



JOURNAL OF THE INSTITUTE FOR OPERATIONS RESEARCH AND THE MANAGEMENT SCIENCES

MARKETING SCIENCE

Volume:

Number:

Year:

Title:

Author:

e-mail:

MktgSci@notes.cba.ufl.edu

Marketing Science Homepage

<http://bear.cba.ufl.edu/centers/MKS>

Collaborating to Compete

Wilfred Amaldoss • Robert J. Meyer • Jagmohan S. Raju • Amnon Rapoport

Krannert Graduate School of Management, Purdue University, West Lafayette, Indiana 47907-1310

amaldoss@mgmt.purdue.edu

The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania 19104, meyer@wharton.upenn.edu

The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania 19104, rajuj@wharton.upenn.edu

University of Arizona, Tucson, Arizona 85721, amnon@u.arizona.edu

Abstract

In collaborating to compete, firms forge different types of strategic alliances: same-function alliances, parallel development of new products, and cross-functional alliances. A major challenge in the management of these alliances is how to control the resource commitment of partners to the collaboration. In this research we examine both theoretically and experimentally how the type of an alliance and the prescribed profit-sharing arrangement affect the resource commitments of partners. We model the interaction within an alliance as a noncooperative variable-sum game, in which each firm invests part of its resources to increase the utility of a new product offering. Different types of alliances are modeled by varying how the resources committed by partners in an alliance determine the utility of the jointly-developed new product. We then model the interalliance competition by nesting two independent intra-alliance games in a supergame in which the groups compete for a market. The partners of the winning alliance share the profits in one of two ways: equally or proportionally to their investments. The Nash equilibrium solutions for the resulting games are examined.

In the case of same-function alliances, when the market is large the predicted investment patterns under both profit-sharing rules are comparable. Partners developing new products in parallel, unlike the partners in a same-function alliance, commit fewer resources to their alliance. Further, the profit-sharing arrangement matters in such alliances—partners commit more resources when profits are shared proportionally rather than equally.

We test the predictions of the model in two laboratory

experiments. We find that the aggregate behavior of the subjects is accounted for remarkably well by the equilibrium solution. As predicted, profit-sharing arrangement did not affect the investment pattern of subjects in same-function alliances when they were in the high-reward condition. Subjects developing products in parallel invested less than subjects in same-function alliance, irrespective of the reward condition. We notice that theory seems to *underpredict* investments in low-reward conditions. A plausible explanation for this departure from the normative benchmark is that subjects in the low-reward condition were influenced by altruistic regard for their partners. These experiments also clarify the support for the mixed strategy equilibrium: aggregate behavior conforms to the equilibrium solution, though the behavior of individual subjects varies substantially from the norm. Individual-level analysis suggests that subjects employ mixed strategies, but not as fully as the theory demands. This inertia in choice of strategies is consistent with learning trends observed in the investment pattern.

A new analysis of Robertson and Gatignon's (1998) field survey data on the conduct of corporate partners in technology alliances is also consistent with our model of same-function alliances.

We extend the model to consider asymmetric distribution of endowments among partners in a same-function alliance. Then we examine the implication of extending the strategy space to include more levels of investment. Finally, we outline an extension of the model to consider cross-functional alliances.

(Strategic Alliances; Experimental Economics; Competitive Strategy; Game Theory; New Product Development)