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Strategic Alliance and Acquisition Performance: Impact of Interfirm Synergies and Motives in the Bio-Pharmaceutical Industry

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ABSTRACT

This study draws on transaction cost, resource dependence, and organizational learning theories to posit relationships between transaction performance and transaction structure (alliances versus acquisitions), interfirm synergies, and motives. The study involves analysis of 66 international and intranational alliances and acquisitions that were undertaken in the pharmaceutical industry. An initial survey was administered to firms involved in these transactions to gather information regarding motives, transaction structure, and interorganizational synergies. A second survey was administered two years after the transaction to gather information on transaction performance. Findings support the importance of transaction structure and strategic synergies between firms. Specifically, transaction structure and high levels of strategic fit between the firms had a positive impact on performance. There is also some evidence that synergies must be linked to the motives driving the transaction. The study yields meaningful results regarding factors leading to success of transactions (alliances and acquisitions) in a longitudinal study of intranational and international transactions in the biopharmaceutical industry.

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Interfirm transactions, including alliances and acquisitions, are popular strategic mechanisms that firms employ to enhance performance in today's competitive global environment. These transactions proliferate even though 35% to 70% are viewed as unsuccessful by virtually any quantitative or qualitative measure[1-3]. When successful, these activities can allow firms to protect or expand their market position, achieve operating efficiencies, and learn valuable new skills and processes. When unsuccessful, they may displace employees and waste valuable financial and managerial resources. Understanding the factors that produce more effective transactions, then, is an important research question. This study examines factors contributing to the success of both international (cross-border) and intranational (within-border) transactions in the pharmaceutical industry. We focus on the roles that transaction motives, structure, and potential for interfirm synergies play in subsequent transaction performance.

A considerable body of knowledge about transactions, including alliances and acquisitions, has been established through theoretical and empirical research: These interorganizational relationships have been viewed through a number of theoretical lenses, including transaction costs, game theory, resource dependence, and organizational learning[4-7]. In research on alliances and joint ventures, researchers have compared those firms that are active in interorganizational affiliations with those that are not and have studied motives for alliance formation, the impact of international alliance activity, the impact of alliances on new product success, the role of exploration versus exploitation in alliances,[8] portfolio diversity,[9] and alliance performance.[9-22]

In research on acquisitions, researchers have investigated the success of related and unrelated diversification activity, the impact on stock prices of acquisition activity, motives for engaging in acquisitions, and related questions (for a review of acquisition research, see Ref. 29).[2,23,24-29] Common to both sets of literature has been research on motives and potential for exchange or synergies between organizations, in various research under the terms relatedness or similarities.[13,19,28-31]

With a few exceptions, research on the major categories of transactions (i.e., alliances versus acquisitions) has remained distinct. Yet the aforementioned literature demonstrates that several common threads are woven into the separate research streams theoretically and empirically. In addition, systematic study of the factors contributing to more successful transactions has been lacking in much of the previous research for both types of transactions (see Refs. 18 and 32 for exceptions). This study, then, contributes to the base of literature on interfirm transactions by investigating the effects of transaction structure, interfirm synergies, and motives on transaction performance. Resource dependence, transaction cost, and organizational learning theories serve as a theoretical basis for positing relationships between these variables and transaction performance. The hypotheses are tested through a 2-stage survey of 66 transactions in the pharmaceutical industry.

THE CONTINUUM OF RELATIONSHIPS

The literature describes the various relationships in which firms engage as a continuum.[14,29,30] The most loosely coupled arrangements are characterized by some shared decision making and cooperation but only a limited contractually binding agreement and no shared equity (e.g., licensing agreements, shared R&D). These transactions progress to more tightly coupled arrangements often governed by extensive contracts such as joint ventures, with equity shared by both partners. Even tighter coupling occurs when one firm acquires another and makes the acquired firm part of its internal hierarchy.

For this study, we have chosen to include a broad spectrum of arrangements, from licenses to acquisitions, to determine the impact of transaction structure on transaction performance. Consistent with past research, alliances are defined here as collaborations between firms with shared decision making and some exchange of assets.[14] We include relationships involving licensing, joint manufacturing or marketing, cooperative research and development, or formal joint ventures leading to the formation of a third entity as alliances. Acquisitions occur when one firm purchases the majority of assets or stock of another. One contribution of this study is that it tests theoretical constructs central to interfirm activity while incorporating a wide array of types of relationships in the same study.

CONCEPTUAL FRAMEWORK

Over several decades, there has been a flurry of transactions (alliances and acquisitions) in the pharmaceutical industry[36] For example, the volume of biopharma deals increased from 646 in 2016 to a record 1,138 in 2020.[3] Given the strategic and financial implications of transactions, it is not surprising that their performance is extremely important in business research. An understanding of the determinants that contribute to their performance is of interest to both academicians and practitioners. In this study, we hypothesize that transaction performance depends upon three important factors. They are (l) the structure of the exchange relationship (transaction structure), (2) the degree of similarity between the partners/participants (potential for interfirm synergies), and (3) the motives for the specific transaction (strategic motives). We first discuss the theoretical underpinnings for these determinants and then present the hypotheses. While these variables by no means completely represent the spectrum of variables that could potentially affect performance, we believe they are shared by all types of transactions as having theoretical merit for empirical investigation.

The rationale underlying the entry of firms into strategic transactional arrangements, how those relationships should be structured, the importance of partner synergies, and the motives for those acquisitions and alliances could be explained using several different theories. We argue that when we closely examine transaction performance, several theoretical explanations should be used as complementary explanations rather than as competing explanations of the phenomena. Thus, we will attempt to integrate these different perspectives into a unified framework.

First, we will develop the theoretical rationale for why some transactions are alliances and other acquisitions. The reason why firms enter into an alliance or acquisition could be explained by resource dependence theory. Building on early work in social exchange theory, resource dependence theory views developing exchange relationships as a strategic response to conditions of uncertainty and dependence.[37-39] The main premise of resource dependence theory is that firms will seek to reduce uncertainty and manage dependence by purposely structuring their exchange relationships or establishing formal or semiformal links with other firms.[40]

Resource dependence theory thus suggests that the formation of interfirm links is seen as a strategic adaptation to environmental uncertainty and dependence.[41]

Even though the initial stimulus to enter an alliance or acquisition may be provided by resource dependence theory, the explanation of how a relationship should be structured (i.e., transaction structure) could be explained using transaction cost theory.[42] Williamson's theory of transaction costs suggests that exchange relationships can be structured along a continuum of integration ranging from markets to hierarchies.[43,44] The basic assumptions of transaction cost theory are opportunism and bounded rationality. Under these assumptions, the key factors that influence this exchange structure are asset specificity, environmental uncertainty, and performance ambiguity. As the assets invested in the exchange relationship increase, firms become more integrated to protect their investments in the relationship. Similarly, increase in environmental uncertainty can create adaptation costs; hence, firms prefer integration to arm's length relationships. In addition, when the performance cannot be adequately controlled due to monitoring difficulty, firms prefer acquisitions compared to alliances. The basic premise is that, by virtue of legitimate authority that arises from ownership, hierarchical structures afford a firm the ability to specify the actions and behaviors of exchange partners. Thus, the transaction structure can range from loosely formed alliances (e.g., licensing arrangements) to highly integrated systems (e.g., acquisitions). Transaction cost theory parallels resource dependence theory in that it views transactions as a response to uncertainty and dependence; however, transaction cost theory explicitly accounts for the efficiency implications of relationship structure.

The second part of our model is the potential for interfirm synergy. From a contingency perspective, when firms enter a dyadic exchange relationship either in the form of an alliance or an acquisition, they should consider potential synergies between the two participants in several areas including strategy, culture, and human relations, among others. Alignment of strategic vision and organizational culture can potentially lead to less conflict and a more conducive environment for mutually beneficial exchange. In addition, resource dependence would suggest that firms want to be sure they are accessing desirable and compatible resources when engaging in transactions.

Finally, the strategic motivation for transactions can be classified into three factors: (1) evasion of small numbers bargaining, (2) enhancement of competitive position, and (3) provision of mechanisms for transfer of organizational knowledge (11). The theoretical backgrounds for these three factors are transaction costs theory, strategic motivation theory, and organizational learning theory, respectively.

Transaction cost theory, as explained earlier, suggests that under conditions of asset specificity, firms enter relationships to minimize costs by evading small number bargaining and opportunism. Strategic motivation theory, on the other hand, illuminates a firm's attempts to enhance its competitive position or market power to improve its overall profitability.[11] Although uncertainty avoidance is central to both of these theories, product-market strategy is outside the domain of transaction cost theory but is central to strategic motivation theory. Thus, reducing transaction costs and building market position are viewed as separate motives. The third explanation. of relationship formation advanced by Kogut is derived from organizational learning theory.[45] The theory addresses a firm's attempts to transfer embedded organizational knowledge. Because organizational knowledge is tacit, experiential, and embedded, it is only through developing relationships with other firms that this knowledge can be transferred from one partner to another. Based on the theoretical arguments made above, specific hypotheses are developed in the following discussion.

HYPOTHESES

Transaction Structure

In general, transaction costs include costs' of crafting safeguards due to asset specificity; communication, negotiation, and coordination costs due to environmental uncertainty; and screening and selection costs due to performance ambiguity.[42] When these transaction costs are low, firms will favor market governance. But when these transaction costs are high enough to exceed the advantages of the market governance, firms will favor integration. Thus, as the cost invested in the relationship increases, the degree of integration in the channel increases to ensure performance.

There may be several levels of integration between partners in the pharmaceutical industry. For example, at one end of the continuum is patent licensing involving a one-time transfer of the patent right. Compensation is fostered in the form of a running royalty, expressed as a fraction of the sales volume. This is an intangible transfer of licensing, in which a firm receives compensation in the form of royalties. A more asset-intensive alliance is one where there is joint research and development, requiring some tangible investment by both parties. The next level is joint manufacturing or marketing,

whereby firms invest more in the relationship to perform the activities together in manufacturing or commercializing a product. Because of a lack of resources (financial and technological), many firms enter collaborative relationships in research and development and manufacturing/marketing to develop and commercialize products. Within alliances, the highest level of asset intensity is a joint venture. Joint ventures often imply the creation of a separate entity, in which two or more partners share stock, each expecting a proportional share of dividends as compensations. Finally, the complete acquisition of one firm by the other is the most intensive form of relationship. Here the investment required to completely buy the other firm might be very high, though it could involve a combination of cash, equity, or a combination.[33]

The ultimate goal of increased integration is to create efficiency and improve performance by enhancing monitoring capabilities. Transaction cost arguments, then, would suggest that closer or more intensive relationships involving higher asset specificity and integration would be more successful. This would be consistent with Parkhe's finding that higher investment was associated with improved joint venture performance.[6] In short, increased integration is expected to lead to higher performance. Thus, our first hypothesis is:

> H_1: The higher the degree of integration, the better the transaction performance.

Interfirm Synergies

Synergy is defined as a situation where the joint action of two or more parties, when taken together, increases each other's effectiveness.[46] Based on contingency theory in marketing and management literature, two types of synergies have been identified. These include (1) strategic fit and (2) organizational fit.[47] While developed in the context of acquisitions, these types of synergies have also been applied in the alliance context.[19]

Strategic Fit. Strategic fit is defined as the match between firms in strategic issues including marketing, manufacturing, and technology. Prior studies in strategic management have elucidated the important role of strategic fit in other contexts.[19, 24–27, 48–50] In this study, we focus on the impact of strategic fit on transactions in the pharmaceutical industry. Research has shown that firms that have shared strategic vision were found to create value mutually and thus perform better.[49] This hypothesis has not been tested in the pharmaceutical industry context, nor has it been tested in the context of transactions (alliances and acquisitions) in the same study. Thus, our hypothesis reads:

> H_{2a}: Strategic fit between the two firms has a positive effect on transaction performance

Organizational Fit. Organizational fit is another factor that is important in realizing potential synergies between two firms in a relationship. Organizational fit is defined as the ease with which two organizations can work together in an alliance or acquisition. An important element of organizational fit in transactions is the extent of synergy in the culture and human relations of both firms. Synergy in the culture of the partner firm is an important element of organizational fit.[51,52] It is implied that the better the fit between the firms, the better the performance. Because members from both organizations have to work together in a demanding environment, unanimity of culture and human relations should fit between the organizations for the transaction to be successful (i.e., avoiding "culture clash"). Boni describes this as "soft factors" of the partnership and M&A transactions.[53] Even though this concept is believed to be important in the performance of the relationship, very few studies have attempted to show the importance of organizational fit.[54]

The synergy in the culture, structure, and human relationships between the firms can create an amicable environment for them to work together. We propose that under high levels of organizational fit, transactions will achieve better results. Thus,

> H_{2a}: Organizational fit between the two firms has a positive effect on transaction performance.

Transaction Motives

Firms engage in transactions to meet a variety of objectives. The motives underlying a firm's entry into alliances or acquisitions can be broadly characterized as attempts to capitalize on opportunities for sales and/or profit growth by (a) efficiency-related motives (i.e., resource use efficiency), (b) market-related motives (i.e., promoting its present product offerings in its present served market, developing new markets for its present products, developing new products for its present served markets, entering into new product-market domains that are either related to or unrelated to its present product-market domain), and (c) organizational learning motives (i.e., learning new skills, enhancement of present skills). It is presumed that firms enter transactions with varied motives. However, we have no compelling *a priori* theory that would suggest one motive may be

more strongly related to transaction performance than another. Thus, we posit no specific relationships between specific types of motives and performance. This study does, though, allow for exploratory research regarding these relationships.

In considering the relationship between fit or synergies between firms in a transaction and performance, though, motives might play a very important role. Hypotheses 2a and 2b suggested that strategic and organizational synergies between firms would lead to higher transaction performance. This relationship could be confounded by the strategic motives of the firms entering the transaction. For example, if a company is making an acquisition of a competitor to build its market share, strategic synergies could be paramount compared to organizational synergies. On the other hand, if a company is entering a joint venture to learn about a new technology in a new geographic region, organizational compatibility with the partner's management and philosophy might be paramount. Thus, we will discuss each of the three motives for engaging in transactions below, then posit how the interaction of motives and fit between firms might affect performance.

Market Motives. Strategic motivation theory posits that firms transact by the mode that maximizes profits through improving a firm's competitive position against rivals. The primary difference is that transaction cost theory addresses the costs specific to a particular economic exchange, independent of the product-market strategy. Strategic behavior addresses how competitive positioning influences the asset value of the firm. For example, firms can improve their market position by (1) defending the present market position, (2) enhancing the present market· position, (3) filling gaps in the present product line, (4) broadening the present product line, (5) reducing the threat of future competition, (6) raising entry barriers/erecting entry barriers, and (7) accelerating the pace of R&D, product development, and/or market entry.[14]

Efficiency Motives. Transactional arrangements can enable firms to lower manufacturing costs by taking advantage of (1) scale, scope, and/or experience effects, and (2) differences in factor costs. In addition, combining sales forces and distribution may allow a firm to market its offerings at a lower cost. Using transaction cost theory arguments, firms transact by the mode that minimizes the sum of production and transaction costs. The benefits of decreased transaction costs are economic efficiencies achieved through closer coordination of the activities of two firms.

Organizational Learning Motives. A third rational explanation for acquisitions and alliances does not rest on either transaction cost or strategic behavior motivations. This explanation views acquisitions and alliances as a means by which firms learn new or seek to retain existing capabilities. In this view, firms consist of a knowledge base, or what McKelvey calls ‘‘comps”; the comps are not easily diffused across the boundaries of the firm.[55] Transactions are, then, a vehicle by which, to use the often-quoted expression of Polanyi, "tacit knowledge" is transferred.[56] Organizations can learn in several ways, such as learning from direct experience, interpretation of experience, and learning from the experiences of others. In this context, we explore the third option, obtained through interfirm transactions.

Organizational learning can be defined as the encoding of inferences from history into routines that guide behavior.[45] The generic term "routines" includes the forms, rules, procedures, conventions, strategies, and technologies around which organizations are constructed and through which they operate. Organizations capture the experiences of other organizations through the transfer of encoded experiences in the form of technologies, codes, procedures, or similar routines.[57] Thus, organizational learning via interorganizational combinations can contribute to positive performance.

Transaction Motives As Moderators

When firms try to identify partners for alliances or acquisitions, it would be expected that they would consider matching up their motives with the fit between their organization and the target. Worded differently, those firms that match the synergistic attributes of the relationship with their motives would be expected to achieve better results. Specifically, we argue that firms trying to decrease costs or to improve market position must be most concerned with the strategic compatibility with the partner/acquisition prospect. To realize economic and market efficiencies, the organizations must be closely aligned in terms of technology, manufacturing, and marketing. Thus, under conditions of higher levels of efficiency motive or market position motive, strategic fit should significantly influence transaction performance. On the other hand, if a firm is engaging in a transaction to achieve a learning motive, the strategic fit will be less important than the organizational fit. To learn from a partner/acquisition prospect, similarities in routines and processes would be expected to facilitate knowledge transfer. Thus, under conditions of organizational learning motive, organizational fit should lead to superior transaction performance. Thus, hypotheses 3a, 3b, and 3c reflect our belief that motives will moderate the

relationship between strategic fit, organizational fit, and performance.

> H3a: Market motives moderate the relationship between strategic fit and transaction performance.
>
> H3b: Efficiency motives moderate the relationship between strategic fit and transaction performance.
>
> H3c: Organizational learning motives moderate the relationship between organizational fit and transaction performance.

In summary, we have drawn on resource dependence, transaction cost, and organizational learning theories to develop an integrated model of several factors related to transaction success. Specifically, we have argued that transaction structure, strategic fit, and organizational fit will have a direct effect on transaction performance. In addition, different motives will moderate the relationship between fit and performance of these transactions. The integrated model is shown in Figure 1.

METHODS

This project involved studying transactions at two separate time periods. First, we administered a survey to a key informant at sample firms who had intimate knowledge of the transactions within a year of the transaction date and in most cases within six months. This survey measured the motives for the transaction and the perceived degree of potential synergies or similarities between the firms. At this time, we also clarified the structure of the transactions. By measuring the independent variables within a year of the transaction, we hoped to avoid problems associated with retrospective bias.[58] The dependent variable, performance, was measured a minimum of two years after the transaction by a survey including subjective and objective measures. By separating measurement of the independent and dependent variables, we hoped to minimize common methods variance and were able to add a longitudinal component to the study.[59] We identified the key informant by calling the firms initially identified in the database and locating the manager with direct responsibility for initiating or managing the alliance activity. We then sent a fax to this contact in three separate waves. The same respondent was contacted by phone and fax for the second round of surveys (performance). If the contact was no longer involved in the alliance, we identified and sought information from his or her replacement. In the majority of the cases, the same contact provided information for both rounds. Having a separate contact provide performance data would only further diminish the concerns about same subject bias.

Sample

About 200 transactions met the initial criteria for inclusion in the study, including timing of the transaction, the industry of activity (pharmaceutical industry), and location of the firms involved. The transactions were identified

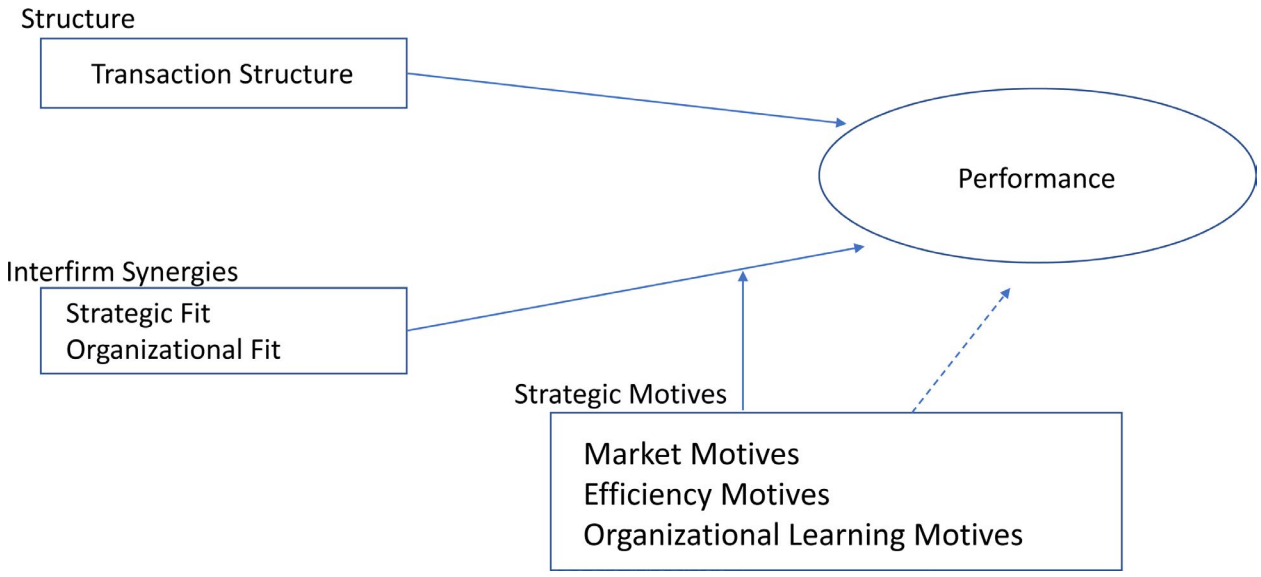

FIGURE 1: Determinants of Transaction Performance.

through an exhaustive review of sources, including an ABI Inform database search, databases from Securities Data (domestic and international), the S&P database of public and private firms, and the Predicast Directory of Corporate Change. The acquirer in an acquisition and both partner firms in an alliance were identified and contacted. The alliance transactions were limited to dyadic relationships (only two firms involved). To focus the data collection efforts, transactions were limited to those where the contact firm was headquartered in one of eight countries including Canada and the United States; the United Kingdom, Germany, and France; and Japan, Malaysia, and India. Over half of the transactions in the initial database involved at least one company outside of the United States. About 100 firms responded to each wave of surveys; 66 provided relatively complete information for both rounds, for a final response rate of about 33%. Thus, the final sample includes both completed surveys on 66 transactions.

Measure Development

Dependent Variable. We developed multi-item scales based on the procedures outlined by Churchill.[60] Transaction performance was measured by a qualitative seven-item scale including overall satisfaction with the transaction (outcomes as well as process), whether motives were realized, contribution of the transaction to core competencies, degree to which synergies were realized, and perceptions of financial as well as overall performance. Factor analysis confirmed that these seven items loaded on a single factor with a high level of reliability (alpha = .87). Previous research has noted the challenges of using objective measures for alliance performance, including the lack of reliable archival data and the difficulties of identifying firms that measure alliance performance using accurate and consistent methods.[18,19] For these reasons, we chose to measure transaction performance with this subjective scale, to have a consistent approach across all types of transactions.

Independent Variables. Independent variables included transaction structure, strategic and organizational fit, and motives. Structure was coded on a scale from 1-5 reflecting the degree of integration of the transaction. Simple "licensing agreements were coded a l; joint R&D (without any other type of affiliation) a 2; joint manufacturing, marketing, or a combination of these relationships a 3; a formal joint venture involving formation of a new entity a 4; and acquisitions were coded a 5. Thus, the scale ranged from the lowest degree of involvement to the highest.[a] Strategic fit was determined by a three-item scale reflecting similarities between the two firms involved in the transaction in manufacturing, marketing, and technology (alpha= .70). Organizational fit was determined by a three-item scale reflecting similarities in culture, human relations, and organizational structure (alpha = .78). Motives were measured using a 12-item scale. The market motive was composed of four items, including increasing market share, geographic expansion, accessing new customers, and growth (alpha = .78). The transaction cost/internal efficiency factor contained four items, including reducing costs, accessing raw materials, accessing resources, and decreasing transaction costs (alpha= .76). The organizational learning factor was made up of four items, including accessing technology, reducing development time, reducing risk, and learning about the business/industry (alpha= .80). We performed factor analysis using SPSS to determine the reliability of the factor structure. All factor analyses were conducted in subgroups by construct due to sample size limitations with the total number of items. Scores were averaged across all items for each factor.

Control Variable. This study involved transactions between firms in the same country (within-border) as well as firms in different countries (cross-border). In all, 20 of the 66 transactions, or 30%, were international, or cross-border, transactions. We are investigating variables such as structure and fit between organizations that may be unevenly affected by the cross-border nature of the transaction. This potential confound could bias the results of the study. To control for this, we include as a control a dummy variable for cross-border versus within-border transactions.

Nonresponse Bias

This study entailed a longitudinal data collection process. In the two rounds of surveys, initial and two-year performance measures were collected. Some respondents responded for Survey 1 but did not respond to the ensuing performance survey, and vice versa. To ensure that there was no nonresponse bias between these categories, a simple t test was conducted comparing the performance scores for those who only responded to the initial survey compared to all those who responded to both surveys. Similarly, the two-year performance scores of those who only responded to the second survey were compared to those who responded to both surveys. The t-test was found to be insignificant for both cases ($p > .10$). In addition, we compared firm-level variables for sales growth, return on investment (ROI), and Jensen's alpha for respondents to either or both surveys to nonparticipants in either survey. All comparisons were insignificant ($p > .10$). This analysis offered support that nonresponse bias was not a problem.

RESULTS

Table 1 reports the means, standard deviations, and correlations for the independent and dependent variables. The relationships are generally positive and significant between the independent variables and performance, as hypothesized. Transaction performance is positively correlated with the degree of integration, as reflected by the transaction structure ($p < .01$), strategic fit between partners ($p < .01$), and organizational fit between partners ($p < .05$). The interaction of strategic fit with market motives and efficiency motives is also positive and significant ($p < .01$). The interaction between organizational fit and learning motives is not significantly related to performance. The correlations provide support for most hypotheses in bivariate relationships, then, providing initial support for hypotheses 1, 2a and 2b, 3a and 3b. Hypothesis 3c is not supported. While we did not predict specific relationships between performance and specific motives, we noted a positive and significant relationship between market motives and performance ($p < .05$), a positive correlation between efficiency motives and performance, and a negative correlation between learning motives and performance.

Table 2 displays the results of the ordinary least squares regression for combinations of the independent variables with performance as the dependent variable. Model 1 posits the change in model fit when the structure

TABLE 1. Means, Standard Deviations, and Correlations for All Variables

Variables	Means	Std. Dev	1	2	3	4	5	6	7	8	9
1. Transaction Performance	4.88	1.23									
2. Transaction Structure	3.81	1.59	.36**								
3. Strategic Fit	3.49	1.73	.50**	.15							
4. Organizational Fit	3.36	1.52	.30*	.20*	.37**						
5. Market Motives	4.87	1.65	.30*	.12	.38**	.15					
6. Efficiency Motives	2.52	1.52	.19	.05	.37**	.31**	.25**				
7. Learning Motives	3.84	1.26	-.10	-.16	.12	.03	.20*	.37**			
8. Strategic Fit x Market	19.02	11.93	.53**	.18	.86**	.38**	.73**	.43**	.14		
9. Strategic Fit x Efficiency	9.90	8.79	.42**	.20	.74**	.39**	.41**	.83**	.27**	.75**	
10. Org. Fit x Learning	12.42	6.44	-.02	.05	.37**	.77**	.25	.47**	.60**	.37**	.51**

** p < .05, ** p < .01 (1-tailed).*

TABLE 2. Results of Regression Analyses with Transaction Performance as Dependent Variable

Variables	Model 1: Structure	Model 2: Structure and Fit	Model 3: Structure, Fit and Motives	Model 4: Full Model with Interactions
Cross vs. Within	.52	.42	.44	.31
Transaction Structure	.30***	.22**	.21*	.21*
Strategic Fit		.32**	.23*	.22*
Organizational Fit		.05	.06	.18
Market Motives			.15	.05
Efficiency Motives			.07	.07
Learning Motives			.08	.44*
Strategic Fit x Market				.10
Strategic Fit x Efficiency				.06
Org. Fit x Org. Learning				-.25**
R - Sq	.15	.25	.28	.36
Adj R-Sq	.12	.20	.19	.25
F	5.69***	5.16***	3.21***	3.18***
Change in R-Sq	.13	.10	.03	.08
Change in F	9.93***	4.07**	.71	2.54*

** p < .1, ** p < .05, *** p < .01. The coefficients are unstandardized.*

variable is added to the model containing the control variable, the cross-border versus within-border nature of the transaction. This model is significant at the $p < .0$ I level and explains 15% of the variance in performance ($F = 5.69$; change in F significant at $p < .01$). In Model 2, we add the effects of the fit variables. This model increases the variance explained in performance by .10 and yields a significant improvement in the model ($F = 5.16$; change in F significant at $p < .05$; model significant at $p < .01$). The coefficients for structure and strategic fit are both significant in this model. To test the significance of the interaction terms in a multivariate model, we must first add the motive variables to the equation, as shown in Model 3. This is an intermediate step to reaching Model 4, the full model, where we test the cumulative effect of the structure, fit, motive, and interaction variables on performance. The R^2 improves to .36, and the overall model is significant ($F = 3.18$; $p < .01$). The unique variance explained by the interaction terms is marginally significant in effect (change in $F = 2.54$, significant at $p < .1$).

In summary, then, the structure and strategic fit variables related significantly to performance in bivariate and multivariate tests, offering strong confirmation for hypotheses 1, 2a, and 2b. Hypothesis 2b was weakly supported, in that organizational fit was significantly related to performance in bivariate tests but only positively related in a multivariate test. Hypotheses 3a and 3b were in the hypothesized direction but statistically insignificant. When Hypothesis 3c was tested, interestingly, the direct effect of organizational learning on transaction performance was positive, but the interaction term had a negative effect on transaction performance. This result was contrary to our hypothesis. It shows that organizational fit has significantly higher levels of influence on transactional performance under low levels of organizational learning compared to under high levels of organizational learning. The addition of the interaction variables accounted for some unique variance in overall model fit (Model 4, $p < .1$).

DISCUSSION

Historically, pharmaceutical industry participants have been accustomed to high returns on any level of investment. In the past decade or two, like many industries, at least parts of the pharmaceutical industry are becoming more mature. Consolidation provides further evidence of this maturation. Firms are engaging in alliances and acquisitions to stay competitive in the marketplace. In addition, there are several factors such as the increased cost of bringing new products to market (estimated at over $1 billion through commercialization), high risk of product failure (devices, drugs, etc.), generic competition, cost-containment pressures for managed care organizations, and global competition. All of these factors contribute to a higher level of interfirm relationships. With firms becoming increasingly inclined toward forming alliances or acquisitions, the determinants of performance become a critical issue. This is particularly pressing because the majority of these transactions fail.[1–3] The significance of this study, which is an updated version of our earlier study[61] is to advance the stream of scientific inquiry regarding this phenomenon.

In this study, we hypothesized that transaction structure, partner synergies, and strategic motives would influence transaction performance. The most significant finding is the role of transaction structure on performance. We created a continuum of transaction structure based on the characteristics of our transaction database, reflecting the intensity of investment and integration. This included licensing at one end and acquisitions at the other. The study showed that higher levels of integration led to increased performance. This would suggest that increased integration, associated with more assets invested in the relationship and more control, leads to better-performing transactions. This supports the rationale behind transaction cost analysis. Of course, we must consider the time frame and context of this study. It is possible that in a longer time frame or in a different time period these relationships would differ. In some markets and geographies, alliances are still new to some firms. It is likely that as executives learn to better manage them, their perceived performance will improve.

The second significant finding is that interfirm synergy (specifically, strategic fit) is found to affect performance positively. A high level of strategic fit between the partners leads to better performance. Our study substantiates Shelton's study on the impact of strategic fit on value creation in acquisitions.[49] The strategic fit between partners has received very cursory treatment in alliance performance research.[19, 62] This study provides initial evidence that the importance of strategic fit may transcend transaction type. This is an interesting finding because it has been held that when firms enter alliances it is important that they have common strategic values or common goals to succeed. Strategic fit, as operationalized by similarities in marketing, manufacturing, and technology, is shown here to positively influence a range of transactions in the pharmaceutical industry.

The third important finding is related to organizational fit between the partners and its influence on performance. The bivariate analysis indicates that performance is positively correlated with organizational fit; the multivariate, though, did not substantiate this finding with a more robust model. Indeed, strategic fit and structure of the transaction accounted for most of the

variance in performance. Experts in the industry argue that firms involved in transactions will have a greater chance of friction among the representatives if cultures are different.[63] A classic example is Eli Lilly's acquisition of Hybritech, a biotechnology company, in 1986. Lilly immediately began to impose its operational and management style upon the company, including retraining Hybritech's managers. As a result, the key employees left, and the company's entrepreneurial spirit was restrained, limiting the success of the relationship. Similarly, the friction between corporate cultures, in part, caused the delay in the merger process between the French company Rhone-Poulenc Rorer and the German company Hoechst Marion Roussel to create Aventis Pharmaceuticals. More recently, Pfizer's deal with GlycoMimetics, Merck's relationship with KalVista[64] and Regeneron with Ocular Therapeutix[65] were terminated. While attributed to product failure as opposed to a lack of organizational fit, the failed relationships are a good example of the ongoing risks of alliances.

Such highly visible examples of a mismatch in organizational fit have led practitioners to conclude that culture clash is to be avoided in interfirm transactions. Our findings suggest that other indicators are better predictors of transaction health. In fact, we argue that differences in culture and other organizational process variables may, in fact, be healthy for interfirm activities and may generate higher degrees of learning by exposure to different problem-solving styles, as suggested by the results of Hypothesis 3c. Thus, culture clash and exposure to different styles may offset each other in their impact on transaction performance. Future studies need to investigate this in more detail.

Motives by themselves were not found to significantly influence performance in a multivariate model except organizational learning. Interactions between strategic fit and market and efficiency motives, though, were found to add some predictive value in explaining transaction performance. It seems that under high levels of organizational learning motive, the organizational fit is less of an issue to create superior performance. Organizational learning by itself has some positive relationship with transaction performance. This may reflect that firms partly motivated by or more open to learning in interfirm transactions are able to better manage these relationships in a satisfactory manner.

LIMITATIONS AND FUTURE RESEARCH

Although the findings of this study are generally in the hypothesized direction, the results must be interpreted with caution. First, although the performance data were collected two years after the transaction, timing of measurement may be an issue. It may be easier to estimate the performance of an acquisition as compared to an alliance at the two-year time frame. In many cases, acquisitions involve an *a priori* valuation. With alliances, the performance may evolve over time, and the benefits of a relationship such as a license or joint R&D may take years to unfold (or fail). Some variables may also take a longer time frame to have an impact on performance. An example would be organizational learning as a motive. Organizational learning is a long, time-consuming process and may require long-term time horizons. Results of performance evaluation at two years could be limited in this regard. The learning motive might depend on the absorptive capacity of the partners and, hence, the performance may take more years to evaluate.[66] The initial burdens of the learning process might be compensated by benefits in the long run. Thus, an estimate of alliance performance at two years provides an initial indication but could be supplemented by additional measures. In addition, we have relied on a comprehensive but perceptual measure of performance, necessitated by the type of sample and lack of objective available financial data. While we believe this to be the best performance measure for our purposes and the approach is consistent with alliance research, it must be recognized that many other measures as well as indicators of performance could be used.[18]

There are several other limitations to the study. We have by no means exhausted the list of variables that could contribute to transaction performance, which have a long list of predictors in the separate alliance and acquisition literatures.[19,20-22,27] Other key variables. that could have a significant impact on transaction performance include equity structure (investment in the relationship), reputation of management, method of payment, and a host of other possible factors. We have focused here on variables of common interest to both types of transactions and consistent with our theoretical model, but many other variables could be included in future studies.

Finally, we would not want to conclude from this study that acquisitions are "better" than alliances. More intensive arrangements may be evidenced by better performance at the two-year time frame but may also involve a much greater commitment of resources. Thus, in the cost-benefit analysis involving any transaction of this nature, the entry costs must be weighed against the magnitude as well as likelihood of success. Like all such investments, they must be evaluated fairly against alternatives such as alliances and internal product development, each of which has its own problems.

The theory used in this study addresses mostly the efficiency, strategic motivations, and organizational

learning arguments for the performance of these interfirm relationships. There are, of course, other explanations outside the economic rationality arguments. Dimaggio and Powell's depiction of mimetic processes of firms offers an interesting alternative point of view, for it is premature to rule out transactions as forms of bandwagon behavior.[67] Pangarkar and Klein found that bandwagon effect contributed to increased alliance activity in the pharmaceutical industry.[68] Future studies should include the role of bandwagon effect along with other variables to study transaction performance. Certainly, exploring relationships in other industries has much merit as well, as many of the same dynamics are affecting a range of industries from high-tech to consumer products. Finally, recent work has examined the network and performance effects of exploration versus exploitation-oriented relationships[8]. An interesting research question would be to integrate acquisitions into the different kinds of relationships and explore network effects.

CONCLUSIONS

This study provides evidence that transaction structure, partner synergies, and motives do affect transaction performance. The dynamism of the pharmaceutical environment and the technological outbursts witnessed in the last decades, including the human genome project, are thrusting firms in the industry into increased reliance on interfirm transactions to reduce uncertainty and to access resources. We have investigated some characteristics of these interfirm relationships that influence performance. There are most certainly additional factors to be considered. We hope this study provides a step in the direction of integrating theory and empirical findings across types of transactions.

NOTES

a. As this could also be conceptualized and constructed as an ordinal measure, we performed additional analysis using a dichotomous variable (acquisition or alliance) and categorical variable (acquisition, equity alliance, nonequity alliance). Overall results were consistent regardless of the form of this variable. Primary differences were between acquisitions and alliances. We found no significant differences between equity and nonequity alliances.

Authors Note and Disclosure – The acceleration of partnering and alliances in the biopharma industry has become even more prevalent in recent years as the industry transforms to drive innovation. This publication builds on our prior publication, c. f. reference 61 loc cit. However, that reference is not available since the journal has ceased operations and is no longer active. Therefore, the authors have used that article as a basis for this work, but have incorporated substantial updates to reflect the current situation.

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