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# An analysis of risk sharing in strategic R&D and new product development projects



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#### Abstract

While prior research regarding strategic projects recognizes the tension inherent in interfirm relationships, less is understood of the impact of risk sharing in the design of the contracts guiding those relationships. This investigation illuminates important performance elements of projects as they differ in the amount of contractual risk that is shared among firms. Through a multivariate analysis of 240 United States defense department R&D and new product development contracts, we found that defense contracts with partner risk sharing built in involve more change and growth than their concentrated risk counterparts. Our results suggest that projects, when managed through interfirm contracts, are more likely to involve strategic change when risk is shared than when either the buyer or seller assumes full design, technical, and/or financial risk. The results further suggest that projects containing shared buyer and seller risk enhance the prospects of joint gain through the generation of opportunities for learning. © 2016 Elsevier Ltd. APM and IPMA. All rights reserved.

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### 1. Introduction

Greater than one-fifth of the world's gross domestic product, over \$12 trillion dollars, was planned to be spent on projects in 2014 (Project Management Institute (PMI), 2014). Yet, we do not fully understand how these temporary endeavors affect the organization's permanent systems or its alliances with other organizations (Sydow et al., 2004; Windeler and Sydow, 2001). Research on strategic projects suggests that firms use contracts to scope out projects, manage joint ventures, encourage cooperation (Adler, 2007; Ring and Van de Ven, 1992; Zaheer et al., 2002), and, in general, implement firm strategy. As Triana notes (2014: 3): "Based on PMI's research, the Board's thinking and also by my own experience as a practitioner, project management is growing and becoming more strategic...we can see that more executives around the world are linking organizational business strategy and projects."

In this manuscript, we are interested in exploring strategic projects to determine whether risk management strategies embedded within the contract are related to key project outcomes. Specifically, we consider how the construction of a project contract provides evidence for managing the financial risk associated with unplanned changes to project deliverables. We partition this risk into three distinct contract risk-sharing profiles: risk born primarily by the seller of products and/or services, risk born primarily by the buyer of the products and/or services, and risk that is shared between the buyer and the seller. Furthermore, we are interested in exploring whether the contract risk profile is related to key contract outcomes such as cost and scheduling budget overruns, and engineering change proposals that occur during the life of the project contract.

To test our hypotheses, we use a robust data set that includes 240 contracts from the Air Force Material Command (AFMC) located at Wright–Patterson Air Force Base in Dayton, Ohio.

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AFMC serves as the primary center for the acquisition of weapon systems by the Air Force and the contracts surveyed represent projects related to Research and Development (R&D) and new product development (NPD). The data include a wide range of contractual terms and conditions spanning divergent R&D and NPD projects. The time period in which these data were collected, 1970-2003, reflects a time of continued, radical acquisition reform by the U.S. government (Fox, 2011). Morris (1997) provides a historical perspective of U.S. military acquisitions during this period that includes issues such as a lack of cost and schedule control because of an over-fixation of the Soviet threat, high technical uncertainty, and the overuse of cost-plus fixed fee contracts. According to Fox (2011), this led acquisition reformers to issue the Carlucci Initiatives in 1981 (also known as the Acquisition Improvement Program), Department of Defense (DOD) Directives 5000.1 and 5000.2 in 1985, and the Blue Ribbon Commission in 1986 to decentralize decision making in military research and development.

These reforms were intended to solve the three major problems facing military acquisitions: long program stretch outs, costly project starts and cancellations, and poorly developed program requirements (Guthrie, 1978). Fox (1988) pointed out, however, that the major problem in managing military contracts was the lack of business acumen by military project managers. The DOD quickly instituted a project (acquisition) certification program to improve project management competencies, especially in how to structure and manage DOD contracts with industry partners. Hence, incentive-based contracts that shared risk between contractors and the government became popular and part of the ensuing military-industrial partnership mind frame. It is in this period that the U.S. military R&D budget doubled from \$142 billion to \$246 billion (Fox, 2011) and contributing to this growth was the fruitful collaboration between military suppliers and DOD in the military procurement process.

As the dominance of innovation makes DOD procurement an unusual case, we agree with Williamson (1985) that defense contracts are akin to market-like exchanges. Thus, these contracts and their supporting documentation enabled us to record the different risk-sharing conditions, negotiation tactics, and project work requirements upon which the project was based, allowing us to code for indicators of trust and distrust in the relationships. Access to this level of data provides a unique opportunity to examine a fine-grained level of detail regarding the underlying framework of business partnerships as archived in these organizational contracts.

## 2. Literature review

#### 2.1. Strategic project contracts

Projects have been demonstrated as a key aspect of implementing an organization's strategy (Adler, 2007; DeFillippi and Arthur, 1998; Engwall and Westling, 2004; Hobday, 2000; Manning, 2010; Manning and Sydow, 2011; Morgan et al., 2007; Schwab and Miner, 2008; Sydow et al., 2004). A Guide to the Project Management Body of Knowledge (2013) defines a project as being short-term (Piore and Sabel, 1984; Schilling and Steensma, 2001; Zenger and Hesterly, 1997) and temporary in nature (Sydow et al., 2004). As such, projects provide a means for organizations to focus on the immediacy of organizational needs in dealing with complex marketplace disruptions or opportunities. Other advantageous uses of projects include making process changes, initiating new ventures, and increasing customer involvement (Jones et al., 1997; Lampel et al., 2000; Storper, 1989). Following these authors, we posit that many projects are embedded into organizational change processes using contracts and their language.

Organizational scholars have long considered contracts as instruments of projects to get work done (Adler, 2005; Bubshait, 2003; Ryall and Sampson, 2009; Sommer and Loch, 2009). In the management of projects, contracts are used in most cases by DOD project oversight teams generally consisting of 3-5 members to manage the transaction. Drawing from well-known scholars like Coase (1937), Macaulay (1963), and Macneil (1978), contracts delineate the scope of the project, terms and conditions to accomplish the project, and conditional enforcement mechanisms regarding partner behavior (Blomqvist et al., 2005). Contracts serve as project communication devices describing not only what is to be communicated but also how it will be accomplished (Adler, 2005; Malhotra and Murnighan, 2002; Roxenhall and Ghauri, 2004; Williamson, 1975). Perceptions of cooperation or manipulation arise from how business partners work in accordance with the contract's intent versus its literal interpretation.

In this article, we extend the work of those who have built a foundation of trust and distrust for studying risk-sharing in R&D and NPD contracts (Camén et al., 2011; Graebner, 2009; Gulati, 1995; Jeffries and Reed, 2000; Lewicki et al., 1998; Luhmann, 1979; Meyerson et al., 1996). We view project contracts as extensions of organizations through the exploration and exploitation aspects (Engwall and Westling, 2004) contained within the terms and conditions of contracts that allow for joint innovation. Sharing risk between parties to a contract allows for better project integration since vulnerabilities in the innovation relationship are explored in the pre-negotiation, negotiation, and post-negotiation phases of the project (Schweitzer et al., 2004). Using contracts to codify project terms and conditions provides organizations with a mechanism to legally review and commit to terms and conditions and share risk in new ventures. When constructed properly, project contracts provide opportunities for greater returns by leveraging limited organizational resources that would not be possible in many other, traditional work arrangements (e.g., sharing of assets).

### 2.2. Comprehensiveness in project contracts

In serving as a mechanism for managing risk, contracts are written with terms and conditions that communicate how to best coordinate project requirements while controlling for risk (Adler, 2007; Gulati and Nickerson, 2008). Contrary to the argument that trust reduces the need for formal contracts (Malhotra and Murnighan, 2002), scholars have found that contracts become more detailed the more frequent the exchanges between business partners (Adler, 2005; Graebner, 2009; Ryall and Sampson, 2009).

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