

Stock Market Reactions to Knowledge-Motivated Acquisitions

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Summary

This study uses a new, fine-grained, firm-based measure of target resources to investigate the relationship between target resource type and acquirer stock market performance. Our findings suggest that the market punishes acquirers of knowledge-based resources more than those that buy property-based resources due to the perceived uncertainty regarding the value of targets' knowledge resources. In support of the underlying uncertainty argument, we find that managers announcing knowledge-based mergers provide more information in their press releases than those announcing property-based transactions. While prior studies have suggested that resource relatedness may moderate the resource type and acquisition performance link, our findings do not support either a direct or moderating relationship.

Despite a significant upsurge in acquisition activity in the 1990's, an acquisition's impact on acquirer performance is a phenomenon not yet fully explained by the strategy or the financial economics research literature. While theory suggests that acquisitions can be a highly effective tool for value creation, empirical evidence shows that most acquisitions have not increased the shareholder value of acquiring firms (Bruner, 2002). Thus, the persistence of seemingly irrational behavior by acquiring firm managers warrants further investigation.

To date, strategy researchers have studied mergers and acquisitions largely as a method of diversification (Trautwein, 1990; Walter and Barney, 1990) and the performance effects of diversification strategy types (Chang and Thomas, 1989; Lubatkin, 1983; Lubatkin and O'Neill, 1987; Nayyar, 1993; Palepu, 1985; Rajan and Ramanujam, 1987; Rumelt, 1982; Seth, 1990a; Singh and Montgomery, 1987). However, inconclusive results from this research stream have prompted some to call for a different approach. "A focus on specific resources rather than strategy types in the merger and acquisition research may better explain firm performance" (Harrison *et al.*, 1991: 187). While the performance benefits of *having* knowledge-based resources have been supported by many empirical studies (Bharadwaj, Bharadwaj and Konsynski, 1999; Chan, Lakonishok and Sougiannis, 2001; De Carolis, 2003; Hatch and Dyer, 2004; Miller and Shamsie, 1996; Villalonga, 2004; Wiklund and Shepherd, 2003), the performance implications of *purchasing* knowledge-based resources through corporate acquisitions have not (with two exceptions: Arikan, 2004a and Jones, Lanctot and Teegen, 2001) yet been explored.

This study investigates the link between the type of target resources acquired and acquirer market performance by developing and employing a fine-grained, firm-level measure of knowledge and property resources. Then it hypothesizes and directly tests the role that

uncertainty and information asymmetry play in the amount of information that managers communicate about acquisitions motivated by different resource types. To assure that the effects of the explanatory variables being studied are attributable to those variables, standard finance controls (including payment method, accounting method, relative size, year, and deal consummation) are added to the acquisition performance equation. The possible effect of relatedness is included as a moderator. These relationships are explored using standard event study methodology and a two-day event window.

The key contribution of this research is the finding that unlike internally-generated knowledge, *acquired* knowledge does not result in superior acquiring firm performance. The results specifically suggest that while the type of target resources acquired is significantly associated with an acquirer's short-term market performance, the mean performance of property-motivated acquisitions is more favorable than that of knowledge-motivated acquisitions. The uncertainty and information asymmetry associated with valuing knowledge resources seem to explain the underperformance of knowledge-motivated acquisitions relative to property-motivated transactions. In support of the underlying information asymmetry hypothesis, we find that managers communicate their motives for acquiring knowledge resources in more detail.

RELATING RESOURCES TO FIRM PERFORMANCE

Many measures of acquiring firm performance have been used by researchers, but short-term market performance is the dominant one in both financial economics (Agrawal, Jaffe and Mandelker, 1992; Bradley, 1988; Jarrell and Poulsen, 1989; Yook, 2003) and strategic management (Capron and Pistre, 2002; Chatterjee, 1992; Hayward, 2002; Lubatkin, 1983; Singh and Montgomery, 1987). In financial economics studies, performance has been found to be

mostly a function of payment method, target type (public or private), size, hostility or friendliness of the bid, and accounting method (Chang, 1998).

The field of strategic management has studied mergers and acquisition performance largely as a function of diversification, focusing on the motives for different types of combinations with mixed results (Chang and Thomas, 1989; Lubatkin, 1983; Lubatkin and O'Neill, 1987; Rajan and Ramanujam, 1987; Seth, 1990a; Singh and Montgomery, 1987; Trautwein, 1990; Walter and Barney, 1990). Accordingly, strategy researchers have suggested that future studies focus on the types of target resources being acquired, which may better explain acquirers' market performance (Black and Boal, 1994; Coff, 1999: 158; Harrison *et al.*, 1991).

While resource-based theory has been criticized due to the difficulties inherent in how resources have been operationalized (Conner, 1991; Godfrey and Hill, 1995; Miller and Shamsie, 1996), recent works have found empirical support for specific propositions relating firm resources to competitive advantage (Bharadwaj *et al.*, 1999; Carmeli and Tishler, 2004; Chan *et al.*, 2001; De Carolis, 2003; Hatch and Dyer, 2004; King and Zeithaml, 2001; McEvily and Chakravarthy, 2002; Miller and Shamsie, 1996; Villalonga, 2004; Wiklund and Shepherd, 2003). However, Coff (1999) was the first to investigate the role of resource type within an acquisition context.

Coff's ground-breaking study used resource-based theory to motivate his findings that managers employ coping strategies, including discounting the premiums paid for targets, when faced with increased uncertainty associated with acquisitions in knowledge-based industries. He proposed that knowledge resources create information dilemmas for buyers due to scarce or tacit information, uncertain transferability, and uncertain synergy potential. Additionally, a study by

Jones *et al.* (2001) contrasted the performance implications of internal technology development with its external acquisition. While they didn't find significant relationships between external technology acquisition and various types of performance measures (product, market, finance), the direction of the relationship (negative in all cases) implies that external technology acquisition may be detrimental to performance. Though neither Coff's nor Jones *et al.*'s study investigated the relationship between target resource type and acquirer market performance, both suggest a value- diminishing aspect of knowledge resources within an acquisition setting and thus invite further investigation.

Arikan's (2004a) is the only study found to date in the strategy literature that directly examines the market assessment of knowledge-based resources in a corporate acquisition context. It investigates the long-run abnormal performance effects of acquiring target resources, which are classified into intangible versus tangible categories. Intangibility of target resources is proxied by multiple measures (i.e. R&D, advertising, human capital stocks, and Tobin's q). Arikan's results show that, on average, acquirers of intangible targets earn negative abnormal returns, whereas acquirers of tangible targets break even. The explanation given for this finding is that intangible assets are more likely to be nonredeployable, although the nonredeployability hypothesis is not tested.

There are reasons to believe that the nature of the acquisition activity has changed from the period covered by Arikan's work in ways that may alter the study's results. For example, the sample covers mergers that occurred over a decade ago (1988-1991), while the 1990's wave of U.S. mergers seems to have more of a strategic focus, seeking to expand into new markets or take advantage of perceived synergies (Gaughan, 2002). This likelihood is further supported by

Miller and Shamsie (1996), who found that intangible or knowledge-based resources are more valuable in dynamic industry environments.

Further, operationalizing knowledge-based resources using accounting measures of intangibles such as R&D, advertising, and intangibles-in-books may be “inadequate because they disregard intangible resources and people-based skills –probably the most strategically important resources of the firm” (Grant, 1991: 119). Even though the use of Tobin’s q (market value / replacement value of tangible assets) is the most common measure used to estimate the intangibility of firm’s resources, it, too, is considered overly broad, and the need for more fine-grained measures has been suggested (Villalonga, 2004). As such, the validity of these measures has been questioned in today’s knowledge economy (Marr and Spender, 2004).

To summarize, while the resource-based view of the firm is the theoretical framework used by many strategy scholars to justify corporate takeovers, the performance implications of acquiring different resource types have received very little explicit attention with a few exceptions (Arikan, 2004a; Jones *et al.*, 2001). Clearly, this is an under-explored area of empirical research. To motivate further exploration, we propose specific hypotheses which relate resource type, uncertainty and acquirers’ market performance.

HYPOTHESES

The Link between Target Resource Type and Acquirer Stock Market Performance

Barney (1991) was among the first to propose a theoretical link between resources and acquirer market performance. According to Barney (1991), a resource is defined as any asset, capability, organizational process, firm attribute, information, knowledge, etc. controlled by a firm that enables the firm to conceive of and implement strategies that improve its efficiency and effectiveness. He suggests that knowledge resources may be particularly valuable as sources of

competitive advantage because their complexity and embeddedness tend to make them more difficult to imitate (Barney, 1991).

Having knowledge-based resources has been found to have a positive impact on a firm's performance (McEvily and Chakravarthy, 2002) due to their higher degree of inimitability by potential competitors, which tends to isolate capabilities within the firm. However, acquirers of knowledge-based resources are likely to suffer significant problems valuing, transferring and integrating such resources, due to their causal ambiguity, complexity and tacitness, all of which increase uncertainty. Coff (1999) argues that it is more difficult for buyers to assess the value of targets in knowledge-intensive industries because quality is more difficult to observe or measure, the buyer cannot be certain exactly what can be transferred, and the prospects for synergy are difficult to assess.

While standardized ways of estimating the value of property resources exist, the valuation of knowledge-based resources is plagued with numerous sources of uncertainty (Chi, 1994; Lippman and Rumelt, 1982). Aboody and Lev (2000) find that intangible resources such as R&D are a major contributor to information asymmetry between acquirers and targets. They argue that because knowledge-based resources are "unique to the developing [target] firm" compared with tangible resources that share characteristics across firms, it is difficult for outsiders, including acquiring managers, to gain information with respect to their value, unlike property resources that are traded in organized markets. From a financial economics perspective, the role of uncertainty is central to asset pricing. Campbell, Lo, and MacKinlay (1997; ***) suggest that "the starting point for every financial model is the uncertainty facing investors, and the substance of every model involves the impact of uncertainty on the behavior of investors and, ultimately, on market prices."

The transferability of a target's knowledge-based resources is another source of uncertainty which may affect valuation. The target's knowledge resources that motivate the transaction might not be transferable to the acquirer's operations because they are firm specific (De Carolis, 2003; Grant, 1996). Firm-specific knowledge-based resources may be harder to transmit because few parties other than the developer can benefit from the application of that knowledge (McEvily and Chakravarthy, 2002). The transfer of new target knowledge depends on its potential to be aggregated with existing bidder knowledge. In contrast, property-based resources are easily transferred from one firm to another by just acquiring their legal ownership. Firms that are efficient in exploiting others' knowledge are more the exception than the rule (Zack, 1999: 137). Thus, some theorists (Grant, 1996; Spender, 1996) view firms as institutions for knowledge development and integration in part because valuable knowledge-based resources can't be readily acquired in the market (Barney, 1986).

Finally, tacitness, social complexity, and specificity can slow learning and hinder knowledge transfer and recombination within organizations (Galunic and Rodan, 1998; Kogut and Zander, 2003; Ranft and Lord, 2002; Szulanski, 1996; Zander and Kogut, 1995). Buyers of knowledge-based resources expect to have post-event integration problems (Shrivastava, 1986; Vaara, 2003), increasing the risk of not fully realizing expected synergies. The ability to capture acquisition synergies is subject to human implementation issues, such as retention of key personnel, culture compatibility, etc. When a company is taken over, the acquirer can be confident that it has possession of the property-based resources, but it cannot be certain that it will retain the knowledge-based resources. Human resources can ultimately "walk away" (Hambrick and Cannella, 1993), having a negative effect on post-acquisition performance

(Cannella and Hambrick, 1993; Zollo and Leshchinskii, 1999) or reducing their productivity (Ernst and Vitt, 2000).

Because the valuation, transferability, and integration of knowledge-based resources are more uncertain than those of property-based resources, it is plausible to assume that investors will react less favorably to an acquisition motivated by knowledge resources. This logic leads to the following hypothesis:

H1: The type of target resources acquired will be significantly associated with an acquirer's short term market performance. The mean performance of property-motivated acquisitions will be more favorable than that of knowledge-motivated acquisitions.

The Link between Uncertainty, Information and Resource Type

While Coff (1999) suggests that uncertainty surrounding resources in knowledge industries leads acquiring managers to discount the value of targets, he didn't directly test that explanation nor did he relate it to acquirer performance. The amount of uncertainty associated with the acquisition of knowledge-based resources is the main argument justifying unfavorable short-term acquirer market performance in this study.

Uncertainty, as used in the finance literature, can be defined as a condition in which the information available to the decision-maker is too imprecise to be summarized by a probability measure; the terms "vagueness" or "ambiguity" can serve as close substitutes. Even though ambiguity is a subjective variable, one can identify objectively some situations likely to present high ambiguity by noting situations where available information is scarce, unreliable or conflicting or where expressed confidence in estimates tends to be low (Kogut and Zander, 2003). Similarly, the organizational theory literature defines uncertainty as the absence of information and suggests that increased information processing can reduce ambiguity, equivocality or uncertainty (Daft and Lengel, 1986). "An individual's perception of uncertainty

in the environment is significantly associated with the acquisition of information from the environment” (Brown and Utterback, 1985).

Because information about a target’s knowledge-based resources and their potential benefits is ambiguous and generally unavailable to the public, the assessment of their value is a highly complex task; task complexity is considered a source of uncertainty and of increased information processing requirements (Tushman and Nadler, 1978). To compensate for the uncertainty of assessing a target’s knowledge-based resource value, it is plausible to expect that the amount of information provided by acquiring management to justify or explain the benefits of a knowledge-based acquisition will be greater than the amount of information provided about more certain property-based acquisitions.

If the dominant motivation behind an acquisition is gaining access to property-based resources, the bidder’s justification of the deal is expected to be short, because the value assessment of these resources follows standard procedures and their transferability is not under question. Because acquisition events are generally announced via press conference and press release, theoretically lengthier and more detailed communications regarding knowledge-based acquisitions would be expected than those regarding property-based acquisitions, resulting in the following hypothesis:

H2: The amount of information communicated to the public in acquisition announcements will be greater in knowledge resource-motivated deals than in property resource-motivated deals.

Relatedness as Moderator of the Resource Type/Acquirer Performance Link

Moderator variables provide information regarding the conditions under which the direct effect or relationship is likely to be stronger. Research on the acquisition integration process suggests several factors that contribute to an acquirer’s ability to capture merger synergies. A

factor that is of special interest for this research is acquirer and target strategic relatedness. Historically, strong theoretical arguments have supported the direct association of relatedness with value creation through acquisitions, even though the empirical literature is rather inconclusive on the subject. The present study empirically considers the role of relatedness as a moderator of the target resource type and acquirer performance relationship.

Strategy theorists (Amit and Schoemaker, 1993; Dierickx and Cool, 1989; Hall, 1993) suggest that an acquirer's ability to capture synergies from strategic knowledge-based resources depends not only on the level of resources it accumulates by buying another firms but also on the interconnectedness between target and acquirer resources. They argue that the costs of integrating a target's resources should decline if the acquirer has knowledge related to the technology being acquired. "These costs are derived from the efforts of codifying and teaching complex knowledge to recipients; the more effort that must be expended, the less capable the user" (Kogut and Zander, 2003). Grant and Baden-Fuller (2004) suggest that the benefits of an unrelated acquisition are likely to be offset by the difficulty of reconciling the different routines and operating rules required by different industries. In a related context, previous research on intra-firm knowledge transfer suggests that knowledge overlap between the source and recipient affects the ease with which a technology or best practice is assimilated by a new organizational unit (Cohen and Levinthal, 1990).

Despite the theoretical attention devoted to resource type and relatedness in an acquisition context, Coff's (1999) is the only empirical study to investigate this issue, finding somewhat counter to theory that because managers of related firms are more informed and thus more wary of the uncertainty associated with a target's knowledge-based resources, they discount their value. While no prior empirical literature has investigated the moderating effect of relatedness on

the target resource type and acquirer performance link, the relationship between knowledge resource type, relatedness and performance has been analyzed within a joint venture context in several recent strategy studies (e.g. Mowery, Oxley and Silverman 1996; Tsang, Nguyen and Erramilli, 2004; Zander and Kogut, 1995) with results mostly consistent with theoretical predictions. Additionally, Lane and Lubatkin (1998) found that the similarity of firms in an alliance is positively related to the firm's ability to learn and to apply knowledge-based resources from another firm. These findings suggest that relatedness between the firms in an acquisition context might also reduce the value uncertainty of knowledge-based resources and moderate the relationship between a knowledge-motivated acquisition and the market performance of the acquirer.

Considering the previous arguments that support the idea that relatedness between acquiring and target firms will improve the likelihood of a positive market reaction to the acquisition, the following hypothesis is proposed:

H3: The relationship between acquirers' short term market performance and target resource type will be moderated by the degree of relatedness between acquirer and target businesses. An acquirer's short term market performance in knowledge resource-motivated acquisitions will be more favorable when the acquirer and target businesses are related.

SAMPLE, MEASURES, AND METHODS

Sample Selection Criteria

The sample for this study was selected from a population of acquisitions listed in Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database between 1990 and 2000. The consolidation of U.S. industries initiated in the 1980's continued in the 1990's, but while 1980's activity was distinguished by its use of leveraged buyouts and hostile takeovers (Holmstrom and Kaplan, 2001), 1990's mergers have been viewed as a distinctly new wave that

is driven by strategic, synergistic factors (Gaughan, 2002). Thus, the time frame 1990 to 2000 was chosen because it covers strategically-motivated transactions in the most recent acquisition wave but avoids the possible confounding effects of the market bubble burst on the investor community. Also, the period is considered long enough to have a large sample with available data.

The acquirers and targets in this study are U.S. firms publicly traded on the Amex, Nasdaq, or NYSE whose market return data is listed on the Center for Research in Security Prices (CRSP) file. Acquisitions with the following characteristics were excluded from the sample: acquirers that had more than a 10% controlling stake in the target firm before the transaction was announced; acquisitions in which less than 100% of the target's stock was sought; transactions in which acquirers' primary SIC codes were in the public administration, financial services, holding company, and non-classifiable or unknown establishment segments; hostile deals; transactions with no announcement date or with two different dates; deals where the SDC announcement date was more than 3 days apart from the one found on the acquisition announcement press release; transactions with confounding events; and, finally, spin-offs, recapitalizations, self-tenders, exchange offers, repurchases, acquisitions of a minority stake, and acquisitions of remaining interest. All of these these exclusion criteria, which are widely used in strategy and finance studies, result in a cleaner sample.

To assure a large enough sample size for the analysis, all transactions with available data were included irrespective of whether the deal was consummated or not (Moeller, Schlingemann and Stulzc, 2004; Travlos, 1987). While the SDC U.S. Mergers and Acquisitions database contains 115,472 deals categorized as mergers or acquisitions during the 1990-2000 time frame of this study, this number of transactions was reduced to 679 after meeting all of the sample

selection criteria discussed above. The SDC database is one of the products offered by Thomson Financial Securities Data, a major provider of financial data. The sample firms' stock market data was obtained from the CRSP database and their financial data from the COMPUSTAT database.

Measures

Acquisition motive type: property vs. knowledge. The motives described in the acquiring firm's acquisition announcement typically suggest which target resources are being sought and why. Consistent with resource-based theory, in this study acquisition motives were determined based on the type of target resources described in press releases about the transactions. At least three factors suggest that acquirers' motives in acquisition announcements provide relevant information to the stock market about the resources being acquired: (a) acquiring firm managers have insider information regarding their own resource potential (Aboody and Lev, 2000), (b) they are in a privileged position to identify potential synergies available from target resources as a result of the due diligence process (Barney, 1986; Denrell, Fang and Winter, 2003), and (c) they are motivated to convince investors that the deal is worthwhile so as not to risk a devaluation of their stock (Eckbo *et al.*, 1990; Sirower and Lipin, 2003: 27; Walter and Barney, 1990: 79).

Categorizing resources as knowledge vs. property-based. When focusing on characteristics that allow resources to be sources of competitive advantage, scholars have developed different categorical schemes that fit their research interests. Some of these resource categorizations include tangible and intangible, assets and competencies (Hall, 1992, 1993), resources and capabilities (Amit and Schoemaker, 1993; Grant, 1991), commodity and complex resources (Denrell *et al.*, 2003), property and knowledge-based resources (Miller and Shamsie,

1996), and contained and system resources (Black and Boal, 1994). Each author outlines particular characteristics for their resource categories, but common ground is shared by most of them. For the purpose of this study, the property-knowledge typology (Alessandri, Ilinitch and McDaniel, 1999; Miller and Shamsie, 1996) is used as a starting point, and the theoretical similarities of other categorical schemes are considered to define the basic criteria to classify all resources as property or knowledge-based.

A property-based resource is defined by Miller and Shamsie (1996) as a firm's asset that has ownership rights defensible by law. Property-based resources categories are associated with the assets valued in a balance sheet as well as with other tangible assets which add value by allowing access to new markets, facilitating competitive deterrence or increasing the firm's size or scale. A knowledge-based resource is defined as an individual, team or organizational capability. Knowledge-based resource categories are associated with functional skills, capabilities, processes, and employee experience. Many knowledge resources can be attributable to the unique history of a firm; as such, they are causally ambiguous and/or socially complex (Barney, 1991). Efficiency acquisition motives are also considered knowledge-based resources because they are more process than asset related.

Considering the theoretical contributions of a variety of resource-based scholars to defining the nature of resources as sources of competitive advantage, the main differences between property and knowledge-based resources and the resource motive categories of each resource type are as follows. Property-based resources are related to "having" (Hall, 1993: 608), are people independent (Amit and Schoemaker, 1993), are defensible by law (Mahoney and Pandian, 1992: 138; Hall, 1993; Miller and Shamsie, 1996), and are transferable from one firm to another (Teece, 1998). Knowledge-based resources, on the other hand, are related to "doing"

(Grant, 1996), are people dependent (Amit and Schoemaker, 1993; Grant, 1996; (Makadok, 2001; Teece et al., 1997), are not defensible by law, and are nontransferable due to their embeddedness. Table 1 contains a complete list of the resource categories used to code acquisition motives.

Identifying resource motives through content analysis of acquisition

announcements. A major assumption of this study is that acquirers' motives are stated in their press releases announcing the transaction. Since an acquisition represents a major transaction with significant strategic impact on the acquirer, the FTC mandates that the market be informed about the acquirer's activities. It is assumed that acquiring firm managers have more inside information about their firm than is available to the public and that they are in a special position to assess the benefits of such an important transaction. The acquisition announcement is typically used by management to suggest what direct economic and strategic benefits that they believe will come from the integration of specific target resources acquired. Thus, to categorize acquisition motives based on the types of resources acquired, content analysis was applied to the press releases announcing the acquisitions. Content analysis may be briefly defined as a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Neuendorf, 2002).

To facilitate the coding process, press releases were obtained from the LexisNexis Academic database using PR Newswire and Business Wire as sources. These communication outlets are the most commonly used by acquiring firms to announce this type of transaction and are considered the first official announcements of the deals. They usually contain a description of the transaction terms, the acquirer and target firms, and the motives that justify the acquisition. All subsequent media coverage of the transaction generally are based on these press releases. A

pilot screening of 200 acquisition press releases was used to develop a dictionary of definitions for each resource motive category. These definitions include the most common wording or phrases of the acquisition motives found in actual press releases. Coders were required to keep to the literal wording of the definitions to avoid interpretive variance. Because some deals involved the acquisition of both property and knowledge resources, acquisitions were classified as knowledge-based if at least 50% of the motives identified in the press release fell within the knowledge categories of this resource motive type (York and McDaniel, 2003). Following Neuendorf's (2002) recommendation, reliability tests were performed on the classification assigned to the primary resource motive type; the average percent agreement among the three raters was 84%, Scott's Pi 77%, and Cohen's Kappa 77%, all of which are considered acceptable based on agreed-upon standards. The final sample was composed of 43% (296) property-based and 57% (391) knowledge-based acquisitions. Detailed documentation of the content analysis procedures, the coding protocol, and the market reaction sensitivity to a more stringent coding scheme are available from the authors to ensure that others can replicate the study if desired.

Amount of publicly-communicated information. In a review of psychological and organizational research describing uncertainty, Gifford, Bobbitt and Slocum (1979) assign the general concept of information load to uncertainty measures that involve overall evaluations of the amount of data, cues, or stimuli available to the decision maker and the timeliness with which it is received. Following their definition, in this study uncertainty is associated with the amount of publicly communicated information about an acquisition, which is operationalized as the word count of the acquirer press release announcing the transaction. The word count is considered an objective measure because it does not depend on coder judgment.

Acquirer and target relatedness. Relatedness of the acquisition is measured using SIC (Standard Industrial Classification) similarity. Specifically, the relatedness of the acquirer's and target's primary lines of business was operationalized as a binary variable (0 for unrelated; 1 for related) at the two-digit SIC level, where the firm's primary 2-digit SIC classification was taken from the SDC data base. This approach has been taken in past cross-sectional work (Kusewitt, 1985; Moeller *et al.*, 2004; York and McDaniel, 2003).

Acquirer's short-term market performance. Many measures of acquiring firm performance have been used by financial economics and strategy researchers, but the market-based returns measure is the dominant one (see Agrawal *et al.*, 1992; Bradley, Desai and Kim, 1988; Capron and Pistre, 2002; Chatterjee, 1992; Hayward, 2002; Jarrell and Poulsen, 1989; Lubatkin, 1983; Singh and Montgomery, 1987; Yook, 2003). In this research, standard event study methodology using stock market returns is used to assess acquiring firm performance. The acquisition announcement is assumed to be a relevant event for the acquiring firm that releases new information to the market. An effect on the acquirer's stock price is expected because such transactions are generally major events with significant economic impact on the firm. The timing of the release of information about the transaction is part of the negotiation strategy of the firms involved and is regulated by the Securities Exchange Commission to avoid the use of privileged information in the stock market. Generally, the information about a friendly acquisition is kept confidential until the negotiations are well underway and then is released to the market through an official press wire where the firms involved in the deal announce the transaction, describe "how" the deal will be carried out, and explain "why" it is a good deal for their business and stockholders. The market reevaluates the acquirer's share price to reflect their perception of how the transaction affects the value of the firm.

Since Fama *et al.* (1969) introduced event study methodology, it has become the standard method in strategy and financial economics research for measuring security price reaction to some business event. If an event (i.e. the announcement of an acquisition) has an information effect on the wealth of the firm's security holders, there should be a nonzero stock-price reaction on the event date (Fama, Fisher and Jensen, 1969). Thus, inference is based on the statistical significance of abnormal returns, termed "the announcement effect," during an event window.

Normal or predicted returns for a security are those returns expected to be observed if no event occurs. These normal returns are estimated over a time period, called the estimation window, prior to the event window. The estimation period should be other than the days immediately surrounding the event date because the information about the deal negotiation process normally starts to leak to the market some days before the official announcement date, and the effects of the new information may continue to show up in the share price for several days after. The event window to evaluate the impact of an acquisition announcement should be as short as possible but more than one day, "including at least the day of the announcement and the day after the announcement" (MacKinlay, 1997: 15; McWilliams and Siegel, 1997: 636). Large event windows present various problems. The larger the event window, the more difficult it is to control for confounding events, and the ability of the event study methodology to detect non-zero abnormal returns is severely compromised (Brown and Warner, 1980, 1985).

In this study, day 0 is defined as the acquisition announcement date. Even though the market might show some reaction before the announcement date because of possible information leakage, it is considered that the days after the announcement day are more suitable to capture any abnormal return resulting from the transaction announcement. The press release, where the dominant resource motivation for the transaction is stated by the acquirer, is assumed a more

reliable source of information than the rumors of the deal before it is officially announced. The SDC announcement date was corroborated with the first press release that announces the deal. For the reasons stated above, this study evaluates the market reaction using a 2-day event window represented as (0,+1).

Schwert's (1996) findings suggest that the market starts to react to an acquisition 42 trading days (roughly 2 months) before the official announcement date. For this reason, the period or window used to estimate the market model does not include the 45 days prior the announcement date. Studies with daily data tend to use about one year of observations for the estimation period (Binder, 1998). In this study, the market model is estimated by ordinary least squares, using data from a 255 trading-day estimation period ending 46 trading days before the event date. During the estimation period the determinants of the normal return are not expected to change due to the event under study (acquisition announcements).

Three classes of techniques may be used to estimate normal or expected common stock returns: 1) market models; 2) mean-adjusted models; and 3) market-adjusted models. There may be several variations within each class, but the market model is the standard. The advantages of the market model method over the others are that it controls for the risk (market factor beta) of the security and removes the effects of economy-wide factors from the security's return, leaving only the portion of the return attributable to the event-specific information. The variance of the abnormal return is reduced by removing the portion of the return that is related to variation in the market return. This in turn leads to increased ability to detect event effects.

The market model requires two time series of return data for each security-event: an estimation period time series for estimating the benchmark parameters, and an event period for computing prediction errors based upon the estimated parameters which are assumed constant

during both periods. The benchmark parameters in the market model specify a linear ex-ante relation between the return on the securities of firm *i* and the return on a market index (such as the equally-weighted CRSP index or the S&P 500 index). This study uses as the market index the equally-weighted CRSP index, which is the most commonly used in merger and acquisition event studies. The equally-weighted index is more likely to detect abnormal security returns due to its greater degree of correlation with the security returns; the greater the precision of the estimated parameters, the more easily detectable are the abnormal returns (Peterson, 1989). The prediction errors represent abnormal returns. The estimation period and the event period (window) do not overlap to avoid biasing the parameter estimates in the direction of the event effect. Further event study details and formulas for calculating returns can be found in McWilliams and Siegel (1997) and are also available from the authors.

Controls

To assure that the effects of the independent variables that are being studied are in fact attributable to those variables, variables of demonstrated importance in explaining acquisition performance in prior financial economics and strategy studies - payment method, accounting method, relative size, year, and deal consummation - are included as controls. Following Coff (1999), the payment method is operationalized as the portion of the offer that is paid in cash as reported by the SDC database. The accounting method used for the combination of the firms involved in the deal is operationalized as a dummy variable (1 for pooling of interests and 0 for purchase). This information was also obtained from the SDC data base. Following Moeller *et al.* (2004) and Sirower (1997), relative size of the deal is the transaction value divided by the equity market capitalization of the acquirer at the end of the fiscal year prior to the acquisition announcement. The market capitalization data was obtained from the COMPUSTAT database,

and the SDC database provided the transaction value. The variable “year” is defined as the acquisition year minus 1989. A dummy variable is included representing whether the transaction was consummated (1) or not (0)".

EMPIRICAL RESULTS

Descriptive Statistics and Correlation Matrix

Table 2 shows sample characteristics by resource type. Highlights of this descriptive data are that while deal size, consummation, and relatedness are similar for both property and knowledge-motivated transactions, deals motivated by a target’s property resources are characterized by less negative abnormal returns, more cash, and more frequent use of the purchase (as opposed to pooling) method of accounting than deals motivated by a target’s knowledge resources.

The distribution of acquisitions by year and industry classification are available from the authors. While the analysis by year and industry gave non-significant results due to the small sample size available for testing, sensitivity analysis suggests that the role of time frame may be worth pursuing further. The Pearson correlation matrix is presented in Table 3.

Hypotheses Tests

H1: The type of target resources acquired will be significantly associated with an acquirer’s short term market performance. The mean performance of property-motivated acquisitions will be more favorable than that of knowledge-motivated acquisitions.

Hypothesis 1 was tested in two ways. First, the significance of the difference between cumulative abnormal returns (CAR) means of property and knowledge-based acquisitions (shown in Table 2) was assessed with a t-test; and second, the relationship between resource type and acquirer’s short term performance (CAR) was tested using a multiple regression model controlling for other variables that have been associated with acquirer performance in previous

studies (payment method, accounting method, relative size, year, and deal consummation). Table 4 shows the results of the cross-sectional regression. The findings using both the bivariate and multivariate methods support H1.

H2: The amount of information communicated to the public in acquisition announcements will be greater in knowledge resource-motivated deals than in property resource-motivated deals.

A t-test was used to test Hypothesis 2. Table 5 shows that the word count mean of acquisition press releases is significantly larger for knowledge-motivated (1144.3) than for property-motivated deals (999.12). This empirical evidence supports the argument that knowledge-based acquisitions involve more uncertainty than property acquisitions.

H3: The relationship between acquirers' short term market performance and target resource type will be moderated by the degree of relatedness between acquirer and target businesses. An acquirer's short term market performance in knowledge resource-motivated acquisitions will be more favorable when the acquirer and target businesses are related.

Hypothesis 3 suggests that relatedness between the primary industry of the acquirer and the target moderates the relationship between acquisition resource motives and acquirer short-term market performance, with a larger CAR mean for knowledge-based acquisitions expected in related than in unrelated deals. Table 6 shows that in the two-way ANOVA, the main effect of relatedness is not significant, and the interaction effect is small but not significant. Unrelated property transactions offered the only positive average abnormal returns of the four categories. Thus, H3 was not supported.

DISCUSSION, CONTRIBUTIONS, IMPLICATIONS, FUTURE DIRECTIONS

Acquisitions have an important economic impact and represent an important strategy available to corporations that need access to valuable resources. However, empirical evidence indicates that the economic benefits of these transactions historically have not been captured by

the acquirers. Thus, at least two questions remain unanswered: Why do acquirers continue doing deals? and Do knowledge-based acquisitions produce better performance results than other types? The present study suggests that not all deals are equal by specifically exploring the relationship between target resource type and acquirer performance. Its findings show that the strategy of acquiring knowledge-based resources is associated with lower acquirer performance and that the amount of information used to announce knowledge-based transactions is representative of the uncertainty associated with their resource value.

The bidder's short-term market performance results support the first hypothesis (H1), which suggests an adverse market reaction to knowledge-motivated acquisitions when compared with property-motivated acquisitions. This result is congruent with the findings of Arikan (2004a; 2004b) on long term market performance of knowledge-based acquisitions and of Jones et al (2001) on external technology acquisition. The findings also are consistent with Coff's (1999) association of lower acquisition premiums with knowledge acquisitions.

The second hypothesis (H2), which proposed that the amount of information communicated through acquirers' press releases announcing the takeover would be greater for knowledge than for property-motivated acquisitions, was also supported. This result not only provides an underlying reason for the H1 findings, but also suggests that Coff's uncertainty explanation is more plausible than Arikan's nonredeployment theory, neither of which was directly tested empirically. The results support the notion that acquiring managers believe that the higher uncertainty associated with a target's knowledge resources may affect the market's reaction to the acquisition and thus, as a result, they may attempt to decrease the knowledge resource disadvantage by providing more information about those transactions.

The third hypothesis, which proposed a moderating role of relatedness in the resource type and acquisition performance relationship, was not supported. Another surprising finding was that the performance of property-based acquisitions is significantly lower in related than in unrelated deals. Harrison *et al.* (1991: 186) suggest a partial explanation for these findings, proposing that similarities between firms in related deals are likely known and that other firms with the same similarities may seek to acquire the same target, thus creating competitive bidding and driving up the price of the target. If the market considers the acquisition overpriced, it may discount the value it is willing to pay for that transaction (Sirower, 1997). The present study both confirms and refines Harrison *et al.*'s argument by suggesting that the related acquisition discount might apply only to property-based acquisitions. In other words, it would be easier for acquirers to enjoy the private and valuable synergistic cash flows or the unexpected synergistic cash flows alluded to by Barney (1988) when the acquisition is property-motivated and the target firm is from an unrelated market.

Contributions and Implications of the Research

This research makes contributions to the acquisition performance research stream in three areas: methodological, empirical and theoretical. The primary methodological contribution of this study is the novel and generalizable way in which target resource type and uncertainty are operationalized. While access to knowledge via acquisitions is mentioned by scholars and practitioners as the main motivation for these strategic events, measures used to operationalize knowledge resources have been limited in past studies to the use of broad characterizations of resources, which oversimplify by using financial data. The present study is the first cross-sectional acquisition research to use content analysis to identify the specific target resources that motivate deals from the acquirer's management perspective in order to assess their effect on the

acquirer's market performance. As such, this research enriches the theoretical classification criteria and resource categories definitions developed by Miller and Shamsie (1996) and refined by York and McDaniel (2003) and develops a detailed coding protocol that will facilitate future use of the resource typology. It also provides evidence of the reliability, accuracy, and precision of the classification measure. Additionally, the present study operationalizes the degree of uncertainty in resource acquisition as the amount of information provided by the acquiring managers in press releases announcing the deal. This measure has the advantages of availability and objectivity; it is easily obtained from the press releases and its value does not depend on researchers' or coders' judgments.

The primary empirical contribution made by this research is the contradictory finding that having knowledge-based resources, which has been found to have a positive impact on firm performance (Carmeli and Tishler, 2004; De Carolis, 2003; Hatch and Dyer, 2004; McEvily and Chakravarthy, 2002; Villalonga, 2004) , does not seem to translate into an acquisition setting, despite the increase in acquisitions motivated by gaining access to a target's knowledge resources. While providing support for Arikan's (2004a) similar findings, the present study varies both methodologically and operationally from her study of the relationship between resource type and acquirer's performance in terms of sample size, time frame, dependent variable, and resource type categorization. It also adds relatedness as a moderating variable and directly tests the underlying cause of the relationship between resource type and acquirer market performance, providing empirical evidence for Coff's (1999) explanation that the uncertainty associated with knowledge resources activated acquirers' coping strategies rather than for Arikan's nonredeployment explanation. The fact that both this and Arikan's studies arrive at the

same conclusion, however, provides strong evidence for a negative relationship between knowledge resource acquisition and acquirers' market performance.

The main theoretical contribution is the focus of the present study on acquiring managers' resource motives rather than on target resource composition (e.g. using a target firm's Tobin's q). This approach is theoretically consistent with Walter and Barney's (1990) resource theory-based suggestion that investigating the pattern of acquisition goals should provide important insight into corporate strategy. Future research should explore in more depth such questions as whether a target's knowledge resources are actually less valuable than property resources due to the reasons mentioned above, or might the market simply be unable to correctly assess their long-term impact, due to incomplete information.

The implications of the findings for managers making strategic acquisition decisions are clear. They suggest that the decision to acquire a target firm in order to gain access to their knowledge resources should be approached with caution. The likely negative market reaction to knowledge-motivated transactions suggests the need to use improved methods to assess the potential value of such resources and to accurately communicate that value to investors.

Limitations and Directions for Future Research

Although the results reported here are provocative and the research approach has provided a rich data set with which to analyze managerial motives in business acquisitions, this study has important limitations. First is the use of a subjective source (management motives) as a proxy for actual target resources acquired. This measure reflects the relatively difficult task of identifying knowledge-based resources with potential synergies in a business acquisition. In this study, coarse-grained resource measures (financial ratios or Tobin's q) were replaced with a more specific and multi-faceted resource identification measure. Although it is not without

difficulties, this subjective measure more directly captures what the deal is about than measures of a financial nature.

Second, the issue of non-random data availability or sample selection bias affects this study as it does most other similar studies. The external validity of the results may be affected by the fact that sample firms might not be representative of the merger activity during some years covered by the study. A related issue is that the study's findings may not generalize to the time frame following the 2000 stock crash. The internet bubble at the turn of the decade marked a *fin de siècle*, where errors in internet and related high-tech stocks valuation were evident (Malkiel, 2003). Changes in accounting and reporting regulations demanding more clarity in valuing firms' resources may have affected the market's assessment of acquisitions after the market bubble burst. The fact that the results are contingent on the time frame used indicates the need to validate previous findings using post-2000 data that is just becoming available.

Third, the design of this study did not include serial acquirers (i.e. those with more than one acquisition within a single year) because such situations could obscure market reaction to the acquisitions of interest. While empirical evidence suggests that differential short term performance is not achieved by knowledge-based acquisition, continuous knowledge acquisition is said to be critical to survive and outperform in rapid change industries. A performance study of firms with multiple knowledge-motivated acquisitions over a long term time frame might begin to answer the question of why there is still so much acquisition activity despite the mounting evidence of lackluster deals. Another stream of research that might shed some light on the link between target resource type and acquirer's performance is the use of real options as a method to unlock the value embedded in target resources that many scholars and practitioners

believe exists but have been unable to quantify. Uncertainty typically is considered bad for the valuation of traditional cash flows. In contrast, uncertainty increases the value of real options.

Fourth, even though a few key variables that significantly moderate the relationship between resource type and acquirer performance were identified, acquisitions are such a complex phenomenon that the performance variance explained by the model was relatively low (7%). With so many possible variables influencing acquirers' short term performance, additional or alternative explanations may exist for the study's results. Clearly, there is a need for further theoretical development.

Fifth, while Arikian's findings suggest that even the longer term market reactions to knowledge resource acquisition are negative, additional exploration of longer term performance and the acquisition of knowledge resources has merit. Such studies may resolve the apparent conflict between firms that *have* knowledge resources and those that *buy* them. It may be that the firm's ability to successfully achieve knowledge transfer will bridge the gap. As such, the development of knowledge transferability measures related to knowledge integration may prove useful in this regard (Bannert and Tschirky, 2004; Ranft and Lord, 2002).

Finally, the fact remains that there is a disconnection between the anecdotal and theoretical emphasis on knowledge access through corporate takeovers and the empirical findings that the market responds negatively to such strategies. If corporate acquisitions are to continue as a viable way to access knowledge rather than become merely a passing fad, future research will need to solidly link this strategy to the creation of economic value for acquirers' shareholders. Because it is clear that the performance implications of knowledge acquisition vary according to industry setting (see also Miller and Shamsie's findings, 1996), the relationship

between the resource type and acquirer market performance will need to be investigated within the environmental context in which they occur.

TABLE 1
Property and knowledge-based resource coding list

Property-based resources	Knowledge-based resources
P1: Access to new markets	K1: Market knowledge and skills
P2: Property, plant, equipment	K2: Efficient processes, procedures
P3: Market position/market consolidation, market share	K3: Economies of scale, cross-selling
P4: Bargaining power	K4: Restructuring efficiencies, economies of scale
P5: New product, business, service	K5: Managerial knowledge, skills
P6: Intellectual property- brands, trademarks, copyrights, patents	K7: Technological knowledge, skills
P8: Contracts, agreements, licenses	K8: IT knowledge, processes
P9: Critical mass, minimum efficient scale	K9: Human capital (non-management)
P10: Financial capital	K10: Relationships, networks
P11: Data bases	K11: Culture
P12: Distribution networks	K12: Company reputation, image
PX : Other property resource motives	K13: Product technology
	KX : Other knowledge resource motives

TABLE 2
Summary statistics sorted by acquisition type

	All	Property	Knowledge
Number of Deals	679	291	388
Cumulative Abnormal Returns (0,+1)	-0.018	-0.009	-0.025
Cash in payment (%)	28.53	32.95	25.22
Relative deal size	0.58	0.57	0.59
Related deals	0.66	0.67	0.64
Accounting method (pooling)	0.35	0.29	0.41
Consummated deals	0.86	0.84	0.88

TABLE 3
Pearson Correlations^a

Variables ^b	1	2	3	4	5	6	7
1. Performance (CAR)							
2. Resource type	.112**						
3. Payment method	.216**	.093*					
4. Accounting method	-.168**	-.126**	-.508**				
5. Relative size	-.125**	-.008	-.142**	-.028			
6. Deal consummation	.090*	-.057	.128**	.078*	-.106**		
7. Relatedness	-.025	.033	-.099**	.110**	.033	-.024	
8. Year	-.047	-.044	.075	-.021	.049	.050	.029

^a N= 679

^b For resource type, 1= “property-based”, 0= “knowledge-based”, for accounting method, 1= “pooling of interests”, 0= “purchase”, for deal consummation, 1= “consummated”, 0= “not consummated”, for relatedness, 1= “related”, 0= “not related”.

** p< 0.01 level

* p< 0.05 level

Two-sided tests

TABLE 4
Results of Cross-Sectional Regression Analysis for Acquirers' market Performance^a

Independent Variables ^b	b	s.e.
(Constant)	-.023	.012
Resource type	.013*	.006
Payment method	.000**	.000
Accounting method	-.015*	.007
Relative size	-.008*	.003
Consummation	.017*	.008
Relatedness	.001	.006
Year	-.002	.001
R ²	.078	
Adjusted R ²	.068	
F	8.081***	

^a n= 679

^b For resource type, 1= “property-based”, 0= “knowledge-based”, for accounting method, 1= “pooling of interests”, 0= “purchase”, for deal consummation, 1= “consummated”, 0= “not consummated”, for relatedness, 1= “related”, 0= “not related”.

* p< .05

** p< .01

*** p< .001

TABLE 5**Word count statistics of acquisitions announcement press releases**

Resource type	N	Word Count Mean	Std. Deviation
Knowledge	388	1144.30	561.53
Property	291	999.12	580.15

t	df	Sig. (2-tailed)	Mean Difference
3.287	677	0.001	145

TABLE 6**A: Two-way ANOVA for acquirer CAR mean by resource type and firm relatedness**

Source	Sum of Squares	df	CAR Mean Square	F	Sig.
Resource type	0.0616	1	0.0616	11.5803	0.0007
Relatedness	0.0058	1	0.0058	1.0847	0.2980
Resource type * Relatedness	0.0178	1	0.0178	3.3524	0.0675
Within	3.5902	675	0.0053		
Total	3.6573	678			

B: Difference of CAR means statistics between relatedness and resource type

PANEL A

Relatedness	Resource type	N	CAR Mean	CAR Mean Difference	t-test	Sig. (2-tailed)
Unrelated	Property	95	0.0031	0.0313	3.2635	0.0013
	Knowledge	139	-0.0282			
Related	Property	196	-0.0141	0.0094	1.3394	0.1811
	Knowledge	249	-0.0235			

PANEL B

Resource type	Relatedness	N	CAR Mean	CAR Mean Difference	t-test	Sig. (2-tailed)
Property	Related	196	-0.0141	-0.0172	-1.8758	0.0617
	Unrelated	95	0.0031			
Knowledge	Related	249	-0.0235	0.0047	0.6123	0.5407
	Unrelated	139	-0.0282			

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