



Collaboration costs and new product development performance[☆]

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ARTICLE INFO

Article history:

Received 1 February 2014

Received in revised form 1 October 2014

Accepted 26 January 2015

Available online 18 February 2015

Keywords:

Collaboration

Collaboration costs

New product development performance

Alliances

Contracts

Relational governance

ABSTRACT

This study analyzes the relationships between governance in new product development collaboration, collaboration costs, and new product development performance. Data from new technology-based firms indicate that comprehensiveness in formal contractual governance has a stronger negative association with collaboration costs than relational governance does. In addition, collaboration costs relate negatively to new product development performance. This study contributes to understanding transaction costs within collaborative arrangements and the role of relational and formal governance in these arrangements.

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1. Introduction

The role of collaboration between firms in new product development is receiving increasing attention from scholars (Zhao, Cavusgil, & Cavusgil, 2014). New firms with resource constraints can access knowledge (Benavides-Espinosa & Ribeiro-Soriano, 2014) and numerous resources through collaboration. Collaboration can be beneficial for new technology-based firms, however, collaboration also poses many risks. These risks include possible loss of valuable knowledge (Parker, 2012), loss of time because of additional complexity in coordination, and potential predatory and opportunistic behavior of collaboration partners (Wallenberg & Schaffler, 2014). Although scholars widely report collaboration's benefits, few studies focus on collaboration's risks. This study addresses this research gap and focuses on understanding the risks in collaboration. In particular, the study investigates the risk of losing development time through the complexity of managing new product development collaboration. Losing time for new technology-based firms is serious because rapid development and first-mover advantages often determine product success. In such a time-pressured context, time losses can lead to collaborative development failure.

Optimal governance of collaboration is essential to reap the benefits of collaboration and minimize collaboration risks (Wallenberg &

Schaffler, 2014). Research on the governance of collaboration often emphasizes the value of relational governance (Leisching, Geigenmueller, & Lohmann, 2014). The singular focus on relational governance may be appropriate for long-term relationships but not for short-term relationships. Lambe, Spekman, and Hunt (2000) highlight the lack of research on the governance of short-term focused, interimistic relationships and discuss how governance may have different roles in short-term versus long-term relationships. This study addresses this gap and empirically examines the role of governance in short-term new product development collaboration. This study contributes to understanding collaboration in challenging, time-pressured environments (Zhao et al., 2014), where an asymmetry between the size of the new firm and the collaboration partner exists (Bazyar, Teimoury, Fesharaki, Moini, & Mohammadi, 2013).

Following this introduction, Section 2 contains the conceptual framework and hypotheses. Section 3 describes the methodology. Section 4 presents the results. Section 5 offers conclusions and then discusses theoretical and managerial implications.

2. Conceptual framework and hypotheses

2.1. Governance and collaboration costs

When new product development requires that two or more separate firms collaborate, new product development coordination challenges intensify significantly (Gerwin, 2004). Despite the significance of coordination costs in collaboration and the effect of governance on coordination costs, research examining this issue is sparse (Gulati & Singh, 1998).

[☆] The authors are grateful to John Luiz, University of Cape Town, and Sharman Wickham (Research and Academic Development), University of Cape Town, for their careful reading and suggestions on revising this study.

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Theoretical discussions and empirical studies show divergent support for the effect of formal and relational governance on coordination costs. Transaction cost theory researchers (Williamson, 1985) recommend using formal controls to address coordination costs. Because of the vulnerability or liabilities of new firms, Stinchcombe (1965) recommends using contracts rather than relying on trust in collaboration. In time-pressured contexts, scholars suggest formal controls to clarify responsibilities and reduce confusion and collaboration costs (Bazyar et al., 2013). Consistent with transaction cost theory, this study proposes that greater comprehensiveness in the formal contractual governance structure correlates with lower levels of collaboration costs.

H1. Comprehensiveness in formal contractual governance presents a negative association with collaboration costs in new product development projects.

In contrast, relational exchange theory advocates emphasize the development of trust and relational norms to alleviate co-ordination concerns (Das & Teng, 2002). Arguments against using formal controls point out that creating and monitoring formal controls waste time and effort and that using relational controls is more time efficient (Lee & Cavusgil, 2006). Dyer and Singh (1998) suggest that coordination in the presence of relational controls is superior and that “self-enforcing safeguards” such as relational controls result in lower transaction costs than using formal controls does. Gulati and Singh (1998, p. 786) suggest that in innovation contexts “inter-firm trust can be an extraordinary lubricant for alliances that involve considerable interdependence and task coordination between partners.” Drawing on these views, which have their roots in relational exchange theory, this study proposes that higher levels of relational governance relate to lower levels of collaboration costs.

H2. Relational governance presents a negative association with collaboration costs in new product development projects.

2.2. Collaboration costs and new product development performance

In new product development, speed in developing new products is imperative for firms trying to gain a competitive advantage (Zhao et al., 2014). Reducing delays makes the new product development process more efficient and increases a firm's ability to achieve first-mover advantages, which has an association with greater profitability (Bazyar et al., 2013). This study proposes that high collaboration costs in the form of time losses relate to lower levels of new product development performance.

H3. Collaboration costs have a negative association with new product development performance.

3. Methods

In the first stage of this research, managers at ten new technology-based firms, five large established firms, and three law firms participated in interviews regarding their new product development collaboration experiences. In the second stage of this research, the survey sample comprised 1071 independent British firms operating in the computer and information processing, communication technology, and electronic instrumentation sectors. All firms were under 10 years old and had fewer than 100 employees (Yli-Renko, Autio, & Sapienza, 2001). The Financial Analysis Made Easy Database, which sources data from the Companies House registration lists, provided the information to create the sampling frame. From the sample, 729 firms were contactable, and the manager responsible for development received the survey. Respondents returned 124 responses, 110 of which were complete. Assessment of non-response bias showed that no significant

differences exist between early and late respondents (Armstrong & Overton, 1977).

3.1. Measures

The choice of measures for this study followed a rigorous search for measures in the literature. Next, feedback from the interviews helped to refine the measures. Exploratory factor analysis then yielded measures for the empirical analysis. Finally, a series of tests checked the validity and reliability of the measures. Likert scales (7-point) measured all items.

3.2. Relational governance

The measure for relational governance draws on Cannon and Perreault's (1999) work. The measure assesses the parties' willingness to make changes from the original agreement. Measures also assess the parties' willingness to support one another and act jointly for collaboration benefits. Finally, measures assess the parties' ability to deal constructively with conflict in the relationship. Cronbach's alpha for this 5-item measure is 0.75.

3.3. Formal contractual governance

The formal contractual governance measure draws on the work of Poppo and Zenger (2002) and the interviews described previously. This measure examines the level of detail in the contract and the level of clarity in project specifications such as roles, responsibilities, schedules, review points, and intellectual property ownership. Cronbach's alpha for this 4-item measure is 0.77.

3.4. Collaboration costs

The collaboration cost measure draws on Artz's (1999) work and the interviews. The collaboration cost measure assesses the degree to which transaction costs (i.e., time losses) appear because of the collaborative nature of new product development. Cronbach's alpha for this 3-item measure is 0.83.

3.5. New product development performance

The measure for new product development performance evaluates the projects' performance in terms of profitability and development time, building on the work of Olson, Walker, Ruekert, and Bonner (2001). Cronbach's alpha for this 3-item measure is 0.77.

3.6. Control variables

The interviews highlight the significance of firm size (number of employees), age (years since founding), and the size of the collaboration partner (number of employees). The analysis therefore includes these variables as control variables. The descriptive statistical analysis reveals that these variables have skewed distributions. Using the values' natural logarithm in the statistical analysis solves this problem (Hair, Anderson, Tatham, & Black, 1998).

4. Results and discussion

After confirming the reliability and validity of the measures, this study uses multivariate linear regression to examine the hypotheses (Lee & Cavusgil, 2006). The regression results (Table 1) show that formal contractual governance has a significant negative effect on collaboration costs (beta = -0.32 ; $p < 0.001$). These results validate H1. Results also validate H2, which predicts a negative association between relational governance and collaboration costs (beta = -0.14 ; $p < 0.01$). This relationship is weaker than the relationship in H1. The regression

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