Aligning and Reconciling: Building project capabilities for digital delivery

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Digital delivery of complex projects, using integrated software and processes, is an important emerging phenomenon as it transforms relationships across the associated ecology of project-based firms. Our study analyses how a project-based firm, ‘Global Engineering’, builds new project capabilities for digital delivery through work on three major road and railway infrastructure projects. We find that it seeks to: (1) align the project set-up with the firm’s existing capabilities; and (2) reconcile differing agendas and capabilities in collaborating firms across the project ecology. Here, aligning involves influencing the set-up of digital delivery and renegotiating that set-up during project implementation; and reconciling involves managing across multiple digital systems: accommodating and learning other firms’ software and processes; and using digital technologies to create shared identity across the firms involved in delivery. We argue that creating relative stability enables firms to use existing, and build new, project capabilities, and hence aligning and reconciling are important to project-based firms in environments where there is high interdependence across heterogeneous firms and rapid technological change. We find that building these capabilities involves both ‘economies of repetition’ and ‘economies of recombination’; the former enabling the firm to capture value by mobilizing existing resources and the latter, requiring additional work to re-combine existing and new resources. Our study thus provides insight into how project-based firms build project capabilities for the digital delivery of complex projects in order to remain competitive in their existing markets, and has broader implications for learning in the project ecologies associated with these projects.

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1. Introduction

Road and rail infrastructure, off-shore platforms, nuclear power stations and commercial or military aircraft are delivered through complex projects. This delivery is a significant challenge, as these projects involve work across a project ecology involving heterogeneous firms with differing skills and practices (Miller and Lessard, 2000; Scott et al., 2011). The introduction of integrated software and processes into this delivery is an emerging phenomenon, which alters the nature of a project-based firm’s work and its relations with other firms in the project ecology. New generations of software bring previously separate activities together (D’Adderio, 2001, 2003), automating workflows and creating new forms of interdependence. They are enabling new forms of project delivery across project-based industries (Levitt, 2011; Whyte and Levitt, 2011); transforming innovation processes (Dodson et al., 2002, 2005; Brynjolfsson and McAfee, 2014) and propagating innovation across the firms involved in the digital delivery of projects (Boland et al., 2007).

In the set-up and implementation of complex projects, we define ‘digital delivery’ as the use of integrated software and processes across the project ecology, where ‘integrated software’ is an interconnected set of applications giving access to a shared dataset through a single user interface and delivery involves design, coordination, project management, and governance. Digital delivery is thus not only the local use of software in specific project tasks, but also the more consequential integration across the firms in the project ecology. Research suggests that within firms, using integrated software provides most benefit where there are mature integrative processes (D’Adderio, 2001), and processes that are initially chaotic may later mature, becoming repeatable, defined and managed (Paulk et al., 1993). In complex projects, integrated software brings together computer-aided design tools, extranets, document management tools, schedules and dashboard displays; and is associated with integrated processes that are partially embedded within the software in standard workflows and approval processes.
A knowledge-based perspective on the firm focuses on capabilities, competence and learning as sources of competitive advantage (Grant, 1996a,b). For project-based firms, it is project capabilities that are central to competitive advantage (Davies and Brady, 2000; Brady and Davies, 2004; Davies and Hobday, 2006). The literature on ‘project capabilities’ suggests that project-based firms build project capabilities, where these are the capabilities of the firm to engage in the delivery of projects (Davies and Brady, 2000: 932). Strongly associated with competence and learning, project capabilities are: “the specific knowledge and experience required to engage with internal or external customers, develop bids or offers, and set up and implement projects” (Brady and Davies, 2004: p. 1602, also see Davies and Brady, 2000). Some capabilities the firm owns, others it controls or has access to via other firms (Helfat et al., 2007). Thus, within the ecology of permanent organizations that are involved in complex projects (Winch, 2014), capabilities are ‘co-created’ across the project and the firm (Söderlund, 2005); the firm builds these capabilities by engaging with projects, repeating activities and using existing knowledge, while also exploring new areas and developing new knowledge (Söderlund et al., 2008). While research has articulated how firms build new project capabilities to explore new markets (Brady and Davies, 2004), it is more limited in explaining how firms build capabilities to compete in their existing markets as these are transformed by the emerging phenomenon of the digital delivery of complex projects.

This paper draws on an empirical study of a project-based firm, ‘Global Engineering’, and its learning through three major road and railway infrastructure projects in which new methods for digital delivery were developed. We approach explaining the emerging phenomenon of the project-based firm’s involvement in digital delivery of complex projects through the project capabilities lens. Hence, the paper addresses the question: How do project-based firms build project capabilities for the digital delivery of complex projects? The challenge is that digital delivery of complex projects involves rapid technological change and increases interdependence across heterogeneous firms in the project ecology.

Our study contributes by providing insight into how project-based firms build project capabilities for the digital delivery of complex projects in order to remain competitive in their existing markets, and has broader implications for learning in the project ecologies associated with these projects. The next section discusses the background and prior research. The research design and methods of the study are then described in the following section. Section 4 gives an overview of the empirical case, giving the timeline of Global Engineering’s work on the projects ‘Railway’, ‘Highway’ and ‘Motorway’; an overview of Global Engineering’s work within the ecology of firms associated with each of the three projects; and how it built project capabilities for digital delivery. Section 5 shows how our data suggests that, in working on these projects, Global Engineering sought to: (1) align the project set-up with the firm’s existing capabilities; and (2) reconcile differing agendas and capabilities in collaborating firms. In Section 6 we argue aligning and reconciling are important to project-based firms in environments where there is high interdependence across heterogeneous firms and rapid technological change to create the relative stability needed to use existing, and build new, project capabilities. Section 7 draws conclusions and discusses theoretical implications for research on project capabilities; as well as practical implications of this empirical work.

2. Background

We define project capabilities for digital delivery, in set-up and implementation, as the specific knowledge and experience required by the project-based firm to deliver complex projects digit-
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