach – focus on the actuality and practical aspects of project management (Cicmil et al., 2006, Winter et al., 2006c). We therefore explore whether the literature has addressed this call and increasingly published theoretical knowledge that is concerned with practical problems. In the next sections we explain in more detail the dataset and methodology that we use to meet our research aim.

Data

The topic of project management has gained interest from a wide range of disciplines, including engineering, information technology, research & development and strategy. Thus, articles on related topics can be found in journals from the broader management and organisation studies areas (e.g. *Academy of Management Journal*, *Organisation Studies*), as well as project management-specific journals (e.g. *Project Management Journal*). During the data collection we collected and analysed articles from all leading management and project management journals. Following Kwak and Anbari (2008), we adopted their list of 18 top management journals, which was the result of an iterative process of assessing the FT40 list in regards to project management.⁴ We collected further data from three highly regarded and upcoming project management-specific journals that have been used in previous reviews; the *International Journal of Project Management* (IJPM), the *Project Management Journal* (PMJ) and the *International Journal of Managing Projects in Business* (IJMPB).

In this paper, however, we solely focus on articles published in the last fifteen years in project management-specific journals (e.g. IJPM, PMJ, IJMPB) to explore the multiplicity of the literature and investigate the proposed practice-turn. These journals represent the current formalised, discipline-specific theoretical knowledge base, and thus are a solid foundation for our investigation. The timeframe of fifteen years (1998-2002) was selected for several reasons: One main reason was the limitations of the Leximancer software, which requires text-readable .pdf-files to run the analyses. The available databases only provided consistent files of that kind from 1998 onwards.⁵ At this point it should be mentioned that the IJPMB was founded in 2008 and therefore provides only five years of data.

For this paper we collected a total dataset of 2197 publications from project management-specific journals; IJPM (1306 articles), PMJ (684 articles) and IJMPB (207 articles). Due to growing interest in the field of project management, the number of issues, volumes and journals increased, producing a vast amount of publications over the years. For instance, between 1998 and 2002, 510 papers were published (327 IJPM, 183 PMJ), between 2003 and 2007 the number of articles has gone up to 698 (450 IJPM, 248 PMJ), and in the last five years (including the addition of the IJMPB) the analysed dataset comprised 942 contributions (487 IJPM, 268 PMJ, 187 IJMPB). We therefore believe that this dataset

⁴ We collected more than 300 papers from 18 top management journals and analysed more than 200. Due to the focus of the paper we, however, excluded this additional analysis.

⁵ We downloaded multiple papers that were published prior to 1998 and found that Adobe was not able to convert the majority of articles from picture to text-readable files. We therefore decided to exclude publication prior to 1998 to avoid any bias.

provides a strong foundation to analyse the project management literature over the last fifteen years. This study goes beyond existing literature reviews in that it uses a more rigorous technique, it is built on a larger dataset and incorporates the *International Journal of Managing Projects in Business*, which has not yet been used in existing reviews, since it only originated in 2008.

Method

To systematically review existing research on project management, we use the textual analysis tool Leximancer, as it is a powerful device for interpreting and visualising complex text data (Campbell et al., 2011). Unlike the more frequently used co-citation analysis, which uses the links between authors rather than key constructs as the primary unit of analysis, our main interest is to uncover the links between constructs that are used in the project management research stream. The co-citation analysis method is aimed at determining the subject similarity between articles, based on the logic that when articles are published in a particular research stream, they are assumed to address similar topics (White and Griffith, 1981). In our study, we investigate the co-occurrence of words within their textual contexts, which provides valuable insights for the narrative inquiry of the project management research field. The idea is that a word is defined by the context within which it occurs and words that co-occur reflect categories (i.e., concepts) with specific meaning. We perform unstructured ontological discovery using Leximancer 4.0 (www.leximancer.com). Leximancer enables us to review the actual words of authors and, thus, to identify concepts and themes emerging from existing literature. Consequently, it is these text-derived concepts and themes that represent our level of analysis, rather than the article or author as used in other bibliometric techniques, such as co-citation analysis. Leximancer has successfully been used in similar research contexts to scientrometrically describe and analyse text (e.g. Dann, 2010, Liesch et al., 2011); for example, decomposing the international business field (Liesch et al., 2011); corporate risk management (Martin and Rice, 2007); tourism (Scott and Smith, 2005); and behavioural research (Smith and Humphreys, 2006).

Leximancer runs both conceptual and relational analyses of textual data and then provides visual representations of these analyses. Thus, it allows the researcher to examine concepts (common text elements) and themes (groupings of uncovered concepts) used by other scholars (Mathies and Burford, 2011). To do so, a machine-learning algorithm is applied to uncover the main concepts in text and how they relate to each other (Campbell et

al., 2011). Leximancer-derived concept identification exhibits high face validity (i.e., close agreement with expert judgment) (Rooney, 2005). Also, the program is appropriate for exploratory research as it produces high reliability and reproducibility of concept extractions and thematic clustering, without facing some of the possible biases characteristic in manually coded text analyses techniques (Baldauf and Kaplan, 2011, Dann, 2010, Smith and Humphreys, 2006).

In the ‘maps of meaning’ presented later in the paper, circles represent themes derived from the articles that entail relevant concepts that have been mentioned in close relation to the overarching theme. The importance of themes is stressed through the darkness of the colour and the size of the themes and number of concepts. The distance between concepts on the map indicates how closely they are related to each other; that is, concepts that are only weakly semantically linked will appear far apart on the concept map (Campbell et al., 2011, Rooney, 2005). The algorithm applied is Bayesian. In the next section we will illustrate the analysis and report the results.

Analysis

One of our research aims is to empirically examine and confirm the pluralistic nature of the project management literature as well as the proposed practice-turn. Analysing key project management journals helps us to reveal the underlying trends of project management research, which helps us to address our research aims. The analysis of the data is structured as follows: First, we analyse the entire dataset to gain insights into the main themes underlying project management research in the last fifteen years to confirm the proposed multiplicity in project management research. We then move on to explore the practice-turn, which was initially called for in a special issue of the *International Journal of Project Management* published in 2006 with the title “Rethinking Project Management”, in which the contributors call for more practice-oriented studies. We therefore investigate the literature pre- and post this special issue for practice-oriented studies to identify potential differences. More precisely, we explore the timeframe between 1998 and 2007, which is followed by an investigation of the project management literature published between 2008 and 2012. These

years were selected because we assume a lag time of two years between the call for practice-oriented studies and the appearance of the papers in journals.⁶

15 years of project management research: 1998 – 2012

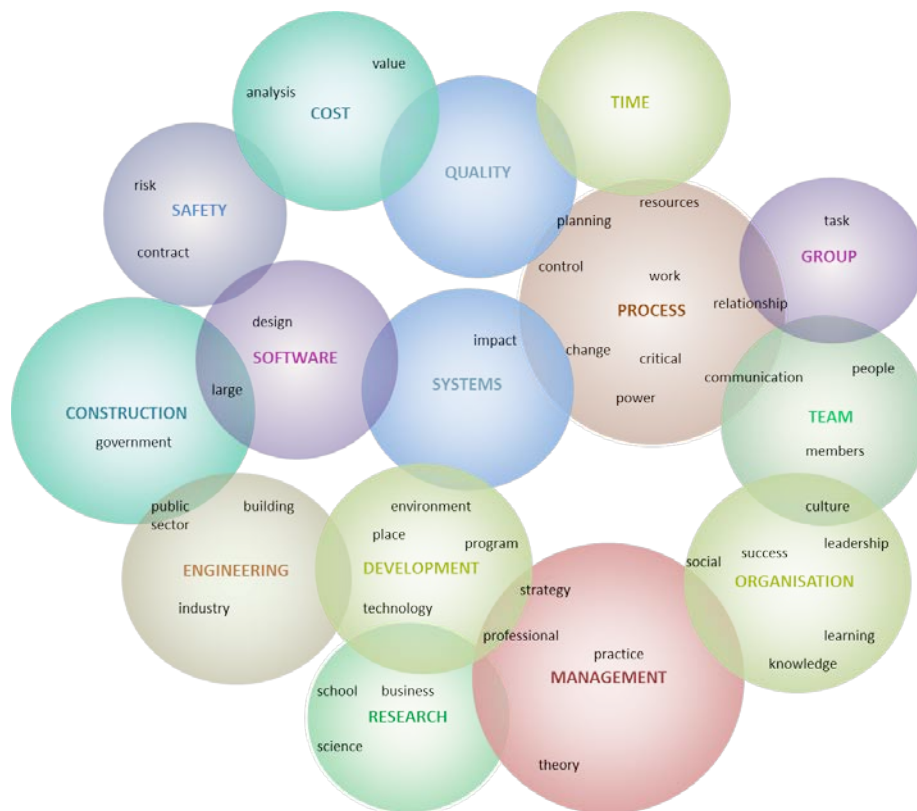
The ‘all papers’ map is based on the entire dataset and provides an overview of the main concepts of the last fifteen years (see Figure 1). The main themes are ‘processes’ and ‘management’, which is aligned with the traditional view of project management proposed by the *Project Management Book of Knowledge* (PMBOK) (2008). This standard developed by the Project Management Institute (PMI) has had a major influence on project managers and their perceptions about managing projects. The PMBOK describes projects as rational, linear and value-neutral concepts (e.g. project lifecycle) that are best managed through a strict and sequential application of ‘best practices’ (Cicmil et al., 2006). The correct application of those processes, which are mainly concerned with planning and control, leads to a successful project outcome. Hence, traditional project management puts a strong emphasis on project management processes (PMI, 2008, Gareis, 2004, Gareis, 2006, Gareis, 2005). In fact, project management has been described as process management (Adler et al., 1995) and a particular stream of academic research has been identified as the Process School (Bredillet, 2010a). In line with this school, Atkinson (1999) defines project management as:

“The planning, organisation, monitoring and control of all aspects of a project and the motivation of all involved to achieve the project objectives safely and within agreed time, cost and performance criteria. The project manager is the single point of responsibility for achieving this.” (Atkinson, 1999, p. 338)

The ‘management’ theme indicates the importance of project management *per se*. In particular, the data highlight a particular interest in the professionalisation of the field through ‘theory’ and ‘practice’. Professionalisation implies a striving for maturity of processes and therefore emphasises ‘project evaluation and improvement’, a topic that has been of increasing significance since the mid 1990s (Crawford et al., 2006b). In the same vein, our data show a direct and close link between management and knowledge, while this connection is mediated by the ‘organisation’ theme. This confirms an intensified focus on organisational project management knowledge, which often represents the maturity of organisational project management processes.

⁶ We excluded the term ‘project’ in our analysis, as we did not want to see how central the term ‘project’ is, since all papers deal with projects and project management. Instead, our intention was to investigate which concepts are most commonly related and how.

Figure 1: Conceptual map entire dataset (1998 – 2012)



The ‘process’ theme highlights the plurality of the literature over the last 15 years. On the one hand we find a particular focus on traditional project management, highlighting the concepts of ‘planning and ‘control’. These two concepts are closely linked to performance aspects (e.g., ‘quality’). On the other hand, the ‘process’ theme indicates a focus on ‘relationship’ and ‘communication’, two aspects that can be more closely linked to behavioural theories of project management. ‘Communication’ and ‘relationship’ are closely linked to the ‘group’, respectively ‘team’ theme in our dataset, which indicates that these aspects are primarily mentioned in combination with the organisational actors. This is in line with existing research, as a specific overlap between processes, ‘team’ and ‘communication’ has been highlighted as a major driver of project success (Jugdev and Müller, 2005). Furthermore, Bredillet (2010a) categorises research concerned with the relationship between people and teams working on projects as the Behavioural School. In addition, ‘critical’ appears within the ‘process’ theme, highlighting the existence of alternative management approaches, such as Critical Project Studies (Hodgson and Cicmil, 2008, Hodgson and Cicmil, 2006).

The two main themes ('process' and 'management') are connected through the organisational levels, 'group', 'team' and 'organisation'. These levels of analysis contain a variety of concepts, such as 'culture', 'leadership', 'success', 'learning' and 'social', which indicates a variety of different research foci that are addressed in the literature in regards to project management in an organisational context. For instance, the existence of the 'leadership' concept indicates a particular focus on interpersonal issues, something that has received little attention in the 1990s (Crawford et al., 2006b), suggesting an increased consideration of behavioural factors in the literature. A specific overlap between 'processes' and 'team' is 'communication', a concept that has been highlighted as a major driver of project success (Jugdev and Müller, 2005).

Assessment of the outcome of projects is of central interest to both managers and academics. Previous review articles have therefore identified a separate stream of research on this topic, entitled Success School (Bredillet, 2010a) or Critical Success Factor School (Söderlund, 2011). The four themes that emerged in our data are performance in general, safety, cost, time and quality, which represent the traditional project management success criteria (Turner, 2009). Success criteria are the *measures "by which we will judge the successful outcome of the project"* (Turner, 2009, p. 47). Especially, time, cost and quality have traditionally been used as success criteria, despite numerous attempts to transcend these measures (Cooke-Davies, 2002, Atkinson, 1999). However, 'value' appears as a concept within those overarching performance measures, indicating the existence of newly emerging success criteria as proposed by alternative project management theories (Hodgson and Cicmil, 2008, Müller and Jugdev, 2012, Atkinson, 1999). In addition, Turner (2009) argues that there is a second component based on which we can assess success, namely success factors. Success factors are *processes, "which will influence the successful achievement of the success criteria"* (Turner, 2009, p. 47). Due to the interdependency between success factors and success criteria, our data show a strong connection between the performance themes and 'processes'. Within the 'process' theme, 'control' and 'planning' are closely related to performance, which is in line with Crawford et al. (2006), as well as the traditional success criteria literature.

Another major component of the 'all papers' map is concerned with the type of research and setting in which the majority of research took place. In general, the actual 'research' theme is closely attached to the 'management' theme, indicating that a high proportion of research in our dataset is about the management of projects in general. Our

data, however, show signs of plurality regarding the research setting. Our data highlight a variety of different contexts in which project management was investigated. We find that the main themes were ‘construction’, ‘engineering’ and ‘software development’. Concepts within these broader themes include ‘government’, ‘public sector’, and ‘design’, which illustrate an even higher multiplicity of research settings.

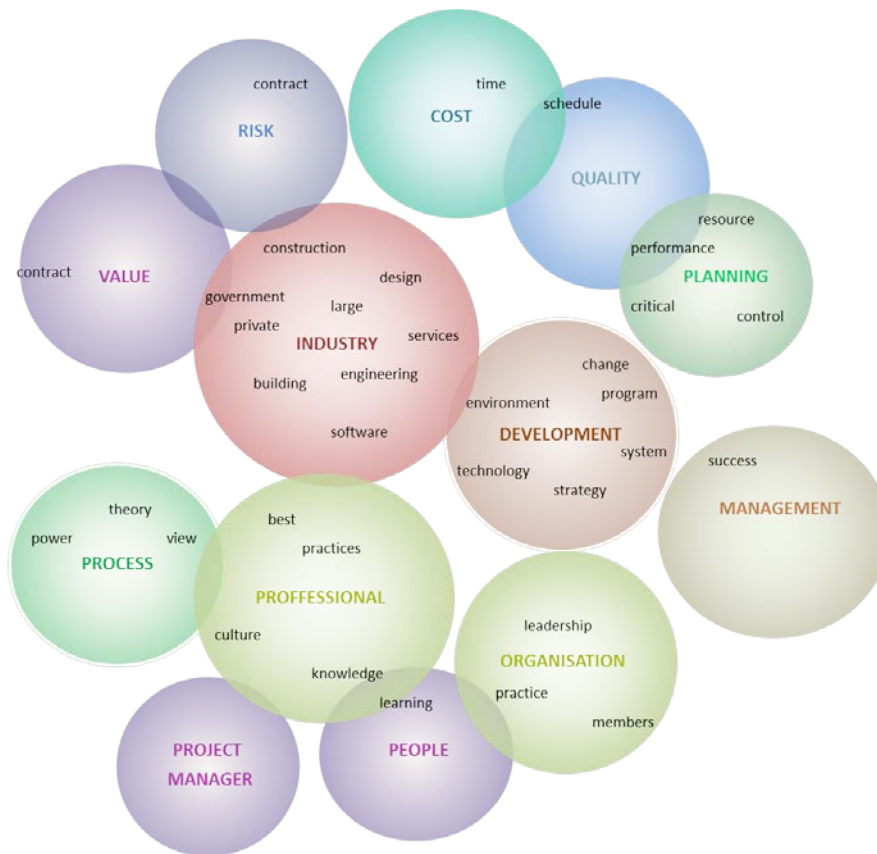
The ‘all papers’ map provides us with an overview of the main concepts that constitute the three major project management journals over the last fifteen years. The data largely support the argument of a pluralistic nature of the field proposed by existing reviews (Söderlund, 2011, Bredillet, 2010a). More precisely, our data highlight traditional aspects of project management, such as the planning and control processes and ‘hard’ performance measures (e.g. iron triangle), as well as alternative concepts such as ‘relationship’ or ‘value’. In conclusion, this means traditional and newly emerging project management theories co-exist in the literature.

Pre practice-turn: 1998 – 2007

To investigate the practice-turn in project management research, we divide the dataset in two timeframes. The first timeframe explores the literature from 1998 until 2007. Figure 2 (next page) illustrates the results of our analysis. In this time period, our dataset entails all papers from two journals: the *International Journal of Project Management* and the *Project Management Journal*.

In this time period we find evidence that the traditional division between scientific and social science-based project management is a highly discussed topic in the literature (Blomquist and Packendorff, 1998, Engwall, 2003). The two themes of ‘process’ and ‘professionalisation’ particularly portray the debate that has been described as a ‘battle’ between espoused theories and theories in use (Blomquist et al., 2010) or between “being” and “becoming” (Winter et al., 2006b, Bjørkeng et al., 2009). In other words, it is the division between engineering-based project management and the Process School (Bredillet, 2008b).

Figure 2: Conceptual map pre practice-turn (1998-2007)



Traditional, engineering-based project management usually refers to the structured, linear and mechanistic approach to managing projects, which primarily relies on established systems, processes and structures (Blomquist et al., 2010). Hence, this literature proposes universally applicable systems in the form of tools, best practices and methods that – when applied strictly – lead to a successful project outcome (Cicmil et al., 2006). These practices, guidelines and norms are often formalised in bodies of knowledge, such as the PMBOK, with the aim of professionalising and standardising the field of project management (Smyth and Morris, 2007). Our analysis shows that the ‘professionalisation’ theme comprises concepts such as ‘best practices’ and ‘knowledge’ that provide evidence for this particular stream of project management research that has been widely discussed in the literature (Turner and Keegan, 2000).

The Process School or process-based approach to project management is concerned with *theories in use* that focus on the contextual nature of the used processes and how they contributed to the successful delivery of a project (Bredillet, 2008b). Hence, projects are perceived as social settings in which numerous organisational theories and frameworks can be applied (Blomquist et al., 2010). While the original perspective of the Process School

produced universal frameworks such as the project lifecycle, the revised version sees processes as part of a wider context and thus highlights the importance of contextual process selection and contingencies (Engwall, 2003). Another contribution of the process perspective is the introduction of social processes that “*take into account the social complexities of human life*” (Blomquist et al., 2010, p. 7). Our findings support the aforementioned aspects. The ‘process’ theme comprises concepts such as ‘view’ and ‘theory’ that highlight the dominant utilisation of process-oriented project management, but it further entails the concept of ‘power’, which represents the issue of social and human complexities in projects.

Our findings further suggest an intensified focus on different performance measures, as four themes appear to particularly deal with ‘quality’, ‘cost’, ‘risk’ and ‘value’. In addition, ‘time’ and ‘schedule’ are concepts within the ‘cost’ and ‘quality’ theme, which suggests the existence of the time performance criterion in the literature. Hence, the literature in this time period is concerned with the broad variety of performance aspects ranging from traditional success criteria such as time, cost and quality (e.g. iron triangle) to alternative measure such as the delivery of value (Hodgson and Cicmil, 2008).

The ‘value’ theme is directly connected to the ‘industry’ theme, which indicates a plurality of different research setting, contexts and industries. For instance, our data show that ‘government’ and ‘private’ appear as concepts and are thus frequently mentioned sectors in this period. Furthermore, our analysis illustrates concepts such as ‘construction’, ‘engineering’, ‘software’ and ‘design’. This variety of industries suggests a certain aspect of plurality in regards to the undertaken research in the field of project management. This multiplicity of research settings provides the opportunity to investigate and develop an understanding of contextual project management processes, something that is at the centre of the process-based approach (Blomquist et al., 2010). However, at the same time, ‘construction’, ‘engineering’ and ‘building’ are particularly frequently mentioned areas in which the traditional approach to project management is dominant.

Development is another dominant theme and directly connected to industry. Projects are therefore promoted as a driver of change that helps to transform organisations and their structures in a particular way. Our data, however, show that organisational development is concerned with multitude of aspects, including ‘environment’, ‘technology’, ‘systems’, and ‘strategy’. These concepts suggest a dominant focus on structural aspects. This supports the argument that engineering-based project management is a major concern of the literature in

this time period, as most of the concepts describe particular ‘tools’ that must be used in an efficient and effective way to successfully deliver a project.

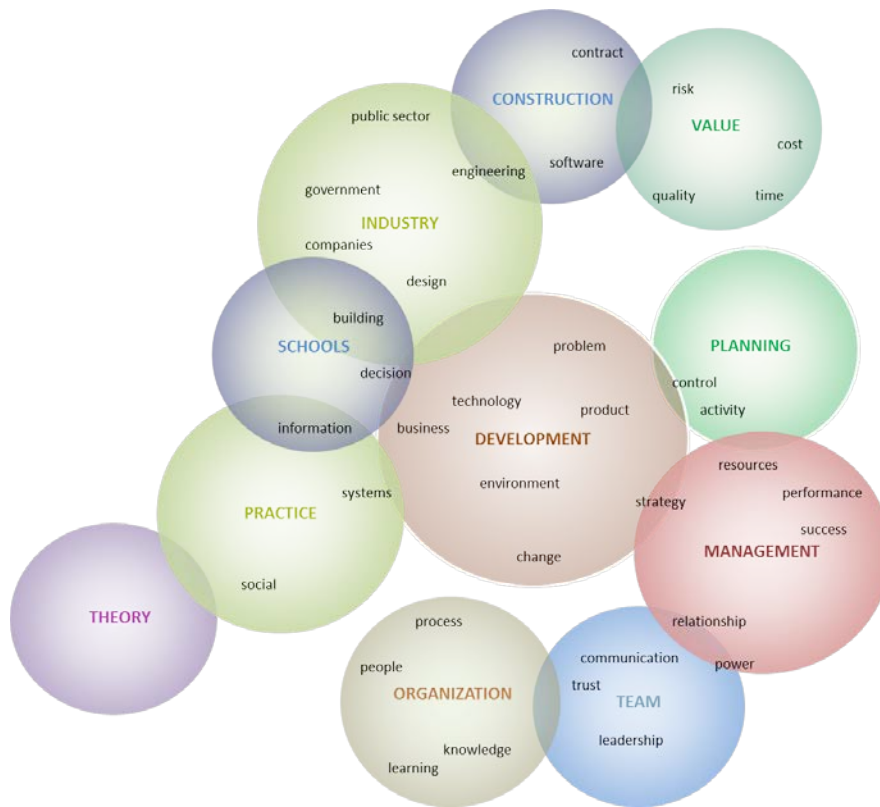
Furthermore, ‘management’ and ‘planning’ appear as concepts in this time period, highlighting that both aspects were central topics in the project management literature in this time period. ‘Management’ merely contains the concept of ‘success’, indicating a particular focus and connection between the two terms. In other words, adequate project management often seems to be viewed as a driver of success. Planning is closely linked to the performance criterion ‘quality’ and comprises the concepts ‘resources’, ‘performance’, ‘control’ and ‘critical’. This symbolises the perception that planning and control mechanisms and the sufficient allocation of resources is crucial to a well-performing project, in particular in regards to the aspect of quality. This is aligned with the traditional view of project management.

Our analysis shows that the literature between 1998 and 2007 is mainly concerned with two approaches to project management. In particular, the engineering-based approach seems to be dominant, which is suggested by the industries, success criteria and the aim to standardise the field. However, the emergence of process-oriented studies indicates the commencement of addressing behavioural aspects of project management (Huemann et al., 2007), something that is not sufficiently addressed in traditional models. Process studies mainly focus on the people in charge on a higher organisational level and thus fail to explain what individual actors do (Blomquist et al., 2010). This consequently leads to a tendency to generalise, which bears the risk of getting caught in the traditional trap of providing ‘best practices’ or universal processes (Cicmil and Hodgson, 2006). Hence, we concluded that the project management literature has taken a turn towards practice-oriented studies that explore the details of human behaviour and actions (Schatzki et al., 2001, Blomquist et al., 2010). We therefore investigate in the next section whether this practice-turn has taken place, and whether it is to be found in the literature.

Post practice-turn: 2008 - 2012

To analyse the literature post the forward-thinking special issue from the *International Journal of Project Management*, we examine all papers from 2008 to 2012 that were published in the *Project Management Journal*, the *International Journal of Project Management* and the *International Journal of Managing Projects in Business*. Figure 3 shows the output of this analysis.

Figure 3: Conceptual map post practice-turn (2008 – 2012)



In the analysed time period, the theme ‘development’ has become the most dominant one, indicating that the project management literature still investigates projects as vehicles for developing business-specific goals. Concepts such as ‘change’ or ‘problem’ further highlight project management as a vehicle for organisational problem solving and change (Brown and Eisenhardt, 1997). The increased interest in ‘strategy’ has been a continuous trend since the 1990s (Crawford et al., 2006b), but has been accelerated in the last five years (e.g. Artto et al., 2008). Another concept within the development theme is ‘environment’, which illustrates the particular focus of projects as part of the greater context – often described as dynamic – in which they create sustainable outcomes (Killen and Hunt, 2010). Furthermore, the ‘development’ theme might provide evidence for the increased use of development projects as a context to study of project management (Ahsan and Gunawan, 2010, Landoni and Corti, 2011, Toor and Ogunlana, 2010).

‘Management’ is still a major theme in this time period, although experiencing a shift in focus. In particular, ‘management’ still entails concepts such as ‘success’ or ‘performance’ and ‘resources’, indicating a traditional focus on effective management processes. However, project success has incorporated different measures, such as benefits, indicating an extension of traditional success measures (Toor and Ogunlana, 2010, Aubry and Hobbs, 2011).

Furthermore, our data show the emergence of 'relationship' as a concept within the greater 'management'. Our findings therefore show the co-existence of multiple project management schools, such as Resource Management (Kwak and Anbari, 2009) and Relationship School (Söderlund, 2011). Hence, there is evidence for pluralism in project management as new and old methods are now addressed in the literature. The remaining focus on traditional project management methods is also highlighted by the 'planning' theme, which is directly connected to 'management'. The theme entails the concepts of 'control' and 'activities', which suggests an emphasis on traditional methods that aim for 'control' and 'order'

The data suggest that the dominant levels of analysis are the 'organisation' and the 'team', which means there is a reduced focus on the individual level, such as the project manager. In particular, on a team level the literature mainly focuses on behavioural aspects, such as 'communication', 'trust' and 'leadership', highlighting the growing emphasis on alternative project management theories (Lalonde et al., 2010). At an organisational level, the literature is mainly concerned with concepts and processes that can be used to deliver a successful project, which reinforces the processual nature of project management, as proposed by Bredillet's (2010) Process School. Furthermore, the 'organisation' theme entails the concepts of 'learning' and 'knowledge', which – linked to the process concept – highlight the emphasis on learning and change process that project-based organisation must possess to remain competitive and successful (Rose, 2011, Anand et al., 2010).

Regarding success and performance, the data show a reduced emphasis on traditional performance measures and an increased focus on value creation, which was proposed by critical project scholars (Cicmil and Hodgson, 2006, Hodgson and Cicmil, 2006). While 'value' occurs as the main theme, aspects of 'time', 'cost' and 'quality' remain in the picture as concepts of a strong performance focus. Another concept within the performance theme is 'risk', which shows the existence of Bredillet's (2010) Governance School as well as Crawford et al.'s (2006) Risk Management topic. The performance theme is directly linked to the organisational setting theme, which may indicate that the literature addresses project performance contextually.

A major aspect of this time period appears to be the development of practical theories and schools of thought, as indicated by the 'school', 'practice' and 'theory' themes. The data therefore suggest a move towards the creation of meaningful theoretical, yet practical, project management knowledge – something that the field has lacked in the past. In particular, our

findings illustrate that ‘practice’ and ‘theory’ are individual themes that represent significant components of the literature in the last five years. The proximity of the two concepts, the in form of a direct connection, reinforces a particular focus on practice-theories – an emerging stream in recent years that has evolved from the process perspective (e.g. Blomquist et al., 2010, Hällgren, 2009). Regarding the research setting, the ‘industry’ themes entail a multiplicity of different concepts. The output therefore suggests that the theoretical contributions are built on a broad foundation that includes ‘public sector’, ‘government’, ‘engineering’, and ‘design’ companies.

However, at this point the different meanings of the word ‘practice’ should be highlighted. While practice, on one hand, can refer to a bundle of actions (Schatzki et al., 2001) in regards to the underlying processes or micro-activities of project management (e.g. projects-as-practice), it can also refer to the sphere, the context in which practitioners operate (e.g. the field of practice). Our analysis does not explore which particular understanding of the word contributes to its growing dominance in recent years. Future research therefore may explore this aspect in greater detail to develop an understanding about the nature of the practice-turn. In the original call by Cicmil and her co-authors (2006), practice generally referred to the actuality of project-based work in which themes like complexity, value creation and development were identified as characteristics of a practice lens. We can confirm the emergence of some of these themes, which leads us to the following conclusion.

In summary, there is evidence for a practice-turn in the field of project management, meaning the literature published in recent years responds to the call from the 2006 special issue and emphasises alternative practice-based project management approaches. Although traditional project methods remain in focus, newly emerging concepts gain prominence and importance. On a more general note, our analysis provides an insightful overview of all the literature of the last fifteen years, with a particular focus on the last five years. We confirmed the plurality of existing theories in the form of traditional and alternative project management approaches that emphasis different concepts and themes. We further explored the existence of the practice-turn, which was recently proposed by project management scholars to investigate the actuality of project management (Cicmil et al., 2006). In the following section, we will further discuss our findings and give recommendations for the future direction of enquiry.

Discussion

Our analysis confirms previous research in that project management literature is built on a broad foundation of theories stemming from different research backgrounds, and focuses on different facets of managing projects. Regarding these theories as tools enables us to argue that all of the existing theories are contextually valid (Worren et al., 2002). Theories are guides for practice, not recipes strictly to be followed. In other words, theories do not guarantee usefulness to practitioners as there is often only sporadic synchronicity between bodies of knowledge and practical problems that are uniquely encountered by project managers (Schön, 1987).

“Managerial practice is far away from being the mere application of a set of well-defined findings or theories. Managers rely primarily on tacit, procedural knowledge, derived from direct experience and trial-and-error learning.” (Worren et al., 2002, p. 1228)

This does, however, not imply that theories are generally impractical or even useless. It much rather means that practitioners must use theories in a practical and reflective way to solve a particular problem (Mohrman, 2001). In that sense, theories are merely contextual tools that can be used differently in different situations, or substituted by different theories (forms of knowledge), if necessary (Shields, 2006, Dewey, 1938). While arguing for project-management theories as tools appears to be rather obvious and simplistic, project management often fails to sufficiently address the obvious.

This paper seeks to demonstrate that a pragmatic perspective implies that theories may be represented, used and applied in different ways (Worren et al., 2002). While the literature does not lack the multiplicity or balance of different theoretical approaches, there is certainly a gap between theories and their practical applicability (Winter et al., 2006c). Project management needs multiple theories to account for the bigger picture, as the field is too diverse to merely rely on one. The usefulness of a theory in a particular context, however, depends on its pragmatic validity, which is *“the extent to which goals or intended consequences can be achieved by producing certain actions or using particular instruments”* (Worren et al., 2002, p. 1228). Project managers, or project-based organisations, therefore have to identify different types of knowledge that fit the demands of their activities. For instance, a manufacturing project may be better suited to apply a traditional theory that focuses on time and effectiveness, whereas an IT project may perform better under a more

agile, customer-focused project management approach.

The usefulness of theories from a pragmatic standpoint depends on the degree of fit between the project itself and the problem to be solved, as well as the decision required (Worren et al., 2002). The pragmatic validity of a theory therefore relies on contextual factors that are often organisation or process specific, such as the different organisational levels that are involved in shaping project management processes or the rigour of the internal structure and framework used. For instance, on a higher level, organisations often utilise rather abstract frameworks to develop an organisational mission and strategic incentives, while on a lower level the frameworks are more technical, linear and operational to ensure the ‘correct’ implementation of the organisational strategy. Nevertheless, these are not identical in every organisation and the different theories and frameworks used are often interdependently connected.

We therefore argue it is crucial to incorporate and accept multiple theories in the picture of project management, as every single theory has a particular purpose. Traditional project management tools, methods or practices provide certainty and comfort for the project manager in the same way a hammer is familiar to a handyman. Companies and practitioners need their structures as a frame in which to operate: which does not, however, imply that traditional tools are restricted to one particular action. The tools are utilised to *make it work*, to achieve the anticipated outcome and to enable actions while providing stability, rules and structure. Project management tools (e.g. theories, processes, software), when perceived as a point of departure rather than a fixed entity, are potential success factors for projects. Project managers or organisations should not, however, restrict themselves to only one tool or method. The multiplicity of methods provides an opportunity to choose and act based on the situation and context. Similar to a handyman’s toolkit, the different theories provide a range of tools that can be used whenever necessary and appropriate.

The increasing prominence of practice-oriented studies signifies the mindset of theories as tools that enable everyday practices of organisational members and are therefore the source of meaningful project management (Orlikowski and Yates, 2002), without undermining the importance of structure. As Dehlin (2008) stresses, structures are not holy in any way, nor are they some taken-for-granted power that must be obeyed; they are merely a tool to play with in a continuously evolving context, indicating that no universally applicable structure can be singled out. The only conceivable ‘correct’ structure is the one that is

reflectively chosen based on the context of project work. Consequently, this structure cannot be technically identical at any point in time. If structure is thought of as either a process or entity, it cannot be taken out of context and studied objectively. In fact, the social context influences the processes in any particular situation. As such, project management must move towards a “*joint accomplishment of sophisticated, cooperative activity over time and across space but always in a social context where judgment, intuition and power play equally important role as logic, rationality, and science*” (Cicmil et al., 2006, p. 681).

Implications and Contributions

Seeing project management theories as tools provides ground to accept the broad variety of – often incompatible and conflicting – approaches, as they are all context dependent by nature. This paper does not attempt to develop a universal project management recipe; instead it offers a distinct position that goes beyond the scientific vs. behavioural theory, or the PMBOK vs. CPS debate, respectively (Wicks and Freeman, 1998). In particular, scientific project management theories and their sharp, categorical distinctions, such as theory vs. practice or planning vs. action, advocate that it is only (pure and rigorous) science that can generate knowledge. This knowledge is then perceived as value neutral, as it is accumulated from a body-freed mind. The gained insights are perceived universally as applicable in an unambiguous reality that is the project (Wicks and Freeman, 1998). On the other hand, theories that are based on social sciences (e.g. Critical Project Studies) relativise the categorical distinctions made by scientific theories; however, it still retains those dichotomies. Due to its ontological relativity, stemming from a strong constructivist stance, there is no foundation to determining the quality of a practice or process (Johnson, 1987, 2004). Reality is perceived as equivocal, which is a result of the fact that everything is viewed as being relative. Consequently, concepts and terms are still value-neutral (Lalonde et al., 2010, Wicks and Freeman, 1998).

While still being a constructivist approach, yet a softer one, pragmatism and its non-dualist mindset rejects the categorical distinction held by the other two philosophies and follows the initiated practice-turn (Lalonde et al., 2010, Blomquist et al., 2010, O’Leary and Williams, 2012, Cicmil et al., 2006). For pragmatists, the theory and action are inseparable, and so are all the other existing dualisms. A certain type of knowledge (e.g. theory) has no privileged status, which implies that different methods and structures can and should contextually to deliver a successful project. Theories are therefore contextual tools that are

embodied by the social actor, who plays an important role in regards to the performed social action (Wicks and Freeman, 1998).

A project reality is therefore created by social practices that produce meaningful outcomes (Alexander, 1990), and an objective and absolute reality is therefore to be rejected. Tools are major contributors to shaping those practices (Levine et al., 1993). Since tools are defined by their appearance and action, they can be described as both nouns and verbs (Chia, 1996). As nouns, tools are described by their the physical and linear characteristics, such as organizational structure, process or system, whereas verbs describe the practical components and underlying action of project management tools (Chia, 1996). In fact, since the perception of certain situations varies, multiple ‘realities’ and perceptions of tools are possible, which means that multiple ‘right’ theories can coexist and subsequently lead to the successful delivery of a project. Consequently, while it is important to develop rigorous theories that aim to explain projects and project management, the underlying practices are always dynamically convergent and divergent (Simpson, 2009).

“Convergence towards norms of social conduct may be explained by invoking ‘significant symbols’ that are embodied [...] and provide a means of establishing and regulating social expectations of conduct [...]. Equally, divergence towards novelty and emergent difference is addressed by the performative qualities [...], which draw on the creative principle of abduction.” (Simpson, 2009, p. 1339)

This pragmatic approach contributes to the field of project management in several ways; firstly, it moves beyond an objective reality of the project towards a view in which the project reality is created by the underlying practices. Secondly, this implies that there is no One Right way of doing things or acting in a project environment. All processes, instruments and methods are part of a large toolkit from which the project manager can choose. Thirdly, regarding the project as a tool implies context dependency, which necessarily means that project management processes have to be constantly adjusted or changed to address the changing nature of the context in which the particular project operates. Overall, seeing project management theories as tools helps to close the gap between theory and practice (Shields, 2006, Worren et al., 2002). This is in line with the recent practice-turn in project studies.

Conclusion

Our findings are – to a large extent – comparable with previously published literature reviews and thus confirm the existing multiplicity in the project management literature (e.g. Bredillet, 2007, Bredillet, 2008a, Bredillet, 2008b, Bredillet, 2008c, Söderlund, 2011, Crawford et al., 2006b). The ‘all paper’ map clearly shows signs of multiplicity and the coexistence of traditional as well as alternative project management models. Our analysis, however, also shows a shift of focus in the last five years that can be explained with the recent call for practice-oriented studies. However, we also find that traditional project management topics, such as planning and control mechanisms or project management processes, remain dominant in the field. Hence, our analysis supports the argument for pluralism in project management, with a focus on traditional project management tools. This is in line with the overarching aim of this thesis, as it highlights the vital interplay between structural and practice-oriented aspects in project management.

Project management research is concerned with a broad variety of traditional and newly emerging concepts, which means that the literature keeps expanding. Not only does this trend increase the internal inconsistency, it also makes the field internally more complex than it already is, and perhaps than it needs to be. However, despite the emergence of new and alternative project management methods, the project management community is resistant to drop its traditional project tools. Hence, there is a lack of research that tries to uncover the practical value of existing project management theories and how we can implement, alter or modify those tools in a context-dependent fashion to make the best use of what is already ‘out there’. As Whitty and Maylor (2009) argue, one does not need complex tools to solve complex problems. The missing link is, however, a project management meta-theory that allows the flexible application of existing – dominantly rational – methods, tools and techniques (Bredillet, 2010a).

We argue that the pragmatism – conceptualised by improvisation – provides the philosophical basis to develop such a meta-theory (Shields, 2006). As improvisation is built on a pragmatic mindset (Dehlin, 2008), it can help to contextually link existing theories to practical problems. In fact, many experienced project managers act outside (while drawing on) formal structures to successfully deliver a project, which makes improvisation a naturally occurring phenomenon in organisations (Cunha and Cunha, 2003, Leybourne, 2007a). In that sense, improvisation is not only a reaction when the initial linear structure proposed by a theory breaks down, it is also a proactive tool to prevent failures or problems based on

intuitive and spontaneous sensemaking (Cunha et al., 2012). This should not undermine the importance of formal processes in any way; it rather highlights the need for a theoretical concept that allows us to implement, change and modify existing structures in a context-dependent fashion. Improvisation – as a theory of practice – therefore provides solutions for current project management issues by using existing theories as starting points for actions that solve practical project management problems.

Chapter 3

Towards a Praxeology of Resilient Project Management - A Conceptual Framework

Introduction

Complexity is an acknowledged issue and projects have become a prominent means of addressing it (Maylor et al., 2008). Over the years, the project-based environment has become more complex itself, as have project management theories and their underlying tools, in the form of processes, procedures and techniques (e.g. Flyvbjerg, 2007, Klein, 2013). The increased complexity often renders the proposed tools impractical, which means they are consequently not used in practice, reinforcing a separation between theory and practice. However, complex tools may not be necessary to solve complex problems (Whitty and Maylor, 2009). Rather, a better understanding is needed of what project managers actually do to transcend the prescriptive and universal nature of current project management theories towards an improved theoretical understanding of project management practices, towards a praxeology of resilient project management.

To improve our current understanding of project management practices we aim to develop a praxeological meta-theory that allows us to use and to benefit from all existing project management knowledge and apply it in a contextual way (Bredillet, 2010b). There is a multitude of project management schools to draw from, which illustrates the plurality of current project management knowledge (e.g. Bredillet, 2010b, Söderlund, 2004, 2011). Each school represents a particular theory; a toolbox that explains one particular way of managing projects successfully. On the other hand, project management practice is often quite messy and formal processes make way for spontaneous and intuitive applications of particular theories (Leybourne and Sadler-Smith, 2006). This form of work is defined as improvisation, which describes a pragmatic approach of applying existing tools in novel ways to define and solve the problem (Dehlin, 2008).

Our approach combines multiple schools and improvisational practices to conceptualise a praxeology of project management that is more resilient overall and more suited to addressing complexity (Hollnagel and Woods, 2006). We propose an evaluation grid that combines the number of schools a project manager *can* controls and the degree of

improvisation the project manager skilfully applies. This ranges from a rigid application of a single school of project management to a more freely applied set of different schools to the most extreme scenario of all schools applied in a very improvisational fashion (Weick, 1998). Our advances toward a praxeology of resilient project management underlies a pragmatic mindset that argues for more flexibility and smarter ways of achieving objectives (Chelariu et al., 2002).

Our praxeological framework is the foundation for resilience in project management and is characterised by the number of schools known and the improvisational ability of the project manager. In other words, the more theoretical knowledge a project manager has (e.g. schools of project management thought) and the more a project manager is able to use and apply this knowledge in different situations, at times improvising, the more prepared and resilient his project management practices will be. The theories and including practices serve as a starting point and can either be applied in a strict, respectively linear fashion, or altered and modified if necessary through the project manager's improvisational ability. This consequently increases the number of applications of any particular project management tool, and thus increases the internal complexity without actually making the tools more complex *per se*, and thus impractical. According to Ashby's law of requisite variety (Ashby, 1958) the alignment of internal and external complexity is the main aspect for solving complex problems and achieving resilience. Our version of praxeology thus combines theoretical knowledge and improvisational practice to create greater internal complexity towards resilient project management.

To develop a praxeological model of project management resilience, we begin by introducing projects as complex social systems that are situated and operate within a complex environment. We then proceed to briefly outline the evolution of project management as a field of knowledge, and demonstrate the multiplicity of current project management theories. Next, we introduce improvisation as a theory based on which we can assess the practicality of existing project management theories. We then elaborate on the topic of praxeology that highlights the importance of practical knowledge as a means of making sense of projects. This is followed by a discussion about resilience, which allows us to combine the aforementioned ideas. We will conclude by highlighting the importance of practice-oriented knowledge creation, and discuss the implications for theory and practice.

Complexity

Complexity is an omnipresent component of most project management debates, and describes the underlying problem of not-knowing or being able to uncover universal truth (Dehlin, 2008, Joas, 1996). Complexity describes systems that are “*composed of many interconnecting parts*” (Maylor et al., 2008, p. S16) that produce nonlinear and unpredictable outcomes. Projects have been described as social complex systems formed out of many components, the behaviour of which is emergent (Whitty and Maylor, 2009). Put simply, the behaviour of complex systems is not simply the addition of the behaviour or its components; rather, complex systems consist of social actors and processes of social interaction often mediated by (technological) artefacts, or tools (Lundin and Söderholm, 1995). When talking about projects and complexity, it is therefore important to include social and technical dynamics (Maylor et al., 2008). For Cicmil and Marshall (2005), “*projects involve complex communicative and power relations among actors, ambiguity, and equivocality of performance criteria, and change over time*” (in Maylor, et al., 2008, p. S17).

Projects are social constructs and must therefore be addressed accordingly. Conventional project management as well as project complexity are approached in a rational (Lundin and Söderholm, 1995), normative (Melgrati and Damiani, 2002) and positivist manner (Smyth and Morris, 2007) so that complexity is addressed through rigorous and detailed planning (Whitty and Maylor, 2009). The underlying principles that constitute the conventional project management approach are mechanistic, absolute and universal, and thus not suited to address modern-day complexity (Cooke-Davies et al., 2007). Social complexity cannot be addressed in such a way. Nevertheless, as Whitty and Maylor (2009) argue, we do not need complex tools to solve complex environments. We have a multiplicity of existing project management theories, all of which provide valuable tools for managing projects successfully. Hence, following Whitty and Maylor’s (2009) research question, we would like to investigate how we can use and apply existing toolsets to address modern complexity.

This paper has a focus on the ‘social’ calls for stepping out of the linear patterns of traditional project management (Klein, 2012). This means working with the existing tools and applying them contextually to solve problematic situations in projects. Social practices perceive human action as the “*process of perpetual reproduction of identity [...] with the potential for transformation*” (Cooke-Davies et al., 2007, p. 57). This transformation is achieved through spontaneous, context-dependent and novel utilisation of tools; put simply, improvisation with tools being artefacts and symbols, technology, software or project plans.

Improvisation does not represent a lack of knowledge, rather it stands for expertise, which allows project managers “*to step out of the matrix of the known and to seek solution innovation, to take up new perspectives and go new ways*” (Klein, 2012, p. 5).

This ability to address complexity is congruent with the concept of resilience, which describes an organisational ability to recover from a shock, insult or disturbance (Klein, 2012). Hence, resilience becomes the answer to the problem of complexity, with improvisation being the means to this end by ‘bending’ the existing structure and processes. Being resilient means to be aware of complexity, and to incorporate and tackle its impact to deliver a successful project (cf. Cunha and Cunha, 2006). Resilience is a fundamental cornerstone of a social system, as one naturally reacts to outside forces in order to achieve a goal. More often than not, one moves outside and beyond the initially developed plan to deal with the unexpected, even though one may not be aware of it.

Arguably, we are living in an age characterised by increasing complexity as well as increasing complicatedness. Complicatedness describes systems, such as projects, that consists of numerous components, all of which are however knowable and definable (Snowden, 2002). The more sophisticated their relationship and underlying logic, the more complicated a system is (Dehlin, 2008). We argue that modern projects become more complicated and complex over time, and to be resilient in such an environment means to being able to deal with the unknown through transforming and adjusting existing processes. Ashby (1965) therefore proposes the law of requisite variety, which clearly outlines that only complexity can absorb complexity. Hence, the internal project management system must have enough complexity (and variety) to address the complexity (and variety) of the external environment. As Klein states, “*the entire paradigmatic set of [project management] models, methods and instruments of management science basically does nothing more than significantly increase the internal complexity of management*” (2012, p. 6). Hence, we argue that the multiplicity of existing project management knowledge, in the form of schools of thought and their underlying processes, provide enough complexity – when applied contextually – to address the external complexity of the system in which we operate.

Brief overview of the evolution of the project management field

Significant interest in project management as a formal area of research emerged in the post-World War II era, with the growth of engineering-based industries such as construction, defence, chemical and aeronautics (Paton et al., 2010). A preference for technical scientific

knowledge led the field towards a focus on quantitative, positivist techniques and methods. Projects were investigated following the standards of the existing operational research. Particularly important to this growth was Taylor's work on scientific management (1911) and Weber's ideas on bureaucracy (1978). These ideas had previously worked well to describe factory-like organisations, and had increasingly played a crucial role in describing practices in projects. During the 1960s and 1970s, project management was criticised for its scientific and positivist foundation (Packendorff, 1995, Winch, 1998) and lack of theory, and as such the field expanded practice and research through organisational theories of leadership, human resource management and team building (Cicmil and Hodgson, 2006). In the 1980s, project management was subjected to another turn, with advancements in technology, such as computers and new media. Sophisticated project control systems (e.g. PRINCE2) for planning and control, as well as risk management, were developed and revolutionised project management.

In the 1990s, when project management expanded as a field of academic research, it built on a broader foundation, being the social sciences, psychology and philosophy (e.g. Cicmil, 2006, Hodgson and Cicmil, 2006, Winter et al., 2006c). Hence, project management is currently a multidisciplinary stream that reflects and attracts many different industries, sectors and methods (Paton et al., 2010). Currently projects reflect a post-bureaucratic form of organising that is dynamic, flexible, versatile, and predictable (Cicmil and Hodgson, 2006). As such, Clarke (1999, p. 139) describes project management as a tool to address the changing world that businesses encounter, and the quest to professionalise the practice began in earnest.

Over the last two decades projects and project management have attracted the interest of academia and organisational researchers, resulting in a multiplicity of different and often competing project management theories. Here, projects are typically presented as pre-determined, temporary and unique organisational structures well suited to a dynamic business environment (e.g. Turner and Müller, 2003). Theoretically, the modern business landscape is described as *projectified*, meaning that much of the daily operations are achieved through or by projects (Lundin and Midler, 1998, Turner and Müller, 2003). As companies face increasingly complex, ambiguous and unpredictable challenges, the number of projects is even likely to increase in the future (Flyvbjerg, 2007).

Multiple schools of project management

The *projectification* of the modern business environment and the subsequent rise in project management research has led to sophisticated and detailed project management knowledge (Crawford and Pollack, 2007), codified in bodies of knowledge as well as numerous papers and books on how to manage projects correctly (e.g. PMI, 2008). There is, however, no one overarching theory, method or approach to project management. The current state of project management theory is better described as a set of theories – a toolbox – that is wide ranging on a scale from postmodern to positivist approaches, most of which are competing, incomparable and non-compatible (Bredillet, 2010b). Over the years, many researchers have tried to capture the evolution of different project management theories and schools of thought (e.g. Bredillet, 2007, 2008a, 2008b, 2008c, Söderlund, 2002, 2004, 2011, Kwak and Anbari, 2009). In this paper, we use Bredillet’s framework of nine schools of project management to describe the variety and differences of current project management knowledge, as it combines all existing approaches into one framework.

As a result of this development of knowledge, Bredillet (2010a) concluded that project management can be classified as an explicit field of research, with knowledge created by scholars, practitioners and researchers that emerged from empirical, rational, historic and pragmatic methods (Hjørland, 1998). Due to this multiplicity of theories within the field, project management can be described as being in a pre-paradigmatic phase (Kuhn, 1970). This stage is characterised by misaligned theories of a particular field, despite ongoing, rigorous and ‘scientific’ research efforts (Bredillet, 2010a). Generally, one can say that the field has moved from a positivist basis towards a more constructivist/postmodern approach to project management (Lalonde et al., 2010). Bredillet’s (2007, 2008a, 2008b, 2008c) analysis of the field was based on an extensive review of existing project management knowledge produced by leading thinkers of the field, including academic articles and standards from professional associations. As a result, Bredillet and his colleagues Turner and Anbari clustered the literature into nine major schools of thought, intending to “*gain insight into current and potential research, within a manageable number of research themes without oversimplification of the richness of the underlying thought*” (Bredillet, 2010a, p. 7).

The nine schools of project management thought are as follows (see Table 1): Optimisation School, Modelling School, Governance School, Behaviour School, Process School, Contingency School, Success School, Decision School, and Marketing School. Each school of thought represents a holistic approach to successfully managing a project, including

particular methods, tools and techniques that can be used in practice. While there is a degree of distinction, there are also relationships and interactions amongst the different project management schools of thought, as the different approaches have evolved over time, partly building on existing knowledge, partly building on a different philosophical worldview, and – more often than not – doing both. Hence, the validity of any individual school of thought as universally and holistically correct is highly questionable, which calls for an ingenious meta-theory that encompasses the multiplicity of project management (Bredillet, 2010a).

Table 1: Overview of the nine schools of project management (adopted from Bredillet (2010))

SCHOOL OF PROJECT MANAGEMENT	MAIN FOCUS OF PROPOSED PROCESS	PERFORMANCE DIMENSION
Optimisation School	Optimise project duration by mathematical processes	Time
Modelling School	Use of hard- and soft-systems theory to model the project	Time, cost, performance, quality, risk, etc.
Governance School	Govern the project and the relationship between project participants	The project, its participants, and governance mechanisms
Behaviour School	Manage the relationships between people on the project	People and teams working on projects
Success School	Define success and failure. Identify causes	Success criteria and success factors
Decision School	Information processing through the project life cycle	Information on which decisions are made
Process School	Find an appropriate path to the desired outcome	The project, its processes, desired outcome and sub-processes
Contingency School	Categorise the project type to select appropriate systems	Factors that differentiate select appropriate systems, projects
Marketing School	Communicate with all stakeholders to obtain their support	Stakeholders and their commitment to the project and project management

The field of project management research is diverse and rich, and thus internally complex (Bredillet, 2010a, Söderlund, 2011). We argue it is precisely this internal complexity of the current state of knowledge that helps to address the external complexity

and make project work more successful. Following Ashby's (1965) logic, an equally high degree of internal logic is required to tackle external complexity. Hence, the nine schools of project management thought represent a sophisticated and valuable toolbox for project managers to deal with the unknown. That implies that project managers should not always follow the proposed processes, methods and tools blindly; it merely means that these theories provide a wonderful point of departure for context-dependent practices. In other words, in any particular situation a certain school of thought may provide a 'better' solution, while in another situation that particular school might not help at all, or only partly (Clegg and Pitsis, 2012, Dehlin, 2012, Flyvbjerg, 2006b). Project work, just like any action, is contextual by nature and established theories are nothing more than simplification and guidelines that help us to practise it in everyday life – something that is already done by many experienced project managers (Flyvbjerg, 2001, Crawford et al., 2006a).

Improvisation: An overview

In practice, project management is often messier than described in books, theories and standards (Pollack, 2007, Remington and Pollack, 2007, Winter et al., 2006c). In practice, project managers often simply *do*, based on their knowledge, their experience and the problem to be solved (Flyvbjerg, 2004). This doing is not so much guided by a strict application of a particular process, tool or theory; it is much more an intuitive and spontaneous response to the situation and thus the goal to be achieved (e.g. Pich et al., 2002, Williams, 2005). This type of doing or acting can be described as improvisation; an aspect of project management practice that has not been sufficiently addressed in the dominant project management theories (e.g. nine schools of project management thought). We argue that learning about improvisation can be valuable for both theory and practice; firstly, as a snapshot of the actuality of project management practices (Cicmil et al., 2006) and secondly, as a way of improving that practice and spurring the development of trust in the project manager's own ability (Kadefors, 2004). In the next paragraph we will introduce the school of improvisation as a basis for our conceptual model.

Our version of improvisation is built on a pragmatic mindset. Pragmatism is a method of doing rather than a philosophical theory *per se* (De Waal, 2005). By focusing on the underlying actions and practices, the main concerns of pragmatists are to assess and solve problems (Salem and Shields, 2011). Pragmatism does not strive for universally applicable truths (e.g. prescriptive theory), something that has proven inaccurate in a project

management context. Hence, the truth of a practice lies not in its correspondence with a given state of affairs, but in the usefulness of the practice (e.g. project management theories) to solve a problematic situation (James, 1977). Our pragmatic version of improvisation therefore allows the application and utilisation of a wide range of organisational theories in a context-specific fashion, making change a constant companion of pragmatic practising. The applied methods are constantly characterised, shaped, and verified within the stream of individual lived experiences and thus are inherently context dependent (Schiller, 1966). Any theory – and its underlying processes – is therefore simply a tool of practice that is used as a means to an end. The tool assists in remodelling existing experience (e.g. organisational learning) as well as shaping future acts (e.g. project planning) (Pitsis et al., 2003). Pragmatic improvisation thus possesses the flexibility to tackle problematic situations with a wide range of viewpoints and activities to create a resilient framework of project management.

Improvisation has attracted the attention of management and organisational scholars for two decades; it has, however, only recently found its way into the world of projects (e.g. Leybourne, 2009, Leybourne, 2010, Leybourne and Sadler-Smith, 2006, Leybourne, 2006b). While improvisation scholars have failed to constitute a field of its own, they have successfully contributed to the current understanding of managing and acting in ‘standard’ organisations (e.g. Baker et al., 2003, Cunha and Cunha, 2003, Cunha et al., 1999, Weick, 1998). In its early days, improvisation was perceived as a rather rare occurrence in organisations, almost to the extent that it was regarded as a negative characteristic, as it was not part of the organisational structure or the organisational routines (Leybourne, 2006a). The perception of improvisation has, however, changed substantially; it is now seen as something that naturally occurs daily within our routinised practices, something inevitable when dealing with complexity and uncertainty. As such, improvisation is a particularly interesting phenomenon for a practical field such as project management, with its dynamic, versatile, and complex characteristics.

The concept of improvisation is prominently described by using the metaphor of jazz (Weick, 1998, Zack, 2000). There is a simple reason: jazz, as a musical genre, is an art in which improvisatory activities constitute the standard practices (Cunha et al., 1999). Hence, early improvisation scholars used this quite romantic metaphor to explain the idea of jazz and make it tangible for management and organisational scholars. However, project management scholars may find it difficult to see the analogy between their everyday work and the work of a jazz musician, as the work of project managers is traditionally determined by strict budgets,

tight deadlines and limited resources to deliver objectively measured outcomes. Furthermore, project management often comes with significant political, managerial and organisational constraints that set a certain path (Williams, 2005), while jazz musician exist in an entirely different sphere, playing an instrument, experimenting and letting the nightly varying crowd take them on a journey. Over the years, authors have therefore developed formal definitions and characteristics that specifically describe improvisation in an organisational setting (Crossan, 1998, Cunha et al., 1999).

We portray improvisation as a form of practical excellence in which the project manager masters daily challenges through educated and context-dependent actions. We use two of the existing definitions to explain the concept of improvisation, as “*the conception of action as it unfolds, drawing on available material, cognitive, affective and social resources*” (Cunha et al., 1999, p. 302) and secondly, as “*intuition guiding action in a spontaneous way*” (Crossan and Sorrenti, 1997, p. 156). We argue these definitions are best suited to explain improvisation in the context of project management, a context that is heavily influenced by prescriptive models that promote the strict application of project management tools, techniques and processes. Our conceptualisation implies that improvisation is not an exclusive aspect of project management practice, but a form of practice that uses and applies existing theories to solve particular problems in an immediate fashion (Cunha et al., 2012). It is thus a naturally occurring practice that occurs on a daily basis to a greater or lesser degree in every project (Baker et al., 2003).

Improvisation does not follow the logic of first thinking and then acting (Baker et al., 2003). It is very much a process in which thinking is expressed through spontaneous and creative actions (Leybourne, 2009). As such, improvisation describes a spontaneous attempt to solve a problematic situation in the present context through the inseparability of sensemaking and action (Dehlin, 2012, Weick et al., 2005). Similarly, seeing improvisation as a sensemaking activity in flux highlights the importance of creativity. If something is in the process of ‘becoming’, it naturally has a degree of uncertainty attached to it. Uncertainty leads to the possibility that our plans may not unfold as intended. While always drawing on existing knowledge and experience, our actions and practices also need to adjust quickly – spontaneously – and are therefore necessarily creative in a complex and uncertain environment. Creativity is often linked to and explained alongside concepts such as entrepreneurship, innovation or knowledge development (Dehlin, 2008, Styhre, 2003).

Improvisation is the opposite of a rational mindset, as it is about making sense of and enacting complex and equivocal experiences in the becoming, something that prompts a mindful gaze upon the situation at hand (Bjørkeng et al., 2009). There is no improvisational action without the use of creative sensemaking. Furthermore, improvisation is necessarily creative and spontaneous and takes place in a certain context, which is constantly changing (Dehlin, 2008, Leybourne, 2009). Further, there is no improvisation without the existence of theories and their underlying tools, processes and procedures (Ciborra, 1999, Crossan, 1998). The extent of spontaneity and creativity however varies with the context: in a given practical situation an individual is more or less spontaneous and more or less creative. This applies specifically in the context of project management, where projects have varying degrees of uncertainty, ambiguity and complexity. Improvisation allows us to combine internal and external complexity with practical excellence to develop a framework for resilient project management.

Degrees of Improvisation

Improvisation provides a valid basis for developing an ingenious meta-theory framework (Bredillet, 2010a) that incorporates multiple schools of project management to deal with aspects of uncertainty, ambiguity and complexity to produce efficient and effective practices. Improvisation is described as the process of “*making things work by ingeniously using whatever is at hand, being unconcerned about the ‘proper’ tools and resources*” (Thayer, 1988, p. 239), and thus well suited as a framework for resilient project management. All existing forms of knowledge (e.g. standards, theories, experiences) are potential tools of practice that can be used to explain and guide contextual project management work (Hickman, 1990).

Tools are used as a term to describe the majority of underlying processes and techniques, which essentially constitute the structure of project management (PMI, 2008). It is, however, not enough to evaluate tools by their structural characteristics and theoretical practicality. Tools are also defined by their actions. In other words, a tool is defined by its significant symbols (theory), such as a project plan or schedule, as well as the practices undertaken with the symbols (practice). For the definition of a tool, both are inseparable and equally important to create meaningful actions in a project management context. The organisational toolbox usually consists of multiple tools that can either be applied in a linear or heuristic fashion (Bingham and Eisenhardt, 2011, Bingham et al., 2007). Our proposed

model of improvisation builds on Weick's (1998) four degrees of improvisation, namely, 'interpretation', 'embellishment', 'variation' and '(pure) improvisation'.

The first degree of improvisation takes place in a context where project management tools are followed very strictly. Following Weick, this degree of improvisation "*occurs when people take minor liberties with a melody as when they choose novel accents or dynamics while performing it basically as written*" (1998, p. 544). In other words, linear project management represents project managers that strictly follow the project plan or the processes in place to deliver the projected outcome. However, project managers use their experience and skill set to make minor adjustments to the existing structures where necessary. Furthermore, everyone interprets and acts upon plans differently, which indicates a certain level of inherent dynamism. In spite of a pre-given organisational structure, which can often be very tight, improvisation in project work is inevitable, as there is no social system that generates total control over one's actions (Luhmann, 1995).

The second type of improvisation describes the application of *bricolage*, a method that merely uses existing resources to achieve a successful project (Baker et al., 2003, Cunha, 2005, Duymedjian and Rüling, 2010). Here, improvisation is specifically concerned with making practical use of readily available organisational resources, and applying them in a context-dependent fashion (Levi-Strauss, 1966). Using Weick's words, this degree "*involves greater use of imagination, this time with whole phrases in the original being anticipated or delayed beyond their usual placements. The melody is rephrased but recognizable*" (1998, p. 544). Bricolage very much reflects a pragmatic mindset in which there is no one 'right' way of doing things; one right way of applying a particular tool (Cunha, 2005). The only measure of adequateness of a certain tool is whether it solves a particular problematic situation at hand (Dewey, 1958). Hence, bricolage describes the act of using available resources, in whatever way necessary, to solve a problematic situation.

The third type of improvisation describes a pluralist approach to project management, when new tools are added to the organisation to help solve a particular problem. While there are often instances when one can make existing resources or tools work (e.g. bricolage), there are also situations when one has to drop the existing tools (Weick, 1996). In other words, additional, newly acquired tools (e.g. resources, processes) are added to complement the existing organisational toolbox (Weick, 1998). In this situation, it is important to look beyond the internal organisational horizon and look for new knowledge external to the organisation.

Improvisation on this level means openness towards new and different ways of operating, while maintaining a solid organisational system that enables efficient practices on a daily basis. Hence, this degree of improvisation represents a dynamic capability that allows companies to constantly evaluate internal resources, while scanning the environment for alternative tools (Helfat et al., 2007, Vera and Crossan, 2005).

The fourth degree of improvisation describes a potentially radical departure from existing plans, at least from their linear applications, in which the outcome is the main concern of the underlying practice (Dehlin, 2008, Weick, 1998). Organisational tools or structures, whether existing or non-existing, play only a secondary role in relation to actual practices. In musical terms, this type of improvisation can be explained as *"transforming the melody into patterns bearing little or no resemblance to the original model or using models altogether alternative to the melody as the basis for inventing new phrases"* (Berliner, 1994, p. 70). This degree of improvisation fundamentally changes segments of the initial structure and the subsequent actions (e.g. project plan, goal) or replaces different aspects with new creation that have little, if any, connection to the initial plan (Dehlin, 2008). Project management actions of this type are primarily guided by the problem to be solved and thus the delivery of a satisfying project outcome.

Overall, the phenomenon of improvisation has different shapes (see Table 2), in which some types are more radical than others, but it is important to note that the different types are not mutually exclusive. All forms contribute to resilient project management, as one may find traces of different forms of improvisation in the same organisation or department. We believe that adding the phenomenon of improvisation to the practical field of project management is essential, as it has the *"ability to provoke significant changes by building upon limited variations, in a fashion close to the 'butterfly effect' proposed by chaos and complexity theory"* (Cunha et al., 1999, p. 310).

Table 2: Degrees of improvisation that contribute to resilient project management

	LINEAR PM	BRICOLAGE	PLURALIST PM	PURE IMPROVISATION
Description	Linear application of existing PM tools	Contextual use of existing PM tools	Seeking and applying new PM tools	Heuristic practices. Little focus on existing PM tools
Dominant PM tools used	Internal tools	Internal tools	External tools	External tools
Application of PM tools	Strict and Linear	Pragmatic	Strict and linear	Pragmatic
Degree of Improvisation	Low	Medium	Medium	High
Degree of complexity	Low	Medium	Medium	High

The conceptual model – knowing the instrument⁷

The two main components of our conceptual model are formed by the types of theories used as well as the application of tools in a particular organisation. First, the theories used represent the project management knowledge in general, as proposed by the nine schools of project management, including its underlying methods, processes and tools (Worren et al., 2002). We differentiate between two types of knowledge: internal and external. Internal knowledge is the type of knowledge that is already formalised within an existing organisation, in the form of processes or working structures. External knowledge is knowledge that exists ‘out there’ but is not part of the organisation’s present toolbox.

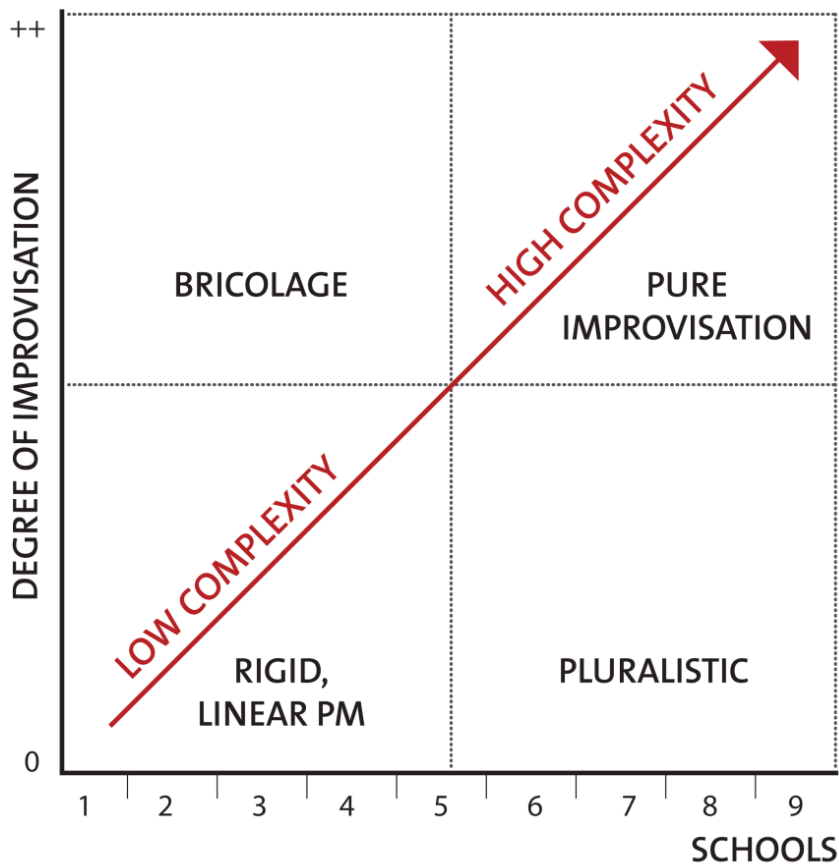
Second, the application of tools is concerned with three aspects; the underlying actions, how the tools are used in practice and. Since every project management school proposes certain ways of doing things, a particular tool is intended to be applied in a certain way. We differentiate between a linear (strict) application of the tools – basically, using tools formally and as initially intended – and a pragmatic application of the tools, where tools are more loosely applied in an iterative and heuristic manner, rather than merely sticking to the

⁷ Moorman and Minor (1998) and Miner, Bassoff and Moorman (2001) use the concept of adaption to describe planned change processes or the deployment of existing routines. Their work was highly influential for this paper and our conceptualisation of identifying different –formal and less formal – ways of improvisation (e.g. pluralistic PM, Bricolage).

original structure and methods. The third dimension that underlies the entire framework is complexity. The more complex the project, the more companies have to apply tools in a pragmatic way, or have to acquire new tools to make it work; or both.

The four degrees of improvisation represent the different types of application in which project managers can act upon and with the tools. They are certainly not mutually exclusive to a particular project, a specific scenario or organisation, and are therefore complimentary aspects of project management. Improvisation therefore does not necessarily signal the end of traditional project management tools, theories or processes. It merely highlights the context-dependent application of existing knowledge, or to use James' (1907) words 'it's a new way of doing old things'. Hence, we argue it is important to see how current project management knowledge is applied in practice. Based on the introduced concepts above, namely nine schools of project management, degrees of improvisation and complexity, we propose the following framework to test the pragmatic applicability of a particular theory.

Figure 1: Conceptual model of resilient project management



Our aim is to propose a model that increases resilience in project management by allowing multiple schools of thought to become true through their contextual application. Existing project management schools of thought are often built on dualist paradigms that suggest a distinction between thinking and acting, and thus propose prescriptive theories of how to manage a project successfully. The increasing complexity, in combination with the high failure rate of projects shows, however, that the traditional application of project management theories fails to provide satisfactory results (Whitty and Maylor, 2009). Bredillet (2010a) therefore calls for a change in thinking and proposes a meta-theory that does not distinguish between thinking and acting and suggests the incorporation of multiple different schools of thought. A conceptualisation of a resilience framework for project management allows us to collapse existing dualisms and apply the entirety of our current project management knowledge in a practical and meaningful way on a daily basis. (2010a). It is therefore a first step towards developing a meta-theory for project management that provides a basis for resilience and contextual practices.

Praxeology of project management

The term praxeology (or praxiology) originated in France in the late 19th century, based on Alfred Victor Espinas' theory of human action, or techniques used by humans in their purposeful behaviour. The theory was further developed into a meaningful field of research and praxeology was defined as "*the study of human action and conduct*" (Gove, 1981, p. 1782). Having its roots in economical theory, praxeology is also referred to as "*the science of human action that strives for universally valid knowledge [...] Like logic and mathematics, it is not derived from experience; it is prior to experience. It is, as it were, the logic of action and deed*" (Von Mises, 1966, Chapter 1 §6). Hence, praxeology is concerned with the science of effective action, which requires a definition of action itself. Kotarbiński, a Polish praxeologist who contributed substantially to the development of the theory, defines action as "*a purposeful and conscious act*" (Kotarbiński, 2002, p. 25) that includes the following essential elements: the agent, the material, the product, the free impulse, surrounding, the effect and the goal (Kotarbiński, 2002). The elements of action help praxeologists to move away from seeing action as a merely intuitive form of behaviour, and to make logical sense of the conditions of a particular act. An act usually implies a sequence of events, or consecutive action, which is meant to perform a practical act (Kotarbiński, 2002).

Practicality is a main component of the study of praxeology, as it describes the technical quality of actions, which enables the evaluation of the performed act. Due to its economic roots, efficacy is the most prominent criterion for the praxeological evaluation. This evaluation is, however, divided into two aspects; firstly, the outcome of the action, which represents the piece of work that was produced, and secondly, the action itself is evaluated, meaning the actual processes that lead to the completion of the specific task. Kotarbinski describes praxeological evaluation as follows: “*A practical or efficacy-oriented evaluation question about the effectiveness and efficiency of action*” (Kotarbiński, 2002, p. 39). Hence, praxeological practicality has two components: effectiveness and efficiency.

Firstly, effectiveness simply describes whether a planned effect is achieved in the initially set goal. Thus, effectiveness is to be evaluated on a scale from zero to full achievement of the goal (Gasparski, 2002). The evaluation of effectiveness ranges from zero up to the highest value that is achievable in a particular context. Similar to effectiveness, knowledge appears to be a determining factor of achieving a highly efficient action. This highlights the importance of creating knowledge, such as theories, that helps us to act and engage in our daily (work) life. Following Bredillet’s line of thought, we introduce classical pragmatism as a praxeological meta-theory that allows us to see theories as tools of practice, which can be used in a context-dependent fashion.

Redefining praxeology with pragmatism

Classical pragmatism is a method of doing rather than a philosophical theory *per se* (De Waal, 2005). By focusing on the underlying actions and practices, the main concerns of pragmatists are to assess and solve problems (Salem and Shields, 2011). Pragmatism transcends traditional praxeology, as it does not strive for universally applicable truths (e.g. prescriptive theory), something that has proven inaccurate in a project management context. The truth of a practice lies not in its correspondence with a given state of affairs, but in the usefulness of the practice (e.g. project management theories) to solve a problematic situation (James, 1977). Pragmatism allows the application and utilisation of a wide range of organisational theories in a context-specific fashion, making change a constant companion of pragmatic practising.

The applied methods are constantly characterised, shaped, and verified within the stream of individual lived experiences and thus are inherently context dependent (Schiller, 1966). Any theory – and its underlying processes – is therefore simply a tool of practice that

is used as a means to an end. The tool assists in remodelling existing experience (e.g. organisational learning) as well as shaping future acts (e.g. project planning) (Pitsis et al., 2003). Pragmatic practices thus possess the flexibility to tackle problematic situations with a wide range of viewpoints and activities while the pragmatic method constantly evolves in the course of our experiences. In that sense, every tool or theory can be used to make it work. As a philosophical concept it is built on three pillars, namely meaning, truth and inquiry (Hickman, 2004).

First, pragmatism applied in the project context suggests that meaning comes with the ability of a theory to solve problematic situations at hand. Pragmatism does not attempt to uncover universally applicable theories as such. Pragmatic theories much rather reflect context-dependent practices that are adequate in relation to the specific project requirements (cf. Schreyögg and Kliesch-Eberl, 2007), and thus are constantly changing by nature. Second, in pragmatism truth is conceived as the satisfactory outcome of deliberate and intentional actions. Put simply, for the pragmatists what is true is what works (Schiller, 1913), which implies a mutability of practices (James, 1907). Something becomes true only insofar and as long as it bears satisfactory practical consequences, in the same way as theories are only 'true' when they help meet the expected project outcome (Gherardi and Nicolini, 2002). Finally, the pragmatic method of inquiry allows us to connect scientific and behavioural theories to practical day-to-day problems by utilising adequate practices (Shields, 2006). The rigid nature of the inquiry process ensures reproducible practices through meaningful sensemaking of past experiences (Weick et al., 2005). Put simply, new experiences are assessed in regards to their contextual workability and captured in the existing stock of knowledge, either as individual experiences or as organisational-level lessons learned (Helfat and Winter, 2011).

The nature of scientific inquiry in practice, however, is fundamentally experimental, as there is never complete certainty about the success of the outcome. Hence, 'best practices' become working hypotheses that are constantly tested when organising projects (Shields, 2006). Scientific inquiry is thus an abductive inference process of constant testing, verifying and re-shaping of existing theories, while project management practices are constantly evolving in the course of the project (Hickman, 2001, 1990).

Theory of conventions

In line with the Theory of Convention we argue that project management theories are tools of practice that become true only insofar as they help to satisfactorily deliver a projected outcome, or, to put it simply, as long as they work (James, 1977, p. 382). The three main notions of the Theory of Convention are uncertainty, structure and the process of addressing uncertainty (Gomez and Jones, 2000, p. 697). Conventions (and theories likewise) are therefore structures with “*a set of formal relationships among the elements in a symbolic system which can be modelled*” (Levi-Strauss, 1974, p. 186). Modelling implies a certain degree of mutability to address uncertainty, which is why we believe project management theories should be seen as conventions. While theories provide a frame and stability, they also enable free and improvisatory action within and through the proposed structure to solve a particular problem.

This is what Dewey (1976-83) describes as an instrumental theory of truth. A hammer, for instance, comes with a pre-conceived definition of both structure and action, which leads to a specific outcome: to pound a nail into a surface. The hammer might not work as expected in any situation, especially not in its pre-conceived way. However, you can use a hammer in many different ways and for multiple problems, such as demolishing a wall, which may be quite different to the original meaning projected onto the tool. In certain situations a hammer is not the right tool, as it is of no practical use. In these situations a specific tool becomes contextually meaningless (Schiller, 1911). Hence, one is required to use a different tool that helps achieve the practical outcome. For these cases, every handyman brings a toolbox that consists of multiple tools that serve various purposes. In the same way, the multiplicity of project management knowledge represents a toolbox that allows any particular theory to be used and applied in multiple ways as long as it provides a satisfactory solution (Dewey, 1976-83).

There is no one ‘right’ way of delivering a project. Multiple approaches have proven to be successful in different contexts, such as formal project management or improvisation. In fact, the more knowledge one has, the more tools and ways one possesses to act successfully in any given situation. Theories must, however, be used contextually to meet specific project requirements and the ‘correctness’ of a chosen tool is determined by its practical problem-solving ability. Introducing theories as tools of practice enables project managers to collapse the theory/practice dichotomy, allowing them to use multiple project management theories to address the complexity of the external.

Resilience

Project management theories are mere creative points of departure brought into life by practices performed by the social actor; they are not objective entities that can be taken for granted and executed in a sequential and strict fashion (Dewey, 1929, Dehlin, 2008). Traditional project management theories fall short in exactly this regard, as they advocate the project as a pre-given entity, ready to be managed (Cicmil et al., 2006). However, theories are merely ideals that “*are not intended to be themselves realised but are meant to direct the course of realisation to potentialities*” (Dewey, 1938, p. 303). Current project management fails to sufficiently adapt to this mindset, as it ignores the less structured, spontaneous and intuitive aspects that guide project managers’ actions. A tool does not provide a predictable outcome; it is only as good as the actor who uses it. Project artefacts, such as schedules and plans, that do not contribute to achieving a projected outcome are contextually insignificant. Action, actor and tool are therefore inseparable components and mutually important (Simpson, 2009).

Traditional project management theories provide certainty, structure and comfort for the project manager in the same way a hammer is familiar to a handyman. Companies and practitioners need their structures as a frame in which they can operate; this does not, however, imply that traditional tools are only restricted to one particular action. The tools are utilised to ‘make it work’, to achieve the anticipated outcome and to enable actions while providing stability, rules and structure (Dewey, 1929). One should not, however, restrict oneself to only one tool or method (Weick, 1996). The multiplicity of methods provides an opportunity to choose and act based on the situation and context. Similar to a handyman’s toolkit, the different theories provide a range of tools that can be used whenever necessary and appropriate (Shields, 2005).

The improvisational approach offers novel ways to engage with project management processes. Instead of solely addressing project management and its tools in a rational instrumental way, improvisation sees the multiplicity of tools as a toolkit. The more tools one has, the more prepared one is to react to and act in certain situations. Further, an instrument is not to be restricted to only one ‘right’ practice at a particular stage of a project. The pragmatic project manager treats methods or processes as tools that can be used to resolve problematic situations. Consequently, the diversity of project management theories and methods represent a neat toolkit for the practising project manager that enables context-dependent action (James, 1959, Shields, 1996). The more ‘tools’ we have, the better prepared

we are to address “*problems that arise from the situation and developing the capacity and competence to deal with them*” (Miller, 2004, p. 248).

There is no one ‘right’ process that universally leads to the desired outcome. Our praxeological framework for resilient project management allows and enables routinised as well as improvisational applications of the available tools. For instance, plans are traditionally advocated by the formal bodies of knowledge as displays of an objective project reality. However, plans are only subjective images of what we perceive as being the project. Cicmil points out that “*experienced project managers always already know that plans will not stand up to the scrutiny of reality*” (2006, p. 32). These images help us to navigate our project in the external world; they allow us to communicate ideas and to act upon them. A plan, therefore, just like any other tool, should not be considered as being fixed or final; rather, it is a starting point to travel from one point to another, as this can help the project manager to challenge problematic situations. A project manager must not only know when to use a particular tool, how to use it, but also when to drop the tool (Weick, 1996).

The concept of improvisation supports this pragmatic mindset by creating more flexible behaviours and allowing new ways to achieve objectives (Chelariu et al., 2002). Our notion of improvisation is neither negative nor positive, as we propose that improvisation is an inevitable part of project work and thus already inherent in current practices. We propose merely that the degree of improvisation varies depending on context and problem, which contributes to resilience in project management. Naturally, there are times when projects lack adequate resources and tools, highlighting that improvisation should be supported by project-based organisations as a key driver of resilience. Hence, project management takes place in improvisatory arenas, where tools are used in a routinised as well as novel way to respond to emerging challenges (Dehlin, 2008).

This improvisatory arena has the qualities of anticipation, attention and responsiveness, which characterises resilient systems likewise (Hollnagel and Woods, 2006). In particular, resilience is defined as “*the developable capacity to rebound or bounce back from adversity, conflict, and failure or even positive events, progress, and increased responsibility*” (Luthans, 2002, p. 702). Resilience allows for not only reactive practices but also fosters proactive learning and growth through focusing on meeting existing and emerging challenges. Hence, improvisation in resilient systems embraces a ‘thinking in action’ mindset that collapses the time between planning and execution (Baker et al., 2003,

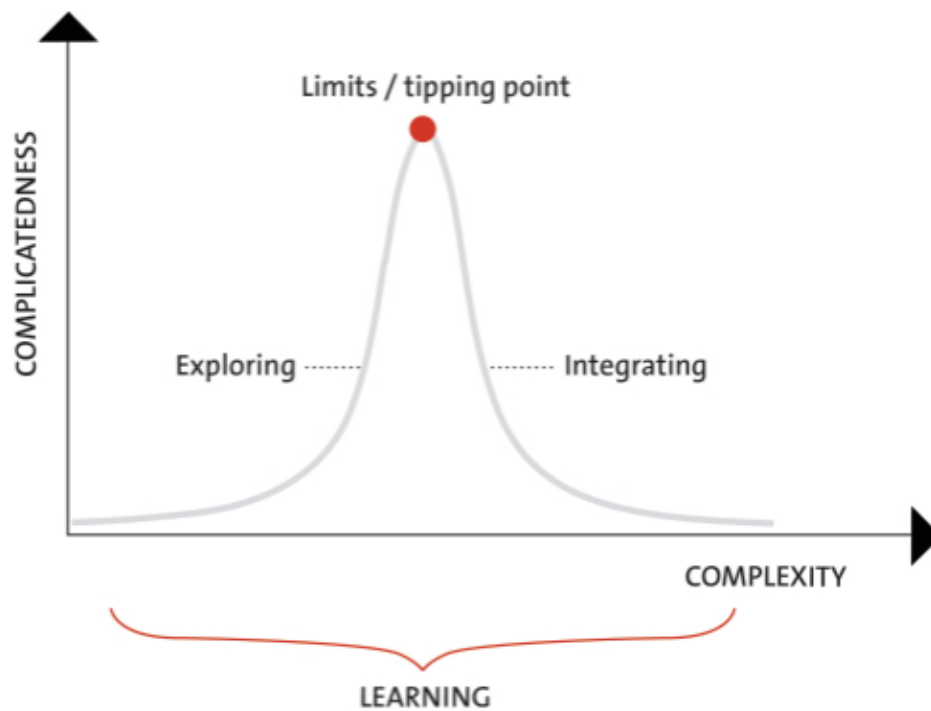
Moorman and Miner, 1998, Clegg et al., 2002). Resilience then becomes the ability to expect the unexpected and look beyond the given structure, as it emphasises the problem-solving act of addressing external complexity (Klein, 2012, Hollnagel and Woods, 2006).

Resilience Grid

Improvisation helps to increase internal complexity, and is therefore a way to deal with external complexity (Ashby, 1965). Improvisation does not make the actual theories or tools more complicated (or complex) it merely increases the variety of processes and potential application of existing theories. Our notion of improvisation transforms best practices, as proposed by the different theories, into context-dependent practical tools that enable successful project work, while remaining within its original and neat theoretical corpus (Klein, 2012, Pascal, 1859).

The improvisatory evolution of theories describes the path of development through constant exercising, which is often experimental and complicated (Dewey, 1929). It therefore increases internal complexity and complicatedness simultaneously. Further development will reach an intolerable limit even though development can be turned around on the basis of a further increase in complexity, while complicatedness is decreasing (see Figure 2). A graphical representation of this relationship would look like a bell curve sitting on a complexity scale with an increasing complexity from left to right and a vertical complicatedness scale with an increasing complicatedness from bottom to top. The first half of the graph can be read as the exploration of a practice increasing in complexity and increasing exponentially in complicatedness. The second half of the graph can be read as a process of integration, which is further increased in complexity on the basis of a decreasing complicatedness. The overall process can be described as a learning process based on exploration and integration driven by continuous exercising.

Figure 2: C&C grid of resilience



Learning to ride a bike or learning a foreign language will very much follow this bell curve-shaped development. Again, a trans-disciplinary approach with reference to newer science may enlighten the basis of integration. What happens at the turning point and thereafter to decrease complicatedness while furthermore increasing complexity? At some point, riding a bicycle or speaking a foreign language becomes a simple task; easy to do with no longer any need to think about the necessary skills to perform the trick (Klein, 2012). This is exactly the state of mastery the tradition of Zen practices describes. A Zen master in martial arts, for example, is able to perform very complex moves and figures almost effortlessly. Neurosciences suggest that a much complexity is hardwired on the basis of constant exercising (Klein, 2012). So, examining resilient practice in complex project management raises a number of questions on how to facilitate and support this kind of development; a development that ranges from trivial to simple, increases systemic variety, and is therefore based on the law of requisite variety, enforcing the ability to cope with any kind of environmental impact on the project and its management.

Conclusion

It is not possible for project management to have an ultimate goal of offering a universal recipe for delivering a successful project. There is no singular project management

method that transcends all others, and as history shows, that project management demonstrates signs of multiplicity (Feyerabend, 1975, Bredillet, 2007, 2008a, 2008b, 2008c). Best practices, theories and methods (e.g. plans, Gantt charts, etc.) are mere tools to be employed with caution and practical wisdom (Flyvbjerg, 2001, 2006b). Projects are social systems that require a focus on non-linear and dynamic aspects of practice and human actions. Complexity involves dealing with the unknown and an (blind) application of routinised, measurable behaviour seems counterproductive. Routines and standardised processes as prescribed by theories can certainly prove themselves valuable as starting points for further creative action, but in order to act effectively upon the unknown there is need for something more than a skilful technician (Dehlin, 2012, Flyvbjerg, 2004). Complex surroundings require a capacity for open creativity, of trial and error and a context-sensitive transformation of old experiences into expert action to create a resilient project management approach (Crawford et al., 2006a). In a sense, what we are alluding to is a routine for non-routines, which has been conceptualised as improvisation (Ciborra, 1999).

A praxeology of resilient project management has implications with two streams; the project management education and the body of knowledge. The resilient project manager therefore may want to possess knowledge of more existing project management theories (e.g. nine schools of project management) and their limitations. Furthermore, the resilient project manager assesses a particular situation and uses a variety of existing theories to solve the problem, whether it is in a strict or improvisational fashion. On an institutional level, formal bodies of knowledge (e.g. PMBOK) may want to embrace the plurality of project management knowledge and propose a heterogeneous body of knowledge. Such a book of knowledge would necessarily at times be contradictive in itself, as the multiple theories (Bredillet, 2010a, 2010b) and organisational settings (Luhmann, 1995) are often incompatible. However, this would accommodate the existing complexity and help develop a framework of resilient project management.

Our paper contributes to the current debates in project management and the initiated practice-turn (e.g. Cicmil et al., 2006). Focusing on existing theoretical knowledge and improvisatory practices provides a wonderful opportunity to do research with and for project managers and develop practical theories. The practicality of project management knowledge is particularly important, as it allows researchers to bridge the gap with practitioners. Providing sound, practice-related theories stimulates fruitful debates between the different professions of the project management community, such as academics, project managers and

consultants, which will help the field to further mature and grow. In that sense, we intended to follow Flyvbjerg's (2001) intentions and provide a new theoretical approach of practice-oriented project management: one that actually matters.

Chapter 4

The Differential Roles of Multilevel Change Capabilities in Project-Based Organisations

Introduction

Project-based organisations (PBOs) emerged as an answer to the current complex, dynamic and transient business environment (e.g. Feldman and Orlikowski, 2011, Maylor et al., 2008). These multilevel organisational entities are temporary structures that rely on project-based work, often in the form of formal routines applied in a strict, linear and sequential fashion to deliver stated objectives (Cicmil et al., 2006). However, the contingencies and context of every project are distinct (Turner, 2009, Maylor et al., 2006) so that PBOs have to frequently modify, transform, or reconfigure their existing project capabilities.

To investigate the complexity of this change to its full extent, we need to account for the multilevel nature of PBOs (Chen, 2005, Lechler and Cohen, 2009, Salvato and Rerup, 2011). To explore multilevel change, this paper focuses on two PBO levels in particular – the project and the organisational level – as the majority of project capabilities reside at these levels. We argue that PBOs embrace project capabilities with distinct characteristics across multiple organisational levels (Brady and Davies, 2004) that facilitate change in various ways, depending on the level and purpose of the capability. A multilevel view is particularly vital for exploring how PBOs change their existing capabilities holistically, as multilevel theories span across levels and help bridge existing, often contrasting, change theories, such that they offer a richer portrait of organisational change (Salvato and Rerup, 2011, Klein et al., 1999) that acknowledges the contextual nature of project capabilities.

By investigating how PBOs accommodate the changing nature of projects across multiple organisational levels, we also gain invaluable insights into the role of dynamic capabilities that enable organisations to deliver projects in complex environments. Our dynamic capabilities conceptualisation captures both formal and less formal change routines in PBOs (e.g. Schreyögg and Kliesch-Eberl, 2007, Hodgkinson and Healey, 2011, Ambrosini et al., 2009). Firstly, we suggest that PBOs continuously modify their project capabilities using ostensive capabilities (Ambrosini et al., 2009, Feldman and Pentland, 2003). Secondly, to solve emerging problems in real time, PBOs may adjust their operational project

capabilities through spontaneous, intuitive and creative actions in the form of performative capabilities (Moorman and Miner, 1998, Weick, 1998, Ambrosini et al., 2009, Feldman and Pentland, 2003). Both types of dynamic capability describe intentional processes to facilitate change in multilevel PBOs (Amit and Schoemaker, 1993, Garud and Karnøe, 2001).

Change in PBOs is characterised by complex social processes at various levels (Cicmil et al., 2006). As the underlying research question that drives our theoretical and empirical analysis, we ask: *How do PBOs change their existing capabilities at different organisational levels?* The answer contributes to current literature, primarily through a clarification of dynamic capabilities in a project-based context. Furthermore, we specify PBOs as multilevel organisational phenomena that possess different types of project capability across organisational layers. Our proposed theoretical model thus contributes to an understanding of how PBOs change their existing project capabilities across multiple organisational levels and project portfolios.

We begin by introducing PBOs as multilevel phenomena, before providing a detailed description of both operational and dynamic project capabilities that act on and are part of a PBO's resource base. A short overview of our multilevel conceptualisation features both ostensive dynamic and performative dynamic capabilities to explain organisational change. After we describe our empirical investigation, including an outline of our three cases and collected data, we present and interpret the qualitative findings. Finally, we conclude with a summary of our findings, some managerial implications, and avenues for further research.

Theoretical Background

Management research predominantly investigates organisational phenomena as a universal entity, using only a single level of analysis (e.g. individual, team, business unit, organisation) (Tracey et al., 2011). More recently, however, researchers have started to develop a more complex understanding of organisations through the development of multilevel theories that account for the different organisational layers. Using a multilevel lens helps to develop contextual theories, as it provides insights regarding a particular social behaviour within an organisational structure (Hitt et al., 2007). Hence, multilevel research is a way of dealing with the complexity of organisations that allows for the creation of context-dependent theories, which enhance our understanding of the interplay between organisational actions and structure across different layers of the organisation. In particular, investigating activities on a project level in relation to the organisational structure provides an opportunity

to capture how the different levels and rationalities influence and shape each other interdependently (Salvato and Rerup, 2011). A multilevel research lens therefore offers great potential to investigate the complexity in PBOs, as it enables us to draw level-specific conclusions.

The multilevel nature of PBOs

Projects offer a non-standard, more flexible method for doing business (Aubry et al., 2007). A PBO refers to an organisation whose strategic business operations are managed mainly through projects, portfolios, or programs (Gareis, 2004). Projects are temporary structures that are integrated into the organisation (Larson, 2004), such that PBOs must possess dual capabilities focusing on the governance as well as the actual management of a range of projects, portfolios and programs (2002). Accordingly, PBOs are inherently multilevel phenomena and one cannot distinguish between the organisation and the project objectives, because the levels are closely connected (cf. Berger and Luckmann, 1967, Brady and Davies, 2004, Mead, 1934, Sydow et al., 2004). The actual number of organisational levels varies with the size and complexity of the PBO; we address two main levels that are common in both theory and empirical data, namely, the organisational and project levels.

In this study, the organisational level is represented by the project management office (PMO), which is “*an organizational entity established to assist project managers, teams and various management levels on strategic matters and functional entities throughout the organization in implementing [project management] principles, practices, methodologies, tools and techniques*” (Dai and Wells, 2004, p. 524). This organisational governance structure thus helps PBOs in their aim to effectively manage a multitude of projects (Aubry et al., 2007), primarily through formal and standardised learning routines (Dinsmore, 1996), centralised and rigid control mechanisms (Marsh, 2000), and universal project management best practices (Hobday, 2000).

The project level is highly influenced by the governance structure imposed by the PMO, which includes certain project management methodologies (e.g. PMBOK, Prince2) that are prescribed to deliver a project. Nevertheless, projects require a more flexible approach to dealing with complexity, as change is a daily companion in projects (Hagstrom and Hedlund, 1999). While projects are often characterised by prescriptive processes that are assigned to different stages within the so-called project lifecycle, they have to remain flexible to address emerging and unexpected challenges. Put simply, projects operate within the governance structure, while remaining flexible enough to master the dynamism of the often

complex project work. On a project level it is therefore absolutely crucial to effectively manage the stability–flexibility paradox by using and accommodating multiple forms of project capabilities (cf. Patel, 2011).

The multilevel nature of operational project capabilities

If PBOs are multilevel phenomena, in which different levels perform different organisational tasks, then project capabilities must vary across levels and projects too (cf. Rerup and Feldman, 2011, Salvato and Rerup, 2011). The increasing amount of project-based work has resulted in a variety of sophisticated project capabilities in the form of formal processes or routines (e.g. best practices) that are promoted to be applied in a context-independent, linear, and sequential fashion (Cicmil et al., 2006, Crawford et al., 2006b, Bredillet, 2010a). We refer to these rather static capabilities as operational project capabilities. Operational project capabilities in PBOs are therefore standard routines repeated over time that help PBOs accomplish successful project outcomes effectively (cf. Bingham and Eisenhardt, 2011, Turner, 2009). The multitude of operational project capabilities do not only depend on the organisational level, but also the project type and the preferred project management approach, such as stakeholder management (cf. Littau et al., 2010), project governance (cf. Turner and Keegan, 2001), cost and time management (cf. Zwikael et al., 2000), and risk management (cf. Raz and Michael, 2001). Considering the multilevel nature of PBOs, we differentiate two main operational project capabilities, which describe existing routines and structures at each level: project management capabilities (PMCs) and project-governance capabilities (PGCs).

PMCs are established routines in the form of best project management practices that help deliver a successful project. They offer a high degree of commonality and stability across projects, levels and contexts (cf. Davies and Brady, 2000), and thus illustrate the static nature of traditional project management. More precisely, operational PMCs represent the project-specific resource base. Here, for example, particular procedures and people are allocated to certain stages of the project lifecycle to ensure a project is accomplished and completed in the most effective manner (PMI, 2008, Turner et al., 2010). The sequential application and completion of these routines is believed to result in successful project delivery. Put simply, effective and successful project management is promoted as the accurate and strict application of prescriptive project management routines, often formal in a detailed project plan (Atkinson et al., 2006), in which project managers merely serve as skilful technicians (Flyvbjerg, 2001, Crawford et al., 2006a).

PGCs represent routines that provide the frame to govern projects at an organisational level. PGCs are static in nature, as they help establish an organisational structure that ensures visibility and control to achieve the related strategic long-term objectives of the PBO (Levin, 2013, Turner, 2009). At the PMO level, PGCs therefore create centralised and standardised control to ensure that processes are followed strictly across projects portfolios and programs (Crawford et al., 2008), such that they implement PMCs that enable the organisation to operate effectively (Mayer and Salomon, 2006). PGCs reflect an organisational-level ability to allocate different mechanisms for governing projects, as a means of keeping track and creating transparency for various ongoing project works (Crawford et al., 2008). As Turner (2009) suggests, PGCs provide a static organisational infrastructure that allows PBOs to govern projects. This governance structure enables PBOs to monitor and control individual projects and project portfolios to ensure compliance with established project management processes that are also in line with the strategic objectives of the PBO.

The increasing environmental complexity often forces PBOs to reconsider and change their strategies and thus their operational project capabilities, something that has not been sufficiently addressed in the literature. In other words, while PBOs aim to have standardised processes that ensure effective project delivery, they are required to address the change aspect of the stability–change paradox (Patel, 2011). Regardless of whether the trigger for this change is internal or external, it often results in a reconfiguration of the existing plan of action (including underlying processes). However, many organisations fail to manage this change process effectively (Turner et al., 2010). In particular, while there is some understanding of the structure and appearance of different operational project capabilities and factors that lead to PMC change (Aubry et al., 2010a, 2010b), we do not understand how PBOs actually change their existing operational project capabilities.

Theoretical foundations of organisational and strategic change in PBOs

Even for seemingly similar tasks, project capabilities can never be totally static, because the “*increasingly frequent occurrence of major, discrete environmental shifts in competitive, technological, social, and regulatory domains*” (Barreto, 2010, p. 257) demands that PBOs actively manage their projects and remain flexible (Goodale et al., 2011). Organisational change thus may be evolutionary, such that change occurs incrementally through continuous improvement, or else it could result from actively and immediately managed change processes (Winch et al., 2012, Worren et al., 1999), in which the emphasis is on the organisation’s state of flux, with neither clear beginnings nor ends (Tsoukas and

Chia, 2002). With a portfolio of dynamic capabilities, PBOs can adjust, reconfigure, or transform their operational project capabilities (i.e., PMCs and PGCs) in various ways (Patel, 2011, Winter, 2003, Zollo and Winter, 2002, Helfat and Peteraf, 2003).

Dynamic capabilities are “*dedicated to the modification of [operational] capabilities and lead, for example, to changes in the firm's products or production processes*” (Cepeda and Vera, 2007, p. 427). In our context, dynamic project capabilities enable PBOs to modify, change, and reconfigure operational project capabilities, making them a fundamental feature of PBOs in complex, project-based environments (cf. Helfat et al., 2007, Bingham et al., 2007). Teece (2007) highlights three core processes that form dynamic capabilities: (1) sensing (and shaping) opportunities and threats, (2) seizing opportunities, and (3) reconfiguring assets and structures to maintain success in the market. Sensing refers to an organisational ability to search and explore the internal and external environment to find appropriate resources, processes, or technology. Seizing describes the strategic decision-making process related to selecting sensed opportunities, such as investing in specialised assets. Finally, reconfiguring entails the continuous transformation of an organisation’s resource base to address the unique requirements of different projects (Katkalo et al., 2010).

However, the traditional dynamic capabilities view (DCV) overemphasises the routine nature of organisational change, privileging formal processes as the primary route to organisational adaptation and performance (Hodgkinson and Healey, 2011). We refer to this as the ostensive aspect of change (Pentland and Feldman, 2005). Recent research suggests an expansion of this view through the inclusion of heuristic processes (Hodgkinson and Healey, 2011, Bingham and Eisenhardt, 2011). Heuristics are processual shortcuts that are inherently improvisational (Eisenhardt et al., 2010), as they represent change routines *in practice* that help to sense, seize, and reconfigure organisations in a more immediate, real-time fashion (Cunha et al., 2012, Ambrosini et al., 2009). Even though heuristic processes are improvisational, they are intentional and repeatable shortcuts and can thus be characterised as organisational capabilities (Bingham and Eisenhardt, 2011, Amit and Schoemaker, 1993). They enable PBOs to transform operational project capabilities without becoming preoccupied by extensive details and precision, in a less formal approach to unexpected adaptation challenges (Bingham and Eisenhardt, 2011, Eisenhardt and Sull, 2001). We refer to this aspect of change as performative dynamic capabilities (Pentland and Feldman, 2005).

Hence, we introduce a dual dynamic capabilities model that incorporates formal and less formal change routines⁸.

There is a limited understanding of how routines change and enable change, especially in regards to the multilevel nature of PBOs (Feldman, 2000, Ambrosini et al., 2009). Organisational-level routines or structures are usually regarded as shaping project-level routines, but there is a lack of understanding about the actual interactions in both directions (Salvato and Rerup, 2011). Dividing dynamic project capabilities and component routines into performative and ostensive parts (Feldman and Pentland, 2003) reveals the interaction between and nature of different organisational levels and capabilities, and the way they change contextually (Rerup and Feldman, 2011).

As PBOs are multilevel in nature, whereby different capabilities reside in different organisational levels, we propose that both forms of dynamic capability affect change across organisational levels. Ostensive dynamic capabilities facilitate change in a more structured and incremental way. Here, change occurs owing to stable routines in which project capabilities are changed through innovation routines (Zollo and Winter, 2002). These innovation routines operate within an existing organisational framework and are shaped by the attention, learning, and action of the predefined organisational structure (Schreyögg and Kliesch-Eberl, 2007). At the same time, we argue that PBOs possess a more flexible, less formal approach to changing project capabilities, in which project capabilities are constantly altered and adjusted based on experiential, improvisational and pragmatic organisational processes, or heuristics (Schreyögg and Kliesch-Eberl, 2007). This form of performative dynamic capability is characterised by its ability to contextually affect change, yet within the existing governance structure that allows projects to quickly alter capabilities in order to master unexpected events (Eisenhardt, 2002).

In summary, PBOs and their underlying capabilities are multilevel. At various levels different PMCs and PGCs exist, which need to be changed in accordance with the changing internal and external project landscape. Previous research has failed to sufficiently conceptualise organisational change in a multi-level fashion (Hitt et al., 2007, Salvato and Rerup, 2011). We anticipate the presence of both ostensive and performative dynamic capabilities to affect strategic change on both organisational and project levels (cf. Augier and Teece, 2008, Bingham et al., 2007, Artto et al., 2008, Patanakul and Shenhar, 2012,

⁸ Moorman and Miner (1998) and Miner, Bassoff and Moorman (2001) use the concept of adaption to describe similar aspects of change in organisation. This work is related to their work, but extends it to a multilevel perspective.

Shenhar et al., 2007). Despite the existence of both dynamic capabilities across different PBO levels, there may be a dominant presence on one particular organisational level. For instance, since ostensive capabilities represent the abstract nature of change routines (e.g., continuous improvement), they are more aligned with the stable nature of PGCs at an organisational level, whereas performative dynamic capabilities represent spontaneous, creative, intuitive, and real-time changes within daily project-based work (Feldman and Orlikowski, 2011), which is more aligned with the flexible nature of PMCs at a project level. In short, our DCV offers a theoretical foundation for exploring change in PBOs, such that sensing, seizing, and reconfiguration embody ostensive and performative dynamic capabilities. To conceptualise change in multilevel PBOs, we further supplement our theoretical argument with empirical, qualitative evidence, as we outline in the following section.

Research Design

Our goal is not to develop a generic theory *per se* but rather to provide contextual insights and a starting point for further, more comprehensive theory development. We avoid any claims of generalisability but still draw on rigorously collected data and analysis to offer a solid empirical foundation for our conceptual argument so that we can support a context-dependent theory of change that can serve as a starting point for investigating change in PBOs on a larger scale.

Method

We examine the multitude of project capabilities of PBOs and how they change on multiple organisational levels, using a practical epistemology as a research foundation (Calori, 2002, Eisenhardt and Graebner, 2007). This type of research involves a philosophical choice about what is important, so our guiding theoretical assumptions are integral to data collection and interpretation (Cicmil, 2006). Because qualitative research approaches in general and ethnographic techniques in particular can uncover routines and capabilities in practice, across a range of organisational levels (Kaplan, 2008, Jarzabkowski, 2005), we adopted a case study approach to assess our theoretical argument and advance a contextual theory (Kaplan, 2008).

Our research draws on a case study approach. This approach typically uses one or more cases to advance practice-based theories (Eisenhardt, 1989), usually through multiple stages, such as identifying theoretical constructs, developing propositions, and undertaking reflective interpretations (Cicmil, 2006). Case study research provides rich descriptions of

particular situations (Yin, 2008), and emergent theoretical findings are “*situated in and developed by recognizing patterns of relationships among constructs within and across cases and their underlying logical arguments*” (Eisenhardt and Graebner, 2007, p. 25). In this sense, a case study is the most suitable approach to understand the organisational phenomena that underlie our research questions (Flyvbjerg, 2004, 2006a, Eisenhardt, 1989, Eisenhardt and Graebner, 2007). We interpreted data from three case studies, for which we undertook rich descriptive interviews, observed people practising project management, and gathered insightful secondary data.

Case Selection

The three cases – a large IT-based company (Xcom), a government organisation (Ycom), and an educational institution (Zcom) – provided multiple data sources. Xcom is a leading telecommunications and information services provider, and through its multidivisional PBO, it offers a wide range of products and services related to fixed and mobile network infrastructure. Similar to other organisations in the industry, Xcom had experienced tremendous, continuous changes since the 1990s due to the emergence of the Internet and mobile phones. As a major national organisation, it runs PBOs nationally; it also requires a solid understanding of project management and having strong governance structures in place. This dynamic environment (Bourgeois and Eisenhardt, 1988) is a suitable context to research change processes in PBOs, because its routinised PMCs have to constantly evolve to meet the changing requirements of projects-based work (Helfat and Peteraf, 2003, Feldman, 2000).

Ycom buys and maintains physical assets and inventory to serve the public interest. As a PBO that delivers equipment and services at a national level, Ycom experiences significant complexity in its projects and operations; effective, efficient performance is crucial. As one of the largest PBOs in the country, Ycom has a deep-rooted interest in project management excellence (Cooke-Davies and Arzymanow, 2003, Jugdev and Thomas, 2002), and as a government organisation, it functions under a tight governance structure that influences multiple levels (Foss et al., 2010). Therefore, its operational project capabilities constitute processes that represent industry, national, or international best practices, in the form of formal routines. This structural nature in combination with high project complexity makes Ycom an insightful and valuable case study.

Finally, Zcom is a tertiary educational institution that recently established a department to deal with major internal projects, in line with its strategic objective to become

a leading, forward-thinking university. Among its solutions to existing shortcomings, it has upgraded its teaching facilities and communal areas to accommodate the future needs of a growing, state-of-the-art educational institution. Multiple major building projects constitute the portfolio of projects, all of which are managed by teams of architects, planners, and project managers responsible for guiding the design, timing, and location of new building works. The multiplicity of projects, changing stakeholder demands, and nature of the strategic plan imply a high level of complexity, such that project capabilities need to adjust to external and internal changes. Accordingly, Zcom is also a relevant case for this research.

With three case studies, we achieve a robust means to advance contextual theory (Yin, 2008), because we can make comparisons across different cases and validate the appropriateness of our argument and its underlying concepts (Eisenhardt, 1991, Eisenhardt and Graebner, 2007). The selected cases share certain features: having a stable project governance structure in place, with standardised processes, rigid control mechanisms, and a hierarchical organisational structure. Yet they also differ, as they represent different industries and varied types of projects, which adhere to replication logic (Eisenhardt, 1989) and ensure that each case can stand on its own as an analytic unit. These characteristics support the validity of our findings in that the identified issues are cross verified within our case selection (Eisenhardt and Graebner, 2007, Kaplan, 2008).

Data collection

With this qualitative research, we sought to examine the nature of capability change in PBOs, mainly by addressing the underlying nature of the dynamic capabilities involved in facilitating the change. First, we relied on observational data of everyday project work, in the form of existing structures, routines and capabilities. Second, we used interview data to confirm or disconfirm the findings from our observations. Third, with secondary data we confirmed and verified our insights, as we summarise in Table 1.

In the initial stage, the research team attended and observed interviews and assessments between consultants and Xcom and Ycom to acquire a general understanding of how the PBOs operate. This initial observational phase lasted four months, during which time we visited different offices of Xcom and Ycom. In the subsequent year, we conducted six semi-structured interviews and one focus group, concentrating on general aspects of project governance. These interviews provided a strong impetus for this study, in that they revealed a range of interesting change aspects in PBOs. In particular, the initial findings indicated that project capabilities and the way PBOs address these changes determine successful project

management (Davies and Brady, 2000, Brady and Davies, 2004). We also found differences across organisational levels related to the structure of organisations.

Table 1: Overview of cases and collected data

	Xcom	Ycom	Zcom
Case Description	Large telecommunication company with bureaucratic governance structure that manages a major intra- and inter-organisational capability change project.	Government organisation that manages technologically and commercially complex projects and is greatly influenced by a rigid governance structure.	Educational institution with hierarchical governance structure that runs major building projects to align the strategic vision of the university with its teaching facilities.
Timeline	2009–2012	2010–2012	2011–2012
Data Collection	<ul style="list-style-type: none"> • Observations • 10 in-depth interviews 	<ul style="list-style-type: none"> • Observations • Focus group • 5 in-depth interviews 	<ul style="list-style-type: none"> • Qualitative shadowing (e.g., weekly meetings, site visits) • Secondary data (e.g., meeting minutes, university newsletters) • 7 in-depth interviews
Respondents	XCOM1.1, XCOM1.2, XCOM1.3, XCOM1.4, XCOM1.5, XCOM1.6, XCOM2.1, XCOM2.2, XCOM2.3, XCOM2.4	YCOM1.1, YCOM2.1, YCOM2.2, YCOM2.3, YCOM2.4, YCOM2.5	ZCOM1.1, ZCOM1.2, ZCOM1.3, ZCOM1.4, ZCOM1.5, ZCOM1.6, ZCOM1.7

To gain a more in-depth understanding of the nature of change in PBOs, we conducted supplementary ethnographic research the following year, focusing on performative aspects of project work by specifically investigating facets of improvisation in projects. During this period, we shadowed project managers in Zcom, observed weekly meetings and seminars, and conducted formal semi-structured interviews. In addition, we collected secondary data (e.g., newsletters, meeting minutes, project plans, drawings) to support our fieldwork and interview data. Following an additional round of reflective analysis, we conducted another round of semi-structured interviews in Xcom and Ycom to further investigate how PBOs change their existing sets of operational PMCs across different levels of the organisation.

For the vast majority of the interviews, we let the participants discuss these themes freely, asking questions from time to time, consistent with the flow of their thoughts. Interviews lasted 60 minutes on average, and they were recorded and transcribed. To support critical reflection in the analysis phase, all interviews were conducted by at least two researchers, who took notes during each interview and transcribed them immediately thereafter. The respondents were chosen on the basis of their knowledge about the specific aspects we study and included project managers, who deal with daily project management, and PMO managers, who are responsible for the PMCs at the organisational level.

Data analysis

We adopted practical epistemology (Calori, 2002, Cicmil, 2006), such that we “*deliberately [sought] out information for answering questions about what structural factors influence individual actions, how those actions are constructed, and their structural consequences*” (Flyvbjerg, 2001, p. 138). Specifically, we aimed to explore structural factors that influence individual actions, how those actions are constructed, and which structural consequences they have to identify potential interplays between ostensive and performative aspects of change. In-depth, semi-structured interviews provided information on processes and routines taking place in naturalistic settings (Patton, 2001) and served as our investigative mechanism. Observations of daily project-related routines (e.g., meetings) also supported our interview data (Silverman, 2009), though data security and information classifications prevented us from conducting field observations in all cases. Where possible, we collected secondary data to develop a more in-depth understanding of the PBOs and their project capabilities. In this sense, our research approach reflects the proposition that project management and its processes are socially construed and operate within a web of organisational structures (cf. Berger and Luckmann, 1967). This intersubjective project reality means that both ostensive and performative aspects of projects should be included in any understanding of change, rather than preferring any focus on one or the other (Cicmil, 2006, Grundy, 2000). That is,

“The distinction between the ‘knowledge of acquaintance’ possessed by practitioners and the ‘knowledge about’, mainly possessed by professional researchers, shows the complementarity and the necessary co-authorship of managers and researchers in building management theories.” (Calori, 2000, p. 1033)

All authors analysed the empirical materials to increase the rigor of our analysis and address the influences of personal backgrounds or belief systems in interpretations of the qualitative data. The initial interviews and field notes helped assess theoretical concepts related to the research question posed in this study. In addition, in the second phase, the interviews were specifically organised to investigate the initial concepts and compare the two organisational levels. The coding of the data was done manually and in NVIVO, and was based on three characteristics that distinguish dynamic capabilities, namely importance of structure, form of dynamic capability and learning direction. Based on these criteria all interviews were coded and analysed and different words were used to identify different patterns. For instance, the terms ‘improvisation’ and ‘pragmatic’ were used to identify

performative dynamic capabilities, which reflect the form of a dynamic capability according to our criteria. Furthermore, ‘capability’ or ‘process’ were further used to identify the type of dynamic capability, depending on the way the term was used in the particular context. Moreover, the words ‘bureaucracy’ or ‘governance’ were for instance used to determine the importance of structure. The multilevel aspect was, inter alia, covered at the start of the interviews when we asked respondents to draw the organisational structure of their PBO. However, we also took into account the position of the individual respondents and thus the context to which they were referring in their answers.

We ensured to capture large parts of the potential quotes from the actual transcription so we could assess the context in which a particular statement was made. When evaluating the different results and discussing them in our research team, we identified unique perceptions of changes through PMCs and PGCs at the different levels of the PBO. For example, if one researcher identified a change driven by a structured process, but another identified it as an unstructured phenomenon, we reconsidered and reinterpreted the interview data, adopting a stronger focus on participants’ roles and level within the organisation. Further discussions and re-evaluations produced our ultimate findings related to how PBOs change their PGCs and PMCs. We use this empirical material to support our conceptual argument.

Findings

The project management literature introduces PBOs as multilevel entities, in which the underlying project capabilities differ (Sydow et al., 2004, Klein et al., 1999). Due to this multilevel nature, in combination with the dynamism of the business landscape, inter- and intra-organisational influences make project-based work increasingly complex, as one of the informants summarised:

“I think what I find difficult to deal with is the sign off framework that—because the client is not a single person obviously, or even a board of people, that it is an organization that has to report back to various other levels, be it stakeholder eventually using the building or be it, some CEO or board level where the money comes from and requiring sign off and so on. It's a very lengthy and often frustrating process to get just the small thing ticked off.” (Zcom1.1, 02.05.2012)

Sydow et al. (2004) highlight four PBO levels: organisational units, organisations, interorganisational networks, and organisational fields. In this study we merely focus on two

organisational levels, the project and the PMO, to investigate change in PBOs. Sydow and his co-authors (2004) specifically describe the organisational unit as the project level, at which capabilities (e.g. PMCs) rely on specialised resources and expertise (Sydow et al. 2004), such that PMCs vary depending on the project context:

“[Xcom] has an underlying say, product development methodology, IT methodologies—whether it's agile or more conventional methodologies. Everything is managed through [internal project management system] at a program and a project level. So I'll be using all the tools and processes that everybody else you talk to will be using.” (Xcom2.3, 21.06.2012)

The organisational level in our study, represented by the PMO, must accommodate a broader set of capabilities (PGCs), ranging from structural to organic organisational features (cf. Burns and Stalker 1961, Sydow et al. 2004). These PGCs are mainly concerned with aspects of project governance of multiple projects and project portfolios:

“Then we have all the corporate checkpoints which we are now going to farm out to the BUs. However, what we are going to do is strengthen the back end of the process which means that we still have a central governance group called the IMC. They basically hold the ultimate approval rights for anything.... We're going to differentiate the levels of governance. We're going to do that by reporting and monitoring. Not building in a hurdle based system where you have to get over the hurdles.” (Xcom1.2, 02.06.2011)

Even though the multiple organisational levels have different functions and possess distinct project capabilities to organise a particular project or a portfolio of projects, they are interrelated and cannot be separated:

“So because we have a central system with a database of record that we use, all the people who use that have access to the projects that they're involved with. So if I'm a business unit planner, for example, for a business unit, I can see everything in my business unit. If I'm a project owner, I can only see the projects I own. If I'm a project manager, I can only see the projects I'm the manager of. We then have a whole heap of other people who are added as participants to a project. They then have access to view most of the information but not all of it.” (Xcom1.4, 02.06.2011)

Project capabilities are thus subject to an interplay of these interdependent levels, which are socially embedded in a particular context (Pentland and Feldman, 2005, Pentland and Feldman, 2008). Social embeddedness in our study describes the interdependency of

multiple PBO layers and project capabilities, which are influenced by structural and behavioural components of organisational life, such as power or trust (Hodgson, 2004):

“Yeah, there's a lot of hierarchy within organizations within [Zcom] and departments. A lot of people who believe they're in power to do things but they're not really. It's a real big problem. It really hinders the process. There's no autonomy given to people. I was quite fortunate people left me alone to get on with the job.” (Zcom1.4, 24.04.2012)

The structural level is represented by the PMO that uses PGCs to govern projects through monitoring and control mechanisms. These PGCs overemphasise the impact of organisational structures on social interaction, including the role of agency in giving life to structures and contexts (Giddens 1984). On the project level, the focus is more on the daily problem-solving processes (Feldman and Pentland, 2003). In this recursive interplay between different project capabilities, the underlying operational project capabilities reflect the different foci of a particular level. For instance, on the project level:

“It's needed on that project. So it's got to be—you've got to have flexibility within the project to be able to deliver it. So you modify what you're going to do to deliver the right outcome. So I'm always outcome driven and I think you have to be as a project manager.” (Xcom2.3, 21.06.2012)

In contrast at the PMO level:

“I went to them with a model for program and project governance to make sure that it met with what they were seeing, and the answer was yes, and what it basically involved was what I'll call directive control, so a directive was given from top level to next level to next level establishing the bounds and the requirements and expectations. Then performance would be assessed by our usual annual performance agreement mechanism, but with specific focus on; did you achieve what you said you would achieve in the program, et cetera. I didn't want to invent another performance assessment. As far as I know, that's still the way that they're looking to progress.” (Ycom2.2, 04.04.2012)

Projects relate to various organisational layers, in accordance with the multilevel conceptualisation of change in PBOs. Our empirical data support this multilevel view, in which project-based work is influenced and managed across multiple organisational layers. Although our data highlight a complex version, with several layers and sublayers (e.g., stakeholders, steering committees, project control groups), we maintain our bi-level focus on

the PMO and project levels, because of their prominence in our cases, across all the data sources. For the purpose of this study, we reinforce the concentration on these two levels of analysis to explore the two dynamic capability components (ostensive and performative) in PBOs and their interaction. Dynamic capabilities have been distinguished by three characteristics (Schreyögg and Kliesch-Eberl's 2007, Winch et al. 2012) and we used an adapted version of these characteristics to investigate project capability changes in PBOs. More specifically, we use the importance of structure, appearance of dynamic capability, and dominant learning direction as starting points for exploring the different characteristics of change in our study. The use of these criteria enables us to position our findings in relation to existing project management and dynamic capability literature.

Project Management Office Level

As an organisational entity, the PMO is driven by the overarching organisational strategy, which requires rigid governance of multiple projects (Turner and Keegan, 2001, Turner and Keegan, 1999). Such governance can be achieved through the creation of a centralised system that bundles multiple organisational processes and routines. Whilst the routines to deliver value and achieve visibility mainly centre on tracking project progress and spending, they can also help evaluate and measure effectiveness, with potential implications for the project team or project managers:

“Centralise[d] visibility—so I've got some ability to see what's going on, but in all of the dimensions; not just I can track the spend or I can track the milestones or I can track the risk. I can look at it in the program—what I call program health perspective—so value, milestones and costs. Then, similarly, then I've got the ability to drive value through consequence.” (Xcom1.1, 02.06.2011)

When PBOs have such a centralised structure, they govern multiple projects successfully and efficiently, in line with their overall business strategy (Brady and Davies, 2004). Formal structures also facilitate the evaluation of existing routines and their value in constantly collecting information to continuously improve project capabilities. As Xcom1.5 (02.06.2011) explains:

“The business units used to be able to manage their own projects and spend their money and we got in all sorts of mess.... So it's going to be important that there [are] very strong measurement frameworks and review processes in place and that that does stay strong. That's where I see moving forward, it's having that information, making sure it's there.”

Nevertheless, PBOs are required to change their PGCs, and some of our respondents specifically highlighted the importance of “*moving forward*” (Xcom1.5, 02.06.2011), which implies striving for beneficial change. Operational project capabilities change at the PMO level has a strong emphasis on structure and formal processes. Ostensive dynamic capabilities represent the more routinised element of dynamic capabilities, in which capability change is facilitated by formal and standardised processes, such as innovation routines, continuous improvement initiatives, or lessons learnt reports (Anand et al., 2009, Bayer and Gann, 2007, Brown and Eisenhardt, 1998).

Ostensive processes entail elements of organisational entrepreneurship, such as innovation, risk-taking tendency, proactiveness and experiential learning (Covin and Slevin, 1991, Covin and Slevin, 1989, Zahra et al., 2006, Corbett, 2005), and are organisational-level capabilities rather than individual skills (Hitt et al., 2011, Ireland et al., 2009, Ireland et al., 2003). PBOs that invest in structural change capabilities can generally operate better in environments where change occurs frequently and in stable patterns (Cohen and Levinthal, 1994). A solid change structure therefore enables sensing, seizing, and reconfiguring operational project capabilities, which is valuable and necessary in dynamic environments (Patel, 2011). Thus, ostensive dynamic capabilities are standardised, repeatable, and sustainable higher-order change capabilities (Winter, 2003, Ambrosini et al., 2009, Keegan and Turner, 2002).

Our findings support this argument and illustrate that at the PMO level, capability change mainly occurs through formal and routine-driven change processes. These incremental changes are based on internal reviews and occur within the existing operational structure (Schreyögg and Kliesch-Eberl, 2007). Although incremental improvement is a first step towards being a dynamic PBO (e.g., continuous improvement), it may not help PBOs to immediately address emerging and unexpected changes (Ambrosini et al., 2009). Being dynamic implies spontaneity and sometimes drastic responses to changing conditions in turbulent project environments, which is very difficult when purely relying on ostensive dynamic capabilities that are attributed to an organisational structure (Schreyögg and Kliesch-Eberl, 2007).

In summary, PGC changes are mainly incremental and often associated with senior management support. Our cases reveal persistent ambitions to improve existing routines and processes, to make them more efficient, but substantial changes at the PMO level are relatively infrequent, because they demand support from senior management and affect the

entire organisational structure and processes, such that they are resource intensive and costly (Teece et al., 1997, Schreyögg and Kliesch-Eberl, 2007). This formal capability change nearly exclusively describes activities at the PMO level, such that major changes are determined and initiated at the top, and are then disseminated throughout the organisation through processes such as workshops and face-to-face meetings (Xcom1.1, 02.06.2011).

“So the minute [the need to change is] not shared by the senior management in the organization, they’re not going to happen. You’re not going to make a significant change like that without them seeing the need for it. I believe they don’t see the need for it; therefore it’s not happening that way.” (Ycom2.3, 04.04.2012)

With their formal nature, ostensive dynamic capabilities combine learning and transformation processes that influence operational PBO capabilities in a rather routine fashion (Kale and Singh, 2007, Nelson and Winter, 1982, Zollo and Winter, 2002). Routines are primarily defined by their structure, such that changes occur systematically and predictably (Nelson and Winter, 1982, p. 17). The learning routine then takes the form of a recursive cycle, based on formal processes and capabilities (Bingham and Eisenhardt, 2011); it includes stages such as experience accumulation, knowledge articulation, and knowledge codification (Zollo and Winter, 2002). Learning tends to be local and close to existing processes (Teece et al., 1997), which fosters incremental rather than fundamental capability changes (Schreyögg and Kliesch-Eberl, 2007). This conceptualisation also applies specifically to the PMO level, at which change occurs in predictable patterns, triggered either by external cycles or by organisational decisions to reconfigure and improve existing capabilities strategically (Pavlou and El Sawy, 2010).

We argue that ostensive dynamic capabilities and their learning routines sufficiently explain change at the PMO level. In our three cases, the dominant learning direction is historical, meaning that organisational process experiences are accumulated over time (cf. Bingham and Eisenhardt, 2011, Teece et al., 1997). The PBOs in our study maintain centralised databases to capture lessons learned at the organisational level. For example, Xcom1.2 (02.06.2011) noted, *“there is ... knowledge management and we have a companywide repository.”* The knowledge repository integrates formal progress reports, captured throughout a project’s lifecycle. In addition, the stakeholders’ perceptions were collected and submitted to the central knowledge database. Xcom1.6 (02.06.2011) further illustrated these project completion reports and their potential value:

“We had a catch up with all of them post, after we’ve deployed and we said, what could we do better? Where did we go wrong? What are the things that we need to change in the future? ... That was with the [stakeholder] group. Then that gets—then we did a formal project closure. Then we do a formal [knowledge management] which gets documented into the [centralised] system.” (Xcom1.6, 02.06.2011)

Thus, there was interplay between the structural aspects and the informal discussions. Regular meetings were devoted to openly sharing opinions and experiences, to be formal in a document. The centralised knowledge database *“captures the learning of each project in the system”* (Xcom1.3, 02.06.2011); the problem was project managers’ access to these data, which included not only lessons learned but *“all those sorts of strategic things that we did and we are doing”* (Xcom1.2, 02.06.2011), and thus including confidential information. As Xcom1.3 (02.06.2011) pointed out, *“You can’t really make them openly available if you’re running a company because there’s financial data in there about a particular project.”*

Thus we found single-loop learning (Clegg et al., 2005, Argyris and Schön, 1974), which failed to adjust the frame of reference that guided existing project capabilities; the amount of detail and accessibility of the formal reports restricted the organisational learning capability. Table 2 (next page) summarises our findings on PGCs that reflect organisational-level dynamic project capabilities.

Table 2: Summary of findings of dynamic capabilities at the PMO level

PMO	Analysis	Supporting Quotes	Source
Importance of structure	PGCs represent the governance structure and provide control, standardisation, and visibility. The aim is to manage the efficiency–flexibility paradox (e.g., repeatability, profitability, sustainability) and enable successful project management across different levels of the PBO.	<i>“You need [...] a framework. You need it there to direct and just make sure – it helps everyone to be on the same page.”</i>	XCOM1.4 (02.06.2012)
		<i>“We’ve got all our processes built in [our system]. We’ve got company-wide processes attached, [...] all integrated into the one tool.”</i>	XCOM1.2 (02.06.2012)
		<i>We have checklists. We have a process where, at certain key points within a project's life, you must have been through and ticked these off. There are, of course, underpinning processes - things that you must achieve. [...] Lastly, something we've introduced in the last couple of years, are gate reviews, which is a formal”</i>	YCOM1.1 (29.09.2011)
Form of dynamic capability	The dynamic capability on this level is a continuous attempt to make existing PGCs more efficient and effective. Internal routine processes drive these incremental changes and highlight their emphasis on structure and standardisation.	<i>“There were no individual specific initiatives [...], this was a continuous improvement and that meant that the initiatives, good or bad, were building on each other and we were getting better plus the fact it takes a long time.”</i>	YCOM2.1 (04.04.2012)
		<i>“So, as an organisation, yes we do keep track of that. For that to flow down into our day-to-day business I'd suggest is a slow process where, like any large bureaucracy, I suppose we don't change quickly, so getting the information and say new skills or a new way of doing business, getting that out into the organisation is a relatively slow process.”</i>	YCOM2.3 (04.04.2012)
		<i>“Yeah, okay. So - and that [change] was really largely driven by A. and his team. So there was a very much kind of project based centrally controlled, a fairly large - relatively speaking - central group that really was very prescriptive, hands on, bureaucratic. You know, everything went through that process [...]. You get a yes, no to proceed and then every stage of the process was handled the same way. So the change was to move to a more program management approach, where - say within the product organisation you might have voice products, mobile, data, media.”</i>	XCOM2.3 (21.06.2012)
Dominant learning direction	Historical learning through organisational -level processes (e.g., centralised knowledge database, lessons learned reports), in which learning is driven by the PBO's governance structure.	<i>“We do a formal [knowledge management] which gets documented into the [centralised] system.”</i>	XCOM1.6 (02.06.2012)
		<i>“I think the cultural change has started to occur in our organisation is we've started to measure things and I see this as a reflection in the culture of not quite a learning culture but a culture that thinks it wants to do better, knows it wants to do better.”</i>	YCOM2.1 (04.04.2012)
		<i>“[we have] a group really who manage [learning] processes if you like, both from a systems point of view - updating the system, and from all the processes that sit around that. So their kind of documentation [...] changes to accommodate new approaches - when that's updated I guess my group's involved. There'd be teams working on changes, updates, et cetera and then being incorporated in documentation for their process.”</i>	XCOM2.3 (21.06.2012)

Project Level

At a project level, PMCs are induced and shaped by the formal governance structure provided by the PMO (Pinto, 2000, Goodman, 1967). However, PMCs are also influenced by interactions with stakeholders and clients and thus change accordingly. PMCs evolve over time and within the context to meet stakeholders' expectations, while the internal governance structure remains stable. Therefore, we argue that change on this level is predominantly facilitated by performative dynamic capabilities, as PMCs constantly adapt to the changing project environment (cf. Tsoukas and Chia 2002).

Performative dynamic capabilities change *in practice* to achieved a projected outcome while using available resources contextually, such as plans, schedules, or Gantt charts (cf. Cunha et al., 1999). In these PMCs, thinking is expressed directly and spontaneously through actions (Leybourne, 2009), reflecting the notion of *bricolage*, or the ability to use existing, operational PMCs to deliver a successful outcome (Baker et al., 2003, Levi-Strauss, 1966). In this sense, performative, improvisational capabilities are not an *ad hoc* problem-solving process that emerges without preparation (Alterhaug, 2004, Dehlin, 2008). Rather, performative dynamic capabilities are conscious, intentional and spontaneous routines, in the form of repeatable heuristics (Bingham and Eisenhardt, 2011) built on an improvisational foundation that can occur either reactively or proactively (Dehlin, 2012). In a reactive form, heuristic routines in practice can pose an immediate response to deficient existing formal processes (Weick, 1998). In its proactive form, it involves changing operational PMCs prospectively to avoid potential malfunctions.

Improvisation in the form of performative capabilities encompass real-time foresight that enables immediate changes to existing PMCs (Cunha et al., 2012). We thus argue that the concepts of performative dynamic capabilities and improvisation are well suited to describe less formal, yet repeatable, change processes in PBOs. Performative dynamic capabilities coexist with other organisational change capabilities, here referred to as ostensive dynamic capabilities, and are critical components of dynamic capabilities (Bingham and Eisenhardt, 2011).

In other words, PMCs are daily problem-solving capabilities that evolve in the course of the project through dynamic performative capabilities, influenced by and operating within the existing formal structure. Simultaneously, it is essential to have a governance structure in place, because "*everyone likes a bit of structure*" (XCOM1.4, 02.06.2011). Structures enable informal work by providing the points of departure for performative problem-solving

capabilities (Dehlin, 2008). For our cases, we define structure broadly, such as having a defined scope or formal organisational stage gates (XCOM1.4, XCOM1.6, 02.06.2011):

“I think you definitely need [formal structure]. You need it as a framework. You need it there to direct and just make sure—it helps everyone to be on the same page.... Because it means that then informally within the project, you do have the ability to have the informal discussions. Maybe say look, let’s do it this way but we’ll use this part of the process to formalise that; so I think they’re great. They definitely, they have to be there. I don’t know how you would do a project or really work at all without them.”
(XCOM1.4, 02.06.2011)

That is, formal processes are a necessary condition that enables project execution in certain aspects but should not be overemphasised when pursuing a solution to an actual problem at hand (YCOM2.3, 04.04.2012). Our findings indicate that PMCs also exhibit varying degrees of formalisation and routinisation, from agile to PMBOK methods.

Furthermore, PMCs are project capabilities, chosen specifically for individual projects, and often limited by the existing organisational resource base (Teece et al., 1997). In our cases, multiple PMCs are in place, from which some can be selected, depending on the project requirements. This selection implies some dynamic aspects but does not necessarily explain how PBOs change their PMCs to accommodate the changing nature of projects, in that the chosen approach is often an industry-specific preference (e.g., IT prefers Agile), personal preference of the project manager, or based on client requirements (XCOM1.1, 02.06.2011). Various methods also underlie a certain structure, in terms of processes and best practices that form part of the PMCs. The dynamic aspect involves adjusting the initially chosen PMCs to meet the project criteria, while being compliant with the broader organisational control system. In the same vein, Bingham and Eisenhardt (2011) find that organisations possess portfolios of heuristics that emerge from process experiences with existing project capabilities. These heuristics are based on existing operational PMCs but facilitate improvisational, opportunity-based solutions that do not require a detailed change process (Bingham and Eisenhardt, 2011).

The complexity of many projects results in unpredictable patterns of change, which do not always allow for strategic planning or formal reconfiguration of existing processes (Pavlou and El Sawy, 2010). Hence, operational PMCs are transformed contextually without prior planning and are the result of experiential, pragmatic sensemaking (Weick et al., 2005,

Alexander, 1990, Nissen and Snider, 2002). In these situations, change is less formal, happening within the actual routine. Performative dynamic capabilities help truncate the lengthy reconfiguration processes often required by innovative capabilities; a key to successfully change capabilities in real time (Bingham and Eisenhardt, 2011, Eisenhardt and Tabrizi, 1995, Pavlou and El Sawy, 2010). For example,

“[Projects] are always changing. So we’re either adding to it and sometimes we might have a company process that we’re now going to add into [our PMC] because there’s a lot of change around that.” (XCOM1.3, 02.06.2011)

The focus on performative problem solving is the catalyst for choosing and adjusting PMCs (XCOM1.2, 02.06.2011). This notion enables the utilisation of different types of PMCs, which can be fundamentally altered to meet the project requirements. One comment—*“Only use tools. Only do the things that are absolutely necessary”* (XCOM1.6, 02.06.2011)—exemplifies that the driving force for choosing PMCs is the project outcome, not project best practices. In that sense, PMCs constantly evolve with the task (XCOM1.3, 02.06.2011), and this evolution often occurs in collaboration with a particular client, which makes the involvement and engagement of different stakeholders vital.

In summary, performative dynamic capabilities reflect experiences, which can have different origins and are not necessarily formal as explicit knowledge (Zollo and Winter, 2002). We argue that the dominant learning direction at the project level is experiential and informal; our data support this view by showing that experiences are shared and distributed among project team members tacitly, such as, *“There’s a culture, but it’s an informal culture. There’s no formal [culture]”* (XCOM1.2, 02.06.2011). The culture operates within the greater PMO governance structure but occurs at the project level (XCOM1.3, 02.06.2011). It is *“organic”* (XCOM1.6, 02.06.2011), and knowledge, in the form of past experiences, gets transferred verbally at the interpersonal level, such as in the following:

“So we’ve got our fortnightly coaches’ forum which project managers come to and share their stories. Some of it is around the [centralised database], some of it is around what I experienced in the process last week...” (XCOM1.2, 02.06.2011)

The learning culture in these discussion forums is *“very supportive”* (XCOM1.6), resulting in informal mentoring and coaching. It consists of personal support (e.g., sharing, helping), informal discussion, and recapitulations, as well as a mentoring and coaching network. However, the formal structure of the PMO remains in place, and project managers

submit the necessary documents, which drives reflections on actual practices. We summarise the project-level findings in Table 3 (next page).

Discussion

Our theoretical argument, supported by empirical evidence, introduces PBOs as multilevel entities that possess multiple operational and dynamic project capabilities to manage organisational change and more precisely the stability-change paradox (Andriopoulos and Lewis, 2009, He and Wong, 2004). To balance this paradox effectively, PBOs have “*to compensate for the natural drift of organizations toward efficiency*” (Eisenhardt et al., 2010, 1267), and therefore often actively engage in an unbalance towards the flexibility aspect through the application of dynamic capabilities (Eisenhardt et al., 2010). In this study we particularly focus on two distinct, yet compatible and complementary dynamic project capabilities that facilitate change in PBOs. Our cases indicate the existence and application of different change capabilities in practice that enable PBOs to deal with the paradox. These different dynamic capabilities coexist across the different organisational levels. More precisely, we find evidence for formal change routines, characterised by ostensive dynamic capabilities, while we also find support for our theoretical argument that PBOs use less formal routines in the form of performative dynamic capabilities to initiate and manipulate change.

Despite their existence across multiple levels of the PBO, one major finding is that the degree and extent to which different change capabilities are used and applied differs on particular organisational levels. Dynamic capabilities thus take diverse forms across different PBO levels in PBOs and affect project capabilities differently. In particular, our results highlight the dominance of routinised change processes at the PMO level and less routinised change processes at the project level. These findings are, however, characteristic of our case studies and not necessarily generalisable. Furthermore, the multiple organisational levels and dynamic capabilities are interdependent, as they interact constantly in everyday project work.

Table 3: Summary of findings of dynamic capabilities at a project level

Project	Analysis	Supporting Quotes	Source
Importance of structure	Structure and routine PMCs are supportive tools that are only used contextually to deliver a project (e.g., reporting, fund release)	<i>"I do not overburden anyone with bureaucracy. We do not do all the papers and templates. [...] Use the tools that are accessible to everyone."</i>	XCOM1.6 (02.06.2012)
		<i>"All the project management stuff you need to have as a project manager [...] it's good that it's there, but when it comes down to it, it's not going to tell me whether or not the project's going to deliver."</i>	XCOM1.5 (02.06.2012)
		<i>"Some of the governance stuff we're talking about - I think it's a good way of looking at it - looking from the other direction, some of the ideas that - governance, to me, in supporting a project to success is about enquiry, rather than advocacy. It's what governance brings to the process."</i>	YCOM1.1 (29.09.2011)
Form of dynamic capability	Operational PMCs are problem-solving tools that are constantly and contextually adapted within the framework of certain project management approaches, as well as the greater organisational structure (organisational-level PGCs)	<i>"I focus on the outcome. I look for the opportunity. [...] We're not interested in the documents and filling in the forms. We're interested in the outcome."</i>	XCOM1.6 (02.06.2012)
		<i>"What I say is, we've got all these great buckets of tools to draw from. [...] Six Sigma is just a set of tools in theory. You pick and pack what works for you to get your project executed in the way that you want to execute it."</i>	XCOM1.4 (02.06.2012)
		<i>"I also believe that you will always find situations where there are people who really don't sit down and find out what the latest processes are and following them. They've got their own way of doing business and they don't even think to check whether it's aligned with the organisation"</i>	YCOM2.3 (04.04.2012)
Dominant learning direction	Past project experiences are verbally transferred within a supportive knowledge culture (e.g., meetings, word-of-mouth, phone calls, coaching/mentoring). Yet this learning culture is influenced by the greater organisational learning structure.	<i>"One of the things that also a lot of my time has been spent is mentoring people and getting their projects actually moving."</i>	XCOM1.6 (02.06.2012)
		<i>"It's like how most knowledge gets transferred, word of mouth. Someone going I remember we've done a project and we did it this way. That's how I've seen it happen."</i>	XCOM1.6 (02.06.2012)
		<i>"Our [organisational-level] learning becomes about writing those rules; not understanding those rules. The most experienced people understand the rules and can work with them, rather than just comply to them. That's a tacit knowledge thing, not an explicit knowledge thing in the organisation."</i>	YCOM1.1 (29.09.2011)
		<i>"There's a culture, but it's an informal culture. There's no formal. We have a project-management group that we go to all [...]. We get their feedback and response. They're mostly highly respected senior project managers that have been around a long time who we trust."</i>	XCOM1.2 (02.06.2012)

Notwithstanding our approach to separate effects of distinct levels, capabilities and organisational layers are often entangled and cannot be fully separated, following a dualist logic (Farjoun, 2010). All aspects across levels are needed to understand the stable, dynamic and emergent aspects of change in PBOs. Hence, project capabilities, the stability they provide, and the way they affect change differ across the PBO levels, subject to the nature of the operational PBO capability itself. PGCs can be better described as project *governance* capabilities that provide the actual project with a certain structural frame that serves as a stabilising entity that ensures effective project work, while continuously striving for incremental improvements to increase the efficiency of existing project capabilities.

PMCs, on the other hand, deal with the more rapidly changing nature of projects in practice and on a daily basis. At the project level, operational PMCs relate directly to specific project goals and the PBO's ability to meet stated project objectives. This level, therefore, inherits actual project management capabilities. Both formal and less formal routines interact in the day-to-day project work and contribute to successful project outcomes and to managing the balance between effectiveness and change. Organisational-level PGCs rarely change substantially; their incremental changes are driven by ostensive dynamic capabilities. Project-level PMCs adjust constantly to accommodate the different needs of the project, and they are better aligned with performative dynamic capabilities. Both components of dynamic capabilities thus influence operational project capabilities across PBOs and the successful delivery of the project.

Metaphorically, at the governance level, operational PGCs provide structure, similar to a railway system, which sets checkpoints, imposes gates, and features switches that must change, all within the constraints of a singular railway system that applies these mechanisms as control and monitoring systems to safely govern multiple trains. On the project level, however, PMCs operate within this structure to bring the train to its final destination. The train's capabilities partly depend on its driver, its destination, and the freight on board, so the methods applied to reach the final stop vary from trip to trip. Similarly, projects should be managed within a greater structure that ensures organisational control (e.g., finances, outcome), even though project-level capabilities adjust and change in accordance with different project criteria.

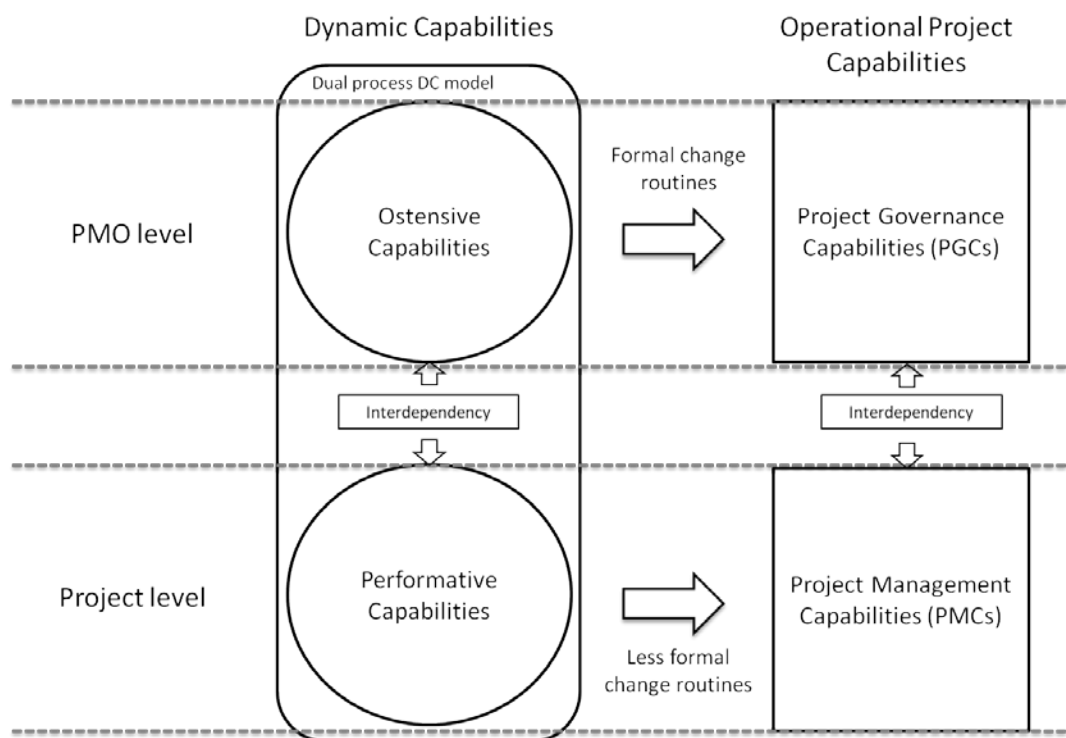
The motivation for change at the project level is the immediate, contextual resolution of a problematic situation that requires the successful delivery of a project. Because PMCs are used, adjusted, and dropped as required, PMCs are dominantly changed in an

improvisational fashion, using heuristic routines such as performative dynamic capabilities. Accordingly, improvising project managers use existing operational PMCs and alter them based on the project requirements. These PMCs therefore evolve through the journey of the project based on the demands and expectations of different stakeholder parties (e.g., clients, senior management, contractors). The improvising project manager accepts these constraints but also exploits them to serve a particular purpose (e.g., attending weekly meetings to meet senior management). The main component of dynamic capabilities at the project level therefore entails performative dynamic capabilities to contextually modify, transform, or reconfigure an existing set of PMCs to deliver a successful project.

Our conceptualisation includes both dynamic capabilities and links them to the multiple levels and underlying project capabilities (Figure 1). Ostensive dynamic capabilities appear more prominent on the PMO level, concerned with structure and formal routines. The ostensive dynamic capabilities represent formal and standardised existing PGCs, to ensure effective and sustainable exploitation of operational project capabilities (Hitt et al., 2011, Ireland et al., 2009) that facilitate change in a more structured and incremental way (Hitt et al., 2011, Ireland et al., 2009). Performative dynamic capabilities at the project level, where change is a constant, allow existing operational project capabilities in the form of PMCs to evolve in the course of a project to address immediate and unexpected changes (Pitsis et al., 2003, Cunha et al., 2012). Nevertheless, while we argue for a prominence of different dynamic capabilities on different levels, neither change capability is solely exclusive to a particular organisational level; they occur throughout the organisation to varying degrees.

The proposed DCV, in combination with the two organisational layers, advances a more detailed view of how PBOs transform their operational project capabilities. It highlights the importance of a solid change structure, in the form of an ostensive dynamic capability, complemented by a less structural, more practice-based approach to change, in the form of a performative dynamic capability. Both change capabilities operate interdependently within the PBO and are vital for meeting stated objectives (Patanakul and Shenhar, 2012, Shenhar et al., 2007, Pavlou and El Sawy, 2010).

Figure 1: A conceptual framework of change in PBOs



Conclusion

Our conceptualisation advances understanding about capability change in PBOs and their multilevel nature, and thus contributes to the stability-flexibility debate in the literature (Smith and Lewis, 2011, Farjoun, 2010). The limitations of our data set led us to use empirical materials in support of our conceptual argument. We thus offer a context-dependent exploration that serves as a starting point for advancing theory, as well as providing avenues for further research. Especially at the project level, where change often occurs through less formal dynamic capabilities, ethnographic studies should provide supplementary insights to reveal the underlying drivers of change in PBOs. The interplay across multiple levels and their capabilities could also be explored more specifically to describe the interdependency of PBO levels and capabilities (Salvato and Rerup, 2011).

With the support of empirical data, this theoretical investigation of change in PBOs accounts for the multilevel nature of capabilities and their effects. We contribute to the dynamic capabilities view by exploring the nature of change in a project-based context and confirming that different types of change processes occur at different organisational levels. Yet the components are also interrelated; learning processes and organisational structures reciprocally influence and are influenced by both forms of dynamic capabilities. In addition,

our analysis reveals that factors external to actual capabilities initiate capability changes in PBOs, such as senior management decisions. Yet in practice, the PMO level often gets detached from actual project work, by focusing solely on internal aspects such as profitability, control, and value. This PMO level represents what James (1977) describes as the independent reality that cannot be influenced but within which projects operate. In that sense, project managers affect the project and its outcomes with procedures available to them (Levi-Strauss, 1966), and PBO capabilities serve as procedures that help produce the final project.

Finally, we make key contributions to literature that concerns project-based and temporary organisations. Capability change is inherent to project management that seeks to deliver a successful project. Change can be facilitated by ostensive dynamic capabilities, which represent a formal way of transforming organisational routines, but project managers need the ability to alter, reconfigure, or adjust existing operational project capabilities. PMCs immediately and temporarily solve a practical problem through performative dynamic capabilities in the form of heuristic routines and improvisation (Cunha et al., 2012). The extent of this adjustment depends on the organisational structure, but particularly at the project level PMCs change in accordance with specific requirements. Project work is a constantly evolving process, in which existing procedures, structures, and problems adjust pragmatically, and PMCs change with different processes that are appropriate because of their usefulness in a particular situation (Bjørkeng et al., 2009, Carlsen, 2006, Tsoukas and Chia, 2002). Managers and PBOs thus can facilitate change in different ways (Leybourne, 2006a, 2006b). As one respondent pointed out, *“I’m a pragmatist when it comes to project tools. I’ve got ... great buckets to draw from, whatever works works.”*

Chapter 5

The Role of Entrepreneurial and Improvisational Capabilities in Project-Based Organisations

Introduction

Project-based organisations (PBOs) describe a variety of organisational structures that involve the creation of temporary systems for the performance of project tasks (Lundin and Söderholm, 1995, Sydow et al., 2004, Turner and Müller, 2003). As contingencies and contexts of every project can differ, PBOs modify their project management capabilities (PMCs) to successfully and effectively deliver the stated objectives (Delios and Beamish, 2001). In general a capability refers to an ability to employ relevant resources effectively, at a time that this usage is relevant (Amit and Schoemaker, 1993). For PBOs, key capabilities include those that enable the effective implementation of operational strategies or facilitate their functioning (e.g. Roche, 2010, Brown and Eisenhardt, 1998). In other words, the strategic deployment of operational PMCs affects performance (e.g. Helfat et al., 2007). Such PMCs are substantive capabilities and refer to the sets of abilities and resources that enable PBOs to solve a problem or achieve a particular outcome (Zahra et al., 2006). If PBOs confront dynamic environments, their substantive PMCs may become less consequential and may require modification to continue offering support so that performance is not constrained (Goodale et al., 2011, Brown and Eisenhardt, 1998).

Thus, although organisations frequently use PMCs to align projects with the dynamic and complex environment, these substantive capabilities may require modification themselves. This modification can be achieved through the use of dynamic PMCs. The dynamic capabilities view (DCV) explains how firms change their substantive capabilities. Dynamic capabilities have been conceptualised as higher-order capabilities (Teece, 2007, Helfat et al., 2007) and imply “*the capacity of an organization to purposefully create, extend, and modify its resource base*” (Helfat et al., 2007, p. 4). For PBOs, this resource base includes “*tangible, intangible, and human assets (or resources) as well as capabilities which the organization owns, controls, or has access to on a preferential basis*” (Helfat et al., 2007, p. 4), and those assets facilitate effective project management.

We argue that two distinct but interrelated dynamic PMCs are especially relevant to

facilitate the modification of substantive PMCs in PBOs: entrepreneurial and improvisational capabilities. However, the roles of entrepreneurial and improvisational processes in changing project-based operations is not yet fully understood, neither in general nor in the specific context of PBOs as temporary systems, and especially with regard to less formal or emergent aspects of improvisational change (Tsoukas and Chia, 2002, Feldman and Orlikowski, 2011). Bingham and Eisenhardt (2011) note the role of rational heuristics in effecting organisational change, particularly when resources are limited. We expand on their argument by clarifying the role of improvisation as heuristic processes. Heuristics are processual shortcuts that are inherently improvisational (Eisenhardt et al., 2010), as they represent change processes *in practice* that help to sense, seize, and reconfigure organisations in a more immediate, real-time fashion (Cunha et al., 2012, Ambrosini et al., 2009). We highlight that operational change occurs not just through routinised, formalised transformation processes but also through improvisational processes that affects the extent to which substantive capabilities in projects transform (da Silveira, 2006).

In this study, we investigate how dynamic capabilities, assessed through improvisational and entrepreneurial capabilities, influence PMCs. More precisely, we theoretically embed improvisational processes within a traditional DCV by elucidating the role of less structured, heuristic transformation processes in effecting operational change. We thus extend the conventional view that organisational change occurs “*through cold, effortful processes*” (Hodgkinson and Healey, 2011, p. 1510) and specify the nature of dynamic PMCs by describing the simultaneous effects of entrepreneurial and improvisational capabilities on shaping a firm’s substantive capabilities. Empirically, we examine in PBOs the differential impact of dynamic and substantive capabilities and show that the substantive capabilities (e.g. substantive PMCs) exert direct effects on performance and improvisational and entrepreneurial capabilities have separate effects on the transformation of substantive capabilities. Our empirical investigation thus demonstrates the applicability of the DCV for explaining PBO performance. Finally, we reveal that greater polychronic organisational values amplify the impacts of improvisational capabilities but lessen the effects of entrepreneurial and substantive project management capabilities.

In the next section, we describe the conceptual foundation for our study and develop a set of hypotheses. We then explain our data and the methodology we used to empirically test our hypotheses. After we report the results, we discuss our findings, as well as some

limitations and avenues for further research.

Conceptual foundation and hypotheses

A firm's portfolio of capabilities includes substantive and dynamic PMCs (Winter, 2003). Substantive capabilities represent the firm's ability to perform basic functional activities (e.g. the design and management of products, processes and supply chains) involving routine daily operations of a firm (Cepeda and Vera, 2007). Thus, substantive capabilities determine how firms earn their living. In contrast dynamic, capabilities enable improvement of organisational activities, and "*are dedicated to the modification of substantive capabilities and lead, for example, to changes in the firm's products or production processes*" (Cepeda and Vera, 2007, p. 427).

Substantive project management capabilities

PBOs possess various substantive PMCs, such as stakeholder management (cf. Littau et al., 2010), project governance (cf. Turner and Keegan, 2001), cost and time management (cf. Zwikaël et al., 2000), and risk management (cf. Raz and Michael, 2001) that enable each particular project to meet the stated objectives. We therefore define substantive PMCs as established processes in the form of best project management practices that help execute a successful project. In other words, substantive PMCs encapsulate those processes that improve project performance, a particularly apparent feature of traditional project management, which embodies linear and standardised processes (cf. Feldman, 2003). The resulting prescriptive approaches refer to a well-defined realm of activities (e.g., PMBOK, Six Sigma). Through sequential application and completion of these pre-set processes, projects can achieve performance goals (Cicmil et al., 2006).

Conventional project management is based on prescriptive approaches that assume a well-defined remit of what needs to get done (e.g. PMBOK, Six Sigma). Processes, procedures, structures and people are specifically employed to certain stages of the so-called project lifecycle to ensure a project is accomplished by a set number of predetermined milestones (Turner et al., 2010, PMI, 2008). The sequential application and completion of these pre-assigned processes is assumed to make sure projects achieve their performance objectives.

Processes that make up substantive project management capabilities legitimize the development and implementation of project plans (Atkinson et al., 2006). Accordingly, effective project management is commonly viewed as the extent to which ‘appropriate’ project management routines are applied ‘correctly’—a process within which project managers play the role of skilful technicians (Flyvbjerg, 2001, Crawford et al., 2006a). Assuming that projects evolve in familiar circumstances and pre-determined ways, and that they can be managed in a universal, context-independent and non-situational manner, allows the prescriptive deployment of substantive PMCs to improve project performance.

Such substantive PMCs therefore require some environmental stability and predictability. In these conditions, substantive PMCs can improve project performance (cf. Di Benedetto et al., 2008). In learning on the general understanding of capabilities, the processes that facilitate project management constitute substantive organisational capabilities (cf. Kale and Singh, 2007), which allow a firm to implement its strategy (cf. Slater et al., 2006, Zott, 2003) and meet its pre-set performance goals (cf. Penrose, 1959). Therefore, PBOs should benefit from possessing substantive PMCs, in the form of improved performance (Schreyögg and Kliesch-Eberl, 2007). The following hypothesis encapsulates this argument:

***Hypothesis 1:** Substantive PMCs have a positive effect on project performance.*

Dynamic project management capabilities

Constantly changing operational contexts and environmental circumstances force firms to refine their operational strategies and the capabilities required to implement them. They might need to adjust their traditional substantive operational capabilities, their substantive PMCs, or both. However, many PBOs struggle to change their substantive PMCs (Turner et al., 2010), and the process for doing so remains unclear. This question is central to the DCV. Because dynamic PMCs are formed by organisational processes that enable firms to modify their resource base, they are a fundamental feature of an organisational strategy in environments that can be affected by change (Bingham et al., 2007).

Teece (2007) highlights three core elements that form a dynamic capability: (1) sensing (and shaping) opportunities and threats, throughout internal and external environments, to identify appropriate resources or processes to establish projects; (2) seizing opportunities through a strategic decision-making process that makes an appropriate selection of a *sensed* opportunity; and (3) reconfiguring the resource base to address the unique requirements of various projects (Katkalo et al., 2010). This conceptualisation emphasises a

routine nature for organisational change, privileging formal processes as a primary route to organisational adaptation and performance (Hodgkinson and Healey, 2011). We label this formal type of change entrepreneurial capability.

In contrast, recent research seeks to account for capabilities that result from heuristic processes and foster intuitive, reflexive, and spontaneous behaviours to facilitate change (Hodgkinson and Healey, 2011, Bingham and Eisenhardt, 2011). In this view, heuristics represent improvisational processes, employed contextually to adapt substantive PMCs. These processes enable firms to transform existing PMCS immediately, without requiring extensive details or precision. Unlike entrepreneurial capabilities, heuristics help firms address adaptation challenges by producing flexible, immediate, opportunity-based solutions (Eisenhardt and Sull, 2001, Bingham and Eisenhardt, 2011). Existing literature devotes relatively little attention to heuristic processes and largely ignores the complementary aspects between improvisational and entrepreneurial capabilities (cf. Hodgkinson and Healey, 2011, Adner and Helfat, 2003). However, we assert that both formalised and heuristic dynamic PMCs affect change of substantive PMCs in PBOs (Goodale et al., 2011).

Accordingly, we propose that dynamic PMCs encompass two different yet compatible processes: entrepreneurial and improvisational capabilities. Entrepreneurial capabilities initiate formalised modifications of substantive capabilities that occur through structured processes (Handfield et al., 2009), whereas spontaneity and extemporaneity mark the change processes underlying improvisational capabilities (Baker et al., 2003, Weick, 1998)—change processes supported through entrepreneurial capabilities do not necessitate the latter characteristics (Goodale et al., 2011). Although both sets of dynamic PMCs involve intentional processes (Garud and Karnøe, 2001), improvisational processes encourage simultaneous thinking and doing, whereas formalised entrepreneurial processes do not necessitate the same (cf. Baker et al., 2003). In particular, improvisation fuses the planning and execution stages into concurrent, rather than sequential, processes (Moorman and Miner, 1998), in an effort to contextually alter substantive PMCs in real time (cf. Miner et al., 2001). In the following section we will further introduce the two components of dynamic PMCs and construct our hypotheses accordingly.

Entrepreneurial capabilities. Entrepreneurial capabilities are consistent with the most prominent conceptualisation of dynamic capabilities as “*the element of dynamic capabilities that involves shaping (and not just adapting to) the environment is*

entrepreneurial in nature” (Teece, 2007, p. 1321). Entrepreneurial behaviours include sensing and seizing opportunities, applying existing knowledge to particular contexts and continuously finding new ways of orchestrating organisational resources and substantive PMCs (Handfield et al., 2009). PBOs necessarily adopt such behaviours because their projects are embedded in complex, uncertain environments that require frequent and context dependent adjustments (Corbett and Hmieleski, 2007, Newey and Zahra, 2009).

Accordingly, we argue entrepreneurial capabilities – described as formal processes – allow PBOs to shape and adapt their substantive PMCs (cf. Teece, 2007, Helfat et al., 2007). These entrepreneurial capabilities comprise four components: innovativeness, proactiveness, risk-taking tendency, and experiential learning (Barringer and Bluedorn, 1999, Naman and Slevin, 1993, Covin and Slevin, 1991). First, PBOs use innovation processes to revise their substantive PMCs (cf. Covin and Slevin, 1991, Ireland et al., 2009). Second, their proactiveness captures the entrepreneurial process of identifying and addressing environmental changes in advance (Lumpkin and Dess, 1996). Third, they engage in projects that can be associated with relatively high risks (cf. Ireland et al., 2009, Covin and Slevin, 1991). Fourth, experiential learning embodies the process of applying organisational experiences to modify substantive PMCs across projects (cf. Corbett, 2005, Lichtenthaler, 2009). In line with the DCV, we argue that the use of entrepreneurial capabilities results in modifications to substantive PMCs (cf. Helfat et al., 2007).

***Hypothesis 2:** Entrepreneurial capabilities have a positive effect on substantive PMCs in project-based organisations.*

The formal aspect of entrepreneurial capabilities, involving formalised organisational change processes (cf. Bingham et al., 2007), cannot effectively capture the processes associated with less formal behaviours (Hodgkinson and Healey, 2011). Our view thus augments the conventional conceptualisation of dynamic capabilities by examining the supplementary role of improvisational capabilities as heuristic processes (Bingham and Eisenhardt, 2011).

Improvisational capabilities. Heuristic processes complement more routinised entrepreneurial capabilities (Bingham and Eisenhardt, 2011). The resulting improvisational capability in a project-based, temporary context includes “*the conception of action as it unfolds, drawing on available material, cognitive, affective and social resources*” (Cunha et

al., 1999, p. 302) and “intuition guiding action in a spontaneous way” (Crossan and Sorrenti, 1997, p. 156). In this process, thinking is expressed directly and spontaneously through action (Leybourne, 2009). In this way, it reflects the notion of *bricolage*, which is the ability to contextually change substantive PMCs to deliver a successful outcome (Baker et al., 2003, Levi-Strauss, 1966). Hence, improvisational capabilities embody less formalized, though inherent, change processes in PBOs to alter substantive PMCs. The employment of associated heuristic shortcuts to modify PMCs enables addressing immediate requirements quickly and leveraging them across a project portfolio (Bingham and Eisenhardt, 2011, Cunha et al., 2012).

Improvisation is about achieving a projected outcome while contextually using available resources in form of substantive PMCS, such as plans, schedules or Gantt charts (Cunha et al., 1999). It is a conscious heuristic process that can occur in two ways: reactively and proactively (Dehlin, 2008). In a reactive form, improvisation is an immediate response when existing organisational structure breaks down (Weick, 1998). In a proactive sense, improvisation is used to change substantive PMCs prospectively to avoid potential failures and delays. Here, improvisation encompasses the ability of real-time foresight that enables immediate changes of existing PMCs (Cunha et al., 2012). Thus it reflects the ability to contextually change substantive PMCs to deliver a successful outcome, and we conceive improvisational capabilities as less formal, heuristic change capabilities (cf. Bingham, 2009, Bingham and Eisenhardt, 2011, Kamoche et al., 2003). We argue that improvisational capabilities coexist with other change capabilities, as critical components of dynamic PMCs that facilitate change in PBOs in a spontaneous, less formal and immediate fashion (Bingham and Eisenhardt, 2011, Cunha et al., 2012).

***Hypothesis 3a:** Improvisational capabilities have a positive effect on substantive PMCs in project-based organisations.*

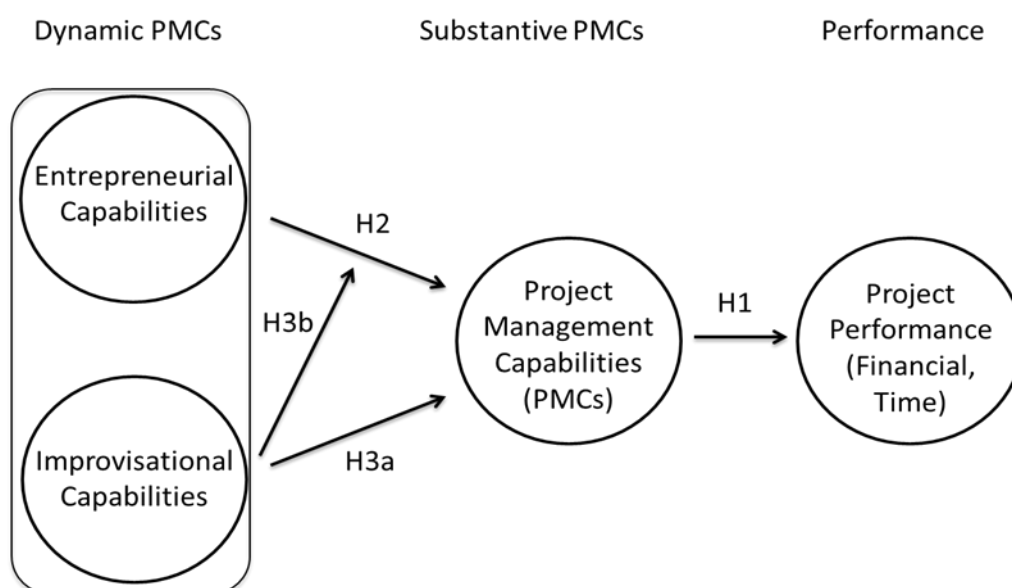
Firms generally strive to formalise organisational processes, to increase their efficiency (Wiklund et al., 2010). But formalised capabilities also can become less effective when handling complexity (Patel, 2011). Therefore, complementing formal entrepreneurial capabilities with flexibility should improve change processes (Hmieleski and Corbett, 2005). Prior research generally relies on the concept of organic structures to address the efficiency–flexibility problem and proposes a dual process in which formalisation and flexibility interact to create effective change processes (George et al., 2012, Adler and Borys, 1996). In this

paper, we use improvisational capabilities to describe this organic aspect of change. We therefore argue that the complementary, intertwined effects of improvisational and entrepreneurial capabilities benefit PBOs in that the improvisational capabilities condense the lengthy reconfiguration processes often required by formalised capabilities (Bingham and Eisenhardt, 2011). That is, PBOs can more effectively leverage their entrepreneurial capabilities when they are supplemented by the flexibility provided by improvisational capabilities. Because flexibility and formalisation are complementary and enabling processes to change contextually (cf. Adler et al., 1999, Patel, 2011), substantive PMCs improve when entrepreneurial capabilities are combined with improvisational capabilities:

***Hypothesis 3b:** Improvisational capabilities moderate the relationship between entrepreneurial capabilities and substantive PMCs in project-based organisations.*

In conclusion, we highlight that the performance of PBOs is conditional upon substantive PMCs. Furthermore, we outline that such substantive organisational capabilities are shaped through the deployment of dynamic PMCs which encompass two supplementary components: entrepreneurial and improvisational capabilities. We also propose that the effects of the latter two on substantive PMCs are of a contingent nature in that improvisational capabilities amplify the impact of entrepreneurial capabilities on substantive PMCs. Finally, we contend that the effects of these two dynamic PMCs are fully mediated through substantive PMCs in that they do not directly affect project performance. Figure 1 illustrates our conceptualisation and the hypothesised relationships.

Figure 1: Dynamic PMCs, substantive capabilities, and performance: A conceptual model



Empirical Study

Sample and data collection

Objective data about substantive PBO practices and performance are not readily available, so we draw on project managers' informed, subjective perceptions of the various capabilities we investigate, as well as their assessments of projects as temporary structures. Our particular level of analysis is therefore the project as a temporary system that is situated within a greater organisational structure (Bakker and Janowicz-Panjaitan, 2009, Kenis et al., 2009, Packendorff, 1995). We collected our data using an online survey, for which we solicited project management professionals whom we could access through professional bodies and panels (e.g. AIPM, PMI), using a key informant approach (Kumar et al., 1993). The respondents had substantial responsibilities for managing projects. The first questions in the survey asked respondents about their experience managing projects; those with insufficient experience were disqualified. The respondents thus have a sufficient understanding of their PBO and associated processes⁹. Our sample includes PBOs from multiple industries: agriculture (3%), construction (27%), financial services (13%), information and communications technology (27%), manufacturing (9%), creative arts (3%), and other (18%). Of the 1,649 managers who started the online survey, 1,124 were disqualified because they did not pass the screening question; 211 managers provided incomplete responses. Thus, our statistical analysis focused on data from 314 respondents, representing an acceptable response rate of 19.0%.

Method

We applied partial least squares (PLS)¹⁰ path modelling (Ringle et al., 2005b) to test our hypotheses. PLS structural equation modelling (PLS-SEM) appears increasingly in strategy research (cf. Gruber et al., 2010, Wilden et al., 2013) and represents a well-substantiated method for estimating complex cause–effect models. Because this study aims to assess a predictive research model with new elements, reflecting an early stage of theory development, PLS-SEM is a more suitable method than covariance-based SEM (Fornell and Bookstein, 1982). Although some previous studies assessed the links among dynamic PMCs, substantive capabilities, and performance, no research has investigated the interactions of entrepreneurial and improvisational capabilities, substantive capabilities, and performance in

⁹ Our respondent sample represents a mix of experienced project managers that is suitable for the purpose of this study. Our data show that, on average, each of our respondents had managed eight projects, that about 30% of them had managed small, medium and large projects, respectively, that about 50% of them had a university degree (undergraduate or postgraduate), and that similarly about 50% had a professional project management accreditation (e.g. PMP, AIPM).

¹⁰ We used SmartPLS version 2.0 (Ringle et al., 2005a).

PBOs. Our model thus is not yet well established, and PLS-SEM is appropriate. Moreover, PLS-SEM does not require normally distributed data, uses more conservative estimates of individual path coefficients, and has lower sample size requirements than covariance-based SEM (Chin et al., 2003). In this sense, the application of PLS-SEM is suitable for our analysis, which includes multi-item and hierarchical measurement models, as well as assessments of indirect and moderation effects, and which relies on a sample of only 314 observations.

Measurement of constructs and survey instrument

The key constructs in this study are latent variables that cannot be observed directly and thus require indirect measurement. We use both formative and reflective measurement models: Formative measurement supposes that indicators cause rather than being caused by the latent variable measured by the indicators, whereas reflective measurement assumes that the indicators are caused by the latent variable (Diamantopoulos et al., 2008). Following the literature and the used scales, we measured entrepreneurial and substantive capabilities in formative mode and all other constructs in reflective mode (e.g. Wilden et al., 2013, Leybourne and Sadler-Smith, 2006, Covin and Slevin, 1986).

Prior to the main data collection, we pre-tested the survey to verify its content validity. Several researchers familiar with the conceptual context of the study, which is PBOs as temporary work structures, reviewed the survey. Then, managers with characteristics like those of our key informants provided feedback, including views on the survey's structure, clarity, appropriateness, and completeness. With these inputs, we modified some aspects (mainly wording) of the survey instrument.

Most of the measurement models used five-point Likert scales, ranging from "strongly disagree" (1) to "strongly agree" (5). For substantive PMCs and project performance, we developed a five-point scale with anchors tailored to each question.

Although we considered experienced managers as the best information source for this study, a key respondent approach creates a risk of bias, due to common method variance.¹¹ We therefore implemented several methods to minimise the potential for bias. For example,

¹¹ We followed guidelines on questionnaire design (Podsakoff et al., 2003) to minimise common method biases and conducted several analyses to assess the extent to which the latter were apparent in our study. We ran Harman's single-factor test by (i) entering the measurement variables and (ii) separately all latent variable scores of this study into a principal-component factor analysis. Neither analysis showed that there is a single factor underlying the data. Also, the application of the Measured Latent Marker Variable Approach at the construct level (Chin et al., 2012) reveals low construct level correlations between the marker variable and the study's constructs. Hence, there does not seem to be a problem with common method bias in our study (Chin et al. 2012, Podsakoff et al. 2003, Lane et al., 2001).

we guaranteed respondents that the survey results would be treated in confidence and used randomised question sequences to reduce systematic response errors. We also compared the responses of early and late respondents (Armstrong and Overton, 1977), but the results did not indicate any bias. Summing up, we are confident that no significant bias underlies our data.

Entrepreneurial capabilities. We conceptualised entrepreneurial capabilities as a Type II, multidimensional, second-order index (reflective–formative) (Becker et al., 2012, Ringle et al., 2012), and developed a second-order measurement model (Wilden et al., 2013). First, we identified key components of entrepreneurial capabilities: innovativeness, risk-taking tendency, proactiveness, experiential learning (cf. Teece, 2007, Covin and Slevin, 1989). Second, we examined and confirmed that the identified components were not interchangeable and instead referred to different aspects, even as they remained essential constituents of the overarching construct. Third, we assessed and ensured that the included components do not covary with one another. Fourth, because “*first-order constructs might share similar antecedents and consequences, but this is not always the case*” (Wilden et al., 2013, p. 9), we developed a set of first-order dimensions to measure the second-order entrepreneurial capability concept.

Without any available measurement model that included all dimensions, we employed an *a-priori* technique to determine the measurement mode (Diamantopoulos et al., 2008). This process supported the four formative dimensions: innovativeness, risk-taking tendency, proactiveness, and experiential learning (Barringer and Bluedorn, 1999, Naman and Slevin, 1993, Covin, 1991). We next investigated whether these four first-order constructs required a reflective or formative measurement mode; the latter must include all indicators that form the construct, because deleting one first-order dimension would change the meaning of the model (Gudergan et al., 2008, Diamantopoulos et al., 2008). Previous studies conceptualise dynamic capabilities in general and entrepreneurial capabilities in particular using a formative mode (cf. Wilden et al., 2013). Hence, we used the four dimensions to measure our second-order formative model of entrepreneurial capabilities.

First, to measure innovativeness, or the extent to which PBOs foster and share routine processes to identify new and reconfigure existing project-based operations (Covin and Slevin, 1990, Ireland et al., 2003), we draw on four facets that reflect innovativeness within the PBO. Therefore, we use a reflective operationalisation, in that the observed indicators are

caused by the innovativeness latent construct. We adapted four items from Covin and Slevin's (1986) corporate entrepreneurship measurement model and measured whether PBOs stimulate new project management innovations (cf. Covin and Slevin, 1990).

Second, risk taking describes the degree to which PBOs are willing to take risks to deliver a project (cf. Hitt et al., 2011), which relates to entrepreneurial PBOs' bold, determined actions to recognise opportunities or achieve particular goals (cf. Hitt et al., 2011, Dyer et al., 2008). Our measurement model includes three indicators that reflect risk-taking tendencies in the PBO, so we operationalise them in a reflective mode. Specifically, we measured risk-taking tendency using three items adapted from Covin and Slevin's (1986) corporate entrepreneurship measurement model.

Third, proactiveness is the extent to which PBOs engage in forward-looking activities to address the unique nature of projects (Handfield et al., 2009), that is, the entrepreneurial ability to deal with environmental changes in advance and develop more efficient ways of managing projects (Lumpkin and Dess, 1996, Wiklund and Shepherd, 2003). This measurement model has four indicators that reflect proactiveness. The model also draws on the corporate entrepreneurship measurement provided by Covin and Slevin (1986).

Fourth, experiential learning describes the process of maintaining and reactivating assimilated organisational knowledge to change existing processes (Corbett, 2005). In applying this definition to experiential learning in PBOs, we developed a measurement model with four reflective indicators of experiential learning, adapted from Lichtenthaler's (2009) absorptive capacity measurement model.

Improvisational capabilities. To measure improvisational capabilities, we adapted an existing measurement model to a project management context (cf. Leybourne and Sadler-Smith, 2006). We conceptualise improvisational processes as one component of dynamic PMCs that facilitate change in a less formalised, more immediate fashion. This concept is abstract, so we used reflective measures to construct our measurement model. It includes four indicators that are caused by and reflect improvisational capabilities in PBOs.

Substantive project management capabilities. Because there was no available measurement scale for substantive PMCs, we developed a new measurement model. Again, we adopted an *a priori* technique, in which theoretical and practical considerations helped specify the formative, multidimensional nature of this construct (Diamantopoulos et al.,

2008), using a Type II, second-order index (reflective–formative). Through our literature review, we identified processes that constitute substantive PMCs, which we classified into three sets of processes: governance, collaboration, and execution. Through focus group discussions with industry experts, we substantiated the practical relevance and unidimensionality of these PMC components. An exploratory factor analysis also confirmed the classification, so we created a second-order reflective–formative model to measure substantive PMCs (see Appendix, Table A1) using a two-stage approach (Becker et al., 2012, Wetzels et al., 2009).

Project performance. To measure performance, we drew on criteria applicable to the project-based context (cf. Meng, 2012). Although there is little consensus about how to measure project performance (cf. Cooke-Davies, 2002), financial aspects and the accomplishment of project objectives are common standards (cf. Boulter et al., 2013). We developed the measurement model using a two-stage approach similar to the one we used to derive our second-order substantive PMC measurement model, except that we concluded that overall project performance can be reflected in financial outcomes and the achievement of project objectives (see Appendix, Table A2).

Construct validity. Before assessing the validity and reliability of the reflective measurement models, we confirmed the unidimensionality of the individual models through exploratory factor analysis. We used Cronbach’s alpha (α) and composite reliability (CR) to evaluate the construct reliability. For all models, the Cronbach’s α and CR values were greater than the .5 threshold for exploratory research (Hair et al., 2012). To test for convergent validity, we used the average variance extracted (AVE). As Table I shows, it was consistently greater than .5 (Fornell and Bookstein, 1982). As a test of discriminant validity, we confirmed that each construct’s AVE was greater than its squared correlation with any other construct (see Table 2) (Fornell and Bookstein, 1982). Although there is no formal statistical test for content validity, the process that we have employed and analyses that we have carried out suggest that the data provide a valid foundation for our structural model. The reflective measurement models fit the collected data sufficiently (see Table 1).

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Table 1: Reflective measurement models

Construct	Indicators	Range	Mean	SD	Loading	AVE	CR	α	AVE>Corr ²
Proactiveness^a	In our organisation we proactively engage in a process of identifying and developing new project management practices.	1-5	3.38	1.11	0.85*	0.72	0.91	0.87	0.72>0.61
	In our organisation we are proactive when implementing new project management practices.	1-5	3.36	1.04	0.90*				
	We work towards departing from established routines and behaviours to enhance the way we work with each other in projects.	1-5	3.33	1.12	0.84*				
Innovativeness^a	Our organisation encourages project managers to actively identify new and better ways of working.	1-5	3.70	1.10	0.80*	0.76	0.93	0.90	0.76>0.61
	In our organisation we bring in the latest know-how on how to improve the way we do our projects.	1-5	3.46	1.08	0.84*				
	We focus on identifying novel procedures and working routines for our projects.	1-5	3.38	1.05	0.87*				
	Our organisation stimulates new project management innovations.	1-5	3.33	1.07	0.91*				
Risk Taking^a	Our organisation stimulates creativity and experimentation with project management practices.	1-5	3.26	1.13	0.87*	0.63	0.84	0.71	0.63>0.27
	Our organisation encourages high risk, high return projects.	1-5	2.52	1.21	0.76*				
	Our organisation responds to uncertain conditions with bold actions.	1-5	2.93	1.11	0.86*				
	In our organisation it is assumed that sometimes it is necessary to take risks to achieve project objectives.	1-5	3.17	1.04	0.76*				
Experiential Learning^a						0.75	0.92	0.89	0.75>0.40
	Our organisation can rely on our existing knowledge.	1-5	2.98	0.07	0.80*				
	Our organisation is proficient in reusing existing knowledge for new projects.	1-5	3.25	0.07	0.88*				
	Our organisation actively analyses required changes to how projects are managed.	1-5	3.27	0.07	0.89*				
Improvisational Capability^a	Our organisation knows how to handle project challenges using existing project management know-how.	1-5	3.31	0.07	0.88*	0.71	0.91	0.87	0.71>0.43
	In our organisation, improvisation within project management is acceptable, providing the risk element is controlled.	1-5	3.36	1.00	0.82*				
	In our organisation we improvise, provided the lessons learned are recorded and used to improve the way in which projects are managed within my organisation.	1-5	3.27	1.00	0.89*				
	Improvisation is recognised within my organisation as a valid way of achieving project-managed change.	1-5	3.23	1.05	0.84*				
	Where appropriate, our organisation captures effective improvisation so that we can re-use it.	1-5	3.33	1.08	0.83*				
Project Performance						0.98	0.99	0.98	0.98>0.27
	Financial	1-5	0.00	1.00	0.99				
	Outcome	1-5	0.00	1.00	0.99				

* Significant at .001 (two-tailed).

^a Anchored at 1 = “strongly disagree” and 5 = “strongly agree.”

Notes: AVE = average variance extracted. CR = construct reliability. Corr² = highest squared correlation between model constructs

Table 2: Correlations between main constructs

	1)	2)	3)	4)	5)	6)	7)
1) Entrepreneurial capability × Improvisation capability	1						
2) Experiential learning	0.18	1					
3) Innovativeness	0.17	0.63	1				
4) Improvisation capability	0.14	0.60	0.66	1			
5) Proactiveness	0.12	0.57	0.78	0.56	1		
6) Project performance	0.20	0.16	0.17	0.18	0.22	1	
7) Risk taking	0.16	0.46	0.55	0.45	0.52	0.01	1

Our measurement model contains two constructs, entrepreneurial capabilities and substantive PMCs, which are measured in a formative mode. In a second-order composite model, the hierarchical latent variable is formatively constructed through repeated uses of the indicator variables of the underlying first-order constructs (see Figure 2) (Tenenhaus et al., 2005). Diamantopoulos et al. (2008) outline different quality criteria to address the specific measurement properties of formative second-order measurement models. As opposed to models with a reflective mode, those with a formative mode are assessed for multicollinearity using variance inflation factors (VIF). Multicollinearity examines the correlation among the predictor variables of a construct. Table 3 indicates that all the VIFs are well below the threshold of 5 (Hair et al., 2012), and the weights of all items are significant and positive for both constructs. Therefore, our formative measurement models are suitable.

Figure 2: Conceptual representation of hierarchical components for entrepreneurial capabilities

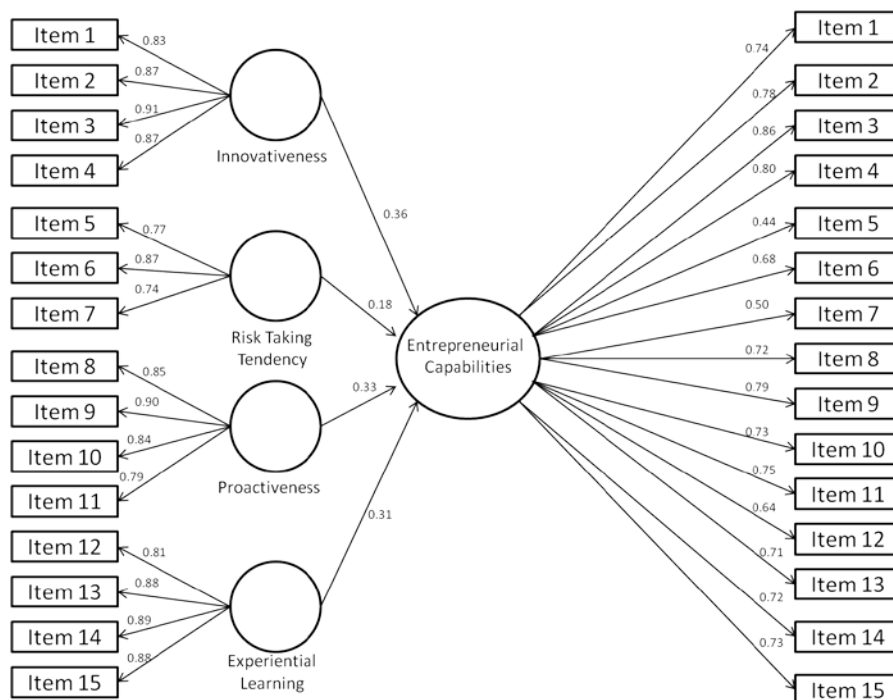


Table 3: Formative measurement models

Construct	Items	No. of items	VIF	Weights
Substantive PMCs	Project governance	3	1.43	0.40*
	Project collaboration	4	1.62	0.30*
	Project execution	4	1.28	0.51*
Entrepreneurial Capabilities (second-order)	Proactiveness	4	2.63	0.33*
	Innovativeness	4	3.04	0.36*
	Risk-taking tendency	3	1.46	0.17*
	Experiential learning	4	1.74	0.32*

*Significant at .001 (two-tailed).

Results of analysis

The correlations between the constructs are appropriately low (see Table 2), indicating that all first-order constructs are empirically independent and thus suitable for this study (Peng and Lai, 2012, Hair et al., 2012). The results of our PLS-SEM analysis, in which we assessed the path coefficients and their significance, are in Table IV. According to Chin (1998), the R-square value of substantive PMCs ($R^2 = .28$) is weak to moderate and that of project performance ($R^2 = .39$) is moderate to substantial, from a statistical point of view. In our specific context of projects as temporary systems, an R-value of .20 can be considered sufficient, because there are other PMCs (e.g. contingency planning), which impact project performance, but are not included in our model (Rexhausen et al., 2012).

Following Hair et al. (2012), we tested indicator reliability using a bootstrapping procedure, with 5,000 randomised samples and the original sample of 314 respondents. All indicators of the outer loadings exceeded the suggested minimum factor loadings of .7 and revealed sufficient t-values (see Table 4), implying that the indicators shared more variance with their respective constructs than with the error variances (Chin, 1998). To further substantiate our results, we conducted a post hoc power analysis; the statistical power was greater than the recommended value of .8 (Cohen, 1992).¹² Finally, we estimated alternative models¹³ to assess our model structure, and the results confirmed our findings.¹⁴

¹² To compute statistical power (F-test; linear multiple regression; fixed model, R2 deviation from 0), we used G*Power 3.1.3 software (Faul et al., 2009). The input variables were the sample size of 314 cases, a two-tailed p-value test with alpha of .05, and effect sizes of $f^2 = .64$ for project performance and $f^2 = .41$ for substantive PMCs. We also included three predictor variables. The output for project performance was $\lambda = 200.75$ (critical F-value = 3.02, df = 310), which leads to a power ($1 - \beta$ error probability) of 1.00. The output for substantive PMCs was $\lambda = 128.25$ (critical F-value = 2.63, df = 310), which leads to a power ($1 - \beta$ error probability) of 1.00.

¹³ We tested three alternative models to further assess our hypotheses. First, we analysed the model without the direct effect of dynamic PMCs on project performance. Second, we tested it without moderating the effect of improvisational capabilities on entrepreneurial capabilities. Third, we combined the two previous analyses and tested our model without the direct effect between the two dynamic capabilities and project performance and without moderating effect. All the alternative models produced similar effects, in direction and significance, in support of our original hypotheses (Table 4). Overall, however, our proposed model is more representative.

¹⁴ Further support for our structural model is provided by the following: The computation of the Stone-Geisser criterion, which draws on the blindfolding procedure to compute cross-validated redundancies (Henseler et al., 2009), yields a Q^2

Table 4: Path coefficient and R-square of alternative structural models

	Path Coefficient (entire model)	Path Coefficient (no direct effect of EC and IC on Perf)	Path Coefficient (no moderator)	Path Coefficient (no moderator or direct effect)
Entrepreneurial capability × Improvisation capability → Substantive PMCs	0.26**	0.26**		
Entrepreneurial capability → Substantive PMCs	0.30***	0.30***	0.34***	0.34***
Entrepreneurial capability → Project performance	-0.11		-0.11	
Substantive PMCs → Project performance	0.67***	0.62***	0.67***	0.62***
Improvisation capability → Substantive PMCs	0.15*	0.14*	0.15**	0.15**
Improvisation capability → Project performance	0.00		0.00	
R ² (Substantive PMCs)	0.27	0.27	0.21	0.21
R ² (Project Performance)	0.39	0.38	0.39	0.38

***Significant at .01 (two-tailed).

**Significant at .05 (two-tailed).

*Significant at .1 (two-tailed).

To test H1 we assessed the direct effects of substantive PMCs on performance. The results, in confirmation of our hypotheses, support our theoretical argument that the conventional DCV applies to project-based organisations. We find a significant positive effect of substantive PMCs on project performance, whereas the relationships of both improvisational and entrepreneurial capabilities with project performance are not significant. Please note, we also tested the direct effects of both dynamic PMCs on project performance and found support for the common view that the effects of entrepreneurial and improvisational capabilities on performance are mediated through substantive PMCs. Furthermore and despite being insignificant, our results indicate that the ultimate direct effect of entrepreneurial capabilities on performance can have a negative direction (Ambrosini et al., 2009).

For H2, H3a, and H3b, we tested the effects of dynamic PMCs on substantive capabilities. In support of H2 and H3a, both entrepreneurial and improvisational capabilities have positive, significant, direct effects on substantive PMCs. We also found that the significant, positive relationship between entrepreneurial capabilities and substantive PMCs was moderated by improvisational capabilities, in support of H3b. Thus, we confirmed our hypotheses with statistical analysis, mostly at the .05 level, though H3a was significant at the .10 level.

value of 0.496, underlining the model's predictive relevance. Then, the results of permutation-based analysis, in which we draw on comparing the genuine model's R² value (0.394) with the average R² values of four synthetic models (0.017) for which we used the actual data for the endogenous (independent) variables and random data for the exogenous (dependent) performance variable, imply that our model's explanation of variance in the exogenous (dependent) performance construct is not based on some estimation artefacts. Also, we created five random samples from our population (each with 150 cases) and the separate estimations of the model for each random sample were consistent with those of the entire sample.

Finite-mixture analysis

Because PBOs vary in aspects that may be associated with the extent to which dynamic PMCs matter, ignoring this form of heterogeneity would lead to biased parameter estimates and potentially flawed conclusions (2011). We therefore examined heterogeneity that may be related to differences in the path coefficients of our estimations, using an additional analysis with finite mixture partial least squares (FIMIX-PLS), which can assess structural models with both formative and reflective measurement models (Sarstedt and Ringle, 2010). Accordingly, we classified the PBOs on the basis of the heterogeneity of their inner path model estimates (Ringle et al., 2005a). The systematic application of FIMIX-PLS includes four steps (Sarstedt and Ringle, 2010). First, we estimated the model and obtained latent variable scores for each observation through our standard model estimation. Second, drawing on these results, we applied the FIMIX-PLS procedure repeatedly to iteratively identify the appropriate number of latent classes (Sarstedt and Ringle, 2010). We did so ten times, using consecutive numbers of subgroups (e.g., 2, 3, 4). We set the stop criterion sufficiently low to avoid premature convergence. To determine an appropriate number of subgroups, we assessed the Akaike Information Criterion (AIC), the AIC Controlled (CAIC), the Bayesian Information Criterion (BIC) and the normed entropy statistic (EN). Especially with regard to the minimal values concerning the CAIC measure and the EN criterion suit FIMIX-PLS (Sarstedt and Ringle, 2010), as we show in Table 5, this comparison, with an explicit consideration of the sizes of the identified subgroups, reveals that the solution with two subgroups is appropriate. That is, two types of PBOs with different covariance structures appear in the inner model.

Table 5: Evaluation criteria for number of subgroups

	Akaike information criterion (AIC)	Bayesian information criterion (BIC)	Consistent AIC (CAIC)	Relative Subgroup Sizes			
				S = 1	S = 2	S = 3	S = 4
2 Subgroups	-681.031	-579.798	-579.712	0.6793	0.3207		
3 Subgroups	-654.272	-500.547	-500.416	0.5796	0.3382	0.0822	
4 Subgroups	-696.682	-490.466	-490.291	0.6812	0.1842	0.0918	0.0427

Third, we explored subgroup heterogeneity by reanalysing the hypothesised model with the relevant subgroup data. Specifically, we derived the path coefficients and R-square values for each PBO subgroup, then compared them with the standard model (Table 6). The comparison indicates significant differences among the three inner model relationships: between entrepreneurial capabilities and substantive PMCs; between improvisational

capabilities and substantive PMCs; and between entrepreneurial capabilities and project performance. The differences thus raise questions about how the two groups differ and which factors contribute to this differentiation.

Table 6: Path coefficients and R-square of structural model, subgroup analysis

	Path Coefficient (entire model)	Subgroup 1 (higher polychronicity)	Subgroup 2 (lower polychronicity)	Difference between Subgroup 1 and 2
Entrepreneurial capability×Improvisation capability → Substantive PMCs	0.26**	0.30***	0.12***	0.18***
Entrepreneurial capability → Substantive PMCs	0.30***	0.07	0.99***	0.92***
Entrepreneurial capability → Project performance	-0.11	-0.16***	0.09*	0.25***
Substantive PMCs → Project performance	0.67***	0.57***	0.81***	0.25***
Improvisation capability → Substantive PMCs	0.15*	0.29***	-0.16***	0.45***
Improvisation capability → Project performance	0.00	-0.04	0.04	0.08
R ² (Substantive PMCs)	0.27	0.18	0.70	
R ² (Project Performance)	0.39	0.30	0.83	

***Significant at .01 (two-tailed).

**Significant at .05 (two-tailed).

*Significant at .1 (two-tailed).

Fourth, we conducted an ex-post analysis to identify variables¹⁵ that may explain the difference between the two PBO subgroups that we identified through our FIMIX-PLS analysis, such as asset specificity (Sarstedt and Ringle, 2010). We used a non-parametric test to identify potential variables that specify how the PBOs in the two subgroups differ; the outcome indicated that polychronic organisational values¹⁶ effectively partition the sample. That is, PBOs in one subgroup are characterised by higher polychronic organisational values than those in the other subgroup, and this distinction is associated with differences in the three cause-and-effect relationships in the inner model. When PBOs have polychronic organisational values, they prefer to engage in multiple activities at the same time, instead of one at a time, and believe simultaneity is the best way of doing things (Bluedorn et al., 1999).

Discussion

Our study offers theoretical and empirical contributions. Our results indicate in support of our theoretical argument that the dynamic capability framework applies to a project-based context. We extend the framework by incorporating the concept of improvisation capabilities as a dynamic capability, which coexists with the more formal

¹⁵Our survey included measurement models for additional constructs associated with a larger study.

¹⁶As we outline in the discussion section, polychronic organisational values differ from entrepreneurial and improvisational capabilities. We assessed this difference empirically by testing the construct and discriminant validity of polychronic organisational values. The high AVE, CR, and Cronbach's α values confirm that it is distinct, and our analysis illustrates empirically that the construct differs from the others, because its AVE is higher than the squared correlation (see the Appendix, Table A3).

entrepreneurial capabilities. The results thus support a positive, significant moderating effect of improvisation capabilities, as well as a direct effect on substantive PMCs. We confirm that improvisational capabilities exist in change practices and provide empirical support for this emergent stream of research (Bingham and Eisenhardt, 2011). Finally, our study provides evidence that dynamic PMCs in PBOs have two separate, interdependent components—entrepreneurial and improvisational capabilities—that represent different change processes, which affect substantive PMCs and indirectly lead to superior project performance.

Dynamic and substantive capabilities

Dynamic PMCs are comprised by two separate capabilities that represent different aspects of change in PBOs. More precisely, entrepreneurial and improvisational capabilities are theoretically and empirically different processes, with distinct change effects on substantive PMCs. We focus on entrepreneurial capabilities to examine the existence of formalised change processes in PBOs (cf. Ireland et al., 2009, Goodale et al., 2011). Our starting point is the widely accepted definition by Helfat and her co-authors, stating that dynamic PMCs are “*the capacity of an organization to purposefully create, extend, and modify its resource base*” (Helfat et al., 2007, p. 4). Entrepreneurial activities are congruent with this view and represent a valid way to examine the formalised nature of dynamic PMCs in PBOs. In turn, entrepreneurial capabilities influence operations by encouraging the development of new, and the modification of existing, substantive PMCs.

Our study indicates a positive relationship between entrepreneurial capabilities and substantive PMCs. Entrepreneurial capabilities are not necessarily sufficient on their own; on average, they rely on the existing substantive PMCs through which they act. This interdependency between dynamic and substantive capabilities sustains organisational adaptation (Ambrosini et al., 2009). Entrepreneurial capabilities are routinised processes, essential for facilitating the change and reconfiguration of substantive PMCs. We recognise the importance of formalisation in PBOs, but existing DCV studies also “*tend to overemphasise structural rigidity and ignore the capacity of agents to ‘think outside the box’ of their cognitive myopia*” (Newey and Zahra, 2009, p. S97). Our conceptualisation extends understanding of dynamic PMCs by confirming improvisational capabilities as a second component of organisational change.

In addition, improvisational processes constitute dynamic PMCs that directly influence substantive PMCs, as well as moderate the relationship between routinised

entrepreneurial capabilities and substantive PMCs. Although improvisational capabilities are integral to project-based organising, firms should not rely solely on them to effect organisational change (Tsoukas and Chia, 2002); they need some formalised processes and explicit, repeatable substantive PMCs. Our findings suggest that improvisational capabilities coexist as less formalised change processes in PBOs (cf. Bingham and Eisenhardt, 2011).

Furthermore, improvisational capabilities are not a non-conscious and non-repeatable process (Bernstein and Barrett, 2011). They reflect an informed response to an emerging situation, such that the firm adjusts or changes its existing processes in real time (Cunha et al., 1999). This type of change requires high levels of expertise and skills (Weick, 1998). Improvisation requires a certain amount of formalisation, which reaffirms the importance of the interplay between improvisational and the more standardised (entrepreneurial and substantive) capabilities of PBOs (Goodale et al., 2011). As previous research suggests, such work is common in PBOs, especially as they near the ends of projects, when resources are limited (Leybourne, 2009).

Capabilities and performance

This study substantiates the influence of dynamic PMCs on performance in PBOs. It supports Zott's (2003, p. 98) argument that "*dynamic capabilities are indirectly linked with firm performance by aiming at changing a firm's bundle of resources, substantive routines, and competencies, which in turn affect economic performance*" and thus offers several implications for the DCV. First, having a reliable change routine in place helps, but it is not sufficient for delivering successful projects. Entrepreneurial processes enable exploitation, allocation, and employment of substantive PMCs. These substantive PMCs and their contextual adjustment through innovative and proactive processes enable successful PBO performance, especially in regards to their temporary nature. Entrepreneurial capabilities in PBOs thus represent an organisational architecture of change that indirectly contributes to successful project operations.

Second, improvisational capabilities reflect a spontaneous dynamic capability and create a form of change, applying existing or newly acquired processes context-bound to make the system work. However, without the stability provided by existing resources and processes, the direct effect of improvisational capabilities on performance can be destructive (Weick, 1998). Substantive PMCs, in the form of organisational processes (or best practices), offer an important foundation for leveraging improvisational capabilities. Our

conceptualisation of improvisational capabilities further implies that they are contingent on the PBO in which they matter through substantive PMCs. Consequently, there is no direct effect between improvisational capabilities and project performance, because this relationship is always mediated by substantive PMCs.

Polychronic organisational values

Unlike improvisational and entrepreneurial capabilities, polychronic organisational values pertain not the degree of formalisation of a particular process but rather to the behavioural preference to engage simultaneously in multiple activities or processes, which may be formalised, less formalised, or some combination (König and Waller, 2010). Because PBOs must complete many deliverables in a limited time, they tend to execute a multitude of processes in parallel (Andersen, 2006), yet project-based operations are often sequential, with project plans and schedules developed to reduce parallelism in favour of monochronic solutions (Voss and Blackmon, 1998). That is, “*polychronic systems are characterized by people doing several things at the same time, and often abandoning pre-set schedules*” (Voss and Blackmon, 1998, p. 149), whereas PBOs are characterised, to varying extents, by standardised processes with sequential structures, such as entrepreneurial capabilities, which do not necessarily align with polychronic organisational values.

Furthermore, organisational change is a complex undertaking, especially for PBOs that face the challenge of balancing multiple agendas across different projects that share substantive PMCs (Winter et al., 2006a). For example, the determination of resources and deliverables depends on external or internal influences (Aubry et al., 2010a), which implies the need to make adjustments to the plan or substantive PMCs (Voss and Blackmon, 1998). Several project-based operations may need to change at the same time for a PBO to remain effective (Souitaris and Maestro, 2010). Performing multiple activities concurrently can reduce the time needed to finish a project but may also require polychronic values within PBOs (Andersen, 2006). Our FIMIX-PLS results suggest these values affect the relationships between entrepreneurial capabilities and substantive PMCs, between improvisational capabilities and substantive PMCs, and between entrepreneurial capabilities and project performance.

Thus, in PBOs with higher polychronic values, the effect of entrepreneurial capabilities on substantive PMCs loses significance. In contrast, PBOs characterised by lower polychronic values align better with routinised, sequential, project-based operations. In such

PBOs, improvisational capabilities even exert a negative effect on substantive PMCs, likely because this organisational orientation “*favours the attendance of unscheduled interpersonal interactions over planned tasks*” (Souitaris and Maestro, 2010, p. 657). Although a common assumption is that polychronic values encourage the development of new processes (Ocasio and Joseph, 2005) and organisational performance (Souitaris and Maestro, 2010), we show that a PBO with strong polychronic values actually performs poorly when its organisational processes are sequential and linear. Polychronic values lessen the effect of entrepreneurial capabilities on performance.

In summary, entrepreneurial capabilities likely exert negative effects on project performance when the PBO is characterised by higher polychronic values, whereas these effects improve for PBOs with lower polychronic values. In other words, PBOs that favour sequential process applications (i.e., monochronic PBOs) benefit from formalised change processes that enhance project performance. This direct effect contradicts standard dynamic capabilities models, in which dynamic capabilities have no direct effect on performance. A spillover effect, caused by polychronic values, may also be associated with influences on other substantive operational capabilities that are not considered in this study.

Managerial Implications

Although effective substantive PMCs are important, their performance implications depend on higher-level change capabilities that enable their contextual reconfiguration. Having adequate change structures in place, in the form of entrepreneurial capabilities, is just as important as possessing improvisational capabilities that allow firms to act outside the box. Therefore, firms need to broaden their views, beyond the constraints of traditional, formalised change processes. Firms accordingly should create a culture that encourages newly created and different processes, instead of one that imposes constraints and merely focuses on existing substantive PMCs. Entrepreneurial capabilities facilitate the structural aspects of organisational change; improvisational capabilities support organisational change with a supplementary, less structured approach.

Our findings also stress the importance of substantive PMCs for performance. It would be negligent to ignore the significance of existing operating processes in PBOs (Crawford, 2006), because they provide a strong basis for effective project management (Eskerod and Östergren, 2000). But these processes may also need to change over time, to reflect relevant and changing contingencies. Modifications to project management processes

allow them to facilitate performance in changed circumstances. When managers invest in changing substantive PMCs, they need to understand cultural aspects such as the extent to which their PBO is polychronic (cf. Bock et al., 2012). A polychronic mindset enables PBOs to operate more quickly and in a more flexible manner, especially in relation to their temporary and fast-changing nature (Bakker et al., 2012), which supports their improvisational capabilities.

Limitations and future research

Limitations, especially those regarding methodology and scope, offer suggestions for further research. First, our sample was cross-sectional, so we call for caution before drawing any cause–effect interpretations across different contexts. Our data cover a wide range of projects, industries, and firm sizes, but we cannot claim the results are generalisable without restrictions; they provide instead a causal scheme. Additional research should investigate a broader population to confirm the findings. Second, our data and analysis were based on key informants, who offered subjective perceptions. Although we implemented several steps to avoid biases, more objective data could complement these insights.

Further studies should also explore the contextual contingencies that influence the extent to which entrepreneurial and improvisational¹⁷ capabilities matter. Our conceptualisation focuses on the effects of dynamic PMCs on substantive PMCs, but PMCs may also affect the development of entrepreneurial and improvisational capabilities. We recommend additional research that investigates the extent to which substantive PMCs affect dynamic PMCs, as well as how they enable or constrain organisational change and thus the work of dynamic PMCs. In a similar vein, research could investigate the aspects that underpin the effects of dynamic PMCs and draw on data from multiple periods over a longer time span. Despite the room for further research, our study offers a better understanding of changes in and the performance of PBOs, particularly in relation to their temporary characteristics, by highlighting the respective roles of dynamic PMCs, as well as the importance of substantive PMCs.

¹⁷ Moorman and Minor (1998) and Miner, Bassoff and Moorman (2001) use the concept of adaption to describe planned change processes or the deployment of existing routines. Their work was highly influential for this paper and our conceptualisation of identifying formal and less formal ways of change in form of improvisational and entrepreneurial capabilities.

Appendix Paper 4:

Table A1: Reflective measurement models for formative components of substantive PMCs

Construct	Indicators	Range	Mean	SD	Loading	AVE	CR	α	AVE>Corr ²
Governance	How well did the project manage critical issues?	1-5	3.82	1.06	0.84	0.68	0.86	0.76	0.68>0.30
	How well did the project deal with risks?	1-5	3.66	0.99	0.84				
	How well was this project governed (i.e., quality of oversight)?	1-5	3.60	1.08	0.80				
Collaboration	How did you communicate progress of project objectives among key stakeholders?	1-5	3.99	1.01	0.78	0.58	0.84	0.75	0.58>0.30
	How were resources utilised during project execution? (cf. matching skill to task OR optimal use of scarce assets)	1-5	3.92	0.99	0.79				
	Did members of the project team trust each other?	1-5	3.99	0.95	0.75				
	The project team worked in a respectful environment	1-5	3.71	1.17	0.70				
Execution	To what extent was project selection based on the overall business strategy?	1-5	4.05	1.07	0.58	0.44	0.75	0.59	0.44>0.23
	How strong was stakeholder involvement in this project?	1-5	3.68	1.16	0.74				
	To what extent were KPIs used as control mechanisms in this project?	1-5	3.30	1.25	0.55				
	To what extent did the organisation recognise good work throughout the project life cycle?	1-5	3.64	1.09	0.75				

Table A2: Reflective measurement model for project performance components

Construct	Indicators	Range	Mean	SD	Loading	AVE	CR	α	AVE>Corr ²
Financial	What best describes the evolution of costs in this project compared to what was expected?	1-5	2.987	1.027	0.804	0.71	0.71	0.60	0.71>0.56
	What best describes the financial outcome of this project compared to what was expected?	1-5	3.080	0.954	0.833				
Outcome	To what degree were the intended project outcomes delivered?	1-5	4.083	0.966	0.922	0.85	0.85	0.83	0.85>0.74
	In your opinion how successful was this project?	1-5	3.825	0.988	0.926				

Table A3: Reflective measurement model for polychronic organisational values

Construct	Indicators	Range	Mean	SD	Loading	AVE	CR	α	AVE>Corr ²
Polychronic organisational values^a						0.73	0.89	0.84	0.73>0.3
polychr1	We like to juggle several activities at the same time.	1-5	3.532	1.159	0.871*				
polychr2	We believe it is best for people to be given several tasks and assignments to perform.	1-5	3.446	1.072	0.963*				
polychr3	We believe people should try to do many things at the same time.	1-5	3.252	1.115	0.740*				

* Significant at .001 (two-tailed).

^a Anchored at 1 = "strongly disagree" and 5 = "strongly agree."

Notes: AVE = average variance extracted. CR = construct reliability. Corr² = highest squared correlation between the model constructs

Chapter 6

“He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast.”

Leonardo Da Vinci (1452 – 1519)

Projects are multifaceted and complex constructs that are perceived, managed and approached differently amongst researchers and practitioners. My thesis introduces improvisation, which is built on a pragmatic foundation, as a practical concept that helps to bridge the gap between theory and practice. From a pragmatic position, there is merit in all project management approaches, whether they are more or less formalised, as they are all contextually useful and thus contribute to a better and more comprehensive understanding of projects and project management in general. Improvisation helps to connect theories, and the underlying processes and structures, to practical situations, as it is often what practitioners *do* in their daily work (Schön, 1987). Improvisation, therefore, cannot be isolated from the context in which it happens. This means that improvisation shall not be studied as an individual concept *per se*, because this separates improvisation from its context and thereby misses the opportunity to study its role within the organisational structure (Miner et al., 2001). For instance, in Chapter 5 I examine improvisation in relation to other organisational capabilities and its effect as a moderating component of organisational change in general. Hence, this thesis examines improvisation as a practical concept with multiple degrees, effects and facets that describes the contextual use of existing organisational tools. Improvisation – as a less formal way of managing projects – coexists with more formal organisational project management processes, which both shape and influence each other in an interdependent fashion.

Contributions

By analysing improvisation as a practical theory, and a daily aspect of project management work that uses existing organisational tools and structures to solve practical problems, this thesis contributes to the literature in several ways and accordingly produces managerial implications. In the following sections, I will outline these contributions and implications in more detail, addressing each research question individually.

The overarching research question of this proposal is: *How can improvisation help to explain modern project management?* This study contributes by showing that a pragmatic mindset, represented by improvisation, offers a compelling alternative to existing project management theories. It provides an additional voice that contributes to the practice-oriented project management community of researchers and practitioners that help the field to complete the initiated practice turn (Blomquist et al., 2010, Lalonde et al., 2010), while acknowledging the importance and value of traditional project management approaches. In a pragmatic project world, the improvising project manager treats theories, processes and methods as tools that can be used to solve problematic situations, and thus overcomes disciplinary and professional boundaries. Pragmatism does not provide us with an objective and absolute truth, or a universal solution to managing projects. It much rather enables improvisational practices, which means that project managers as well as project-based organisations can possess and apply new and existing norms, practices and processes to *make it work* (Blomquist and Müller, 2006, Miller, 2005).

There is no one-size-fits-all approach that helps project managers to successfully progress through the journey of the project. Instead, the required practices are constantly evolving from the emerging context (Maylor et al., 2008). The often accidental nature of project managers (Ensworth, 2001) in which different backgrounds drive the daily project work fosters context-dependent project management (Turner and Müller, 2005). While some projects can be successfully managed through the strict application of routinised management practices, others necessitate a less structured approach, all of which are however driven by improvisational practices to a larger or smaller extent. Nevertheless, there is an improvisational effort in any project, as the context is never identical and it is therefore crucial that the skills and practices have an immediate resonance in the world of practice (Evans, 2005). As a result, project management practices are defined by constant evaluation of the present situation and context-dependent action, which creates resilience and a robust mindset that is able to operate in modern complexity (Hamel and Valikangas, 2003).

Organisations often fail to acknowledge the fact that improvisation is an important component of managerial work, as that potentially undermines its tightly designed planning and control systems, which represent professional and standardised practices that ensure effectiveness (Eskerod and Östergren, 2000). Improvisation is often perceived as a form of action without clear plans or intentionality about how to proceed, which often results in discrepancies. This is, however, not the type of improvisation that I propose. My version of

improvisation combines “*disparate and incomplete materials*” (Barrett, 1998, p. 617) and contextually applies them in order to achieve a projected outcome. This is particularly important in dynamic, uncertain, complex, transient and fast-changing industries and contexts. Many projects have these characteristics (Geraldi et al., 2010, Maylor et al., 2008) and thus require an improvisational mindset that fosters spontaneity, creativity, experimentation, and situational synchronisation of resources in organisations (Barrett, 2006). My contributions, in regards to the three research gaps identified, are as follows (see Table 1):¹⁸

1. Theories *about* practice:

Following a pragmatic mindset, this thesis theoretically conceptualises the broad spectrum of existing project management theories as a toolbox that describes contextual practices. In that sense, all theories are theories *about* practice as long as they are used in a contextual fashion. For instance, the first paper confirms the pluralistic nature of the field of project management through our scientometric analysis of the existing literature, which is the foundation of the project managers’ toolbox. I also find evidence for the so-called practice turn, which highlights an increased focus on practice-oriented studies (Blomquist et al., 2010). The first paper therefore contributes to the field of project management in several ways; firstly, it moves beyond an objective reality of projects, towards a perception in which the project reality is created by the application of contextual practices. This implies that there is no one right way of doing things or acting in a project environment. All processes, instruments and methods are part of a large toolkit from which the project manager can choose. Thirdly, seeing the project as a tool implies context dependency, which necessarily means that project management processes have to be constantly adjusted or changed to address the changing nature of the context in which the particular project operates (Blomquist and Müller, 2006).

2. Theories *for* practice:

There is an overarching need to develop theories *for* practice that close the gap between project management theory and practice to enable project managers to do their job successfully (Winter et al., 2006c). The second paper theoretically contributes to this research gap, as it attempts to develop a starting point for developing theories *for* practice. In

¹⁸ Please note, a more specific description of my contribution can be found in the different Chapters themselves

particular, the paper contributes to the current debates in project management and the initiated practice turn (e.g. Cicmil et al., 2006). Focusing on existing theoretical knowledge and improvisation provides a wonderful opportunity to do research with and for project managers and develop practical theories. The practicality of project management knowledge is particularly important, as it allows researchers to bridge the gap to practitioners, and project-based organisations to be more resilient. Providing sound, practice-related theories stimulates fruitful debates between within the project management community, such as academics, project managers and consultants, which will help the field to further mature and grow. I specifically introduce different degrees of improvisation that describe situational project management practices that are not constrained, but rather encouraged by existing structures. Improvisation in various degrees is therefore a fundamental component of contextual project management that helps to transform existing theoretical knowledge into theories *for* practice to develop a practical theory of project management.

3. Theories in practice:

To develop theories in practice in project management, it is necessary to empirically investigate the concepts in the proposed context. Hence, I qualitatively and quantitatively explore change processes in project-based organisations to grasp the existence of improvisation in practice. While there is consensus that traditional (project) management theories provide an incomplete representation of managerial work, which is why alternative theories (e.g. Critical Project Studies) have emerged, conventional tools and structures are still integral to project management practice. At the same time, project management is infiltrated with improvisational work, where the project manager contextually changes existing, or develops new, processes to deliver a successful project. Papers 3 and 4 deal with the interdependence between formal and less formal aspects of project management work. In particular, I contribute to the practical understanding of improvisations by showing that improvisational capabilities in the form of less formal, non routine processes coexist with the more formal project management capabilities, such as entrepreneurial capabilities and best practices. In fact, both aspects are interdependent components of project management practice that shape and affect each other. In other words, structural (e.g. formal processes) as well as less structural aspects (e.g. improvisation) constitute project-based work and thus coexist in an organisational setting across different levels. This extends existing theories of change, as it merges two components that have predominantly been described separately in existing research.

Table 1: Summary of contributions

RESEARCH GAP	MAIN CONTRIBUTIONS IN RELATION TO THE RESEARCH GAP
Theories <i>about</i> practice (Theory)	<ul style="list-style-type: none"> ▪ All theories are theories about practice if used with a pragmatic mindset ▪ Existing project management theories represent a pragmatic tools that – when used in a context dependent way – help project managers to deliver successful projects.
Theories <i>for</i> practice (Policy)	<ul style="list-style-type: none"> ▪ Improvisation is a practical theory for practice that enables the context dependent application of existing and traditional project management theories ▪ Different degrees of improvisation describe situational project management practices that are not constrained, but rather encouraged by existing structures.
Theories <i>in</i> practice (Practice)	<ul style="list-style-type: none"> ▪ Improvisation is a natural component of project management work ▪ Strict (formal) and improvisational (less formal) project management approaches coexist in projects (and PBOs) ▪ Both are interdependent and thus important components that contribute to successful project management

Implications¹⁹

A pragmatic perspective of project management has two directions of implications that affect project management on multiple levels. The first direction is concerned with project management education and the body of knowledge. On an individual level, the pragmatic project manager should possess knowledge of more existing project management theories (e.g. nine schools of project management), and their limitations. Furthermore, the improvising project manager is well educated and possesses a solid understanding of existing project management theories and project management knowledge in general. He assesses a particular situation and uses a variety of existing theories to solve the problem, whether it is in a strict and linear, or improvisational fashion. The improvising project manager is therefore sufficiently trained and has a good understanding about project management, just as musicians must first learn how to play the instrument itself before being able to improvise. The better one masters the basics, the more one is able to push the boundaries and act freely without losing track of the final goal.

On an institutional level, formal bodies of knowledge (e.g. PMBOK) may want to embrace the plurality of project management knowledge and propose a heterogeneous body of knowledge. Such a body of knowledge would necessarily – at times – be contradicting

¹⁹ Please note, a more specific description of implications can be found in the different Chapters themselves

itself, as the multiple theories (Bredillet, 2010a, 2010b) and organisational settings (Luhmann, 1995) are often incompatible. While this might be counterintuitive to our traditional understanding of a body of knowledge and best practices, it would be a better representation of the existing knowledge base and thus accommodate the existing complexity of the modern business environment.

The second direction is concerned with actual project management practices. While highlighting the importance of acknowledging improvisational actions, this thesis reinforces the need for structure and formal processes, as they provide certainty and comfort for the project manager and project-based organisations, and are thus starting points for improvisation. Having adequate structures in place, in the form of project management processes, structures or tools, is just as important as possessing the ability to act in an improvisational fashion. Nevertheless, project-based organisations need to broaden their views, beyond the constraints of traditional, formalised change processes. This can be achieved by creating a culture, in which mistakes are accepted and project managers are trusted successfully deliver the project. This culture is one of empowerment that encourages project managers to “*solo from time to time*” (Barrett, 1998, p. 618), instead of one that merely imposes constraints and existing routines.

Furthermore, improvisation does not only help to overcome challenges, it is also a source of organisational learning (Miner et al., 2001). While, again, improvisation shall not be the main vehicle for learning, capturing newly acquired processes or heuristics can help make existing structures more effective. Many good things can happen when people have to respond to changes and uncertainties, and it is worth capturing or reporting these heuristic shortcuts. Of course, this form of learning is rather risky and unstable, as there is no guarantee of a useful outcome (Barrett, 2006). It must therefore not be the sole form of organisational knowledge generation. However, capturing improvisational practices represents an additional pool of knowledge that can potentially help boost internal project management processes. This can be achieved by creating an organisational context in which reporting and discussing errors or performing outside the box is accepted and encouraged.

Generally, project-based organisation should enable project managers to work with and through the organisational structures to deliver a successful outcome, rather than being restricted by them. Too much control inhibits the flow of the project, which can have a major impact on time and cost of the final outcome. While a certain level of control is necessary, it

is important to manage the paradox between control and flexibility mindfully, while being aware of the clients' and other stakeholder's preferences. Project managers must be able to achieve a balance between structure and freedom, as both are interpedently related and situated within the greater organisational context. As Quinn (1988) points out:

“The people who come to be masters of management do not see their work environment only in structured, analytic ways. Instead, they also have the capacity to see it as a complex dynamic system that is constantly evolving. In order to interact effectively with it, they employ a variety of different perspectives and frames.”
(Quinn, 1988, p. 3-4)

Limitations and Future Research

Despite its contributions and relevant managerial implications, this thesis has several limitations.²⁰ Firstly, there are methodological limitations in the empirical papers. In Chapter 2, the analysis of the literature is based on three main project management journals (*International Journal of Project Management*, *Project Management Journal*, and the *International Journal of Managing Projects in Business*), which means that our findings are limited to this particular dataset. Even though the chosen sample is adequate for the paper in Chapter 2, future research should incorporate a greater variety of publications that goes beyond project management-specific journals. Since projects and project management have found their way into the field of management and organisation studies, it would be valuable to understand how the general management literature has approached the topic in order to develop a more sophisticated and broad conceptualisation of the field of project management research.

The qualitative paper, Chapter 4, uses three case studies as the basis for the empirical investigation. While the number of case studies is not related to the meaningfulness of the findings (Flyvbjerg, 2006a), the results of this paper provided no basis for context-independent, generalisable knowledge. Although the study uses multiple ways to collect data over a three-year period, additional qualitative insights into the uncovered aspects are needed to develop a sufficient understanding of multilevel change in project-based organisations. An additional focus in this regard should be non-Australian project-based organisations, since the cases were Australian-based organisations. Nevertheless, the paper does not claim to generate generalisable theories; rather, it is a starting point for future research. Since the data

²⁰ Please note, a more detailed description of limitations can be found in the Chapters themselves.

collection has been executed quite rigorously, the findings can be perceived as meaningful, context-dependent theoretical knowledge.

In the quantitative paper, Chapter 5, the sample used was cross-sectional, which calls for caution, as drawing any cause–effect interpretations across different contexts is not always meaningful. While the data cover a wide range of projects, industries, and firm sizes, one cannot claim the results are generalisable without restrictions; rather, they provide a causal scheme on which future research can build. Hence, additional research should either explore a broader population to confirm the findings or undertake a context-specific analysis. Furthermore, the data and analysis were based on key informants, who offered subjective perceptions. Even though several steps and precautions were implemented to avoid biases, more ‘objective’ data could complement these insights.

Theoretically, research on improvisation holds the risk of solely focusing on improvisation as such, while losing sight of the context in which improvisation takes place. This is to be avoided, as there is no improvisation without the context, in this case the project and project-based organisations and the existing resources. Hence, the perception and creation of context could be a viable option for further studies. This thesis tries to overcome this limitation by focusing on the structural aspects of projects, such as formalised project management capabilities that coexist with and enable improvisational practices. Future studies should adopt this mindset and explicitly research improvisation in regards to the greater organisational context in which this form of project work is situated. One cannot meaningfully investigate improvisation without accounting for other organisational structures, such as project plans, processes and procedures. Future studies should therefore explore what particular theories (and their proposed structures, processes and tools) enable improvisational practices, as this would provide invaluable insights into the pragmatic validity of the existing organisational theories and structures (Worren et al., 2002).

Therefore, in conclusion this thesis reinforces the need to incorporate both theoretical and practical knowledge into the bigger picture of project management. Scientific and behavioural project management theories are necessary to develop a comprehensive and sophisticated knowledge base. Theories provide structure and structures provide a level of certainty, which is essential in the complex and uncertain modern business environment, as humans have a natural quest for certainty. Simultaneously, it is important to acknowledge the existence of spontaneous, creative and intuitive actions. A pragmatic mindset can help to

utilise the knowledge base to its full extent, as it allows multiple theories to be true, while acknowledging practical knowledge to be equally important. This duality between theory and practice in which both contribute to successful and contextual practices provides a wonderful opportunity to transcend absolute certainty, while providing enough certainty for project managers to comfortably act and produce great outcomes. As Dewey illustrates:

“Action, when directed by [theoretical] knowledge, is method and means, not an end. The aim and end is the securer, freer and more widely shared embodiment of values in experience by means of that active control of objects which knowledge alone makes possible.” (Dewey, 1929, p. 37)

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