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Building Theory from Practice: Opportunities in IS Project Management

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Abstract
This paper reports on a program of practice-driven research to develop theory to improve IS project performance. This is a significant and persistent problem for the IS discipline. The paper identifies a novel, meta-level research methodology or approach that is motivated by ‘looking for a gap in practice and developing the theory in the gap’. Reviewing four examples from a seven-year research program, the paper describes the approach as a high potential, under-utilised approach to developing theory. Critically, the approach assumes that multiple theories are required to improve the management of IS projects, rather than a single theory of IS project management.

Keywords:
Theory Building, Practice-led research, Exploratory research, IS Research Methodology, IS Project Management
1. Introduction

This paper highlights the potential of ‘exploratory practice-driven research’, which builds on Kilduff’s (2006) comments on the opportunities for deriving influential theories from the observation of real-life phenomena and March’s (1991) concepts of learning and knowledge creation. The goal is to formalise a research approach on which future research can build. The paper does not contend that exploratory practice-driven theory development is the only approach to improve IS project management performance. Rather, it highlights the research opportunities, contingent on that approach.

The paper is organised into five sections. Section 2 examines the nature of ‘exploratory practice-driven research’. A 2x2 typology of research approaches is presented, where a research approach is defined as a meta-level research methodology in which the research methodologies share characteristics defined by exploitation versus exploration of new theory, and a motivation to explore holes in literature versus gaps in practice. Section 3 provides a very brief introduction to IS project management research. Section 4 presents four examples and discusses the strengths and challenges of the approach when applied to IS project management. Finally, section 5 presents the conclusions.

2. Exploratory Practice-driven Research

Kilduff (2006) argues: “The route to good theory leads not through gaps in the literature but through an engagement with problems in the real-world that you find personally interesting.” (p. 252). He reiterates Hambrick’s (2005) observation that influential theories are often derived from the observation of real-life phenomena, not always from ‘scholars struggling to find holes in the literature.’ (p. 124).

When motivated by a gap in the literature, researchers start with a problem within an existing theory, extend or refine it in some way, and apply it to a specific context (Kuhn, 1996). The nature of this learning and knowledge creation is ‘exploitation’ of the existing theory (March, 1991), including processes captured by terms such as refinement, choice, production, efficiency, selection, implementation and execution. Alternatively, researchers can address a gap in theory by starting with a new theory and testing it in a specific context. The nature of this learning and knowledge creation is ‘exploration’, including processes captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, and innovation.

When motivated by the observation of practice, the problem is practice-driven rather than theory-driven (Zmud 1998). Practice-led research that uses existing theories to codify best practice is exploitative. In IS project research, this often includes research that seeks to improve project performance by developing new methodologies, improving execution and streamlining governance. Alternatively practice-led research can be exploratory, developing new theories to support and guide practice. This is the focus of this paper. These new theories are frequently ‘borrowed’ from other research domains. By not adopting a model ex ante, this approach acknowledges that the research team does not know, a priori, the theory to be developed.

Integrating the two categories of theory development motivation (Kilduff, 2006) and learning and knowledge creation (March, 1991), Figure 1 presents a typology of research approaches, with exploratory practice-driven research located in the bottom right-hand quadrant. This research approach challenges researchers and practitioners to collaborate to develop new theory to guide new practice.

A wide range of research methods can support the exploratory, practice-driven research approach, including single-case, multi-case, and longitudinal case studies (following Yin 2003), and action research (following Baskerville et al. 1999; Susman et al. 1978). The selection of each is dependent on the research context. The associated techniques to guide theory building are rooted in the classic grounded theory-building paradigm from Glaser and Strauss (1967) and subsequent developments. A notable application of grounded theory building is given by Eisenhardt (1989), who presents a framework for building theory based on case study research.

These research methodologies are characterised by:

- high engagement with practitioners
- deep access
- study over long periods
When researchers desire to engage in this kind of research, they are often unable to satisfy these demanding characteristics. Even when they do, the dominant research paradigm in top IS journals until recently has tended not to support this kind of research. There is a need to further develop and articulate research methodologies to support such research. While research progress typically involves a mix of research approaches from all of the quadrants in Figure 1, this paper contends that the research in the bottom right hand quadrant is under-utilised in the extant literature, yet may have great potential to explain IS project management performance.

3. IS Project Management Performance

“Nothing is so practical as a good theory.” (Lewin 1945)

The research program described in this paper is focused on improving IS Project Management performance, which is distinguished from IS Development research which only addresses one component of an IS project. While IS Project Management research is extensive, cumulatively, there has been little improvement in project management performance over an extended period (Ambler 1999; Field 1997; Johnson et al. 2001; Standish Group 2004).

Much of the existing IS project management research is exploitative, with the research motivated by a gap in the literature to extend existing factor and process models (Markus et al. 1988; Robey et al. 1996; Sauer 1999). As contexts are found where these theories do not hold, researchers have introduced contingencies (Shenhar 1998; Shenhar 2001). Practice-driven research has also mostly been exploitative, codifying practice into various Bodies of Knowledge. Surprisingly, however, there is limited evidence for the success of the espoused practices.

Exploratory research on IS project management is limited. Two notable exceptions presenting new theories to change the existing IS Project management paradigms are the application of Adaptive Control Theory (Alleman 2002) and the research stream based on the application of Complex Systems, often using simulation techniques, (Benbya et al. 2006; Morris 2002;

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1 Kuhn, T.S. The Structure of Scientific Revolutions, (3rd ed.) University of Chicago Press, Chicago, IL, 1996, pp. xiv, 212 p.outlines the importance of the existing paradigm for conducting ‘normal science’, with punctuated changes to the status quo involving ‘paradigm changes’.

March, J.G. ‘Exploration and Exploitation in Organizational Learning,” Organisational Science (2:1), February 1991, pp 71-87 contends that maintaining an appropriate balance between exploration and exploitation efforts is necessary for system survival and prosperity.


3 Koskela, L., and Howell, G. “The Underlying Theory of Project Management is Obsolete,” Project Management Institute Research Conference, Seattle, WA, 2002, pp. 293-301. review the theories that underpin project management as espoused in PMBOK. They show that the espoused practice rests on three theories of management: management as planning, the dispatch model of execution, and the thermostat model of control. They conclude that these implicit and narrow theories are of limited value and explanatory power. Importantly, they note that these theories have already been superseded in the original management fields from which they were imported.
4. Research Approach

Research in organizations requires tradeoffs between practice-driven exploratory and traditional research approaches. Examples are presented in Table 1.

<table>
<thead>
<tr>
<th>Research Characteristics</th>
<th>Give up</th>
<th>Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Orientation</td>
<td>Theory generates research</td>
<td>Research generates theory</td>
</tr>
<tr>
<td>Topic of Inquiry</td>
<td>Freedom to pursue serendipitous research</td>
<td>Direct organizational impact</td>
</tr>
<tr>
<td>Experimental Design</td>
<td>Use of complex factorial paradigms</td>
<td>Capacity for longitudinal analysis</td>
</tr>
<tr>
<td>Sample Investigated</td>
<td>Control over precise sample composition</td>
<td>Ability to define and investigate the population</td>
</tr>
<tr>
<td>Interpretation of Results</td>
<td>Exclusion of alternative hypotheses</td>
<td>Increased external validity</td>
</tr>
</tbody>
</table>

Adapted from (Hakel 1982)

The research approach described below seeks to match the gains from practice-driven exploratory research presented in Table 1 with the problem of poor IS project management performance. The scale and scope of IS project management and its limited extant theory make this research approach an appropriate fit with the problem.

4.1. Research Process

“A model system or controller can only model or control something to the extent that it has sufficient internal variety to represent it.”  Law of Requisite Variety (Ashby’s Law)

“Everything should be made as simple as possible, but not simpler.”  Attributed to Albert Einstein

4.1.1 Engagement

Engagement is the first of four steps in practice-driven exploratory research, involving a collaborative effort between a research team and management, the sponsors of the research effort (Zmud 1998). The success of practice-driven theory development is heavily dependent on demanding sponsors and challenging environments. In the research program discussed in the next section, the sponsors have been highly sophisticated, experienced, demanding, and well trained. They brought expertise and new perspectives to the research team. In some cases but not all, the environments were challenging, providing pressure to find solutions within tight timeframes. This provided focus to the research team, requiring immersion in the project longitudinally to respond quickly when the articulation of a problem was agreed.

The backgrounds of the researchers in the team included organizational psychology, philosophy, political science, marketing, systems design and engineering. Four of the researchers had also held senior positions in industry. They brought an understanding of accepted practice and an extensive knowledge of theories and methodologies. This diverse set of theoretical and practical backgrounds supported open dialogue and simultaneous engagement in robust debate.

Researcher participation ranged from membership of executive steering committees to participant observer roles (Jorgenson 1989; McCall et al. 1969) and undertaking project roles, as well as being part of the research team. The extent of participant observation provided a unique perspective of operations across the organizations and extensive access to research subjects. Understanding increases by ‘being there’ as part of the project control system.

Formal data collection followed three basic protocols. First, semi-structured interviews with individual informants were recorded, transcribed and validated. Second, direct observation augmented, compared and corroborated evidence in meetings, reviews and informal gatherings. Third, documents provided supplementary information on data gathered from interviews. Together, the multiple data sources enabled triangulation of evidence to identify the gap in practice. Importantly, the engagement of management in the research process legitimized the following of formal research protocols in the data collection. Table 2 summaries the four-step research approach beginning with engagement.

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4 “The larger the variety of actions available to a control system, the larger the variety of perturbations it is able to compensate for.”  (Ashby, R. “Requisite Variety and its Implications for the Control of Complex Systems,” Cybernetica (1:2) 1958, pp 1-17.)
4.1.2 The ‘Gap in Practice’

Weber (2003) describes the *choice* and *articulation* of the phenomenon to be explained or predicted via theory as the two most critical tasks undertaken by researchers. The identification of a ‘gap in practice’ requires both the choice and articulation of the phenomenon. It is a dynamic process, requiring ongoing assessment of the difference between the phenomenon observed and the phenomenon predicted by the conditions where theory is known to apply.

<table>
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<th>Table 2: Theory Development</th>
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<tr>
<td><strong>Objective</strong></td>
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<tr>
<td>Engagement</td>
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<td></td>
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<tr>
<td>Looking for the gap in practice</td>
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<td></td>
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<tr>
<td>Finding the theory in that gap</td>
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To do this, researchers require a ‘prepared mind’. Louis Pasteur is attributed with the saying that “Chance favors only the prepared mind.” By this, he meant that sudden flashes of insight don’t just happen, but are the product of preparation. The research team needs to be sensitive to departures of practice from theory and must assess them against different theoretical backgrounds to identify unexpected insights. Otherwise, they would frequently treat departures from expectations as errors. In this research approach, the sponsors often table the initial problem definition, or, ‘gap in practice’. This often takes one of two forms. One is that, while following the accepted theory, the expected results are not achieved - ‘the absence of outcomes predicted by theory’. Alternatively, they report outcomes for which the researchers can provide no theory – ‘the absence of theory to account for the outcomes’. Both conditions can provide signals pointing towards alternative theoretical frameworks to explain the observations.

The identification of the specific gap in practice is a dynamic, rather than static, process requiring ongoing engagement to build a pattern of observation. The researchers require freedom to explore different definitions of the problem over time. When an effective new definition emerges, it often becomes obvious why the presenting problem was difficult to solve within its prior framing.

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5 The choice and articulation of the phenomena often occur concurrently rather than as discrete sequenced event. (Weber. 2003, p iv)
4.1.3 The ‘Theory in the Gap’

There is an extensive literature on what constitutes ‘good’ theory but limited guidance on ‘good theorising’ or ‘how to develop good theory’, specifically, in this case, to address a ‘gap in practice’. Developing new theory “commonly involves borrowing a perspective from other fields, which encourages altering our metaphors and gestalts in ways that challenge the underlying rationales supporting accepted theories” (Whetten 1989, p 493). A useful place to start is to develop an understanding of the ontological and epistemological underpinnings and look at what researchers have taken for granted. It is then possible to challenge or relax even the most accepted propositions in the current theory to explore alternative explanations of the phenomenon. The challenge is to look for theories that simultaneously define the gap and account for the key features of that gap.

In addressing this challenge, the ability to draw on multi-disciplinary thinking has three major benefits. First, it enables ready access to alternative theoretical frameworks. Second, it provides access to a wide-range of research methods. Third, it supports deep immersion in the problem, generating strong engagement with practitioners. The diverse theoretical backgrounds of the researchers involved in the cases cited in this paper supported the search for alternative theoretical frameworks.

Active and deep engagement with practitioners provides valuable dialogue that can bring fresh ideas and an immediate check on the validity of the theory being developed. The managers involved in the projects help evaluate insights, providing an early ‘test’ against practice. For example, the managers typically know whether a proposal has already been tried and failed within their company or elsewhere in their industry. It also provides a guard against developing overly complex explanations. This illustrates how, within this research approach, there is a natural tension between the need to develop rich theory while, at the same time, maintaining simplicity to explain and guide practice. Finally, implementing solutions, when part of the research engagement, both begins to test the theory and provides additional insights into the phenomenon on which to base further theory development.

4.1.4 Developing an Account of the Phenomenon

Good guidelines are available specifying the appropriate form for a theoretical account of a phenomenon. See, for example, Weber (2003) and Weick (1989). Weber describes this step as the explanation of the laws that are hypothesised, including their constructs, interactions, states and lawful transitions.

Where the multi-disciplinary team has adapted extant theory from alternative fields to the new problem domain, they are also frequently able to bring across known requirements to test the theory. The ability of much of this research to carry across to the new domain brings advantages in establishing the evaluation criteria.

5. Examples

The research program drawn on for this paper consists of a series of engagements with organizations managing large complex IS projects to deliver IS-based business change. The engagements extended over periods of three to seven years, involved deep immersion by the research team in the organizations, followed by periods of reflection and theory development. Table 3 describes four engagements where gaps in practice stimulated theory development. Two engagements provide situations characterised by the ‘absence of practice predicted by current theory’. The other two describe situations characterised by the ‘absence of theory to account for the outcomes’. Table 3 identifies multiple theories to address the gaps in practice. These theories provide insights into problems in IS project management performance and can be applied to analyse, explain and guide practice in IS project management. The research spans theories of the IS investment decision models, project set-up and project lifecycle execution.

Given the space limitations of this paper, we cannot explore the cases in depth. Bannerman (2004) provides a capability-based explanation of IS project management performance, as an alternative to the traditional factor and process theories. It presents a theory of performance as the contested outcome of the benefits of learning and the liability of newness as a function of technological change.
other fields, the unique challenge for the IS discipline becomes the need to provide an integration of those relevant theories.

Whilst many theories can be 'borrowed' and further developed from opposed to a single theory of IS project management. This paper has not attempted to identify and resolve the range of gaps directly on project performance.

In the New South Wales Roads and Traffic Authority “Drives” case, the researchers engaged with the project over the course of seven years but the case itself covers a period of twelve years. The case describes the change from a batch process system at the beginning of the 1990s to the current on-line web-based system, and the various systems in-between. The gap in practice was identified as the failure to build the expected accumulation of capabilities from the successful development of systems over an extended period.

The other cases cannot be explored but Table 3 reports the variety of theories employed in the research program, demonstrating the multi-disciplinary nature of the research approach, at least in this context. For example, in the second case, the findings from Total Quality Management (TQM) production management concerning variance-driven scheduling performance are drawn on. The project critical path is modelled as one run down a production line to explain a significant proportion of the schedule over run. In the third case, Real Options pricing is imported from investment theory to restructure the IS investment decision, with important implications for alignment, governance and the structure of the project, impacting directly on project performance.

A key finding of this paper is that there are likely to be multiple theories that support the management of IS projects, as opposed to a single theory of IS project management. This paper has not attempted to identify and resolve the range of gaps in practice and the theories required to fill those gaps. Whilst many theories can be ‘borrowed’ and further developed from other fields, the unique challenge for the IS discipline becomes the need to provide an integration of those relevant theories.
5.1. Discussion

Following the exploratory practice-driven approach and experiences described above requires researchers to address three major challenges: 1) avoiding early closure, 2) extending knowledge in practice, and 3) ensuring that the application of insights from other fields develops new theory.

The first challenge requires researchers to remain both problem-focused and theory-focused, even when deeply immersed in practice. Without this discipline, it is easy to become ‘solution-bound’. The danger is that specific events are explained and/or practical problems are solved, but the researchers do not generate new theory. This challenge has been addressed in these studies reported in Table 3 by having some researchers immersed in practice, whilst others oversaw the development of theory.

The second challenge is to develop theories that improve performance in practice, where the danger is that the researchers may explain only what is already known in practice. Lee (1999, p30) states that “… with few exceptions, none of much significance, the scientists who turned to [practical needs] for their problems succeeded merely in validating and explaining, not improving, techniques developed earlier and without the aid of science”. This is almost certainly true for mature disciplines and practices. However, in immature areas with poor performance, including IS project management, this is less of an issue. In addition, the approach of applying multi-disciplinary thinking allows new skills to be applied to practical problems.

The third challenge is to ensure that the application of insights and models from other fields generates new theory. To make a theoretical contribution, it is not sufficient to apply a theory from one field to a new context and to show that it works as expected (Whetten 1989). The application of the research approach developed in this paper addresses this by integrating extant theories to build new theories of project management. See Bannerman’s (2004) capability-based theory as an example. Finally, the approach presented above in Section 3 is oriented around the development of new theory using insights and existing theory from other fields. This, in itself, does not address calls for new theory in the ‘core of IS’. Some, including Weber (2003), argue that the IS discipline relies too much on theories borrowed or adapted from other disciplines. Instead, here, the unique IS theory is the integration of those theories.

6. Conclusions

This paper contributes to the theory and practice of IS research by examining and articulating a context and process of exploratory practice-driven research. The process presented is based on a multi-disciplinary team of researchers working with practitioners to explain and guide practice by developing new theory. It focuses on ‘looking for a gap in practice and finding the theory in the gap’.

The approach is illustrated by drawing on a seven year program of research to improve IS project management performance. It is argued that ‘exploratory practice-driven research’ is a high potential and under-utilised approach to address this challenge. Critically, the approach assumes that multiple theories are required to improve the management of IS projects, rather than a single theory of IS project management.

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