

# Cross-Business Information Technology Integration and Acquirer Value Creation in Corporate Mergers and Acquisitions

Hüseyin Tanriverdi

Department of Information, Risk, and Operations Management, Red McCombs School of Business,  
University of Texas at Austin, Austin, Texas 78712, [huseyin.tanriverdi@mcombs.utexas.edu](mailto:huseyin.tanriverdi@mcombs.utexas.edu)

Vahap Bülent Uysal

Department of Finance, Price College of Business, University of Oklahoma, Norman, Oklahoma 73019,  
[uysal@ou.edu](mailto:uysal@ou.edu)

This study develops and tests the idea that the cross-business information technology integration (CBITI) capability of an acquirer creates significant value for shareholders of the acquirer in mergers and acquisitions (M&A). In M&A, integrating the IT systems and IT management processes of acquirer and target could generate benefits such as (a) the consolidation of IT resources and the reduction of overall IT costs of the combined firm, (b) the development of an IT-based coordination mechanism and the realization of cross-firm business synergies, (c) the minimization of potential disruptions to business operations, and (d) greater ability to comply with relevant laws and regulations and the reduction of regulatory compliance costs. We test these ideas in a sample of 141 acquisitions conducted by 86 Fortune 1000 firms. In the short run, acquirers that have high levels of CBITI capabilities receive positive and significant cumulative abnormal returns to their M&A announcements. Announcement period returns indicate that the capital markets value CBITI similarly in same-industry and different-industry acquisitions. In the long run, acquirers with high levels of CBITI capabilities obtain significantly higher abnormal operating performance. They create significantly greater value in complementary acquisitions from different industries than in related acquisitions from the same industry. The findings have important implications for M&A research and practice.

*Key words:* corporate mergers and acquisitions; cross-business IT integration; short-run abnormal stock returns; long-run abnormal operating performance

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## Introduction

Corporate mergers and acquisitions (M&A) are prevalent and economically significant across almost all sectors of the economy. In 2006, the economic volume of M&A transactions reached \$3.79 trillion globally, according to the market analysis firm Thomson Financial. However, financial returns to the shareholders of acquirers are not significantly different from zero (Andrade et al. 2001, King et al. 2004). The wide variance around the mean implies that a subgroup of acquirers obtains major financial gains, whereas another incurs major losses (Capron and Pistre 2002). In the finance literature, a recent review of M&A studies concludes that the coarse-grained nature of the data and measures have inhibited finance researchers' ability to identify the mechanisms underlying acquirer gains or losses (Andrade et al. 2001). In the strategic management literature, a recent meta-analysis of M&A studies finds that the most commonly stud-

ied antecedent mechanisms of acquirer returns fail to uncover how acquirers create or destroy value in M&A (King et al. 2004). Researchers call for new research to identify organizational mechanisms by which acquirers create value for their shareholders in M&A transactions (Andrade et al. 2001, Zollo and Singh 2004).

In this study, we theoretically develop and empirically validate the idea that the cross-business information technology integration (CBITI) capability of an acquirer is an important value-creation mechanism in M&A. First, the CBITI capability could create significant cross-business synergies in IT resources and reduce the overall IT costs of the merging firms, given that more than 50% of firms' capital investments go to IT resources (Tanriverdi 2006). Second, the CBITI capability could create significant cross-firm synergies in non-IT business resources by serving as a cross-business coordination mechanism

and enabling the exchange of knowledge resources in the merged firm (Capron and Pistre 2002, Tanriverdi 2005). Third, the CBITI capability could minimize potential disruptions in the business operations of the two firms during the merger. Because of the pervasiveness of IT across firm value chains, the ability to integrate the underlying IT systems and IT management processes of acquirer and target is important for integrating business operations without causing major delays or disruptions (Homburg and Bucorius 2006, Zollo and Singh 2004). Finally, the CBITI capability could enable the merged firm to comply with government regulations and reduce the costs of regulatory compliance.

Despite the relevance of CBITI to shareholder value creation in M&A, IT has been the least studied of all corporate functions in M&A. The predominant concerns of executives during predeal negotiations are statutory and regulatory issues, financial and tax structuring, and business synergies (Witney and Boss 2004). Most of them do not recognize the importance and intricacies of IT integration in M&A. For example, executives of German firms undertaking M&A in the United States rank IT as the least important of all premerger due-diligence activities after the legal, tax, financial, cultural, environmental, human resource, and marketing activities (Wübben 2007). Furthermore, an Accenture survey finds that only 24% of acquirers involve their IT executives in premerger integration planning (Curtis and Chanmugam 2005). Most IT executives learn about their firms' new acquisition announcements from the press, along with everyone else (Vielba and Vielba 2006).

In academia, M&A performance has attracted significant research attention in the finance and strategic management disciplines. However, these disciplines have not recognized IT as a value creation mechanism in M&A. A nascent stream of the IS literature recognizes the importance of IT integration in M&A, but the main dependent variable of interest in the IS research on M&A has been IT integration rather than M&A performance (Accenture 2002, Brown et al. 2003, Giacomazzi et al. 1997, Johnston and Yetton 1996, Main and Short 1989, McKiernan and Merali 1995, Mehta and Hirschheim 2007, Merali and McKiernan 1993, Stylianou et al. 1996, Sumi and Tsuruoka 2002, Weber and Pliskin 1996). IS research does not yet link CBITI to M&A performance, nor does it theoretically explain whether, how, and why CBITI ought to create value for the shareholders of acquirers.

In this study, we posit that acquirers with stronger CBITI capabilities will better address the challenges of cross-business integration in M&A and achieve superior M&A performance. We test this proposition in a sample of 141 acquisitions conducted by 86 Fortune 1000 firms. Our findings indicate that, in the

short run, acquirers with superior CBITI capabilities receive significant cumulative abnormal returns (CAR) to their M&A announcements. In the long run, over a period of five years after the acquisition, they also achieve significantly higher abnormal operating performance. These findings contribute to the M&A literature by identifying the CBITI capability of an acquirer as a significant value creation mechanism in M&A.

## Theory and Hypotheses

### Cross-Business Organizational Integration in Acquisitions

An acquisition creates value for the shareholders of an acquirer when the acquirer and target exploit unique cross-business synergies (Seth et al. 2000) and create additional value over and above the sum of the two firms' individual value (Coff 1999). Exploitation of cross-business synergy requires organizational integration and resource sharing between the two firms (Hitt et al. 2001, Larsson and Finkelstein 1999, Zollo and Singh 2004). Organizational integration is the process of combining some or all of the previously distinct and interdependent assets, structures, business processes, systems, people, and cultures of the two firms into a unified whole (Barki and Pinsonneault 2005, Mehta and Hirschheim 2007, Pablo 1994). The extent of organizational integration can range from marginal to partial to full integration (Wijnhoven et al. 2006). At higher levels of integration, larger numbers of organizational units from the acquirer and target communicate, cooperate, and share resources with each other to accomplish the tasks of the merged firm.

At higher levels of organizational integration, there is a need for more cross-business coordination (Zollo and Singh 2004). A number of nontechnical, human-intensive coordination mechanisms are available: e.g., liaison roles, integrating managers, cross-unit groups, task forces, direct contact among managers, and so forth (Brown 1999). However, as organizational size grows, the coordination capacity of human-intensive mechanisms becomes limited (Brown 1999). IT-based integration and coordination mechanisms become critical for achieving higher levels of organizational integration (Markus 2000).

### Cross-Business IT Integration in Acquisitions

Academic and practitioner literatures indicate that cross-business IT integration activities take place in five distinct but complementary domains of IT resources: (a) integration of IT infrastructures (e.g., IT hardware, data communications networks, operating systems), (b) integration of IT applications and data, (c) integration of IT human resource management practices, (d) integration of IT vendor management

practices, and (e) integration of IT strategy-making practices (Brown et al. 2003, Giacomazzi et al. 1997, Johnston and Yetton 1996, Main and Short 1989, Mehta and Hirschheim 2007, Merali and McKiernan 1993, Robbins and Stylianou 1999, Stylianou et al. 1996, Wijnhoven et al. 2006).

According to Milgrom and Roberts (1990, p. 514), the defining characteristic of a system of complements is that the elements of the system mutually depend on each other. They covary with each other and reinforce each other's performance. Thus, the extent of integration of any one of the five complementary IT resources affects marginal returns to the integration of the remaining ones as well. This implies that an acquirer has strong incentives for simultaneously undertaking and coordinating IT integration activities in all five of the IT resource domains. Thus, we conceptualize the CBITI capability as a system of complementary IT integration capabilities that are, respectively, responsible for IT integration activities in the five complementary IT resource domains. We define the CBITI capability of an acquirer as the extent to which the acquirer combines the target's system of complementary IT resources with its own and unifies them into a whole (Mehta and Hirschheim 2007, Tanriverdi 2006).

### The Five Dimensions of Cross-Business IT Integration in Acquisitions

**Integration of the IT Infrastructures of Acquirer and Target.** A firm's IT infrastructure consists of complementary technologies such as data communications networks, computing hardware, and operating systems software. Integrating these technologies is essential for creating a common IT infrastructure over which acquirer and target can seamlessly exchange business data. However, IT executives cite technological incompatibility problems among the top IT integration challenges in M&A (Vielba and Vielba 2006, p. 57). Even firms operating in the same industry suffer from the technological incompatibility problem. For example, when Bank of America acquired FleetBoston, there was little overlap between the core computer systems of the two banks. Bank of America faced the challenge of integrating hundreds of disparate IT systems (Duvall 2003). Once integrated, maintaining the commonality of the IT infrastructure across the merged firms is also a challenge. Each firm tends to invest in IT to accomplish its own goals. If the IT investments are not coordinated, the integrated IT infrastructure can rapidly disintegrate and diverge. Setting common policies and standards for hardware, software, and communications technologies could ensure the commonality of the IT infrastructure on an ongoing basis (Tanriverdi 2006).

**Integration of the IT Applications and Data of Acquirer and Target.** IT applications and data run on IT infrastructure and support the business processes and operations of a firm. IT applications and data complement each other. If an acquirer decides to integrate the IT applications of a target with its own, it also needs to integrate the target's data. Integrating IT applications and data of the acquirer and target is critical for integrating the business processes and operations of the merged firm.

IT applications refer to software applications such as customer support systems, transaction-processing systems, and workflow management systems. The IT application portfolios of large firms could contain thousands of applications. For example, when Chase Manhattan acquired Chemical Bank, it had to integrate a total of 2,500 IT applications (Duthoit et al. 2004). Integrating the IT application portfolios of merging firms is challenging because the applications exhibit different levels of standardization, customization, automation, scalability, and compatibility. Some IT applications are custom developed to meet the specific business needs of one firm. Custom-developed IT applications are more difficult to integrate, migrate to commercial packages, and maintain and support. Commercial off-the-shelf application packages (e.g., Oracle eBusiness Suite, SAP mySAP, PeopleSoft/Oracle Enterprise) exhibit higher levels of standardization, but they can also entail significant integration challenges and costs when acquirer and target use customized configurations. For example, when Detroit Edison Co. acquired the Michigan Consolidated Gas Co., their bankers estimated \$25 million in savings for IT alone because both firms were using PeopleSoft applications, and their integration was assumed to be straightforward. The estimated cost savings were not realized because the two firms had customized their PeopleSoft applications by 70% and 40%, respectively, and such levels of customization created significant challenges in integration (Shearer 2004).

Data refer to customer profiles, employee skills and expertise, product designs, best practices, and so forth. Most firms have unique internal systems environments and use idiosyncratic data schemes (Markus 2001). Differences in the formats of structured data (e.g., 8- versus 12-digit product codes) create incompatibility problems when dealing with customers and suppliers, and require the migration of large volumes of data from one IT system to another in M&A. For example, when Royal Bank of Scotland (RBS) acquired National Westminster Bank (NatWest), data migration was the biggest IT integration challenge:

Our biggest milestone was to convert NatWest customer data to RBS's IT platform. . . . [It] involved thousands of conversion jobs, migrating 250 GB of data and

transferring 14 million customer records and 33 million direct debit records. From a planning perspective it involved 4,200 people and 9,200 milestones!

(Watson 2003, p. 18)

If the acquirer lacks data migration capabilities, data loss is likely during the migration and conversion processes. For example, when Wells Fargo acquired First Interstate Bancorp, faulty data migration led to the loss of some customer records, which in turn, led to long lines at branches and administrative snarls. Wells Fargo had to announce a write-off of \$150 million to cover the lost deposits (Popovich 2001). Once the data migration project is over, the next challenge is to ensure that the data will remain integrated on an ongoing basis. To minimize the possibility that data incompatibilities reemerge, it is important that the merged firms use common data models and data ownership policies.

**Integration of the IT Human Resource Management Processes of Acquirer and Target.** IT human resource management entails a complementary set of management practices such as recruitment, training, motivation, and retention of a firm's IT human resources. In an acquisition, consolidation, or transformation of the IT organizations of acquirer and target could create significant uncertainty and turmoil for IT employees. Some IT jobs may be threatened. Some IT employees may have to relocate to new geographic locations. Some may have to upgrade or retool their IT skill sets to serve the IT needs of the merged entity. In such a context, it is not uncommon for IT talent to resist change or seek new job opportunities (Brown et al. 2003). Thus, IT HR management practices such as the retention, training, and motivation of existing IT talent and the recruitment of new talent are critical for ensuring that the acquirer has a capable and motivated IT workforce to tackle the CBITI challenges.

Retention of key IT talent is one of the primary concerns of CIOs during M&A (Vielba and Vielba 2006, p. 95). It could be difficult and costly to replace lost IT talent, especially those who have knowledge of firm-specific IT systems and applications. To retain the key IT talent, an acquirer needs to decide quickly which employees to retain, and must implement retention practices such as recognizing their skills, getting them involved in the IT integration process, offering them career development opportunities, and providing them with appropriate new contractual terms and benefits (Vielba and Vielba 2006). Providing training programs and opportunities to IT talent could be useful for upgrading their skill sets and preparing them for the needs of the new IT organization. Aligning their interests with the business goals of the merged firm could also motivate the IT talent to stay with the firm and contribute to the achievement of the firm's business goals.

Considering that the IT organizations of acquirer and target have their respective IT-HR management processes prior to the acquisition, it could be challenging to decide whose retention, training, motivation, and recruitment practices to use in the merged organization. Some acquirers impose their own IT-HR management practices and require the targets to go through major cultural changes. Some leave much of the targets' IT-HR management processes unchanged. Others mix the two approaches and require cultural changes in both firms (Vielba and Vielba 2006). Using common IT-HR management practices across the two firms could create economies of scale and scope. If one firm excels in recruiting, training, motivating, and retaining skilled IT talent, the other can also benefit from that expertise. Common IT-HR practices could also promote common goals, principles, values, and language among the IT workforce, which are important precursors for facilitating the rotation of IT talent as well as the sharing and integration of IT knowledge across the two firms.

**Integration of the IT Vendor Management Processes of Acquirer and Target.** IT vendor management entails a complementary set of management practices such as determining strategic goals for IT vendor relations, negotiating and making deals with vendors and service providers, and managing vendor relationships. Prior to an acquisition, the acquirer and target have ongoing relationships with their respective IT vendors to source their hardware, software, and service needs. After the acquisition, the acquirer needs to decide which vendors to terminate, which vendors to keep, and how to change some of the existing vendor contracts. Negotiations need to address licensing rights, exclusivity pacts, obligations, competition issues, and penalties associated with the termination of previous deals. Changes to existing contracts need to reflect the new requirements of the merged entity. Terminating or changing existing contracts could involve significant costs (Vielba and Vielba 2006). In addition, the acquirer and target may differ significantly in their approach to IT outsourcing. For example, before it was acquired by British Petroleum, Amoco was doing almost everything in-house, whereas British Petroleum outsourced everything from IT application development to telecommunications and IT help-desk functions (Worthen 2002). The two firms may also have different prior experiences with IT-outsourcing arrangements. Before acquiring Bank One, JP Morgan Chase had signed a major IT-outsourcing contract with IBM that was worth \$5 billion over a seven-year period. By contrast, Bank One brought back in house the IT operations it had previously outsourced to AT&T (Vielba and Vielba 2006). Acquirers and targets may also differ significantly in their strategic

goals for entering into vendor relationships, negotiating terms of contracts, making deals, and managing postdeal relationships (Useem and Harder 2000). Acquirers need to decide how to address the differences in IT vendor management practices between the two firms. They also need to clarify to existing vendors of the two firms what is expected of them during the IT integration phase in terms of performance, scalability, service-level agreements, and support services during the transition (Vielba and Vielba 2006).

If an acquirer can consolidate the disparate IT vendors and vendor management practices of the two firms, it could increase the negotiation power of the merged entity and obtain lower prices and higher-quality IT products and services. For example, former USA Group managers reported that after being acquired by Sallie Mae, their negotiating power increased with some of their old IT vendors because of their increased purchasing power as a Sallie Mae IT shop (Brown et al. 2003). Similarly, Daimler-Benz reported that after its acquisition of Chrysler it saved \$30 million by renegotiating terms with hardware suppliers (Meyer et al. 2005). However, conducting an orderly consolidation of existing vendors and pooling together the purchasing and negotiation powers of the two firms are not trivial tasks. It requires good vendor management skills both during the transition and in the steady-state phases. The acquirer needs to systematically coordinate IT vendor relationships across the two firms. In the absence of coordination, each firm could pursue separate contracts with the same vendor or buy similar products from different vendors. The lack of coordination could lead to overspending in IT resources, redundancies, and lack of standardization in the IT infrastructure of the combined firm. Instituting common IT vendor management processes across the two firms facilitates the sharing of purchasing information and best practices and fosters informed buying, contract preparation, and contract-monitoring practices (Feeny and Willcocks 1998).

**Integration of the IT Strategy-Making Processes of Acquirer and Target.** IT strategy making entails a complementary set of management practices such as determining strategic rationales of a firm's IT investments, formulating a firm's IT strategy, aligning its IT and business strategies, and managing its relationships between IT and business units.

As the foregoing discussions imply, achieving CBITI requires joint, coordinated actions by the acquirer and target. As the desired level of integration increases, the number, frequency, and interdependence of decisions and actions to be taken by the two firms also increase correspondingly (Zollo and Singh 2004). Coordinating the strategies of the two firms becomes critical for enabling joint actions (Campbell and Goold 1998). Using a common IT strategy across the two firms can

achieve the objective of fostering joint actions, but it can also inhibit autonomy and reduce the performance of each firm (Tanriverdi 2006). Using unique IT strategies in the two firms can provide autonomy and optimize the performance of each firm, but it can also foster independent actions and inhibit the development of a common IT infrastructure over which business information and knowledge can flow seamlessly. These coordination challenges could be addressed by providing general strategic direction to the two firms rather than coordinating the contents of their respective IT strategies. The institution of a common IT strategy-making process can provide the two firms with general strategic direction for coordinating their IT strategies and actions. A common IT strategy-making process embeds guidelines about strategic IT actions such as formulating and executing an IT strategy, aligning IT and business strategies, the process of managing relations between IT and business units, and making investments into IT resources (Tanriverdi 2006). The lack of direction for the strategic IT actions of the two firms makes decisions on technology, people, and business processes much more difficult, and creates duplications, incompatibilities, and higher costs during CBITI (Vielba and Vielba 2006).

### **CBITI and Acquirer Value Creation in Acquisitions**

A superior CBITI capability could create value for acquirers' shareholders through four major causal mechanisms. We explain and justify each of them in turn.

**CBITI Could Generate IT Cost Savings.** As discussed under the five dimensions above, a strong CBITI capability could generate significant IT cost savings in merged businesses. Duplications across the IT organizations of acquirer and target can be minimized because IT infrastructure technologies (e.g., hardware, software, and communications) and fundamental principles of good IT management (e.g., alignment of business and IT strategies, management of IT vendors, management of IT talent) are applicable even across unrelated businesses (Tanriverdi 2006). The acquirer has an opportunity to exploit IT synergies by consolidating IT assets and IT management practices and reducing the overall IT costs of the two firms. Practitioners estimate that IT synergies in a merger usually account for between 20% and 30% of the overall postacquisition benefits (Vielba and Vielba 2006). In some industries such as utilities, IT cost savings make up to 50% of the total postintegration synergies (Vielba and Vielba 2006). For example, when they announced the acquisition of Chase, top managers at JP Morgan estimated overall cost savings in the merger as follows: "We believe this merger will

create pretax synergies of \$3 bn, \$2 bn of cost savings and \$1 bn of incremental net revenue.” Analysts commented, “A significant share of the savings would come from a consolidation and integration of information systems” (Strassmann 2003). However, estimated cost savings in IT or revenue growth did not materialize during the postannouncement implementation phase because of CBITI problems. An analyst reported,

To demonstrate gains, at least one of the IT-related ratios would have to show improvement. IT/compensation should decline with rising efficiencies, but it increases 6%. IT/revenue should decline, but it increases 26%. IT/profit and IT/shareholder equity should decline, but they increase 294% and 3%, respectively. Every indicator has turned in the wrong direction. (Strassmann 2003)

**CBITI Could Minimize Potential Disruptions to Business Operations.** After deal announcement, the cross-firm integration phase starts. As the acquiring firm integrates operations of the two firms, rumors start emerging about potential changes in the product offerings, brands, product/service quality, pricing policies, sales structure, and customer service of the old and new firms. The longer these rumors and speculations continue, the higher will be the uncertainty faced by customers. The uncertainty, in turn, could lead to negative consequences such as customer dissatisfaction, restraint, and defection, and negatively impact the success of the merger (Homburg and Bucerius 2006).

Successful CBITI can minimize such negative impacts by speeding up the integration of the information systems, structures, value chain activities, and operations of the two companies, and reducing the uncertainty experienced by the customers. Unsuccessful CBITI can create disruptions. For example, when a manufacturing firm experienced challenges in changing the IT systems of an acquired target,

the fallout that followed the [IT] system changeover meant goods going to the wrong customers, invoices being sent to wrong addresses, customer orders being lost. The result was loss of customers, loss of employees, and loss of corporate reputation. The IT issues were a contributory reason for this acquisition failing to achieve its pre-merger objectives. (Vielba and Vielba 2006, p. 51)

Operational disruptions caused by CBITI problems could also have significant negative effects on the financials and stock performance of an acquirer. For example, after acquiring Compaq, Hewlett-Packard’s (HP) CEO, Carly Fiorina, blamed poor IT integration for a revenue shortfall of \$400 million, which, in turn, contributed to a 5% drop in third-quarter revenues of the firm’s enterprise server and storage group. Gilles

Bouchard, the CIO and EVP of global operations at HP, acknowledged the CBITI problems and explained why they led to the financial loss:

It was one of many (ERP) transitions we had done . . . . It was initiated by merging a product line into an SAP instance; we merged that product line from a legacy SAP to the target SAP platform . . . . We had planned for three weeks of disruption, and there were six weeks of disruption . . . . There were a lot of data integrity (problems). Orders fell out between the legacy front-end system and SAP on the back end, which required a lot of manual intervention . . . . So backlogged orders started doubling, and by the time people were finished fixing those issues, we had a fairly large backlog, which took several weeks to get rid of. The backlog was not resolved until the end of the quarter, which had an impact on our financials. (Thibodeau and Tennant 2004)

**CBITI Could Enable the Realization of Business Synergies.** Most acquirers undertake M&A to exploit business synergies with targets; however, most acquirers fail to realize the expected business synergies (Harrison et al. 1991, Larsson and Finkelstein 1999). CBITI is a precursor to the realization of most business synergies. It enables integration of the business operations, products (Zollo and Singh 2004, p. 1242), brands, pricing policies, sales structures, and customer services of the merging firms (Homburg and Bucerius 2006). It also enables the exchange of relevant R&D and operations knowledge, customer knowledge, and managerial policies, processes, and practices across the businesses (Tanriverdi 2005).

Cheryl Smith, CIO of Keyspan, who participated in the acquisitions of Brooklyn Union, Island Lighting, and Boston Gas, explained the role of CBITI in business synergy exploitation as follows:

We learned a lesson. No other teams can begin to operate as a single cohesive unit until [IT] systems are together. IT drives the process. Once we’re on a single [IT] platform, organizations can change their processes . . . . (Bowen 2002)

In a survey of executives who were involved in acquisitions, PricewaterhouseCoopers found broad support for the role of CBITI in business synergy exploitation: 72% of the respondents attributed the synergy realization failures to problems in CBITI during the postannouncement implementation phase of the M&A (Shay 2002).

**CBITI Could Enable Regulatory Compliance and Reduce Costs of Compliance.** Government regulations require firms to institute internal controls over sensitive data such as financials and personally identifiable data. For example, the Sarbanes-Oxley Act (SOX) requires the CEOs and CFOs of large public firms to certify that: (a) financial statements of

their company, including those of the newly acquired businesses, are accurate; and (b) they have an internal control system in place to ensure the accuracy of the financial statements. In large firms that have hundreds of business units dispersed across different geographies, these requirements are difficult to meet without integrated IT systems that collect, aggregate, and report the financial results of the business units. In M&A, even if the acquirer and the target each have integrated IT systems that are compliant with the regulations prior to the merger, after the merger the combined entity may not be compliant until the IT systems are successfully integrated. From the CIO's viewpoint, regulations such as SOX have significant implications for CBITI because the integration process requires a more detailed analysis of the IT systems' controls, security, and reporting features (Vielba and Vielba 2006).

Success or failure of the CBITI effort could affect the merged entity's ability to comply with regulations and increase the costs of regulatory compliance. For example, in implementing its strategy of global expansion through acquisitions, Interpublic Group acquired more than 400 targets across the globe. However, integrating the IT systems of the acquired firms proved highly challenging. To comply with SOX, the firm had to spend \$300 million in professional fees alone in 2005. The CEO summarized the lesson learned as follows: "Get accounting systems in place before you go global. Interpublic's financial woes have been compounded by a failure to unify its operations' IT systems" (Vielba and Vielba 2006).

As the foregoing discussion of the four causal mechanisms implies, CBITI among merging firms is a highly complex process that is fraught with significant implementation challenges and risks, but successful CBITI capabilities could create significant business value. The publicly available information we cite in our theory development to illustrate the CBITI experiences of acquirers indicates that the CBITI capabilities of acquirers may be externally visible. However, external visibility does not imply that competitors can easily imitate successful CBITI capabilities. Complementarities among the dimensions of CBITI raise significant barriers to imitation. For example, when Royal DSM acquired the Vitamins division of Roche, to integrate the acquired unit, it had to successfully complete a total of 360 CBITI projects (Applegate et al. 2007). Assuming that the probability of successful imitation in each CBITI project is very high, e.g., 99%, the complementarities among the 360 CBITI projects imply that the probability of success in the overall imitation effort would be very low,  $0.99^{360} = 2.7\%$ . An imitator that can observe the CBITI capability perfectly has little chance of successfully imitating it. Thus, acquirers that achieve high levels of CBITI are likely to achieve superior performance.

**HYPOTHESIS 1 (H1).** *The CBITI level of an acquirer positively affects the performance of the acquirer in a new acquisition.*

**HYPOTHESIS 1A (H1A).** *In the short run, CBITI level positively affects the abnormal stock returns of the acquirer.*

**HYPOTHESIS 1B (H1B).** *In the long run, CBITI level positively affects the abnormal operating performance of the acquirer.*

### **The Moderating Role of the Industry Relatedness of Target**

An important, but unresolved question in the M&A literature is whether the industry relatedness of a target affects acquirer performance by affecting synergies in the merged entity. We seek to contribute to our understanding of this question by examining the joint effects of the industry relatedness of target and the CBITI capability of acquirer on acquirer's performance.

Related target acquisitions from the same industry are assumed to offer significant synergy potential because both acquirer and target share the same institutional environment (Powell and DiMaggio 1991), compete for the same customer base, use similar human resource skills and know-how (Farjoun 1994), and face the same levels of industry dynamism, munificence, and complexity (Dess and Beard 1984). Unrelated target acquisitions from different industries, on the other hand, are assumed to offer less synergy potential because the two firms bring different resources to the merged entity (Chatterjee 1986). However, there is increasing recognition that the complementary resources of different industries could also offer significant synergy potential (Harrison et al. 1991, 2001; Larsson and Finkelstein 1999; Tanriverdi and Venkatraman 2005; Vermeulen and Barkema 2001). Although there are examples of empirical studies that support or refute the performance effects of related and unrelated acquisitions, cumulatively, the findings of a meta-analysis indicate that there is no significant link between industry relatedness of target and acquirer performance (King et al. 2004).

Empirical studies focus almost exclusively on potential synergies between acquirer and target. They rarely examine whether the acquirer has the capability to realize the potential synergies. To create value, an acquirer needs an organizational capability that can realize the synergy potential and create unique synergies that are difficult to replicate by rival bidders for the same target (Barney 1988, Zollo and Singh 2004). As discussed above, the CBITI capability of an acquirer is critical to realizing potential resource-based synergies regardless of whether they arise from the similar resources of a related target or complementary resources of an unrelated target.

In addition, the arguments in favor of the value creation effects of same-industry acquisitions emphasize the relative ease of integration of same-industry targets in comparison to integration of different-industry targets. CBITI is assumed to be easier in same-industry acquisitions because of structural similarities among business resources, operations, and underlying IT systems and the IT management processes of acquirer and target. However, the ease of CBITI does not necessarily imply superior value for an acquirer. If CBITI is, indeed, easier in same-industry acquisitions, then it would be easier for all acquirers in the industry bidding for the same target. The resulting IT and business synergies would not be unique to the acquirer winning the bid. Hence, the acquirer would be unable to differentiate its performance (Barney 1988, Zollo and Singh 2004). In comparison, it is more challenging to integrate the different IT resources and management processes of an unrelated target. An acquirer having a high level of CBITI capability is more likely to overcome the CBITI challenges in an unrelated acquisition. Hence, it is also more likely to realize business synergies from the complementary resources of the unrelated target, which would be relatively more difficult for rival bidders to replicate. Thus, we expect the CBITI capability of an acquirer to create more value in acquisitions from unrelated industries.

**HYPOTHESIS 2 (H2).** *The industry relatedness of target moderates the relationship between CBITI level of an acquirer and performance of the acquirer in a new acquisition.*

**HYPOTHESIS 2A (H2A).** *In the short run, acquisitions from unrelated industries positively reinforce the relationship between CBITI level of an acquirer and abnormal stock returns of the acquirer.*

**HYPOTHESIS 2B (H2B).** *In the long run, acquisitions from unrelated industries positively reinforce the relationship between CBITI level of an acquirer and abnormal operating performance of the acquirer.*

## Methods

### Sample and Data Sources

Our sampling frame is multibusiness firms in the Fortune 1000 list from 2000. We obtain data on the CBITI levels of 356 of these firms through a survey of senior IT executives. Then, as reported in Table 1, we identify a subset of the respondents that meet our criteria for inclusion in this study: i.e., having a history of prior acquisitions, being a publicly traded company, and having publicly available data on the variables used in this study. We obtain data on firms' M&A activity from the SDC Platinum Mergers & Acquisitions database of Thomson Financial Securities Data Corporation. The firms in our

sample grew by an average of about 10% through acquisitions in the five years prior to our study. We focus on new acquisitions of these firms and measure their short-run abnormal stock returns and long-run abnormal operating performance using data from the CRSP and COMPUSTAT databases. We obtain data for the study's control variables from various databases such as COMPUSTAT, Factiva, Standard and Poor's ExecuComp database, Investor Responsibility Research Center (IRRC) database, and the occupational employment database of the Bureau of Labor Statistics. As explained in detail in Table 1, we conduct a multiway match across these data sources and apply the standard data-cleaning practices of prior M&A studies to form our sample. This process results in a final sample of 141 acquisitions by 86 Fortune 1000 firms. In the final sample, the average market value of acquirers is \$23.3 billion (SD = \$56.1 billion), whereas the average transaction value of the acquisitions is \$886.8 million (SD = \$2.4 billion). In comparison, the average market value of the entire population of acquirers in the SDC database during the same time frame is \$12.6 billion (SD = \$57 billion;  $n = 3,186$ ), whereas the average transaction value of the acquisitions is \$347.9 million (SD = \$2.7 billion;  $n = 9,387$ ). These descriptive statistics indicate that our sample contains large acquisitions of large firms. Earlier studies find that large acquisitions of large firms destroy value on a massive scale (Moeller et al. 2004, 2005). If we find a value-creation effect for CBITI in such a challenging sample, we will obtain strong support for our theory.

### Dependent Variables

**Short-Run Abnormal Stock Returns.** We use the event study methodology (Brown and Warner 1980, 1985) to measure forward-looking expectations of the capital markets about the value-creation or destruction effects of CBITI in a newly announced acquisition. The event study methodology assumes that capital markets are efficient. In reacting to news of a new M&A announcement, the capital markets can incorporate into the stock price of the acquirer all relevant information about the acquirer such as the publicly available information about CBITI experiences of the firm in past acquisitions, as illustrated in our theory development (McWilliams and Siegel 1997).

We compute the abnormal returns ( $AR_i$ ) of an acquirer  $i$  in a five-day "event window"  $[-2, +2]$ , surrounding the announcement of an acquisition (day 0) by examining deviations of the acquirer's actual returns ( $R_i$ ) from the expected normal returns ( $R_n$ ) had it not undertaken the acquisition:

$$AR_i = R_i - R_n. \quad (1)$$

**Table 1** Sample Formation and Data-Cleaning Procedures

Step	Details	No. of firms in sample	No. of acquisitions in sample																		
1	Cross-business IT integration level of Fortune 1000 firms are measured through a survey of senior IT executives. Responding firms are used as the starting sample of this study	356	N/A																		
2	Survey respondents are matched with firms in COMPUSTAT, CRSP, ExecuComp, IRRG, and the Bureau of Labor Statistics databases to identify and retain the publicly traded multibusiness firms whose accounting, stock price, and control variable data are available	132	N/A																		
3	M&A activities of the remaining firms are obtained from the SDC database <sup>a</sup> Partial acquisitions, stake purchases, and acquisitions with missing data on control variables are dropped Only majority acquisitions in which target ownership by acquiring firm exceeds 50% are retained (Haleblian and Finkelstein 1999) Mergers of equals are dropped to ensure that acquirers are larger than targets, and hence, as the more powerful party, they hold the decision rights and control over post-deal IT integration and implementation processes	99	251																		
4	Only those acquisitions that are large enough to influence acquirers' stock prices (Chatterjee and Lubatkin 1990) are retained; acquisitions whose transaction value is less than \$10 million or 0.1% of the acquirer's market capitalization at the time of the announcement are dropped	96	214																		
5	Acquisitions that suffer from confounding events are dropped. The <i>Wall Street Journal</i> is used to identify all major announcements of acquirers that could confound stock price reactions to their M&A announcements in the five-day event window (McWilliams and Siegel 1997). Acquisitions that are subject to one or more of the confounding events below are eliminated:	86	141																		
	<table border="0"> <tr> <td>Restructuring or divestiture (17)</td> <td>Bond issuance (2)</td> </tr> <tr> <td>Other acquisition activity (18)</td> <td>Executive severance package announcement (1)</td> </tr> <tr> <td>Major litigation or labor unrest (12)</td> <td>Release of industry reports (1)</td> </tr> <tr> <td>Earning or dividend announcement (16)</td> <td>Accounting write-offs (1)</td> </tr> <tr> <td>Joint ventures (8)</td> <td>Spin-off (6)</td> </tr> <tr> <td>Top management changes (6)</td> <td>Considerations of change in bond rating (1)</td> </tr> <tr> <td>Forecasted changes in sales or earnings (7)</td> <td>Development of new technology (1)</td> </tr> <tr> <td>Major contracts (4)</td> <td>Share repurchase (2)</td> </tr> <tr> <td>EPA violations (1)</td> <td>Competitor announcements (1)</td> </tr> </table>	Restructuring or divestiture (17)	Bond issuance (2)	Other acquisition activity (18)	Executive severance package announcement (1)	Major litigation or labor unrest (12)	Release of industry reports (1)	Earning or dividend announcement (16)	Accounting write-offs (1)	Joint ventures (8)	Spin-off (6)	Top management changes (6)	Considerations of change in bond rating (1)	Forecasted changes in sales or earnings (7)	Development of new technology (1)	Major contracts (4)	Share repurchase (2)	EPA violations (1)	Competitor announcements (1)		
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<sup>a</sup>Cross-business IT integration capability is measured at the end of 1999 and beginning of 2000. Because such capabilities are achieved over long periods of time and do not immediately become obsolete, we assumed that the measure is also a plausible proxy for the following year and collected acquisition data for years 1999, 2000, and 2001.

In choosing the event window, we keep in mind that small event windows may miss early market reaction, whereas large event windows may capture information unrelated to the event (Haleblian and Finkelstein 1999). Our searches on *PR Newswire* reveal that news of some acquisitions in our sample started leaking to the market two days prior to the official announcement date. That is why we cumulate the abnormal returns over a five-day event window  $[-2, +2]$ :

$$CAR_i(-2, 2) = \sum_{t=-2}^2 (AR_{it}). \quad (2)$$

Although our choice of the event window is consistent with event windows chosen in earlier studies (Fuller et al. 2002, Hayward 2002), we also conduct robustness checks across alternative event window specifications such as  $[-2, +1]$ ,  $[-2, 0]$ ,  $[-1, +1]$ , and  $[-1, 2]$  and obtain qualitatively similar results. We also examine the correlation between CAR and CBITI prior to the event window to assess whether the news started leaking earlier. There are no statistically significant correlations during windows such as  $[-20, -3]$ ,  $[-15, -3]$ , or  $[-10, -3]$ . Significant differences began emerging only two days

prior to the official announcement date. This finding is consistent with our findings from *PR Newswire* searches. We search the *Wall Street Journal* to identify all major announcements of acquirers that could potentially confound stock price reactions to their M&A announcements in the five-day event window (McWilliams and Siegel 1997). We drop the acquisitions that are subject to one or more of the confounding events that are listed in the fifth row of Table 1. Thus, the CAR of an acquirer in the five-day event window can be attributed to the announcement of the acquisition.

The standard event study methodology computes expected normal returns ( $R_{it}$ ) of the firm in Equation (1), from an estimated market model for the firm in an "estimation period" such as 200 trading days  $[-205, -6]$  prior to the event window (Brown and Warner 1980, 1985). This approach assumes that there is no other acquisition in the estimation period. In samples of "frequent acquirers" that conduct multiple acquisitions per year, one or more acquisitions may fall into the estimation period and confound the computation of expected normal returns. Thus, prior

studies drop the estimation period approach for samples of frequent acquirers. Instead, they use alternative proxies for the expected normal returns, such as the value-weighted market returns or the equally weighted market returns (Fuller et al. 2002, Haleblan and Finkelstein 1999). Because our sample contains some frequent acquirers, we set the expected normal returns of an acquirer,  $R_n$ , equal to the value-weighted market returns. We also conduct robustness analyses using three alternative estimations for the expected normal returns, including the conventional estimation period approach used in the standard event study methodology. The results remain robust across all four estimations of  $R_n$ .<sup>1</sup>

**Long-Run Abnormal Operating Performance.** To compute the long-run abnormal operating performance of an acquirer after a new acquisition, we use an event study method that is designed to capture changes in accounting-based measures of a firm's operating performance relative to a benchmark, following a corporate event such as a M&A (Barber and Lyon 1996). The abnormal operating performance of acquirer  $i$  in year  $t$ ,  $AOP_{it}$ , is defined as the realized performance of the acquirer,  $P_{it}$ , minus the expected performance of the acquirer, had it not undertaken the acquisition,  $E(P_{it})$ :

$$AOP_{i,t} = P_{i,t} - E(P_{i,t}). \quad (3)$$

Realized operating performance,  $P_{i,t}$ , of an acquirer is measured with "earnings before interest, tax, and depreciation/total assets" (EBITD/TA). Operating performance could be obscured by several factors such as special items, interest expense, tax considerations, and accounting for minority interests. For example, because acquisition is a corporate event that changes the capital structure of the firm, it could affect interest expense and, consequently, earnings net of interest expense, but leave operating income unaffected. Using earnings before interest, tax, and depreciation addresses these issues (Barber and Lyon 1996). We also scale the operating income by operating assets. Because the current value of operating assets is not reported in financial statements, we use the book value of total assets (COMPUSTAT item 6) as an alternative. We divide operating income by the beginning-period book value of total assets to obtain EBITD/TA.

Expected operating performance,  $E(P_{i,t})$ , refers to the would-be performance of the acquirer, had it not undertaken the acquisition of interest in our sample. To compute  $E(P_{i,t})$ , we use an industry benchmark, i.e., a matched control firm against which the sample

firm could be compared. Differences in the preevent characteristics of firms could lead to operating performance differences even before the impact of the M&A event under consideration. Using an industry benchmark minimizes such problems. Following Barber and Lyon (1996), for each acquirer in our sample, we identify a matched control firm by using three criteria.

First, we identify a pool of candidate control firms by selecting those that did not undertake acquisitions within  $-/+$  one year of the acquisition of our sample firm. Second, we focus on the subset of the candidate control firms operating in the same three-digit SIC industry with the sample firm. This industry match controls for cross-sectional variations in operating performance that arise from industry. For example, if an industry has experienced unusual growth in EBITD/TA during the sample period, our sample firms in that industry could experience similar growth in EBITD/TA. Industry match controls for such variations (Barber and Lyon 1996). Third, we identify the control firm that has the pre-event performance (EBITD/TA) closest to our sample firm. Matching by pre-event performance adjusts for the mean reversion problem in accounting data that reflects a transitory component of operating income (Barber and Lyon 1996). The transitory component could arise from manipulations of accounting numbers, one-time effects of accounting changes, nonrecurring income or expenses, temporary shifts in product demand, and so forth. Over time, as the transitory component dissipates, the EBITD/TA reverts toward a population mean. If an acquirer performs well before an acquisition, the tendency for mean reversion might lead us to conclude that the acquirer subsequently experiences poor EBITD/TA, when in fact the measure is merely reverting to its mean in a predictable fashion. Matching by preevent performance addresses this problem. In addition, some firms may experience high or low operating performance because of corporate strategy, managerial ability, or other factors unrelated to the acquisition. Matching by preevent performance also controls for the effects of such factors and yields well-specified test statistics (Barber and Lyon 1996).

After the matching process, we set the expected operating performance  $E(P_{i,t})$  of a sample firm equal to its control firm's realized operating performance,  $PI_{i,t}$ . We compare the sample firm's performance to that of the control firm over a five-year period, which starts one year before the acquisition ( $P_{i,t-1} - PI_{i,t-1}$ ) and ends four years after the acquisition ( $P_{i,t+4} - PI_{i,t+4}$ ). The long-run abnormal operating performance measure captures changes in the sample firm's operating performance relative to those in the control firm's operating performance over the five-year period, as follows:

$$AOP_{i,t+4} = (P_{i,t+4} - P_{i,t-1}) - (PI_{i,t+4} - PI_{i,t-1}). \quad (4)$$

<sup>1</sup> Panels 1 through 4 of Table 3 present the results with four different estimations of  $R_n$ .

If an acquirer has more than one acquisition in our sample, we focus on the first acquisition and drop the subsequent ones to ensure that their five-year AOP time frames do not overlap and confound each other. Thus, the AOP analyses contain 78 acquisitions of 78 acquirers.

### **Independent Variable: Cross-Business IT Integration**

CBITI takes place during the postannouncement implementation phase of M&A. At the time of the announcement, the capital markets do not yet know how the CBITI process will unfold. Thus, in valuing a newly announced acquisition, the capital markets take into account publicly available information about the past track record of an acquirer in CBITI. Information about the past CBITI experiences of an acquirer becomes available to the markets through various channels such as the “Mergers and Acquisitions” sections of the firm’s 10-K filings, the firm’s white papers on its M&A integration experiences, analyst coverage of the firm’s M&A integration experiences, industry benchmarking reports on M&A integration efforts of firms, reports of consulting firms, academic case studies on IT integration efforts of firms in M&A, and so forth. In this study, we need fine-grained data for operationalizing the five dimensions of the CBITI construct. Thus, we use the survey method to measure the CBITI capabilities of firms.

Previously validated measures of the CBITI levels of a sample of 356 multibusiness Fortune 1000 firms are available, as of 2000, from a survey published by Tanriverdi (2006, p. 59); this survey measures cross-business IT relatedness, which is defined as “the extent to which a multibusiness firm uses common IT resources and common IT management processes across its business units.” The measures capture the extent to which the business units of a multibusiness firm use unique [1] or common [5] IT infrastructure technologies, IT human resource management processes, IT vendor management processes, and IT strategy-making processes. As the conceptual definition and the operational measures show, cross-business IT relatedness is an outcome-oriented measure of a multibusiness firm’s CBITI capability at one point in time. The measures published in Tanriverdi (2006) capture four of the five dimensions we need for the CBITI construct, but leave out the integration of IT applications and data. As discussed, the integration of IT applications and data is a critical dimension of CBITI efforts in M&A. Thus, we add it as a fifth dimension to capture the extent to which an acquirer uses unique [1] versus common [5] IT applications and data across its businesses. The

online appendix<sup>2</sup> presents the survey instrument and methodological procedures used in measuring CBITI and validating its measurement properties.

In specifying a measurement model for CBITI, we assessed the appropriateness of reflective versus formative models (Petter et al. 2007). This choice is guided primarily by the underlying theory of the construct. Our theory construes the five dimensions of CBITI as elements of a system of complements that manifest themselves in the integration of (a) IT infrastructures, (b) IT applications and data, (c) IT human resource management processes, (d) IT vendor management processes, and (e) IT strategy-making processes of merging firms, respectively. According to the economic theory of complementarities, elements of a system of complements have mutual dependencies (Milgrom and Roberts 1990). To function as a system, the dependencies among the five IT integration capabilities need to be coordinated. Some firms may be unable to implement all five IT integration capabilities simultaneously because of lack of capability or resources, or for other reasons. However, the economic theory of complementarities suggests that firms have incentives to implement the entire system of complementary IT capabilities simultaneously, because mutual dependencies among the system’s elements affect overall performance of the system, and partial implementation of the elements would reduce the system’s performance. Thus, we specify the measurement model of CBITI as a reflective second-order factor model in which the second-order factor causes simultaneous manifestations of the five first-order IT integration capabilities, coordinates their mutual dependencies, and accounts for their observed covariance.

We also specify reflective measurement models for the first-order IT integration capabilities, because the domains of each of those constructs are conceptualized and circumscribed in terms of complementary IT integration activities. For example, an IT infrastructure is made up of complementary technologies such as communications networks, hardware, and software. Because of mutual dependencies among the complementary technologies, the activity of integrating one of the technologies has dependencies with the activities of integrating the complementary technologies as well. Integrating some of those technologies, but not all, is a possibility. However, because of mutual dependencies, such an approach would reduce the effectiveness and sustainability of the entire integration effort. The logic of the theory of complementarities (Milgrom and Roberts 1990) and industry best practices (Applegate et al. 2007)

<sup>2</sup> An electronic companion to this paper is available as part of the online version that can be found at <http://isr.journal.informs.org/>.

implies that an IT capability, which is responsible for integrating the IT infrastructures of two firms, will seek to institute activities for integrating individual technologies in the IT infrastructure and coordinating their mutual dependencies. Hence, the IT infrastructure integration capability will account for the observed covariance among the multiple integration activities. Thus, we use a reflective measurement model in which the causality runs from the capability to the measures capturing the IT integration activities.

As explained in more detail in the online appendix, comparison of alternative measurement models confirms that CBITI is a reflective second-order factor model. The acquirers in our sample exhibit varying levels of CBITI (mean = 3.76; SD = 0.95; min = 1.46; max = 5.00). Some acquirers rank low in CBITI, indicating that they have had little or no success in the past in integrating the IT resources and IT management processes of their businesses. Others rank medium or high in CBITI, indicating that they were more successful in integrating the IT resources and IT management processes of their businesses. Some acquirers may choose not to integrate all five dimensions of CBITI. Some may choose to integrate them, but because of implementation difficulties, lack of capability, or other reasons, may be unable to successfully implement all five dimensions simultaneously. Nevertheless, the observed covariance structure in the data indicates that the five dimensions of CBITI exhibit significant covariance. The second-order factor loadings ( $\gamma_{1,1}$  to  $\gamma_{5,1}$ ) range from 0.76 to 0.87, and they are all statistically significant ( $p < 0.001$ ). These findings indicate that the second-order factor drives the five first-order factors and accounts for their covariance (Tippins and Sohi 2003, Venkatraman 1990). Furthermore, the target coefficient value indicates that the second-order factor accounts for 96.4% of the covariance among the first-order factors (Marsh and Hocevar 1985).

The test of our moderation hypothesis requires the use of a moderated regression analysis (MRA). However, the test of moderation has historically been problematic within structural equation models (Cortina et al. 2001). Although some workarounds have been proposed for testing moderation effects involving first-order factor models (Chin et al. 2003), there are no established methods for testing moderation effects involving second-order factor models. When faced with this limitation, prior research converted rich measurement models of second-order constructs into single-item measures by taking weighted averages of measurement items and using first-order and second-order factor loadings as weights (Tanriverdi 2006). We use the reflective first-order factor loadings to weight multiple measurement items within each factor to obtain the first-order factor scores. Then, we

weight these scores with the corresponding reflective second-order factor loadings to obtain the single-item measure. To verify if the single-item measure is a satisfactory proxy for the reflective second-order measurement model of CBITI, we first construct our research model within the structural equation framework of LISREL. After accounting for the controls, we verify that the structural link from the reflective second-order factor model of CBITI to acquirer performance is significant. Then, we implement the same research model within a regression framework in which we use the single-item measure of CBITI. We find that the direct effect of CBITI on acquirer performance remains significant within the regression framework. This replication verifies that any loss incurred in the richness of the original measurement model during the conversion process does not have any material effects on the nomological links of interest (Tanriverdi 2006).

### Control Variables

Prior research identifies various transaction, target, and acquirer characteristics as antecedents of acquirer CAR in M&A. We control for those characteristics to rule out potential alternative explanations for our findings. We also control for factors that are likely to influence both the independent and the dependent variables of the study simultaneously to minimize potential endogeneity concerns. More specifically, we control for transaction characteristics such as method of payment and relative acquisition size; target characteristics such as industry relatedness, geographic scope, and ownership; and acquirer characteristics such as the acquirer's relatedness, book leverage, prior acquisition experience, prior financial performance, prior acquisition performance, IT capability, industry IT intensity, board independence, CEO/Chairman duality, dictatorship, and managerial incentive alignment. The computations of these control variables and the rationales for their inclusion in this study are explained in detail in §2 of the online appendix.

## Results

### Descriptive Statistics and Correlations

Table 2 reports descriptive statistics and correlations among the study variables. Consistent with prior findings, CAR to M&A announcements in our sample have a mean close to zero (Mean = -0.008) and exhibit wide variance around the mean (SD = 0.061). As expected, CBITI has a positive and significant association with both short-run CAR ( $r = 0.169$ ,  $p < 0.05$ ) and long-run AOP ( $r = 0.255$ ,  $p < 0.05$ ). There is also a positive and significant association between CBITI and the IT capabilities of acquirers ( $r = 0.177$ ,

**Table 2** Descriptive Statistics and Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Short-run abnormal stock returns of acquirer, $CAR(-2, +2)$	1.000																		
2. Long-run abnormal operating performance of acquirer, $AOP_{-1,t+4}$	-0.024	1.000																	
3. Cross-business IT integration capability of acquirer	0.169*	0.255*	1.000																
4. Method of payment (1 = cash)	-0.090	-0.074	0.116	1.000															
5. Relative acquisition size	-0.014	-0.136	-0.052	-0.387***	1.000														
6. Industry relatedness of target (1 = same industry)	-0.168*	0.075	0.297***	-0.094	0.173*	1.000													
7. Geographic scope of target (1 = cross-border)	-0.019	0.079	0.154+	0.247**	-0.126	-0.026	1.000												
8. Ownership of target (1 = public)	-0.063	-0.022	-0.094	-0.346***	0.234**	-0.032	-0.166*	1.000											
9. Relatedness of acquirer	-0.090	-0.025	-0.005	0.093	-0.047	-0.062	-0.025	-0.053	1.000										
10. Book leverage of acquirer	0.027	-0.021	-0.037	-0.031	0.125	0.001	-0.044	-0.055	-0.088	1.000									
11. Prior acquisition experience of acquirer	-0.117	-0.032	-0.056	-0.047	0.020	0.112	-0.048	0.048	-0.045	-0.063	1.000								
12. Prior financial performance of acquirer	0.006	-0.239*	0.128	0.072	-0.060	0.165+	-0.080	-0.070	-0.285***	-0.046	0.097	1.000							
13. Previous acquisition performance of acquirer	-0.031	-0.289*	-0.089	-0.071	-0.013	0.139+	-0.030	-0.045	0.012	-0.185*	0.416***	0.097	1.000						
14. IT capability of acquirer	-0.004	0.085	0.177*	0.091	0.081	0.130	0.103	0.042	0.058	-0.022	-0.084	0.089	-0.119	1.000					
15. IT intensity of acquirer's industry	-0.028	0.165	0.121	0.107	-0.143+	-0.022	-0.055	0.043	0.082	-0.375***	-0.107	-0.084	-0.223**	0.164+	1.000				
16. Board independence of acquirer	0.123	0.045	-0.070	0.017	0.095	-0.110	-0.112	0.112	0.110	0.083	-0.067	0.026	-0.088	0.253**	0.126	1.000			
17. CEO/Chairman duality of acquirer	-0.069	-0.084	-0.008	-0.031	-0.025	0.064	0.119	0.036	-0.005	0.046	0.127	-0.070	0.139+	-0.008	-0.168*	-0.328***	1.000		
18. Dictatorship of acquirer	-0.091	0.089	-0.058	-0.054	0.009	-0.123	0.178*	0.148+	0.126	-0.027	-0.126	-0.145+	0.042	0.120	-0.014	0.234**	-0.063	1.000	
19. Managerial incentive alignment of acquirer	-0.019	-0.040	-0.149+	-0.076	-0.337***	-0.127	-0.003	0.082	0.037	-0.068	0.098	0.009	-0.009	-0.058	0.116	-0.219**	0.067	0.047	1.000
<i>N</i>	141	78	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141	141
Mean	-0.008	0.003	3.767	0.589	-3.328	0.461	0.227	0.433	0.478	0.286	0.705	0.172	0.346	0.468	-4.107	0.801	0.277	0.589	0.198
Standard deviation	0.061	0.115	0.946	0.494	1.518	0.500	0.420	0.497	0.449	0.142	0.641	0.089	0.386	0.501	1.445	0.400	0.449	0.494	0.185
Min	-0.197	-0.311	1.470	0.000	-6.150	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.000	0.000	-9.265	0.000	0.000	0.000	0.000
Max	0.168	0.430	5.000	1.000	-0.017	1.000	1.000	1.000	1.782	0.670	2.565	0.450	1.000	1.000	-0.688	1.000	1.000	1.000	0.885

+  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

**Table 3** Multivariate Regression Analyses for Short-Run Abnormal Returns ( $N = 141$ )

Dependent variable: $CAR(-2, +2)$	Panel 1			Panel 2			Panel 3			Panel 4		
	1	2	3	1	2	3	1	2	3	1	2	3
<b>Transaction characteristics</b>												
Method of payment (1 = cash)	-0.164 <sup>+</sup> (0.088)	-0.164 <sup>+</sup> (0.089)	-0.171 <sup>+</sup> (0.090)	-0.161 <sup>+</sup> (0.088)	-0.160 <sup>+</sup> (0.089)	-0.166 <sup>+</sup> (0.090)	-0.096 (0.085)	-0.096 (0.085)	-0.103 (0.087)	-0.121 (0.086)	-0.121 (0.087)	-0.127 (0.088)
Relative acquisition size	-0.049 (0.126)	-0.017 (0.121)	-0.014 (0.119)	-0.010 (0.132)	0.022 (0.122)	0.024 (0.121)	-0.045 (0.123)	-0.015 (0.122)	-0.013 (0.126)	-0.069 (0.123)	-0.037 (0.121)	-0.035 (0.122)
<b>Target characteristics</b>												
Industry relatedness of target (1 = same industry)	-0.162 <sup>+</sup> (0.090)	-0.237* (0.091)	-0.248** (0.089)	-0.128 (0.088)	-0.203* (0.088)	-0.212* (0.088)	-0.122 (0.091)	-0.194* (0.091)	-0.205* (0.090)	-0.132 (0.088)	-0.209* (0.087)	-0.219* (0.087)
Geographic scope of target (1 = cross-border)	0.026 (0.092)	-0.021 (0.095)	-0.019 (0.095)	0.027 (0.094)	-0.020 (0.093)	-0.019 (0.096)	0.016 (0.095)	-0.030 (0.095)	-0.028 (0.095)	0.015 (0.093)	-0.033 (0.092)	-0.032 (0.094)
Ownership of target (1 = public)	-0.093 (0.104)	-0.088 (0.098)	-0.079 (0.098)	-0.063 (0.104)	-0.058 (0.098)	-0.051 (0.098)	-0.118 (0.107)	-0.113 (0.101)	-0.105 (0.100)	-0.112 (0.104)	-0.107 (0.098)	-0.099 (0.097)
<b>Acquirer characteristics</b>												
Relatedness of acquirer	-0.086 (0.102)	-0.097 (0.101)	-0.087 (0.099)	-0.106 (0.100)	-0.118 (0.101)	-0.110 (0.100)	-0.090 (0.101)	-0.102 (0.100)	-0.092 (0.098)	-0.106 (0.101)	-0.118 (0.099)	-0.110 (0.098)
Book leverage of acquirer	-0.017 (0.106)	-0.027 (0.105)	-0.035 (0.103)	-0.076 (0.110)	-0.086 (0.109)	-0.093 (0.109)	-0.016 (0.115)	-0.025 (0.110)	-0.033 (0.111)	-0.039 (0.112)	-0.049 (0.110)	-0.056 (0.110)
Prior acquisition experience of acquirer	-0.144 (0.100)	-0.142 (0.097)	-0.149 (0.096)	-0.135 (0.099)	-0.134 (0.096)	-0.139 (0.095)	-0.170 <sup>+</sup> (0.099)	-0.169 <sup>+</sup> (0.097)	-0.175 <sup>+</sup> (0.096)	-0.150 (0.098)	-0.148 (0.095)	-0.154 (0.094)
Prior financial performance of acquirer	-0.032 (0.091)	-0.069 (0.097)	-0.074 (0.096)	-0.074 (0.091)	-0.111 (0.096)	-0.115 (0.096)	-0.027 (0.085)	-0.063 (0.091)	-0.068 (0.091)	-0.042 (0.087)	-0.081 (0.092)	-0.085 (0.091)
Previous acquisition performance of acquirer	0.072 (0.102)	0.104 (0.101)	0.099 (0.102)	0.073 (0.108)	0.105 (0.105)	0.101 (0.106)	0.089 (0.105)	0.120 (0.104)	0.115 (0.105)	0.065 (0.107)	0.098 (0.104)	0.094 (0.106)
IT capability of acquirer	0.020 (0.099)	-0.014 (0.097)	-0.023 (0.094)	0.032 (0.098)	-0.001 (0.100)	-0.008 (0.091)	-0.006 (0.097)	-0.038 (0.096)	-0.046 (0.093)	0.002 (0.100)	-0.032 (0.095)	-0.040 (0.094)
IT intensity of acquirer's industry	-0.054 (0.099)	-0.089 (0.100)	-0.108 (0.102)	-0.069 (0.101)	-0.104 (0.101)	-0.119 (0.103)	-0.125 (0.101)	-0.159 (0.102)	-0.176 <sup>+</sup> (0.103)	-0.125 (0.101)	-0.162 (0.102)	-0.177 <sup>+</sup> (0.103)
Board independence of acquirer	0.184 <sup>+</sup> (0.108)	0.214 <sup>+</sup> (0.119)	0.226 <sup>+</sup> (0.117)	0.229* (0.108)	0.259* (0.116)	0.269* (0.115)	0.252* (0.112)	0.281* (0.119)	0.292* (0.117)	0.256* (0.108)	0.287* (0.116)	0.297* (0.115)
CEO/Chairman duality of acquirer	-0.009 (0.107)	0.000 (0.060)	-0.004 (0.118)	0.058 (0.104)	0.067 (0.099)	0.065 (0.102)	0.051 (0.110)	0.060 (0.107)	0.057 (0.108)	0.054 (0.111)	0.063 (0.105)	0.060 (0.107)
Dictatorship of acquirer	-0.173* (0.085)	-0.171* (0.084)	-0.179* (0.084)	-0.196* (0.085)	-0.194* (0.083)	-0.201* (0.083)	-0.172* (0.086)	-0.170* (0.084)	-0.177* (0.084)	-0.183* (0.085)	-0.181* (0.082)	-0.187* (0.082)
Managerial incentive alignment of acquirer	0.006 (0.095)	0.057 (0.103)	0.060 (0.103)	0.096 (0.100)	0.147 (0.102)	0.150 (0.103)	0.038 (0.104)	0.087 (0.105)	0.090 (0.106)	0.035 (0.101)	0.087 (0.102)	0.090 (0.103)
Cross-business IT integration capability		0.291** (0.100)	0.212* (0.107)		0.290** (0.096)	0.227* (0.105)		0.280** (0.099)	0.207 <sup>+</sup> (0.111)		0.298** (0.099)	0.231* (0.111)
Cross-business IT integration capability $\times$ Industry relatedness of target			0.146 (0.102)			0.117 (0.102)			0.135 (0.100)			0.125 (0.100)
<b>Model statistics</b>												
$F$	1.220	1.610 <sup>+</sup>	1.750*	1.220	1.700*	1.710*	1.170	1.380	1.550 <sup>+</sup>	1.290	1.500 <sup>+</sup>	1.650 <sup>+</sup>
$R^2$	0.118	0.183	0.195	0.113	0.178	0.186	0.122	0.183	0.193	0.131	0.200	0.208
$\Delta R^2$		0.065**	0.012		0.065**	0.008		0.061**	0.010		0.069**	0.008

*Notes.* Standardized beta coefficients are in cells; standard errors are in the parentheses below. Panel 1:  $R_n$ , normal return of a firm, is set equal to value-weighted market returns. Panel 2:  $R_n$  is set equal to equally weighted market returns. Panel 3:  $R_n$  is obtained from an estimated market model for the firm in a 200-day estimation period  $[-205, -6]$ ; both  $\alpha$  and  $\beta$  are estimated. Panel 4:  $R_n$  is obtained from an estimated market model for the firm in a 200-day estimation period  $[-205, -6]$ ;  $\alpha = 0$ ,  $\beta$  is estimated.

<sup>+</sup> $p < 0.10$ ; \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

$p < 0.05$ ). However, IT capability does not have a significant association with CAR ( $r = -0.004$ ,  $p > 0.1$ ). These associations indicate that the two constructs are related but distinct.

### Test of Hypotheses

#### Short-Run Abnormal Stock Returns (CAR).

Table 3 reports coefficient estimates and White's heteroskedasticity consistent standard errors of the OLS regressions for CAR (White 1980). We use four pan-

els to report the results with four different estimations of  $R_n$ . Within each panel, the first model is the base model containing the control variables. The second model introduces the main effect of CBITI. The third model adds the interaction of CBITI with the industry relatedness of the target. The variables in the interaction term are mean centered (Aiken and West 1991). Variance inflation factor (VIF) values across all models are well below the suggested cutoff value of 10 (min = 1.23, max = 1.82), indicating the lack of any major multicollinearity problems.

As shown in model 2 of panel 1 in Table 3, CBITI level has a positive and highly significant effect on CAR (beta = 0.291,  $p < 0.01$ ). The addition of CBITI level also significantly increases the incremental variance explained by the model ( $\Delta R^2 = 0.065$ ,  $p < 0.01$ ). As panels 2 through 4 show, the results remain robust when alternative estimations of  $R_n$  are used in the computation of CAR. These findings falsify the null hypothesis that there is no association between CBITI and CAR. They provide support for H1A and imply that the capital markets incorporate information about the CBITI level of an acquirer into their valuation of a new M&A announcement by the acquirer.

As model 3 of panel 1 shows, the interaction of CBITI with the industry relatedness of a target does not have a significant effect on CAR (beta = 0.146,  $p > 0.1$ ), nor does it significantly increase the incremental variance explained by the model ( $\Delta R^2 = 0.012$ ,  $p > 0.1$ ). These findings remain qualitatively the same in panels 2 through 4. Thus, H2A is not supported.

**Long-Run Abnormal Operating Performance (AOP).** Table 4 reports coefficient estimates and White's heteroskedasticity consistent standard errors of the OLS regressions for long-run AOP (White 1980). The first model is the base model containing the control variables. The second model introduces the main effect of CBITI. The third model adds the interaction of CBITI with the industry relatedness of a target. The variables in the interaction term are mean centered (Aiken and West 1991). VIF values across all models are well below the suggested cutoff value of 10 (min = 1.21, max = 2.09), indicating the lack of any major multicollinearity problems.

As shown in model 2 of Table 4, CBITI level has a positive and highly significant effect on long-run AOP (beta = 0.274,  $p < 0.01$ ). The addition of CBITI level also significantly increases the incremental variance explained by the model ( $\Delta R^2 = 0.052$ ,  $p < 0.05$ ). Thus, H1B is supported.

As model 3 of Table 4 shows, the interaction of CBITI with the industry relatedness of a target has a significant effect on long-run AOP (beta = -0.317,  $p < 0.05$ ). It also significantly increases the incremental variance explained by the model ( $\Delta R^2 = 0.049$ ,  $p < 0.05$ ). The negative sign of the interaction effect indicates that acquirers with high levels of CBITI create greater long-run AOP in complementary acquisitions from different industries than in related acquisitions from the same industry. Thus, H2B is supported.

## Discussion and Conclusions

This study contributes to the M&A literatures in IS, finance, and strategy by conceptualizing the CBITI

**Table 4** Multivariate Regression Analyses for Long-Run Abnormal Operating Performance ( $N = 78$ )

	Dependent variable: Five-year abnormal operating performance of acquirer		
	1	2	3
<b>Transaction characteristics</b>			
Method of payment (1 = cash)	-0.189 (0.138)	-0.192 (0.151)	-0.169 (0.140)
Relative acquisition size	-0.215+ (0.113)	-0.237+ (0.127)	-0.222+ (0.123)
<b>Target characteristics</b>			
Industry relatedness of target (1 = same industry; 0 = different industry)	0.113 (0.137)	0.019 (0.145)	0.043 (0.137)
Geographic scope of target (1 = cross-border; 0 = domestic)	0.009 (0.143)	-0.016 (0.151)	-0.016 (0.144)
Ownership of target (1 = public; 0 = private)	-0.139 (0.133)	-0.164 (0.127)	-0.167 (0.126)
<b>Acquirer characteristics</b>			
Relatedness of acquirer	-0.157 (0.140)	-0.188 (0.140)	-0.229+ (0.137)
Book leverage of acquirer	-0.002 (0.111)	-0.017 (0.121)	0.053 (0.120)
Prior acquisition experience of acquirer	0.183 (0.138)	0.216 (0.156)	0.224 (0.149)
Prior financial performance of acquirer	-0.216 (0.160)	-0.248 (0.156)	-0.218 (0.154)
Previous acquisition performance of acquirer	-0.389** (0.147)	-0.364** (0.129)	-0.359** (0.110)
IT capability of acquirer	0.098 (0.128)	0.077 (0.125)	0.143 (0.135)
IT intensity of acquirer's industry	0.050 (0.183)	-0.017 (0.200)	0.057 (0.195)
Board independence of acquirer	-0.029 (0.109)	-0.026 (0.098)	-0.119 (0.104)
CEO/Chairman duality of acquirer	-0.092 (0.102)	-0.093 (0.101)	-0.122 (0.101)
Dictatorship of acquirer	0.111 (0.117)	0.148 (0.111)	0.165 (0.108)
Managerial incentive alignment of acquirer	-0.086 (0.141)	-0.034 (0.137)	-0.034 (0.137)
Cross-business IT integration capability		0.274** (0.101)	0.419** (0.115)
Cross-business IT integration capability × Industry relatedness of target			-0.317* (0.131)
<b>Model statistics</b>			
$F$	1.480	1.830*	2.700**
$R^2$	0.319	0.371	0.420
$\Delta R^2$		0.052*	0.049*

Note. Standardized beta coefficients are in cells; standard errors are in the parentheses below.

+  $p < 0.10$ ; \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

capability, explaining how and why CBITI capability creates value for acquirers in M&A, and empirically validating this explanation with both short-run,

market-based measures and long-run, accounting-based measures of M&A performance.

How acquiring firms create value in M&A is an enduring research question in finance and strategic management (Andrade et al. 2001, King et al. 2004). Prior studies have not considered the CBITI capability of an acquirer as a potential value-creation mechanism in M&A. The mechanisms identified to date remain inadequate in explaining acquirer returns to M&A. The most recent review of M&A studies in finance concludes (Andrade et al. 2001, p. 117): "...[T]he underlying sources of the gains from mergers have not been identified." Furthermore, a recent meta-analysis of M&A studies finds (King et al. 2004, p. 187): "Existing empirical M&A research has not clearly and repeatedly identified those variables that impact an acquiring firm's subsequent performance." This study contributes to the M&A streams within the finance and strategy literatures by explaining how and why the CBITI capability of an acquirer creates short-run and long-run value for the acquirer following an acquisition.

The IS discipline recognizes CBITI as a major challenge and focuses on antecedent mechanisms of successful CBITI. However, IS research has not empirically linked CBITI to acquirer performance, nor has it theoretically explained whether, how, and why CBITI ought to affect acquirer performance in M&A. This study makes a contribution by theoretically explaining and empirically validating the nomological link between CBITI and performance of acquirers in M&A.

In examining short-run abnormal stock returns (CAR), we do not find a moderating effect for the industry relatedness of a target on the relationship between CBITI capability and CAR of an acquirer. However, the main effect of the CBITI capability remains significant after introducing the interaction term. These findings imply that in the short term, capital markets are indifferent to whether the value will be created out of potential synergies in similar resources of related targets or complementary resources of unrelated targets. Instead, they react to the synergy realization mechanisms of acquirers such as the CBITI capabilities.

In examining long-run AOP, we find a significant moderation effect for the industry relatedness of a target. Over five years after the acquisition, acquirers with superior CBITI capabilities achieve significantly higher AOP in unrelated acquisitions from different industries than in related acquisitions within the same industry. Despite the structural dissimilarities among different industries, acquirers with superior CBITI capabilities can integrate the complementary resources of unrelated targets acquired from different industries, create unique synergies with them that are

difficult for rivals to replicate, and achieve superior operational performance. These findings indicate that the short-term value-creation effects of CBITI, as captured by capital market reactions at the time of deal announcements, are also corroborated and reinforced by long-term operating performance results observed during a five-year period after the deals.

CIOs can use our findings to raise the awareness of their CEOs and CFOs that superior CBITI capabilities increase announcement period returns as well as long-run abnormal operating performance in M&A. Accordingly, CEOs and CFOs may be more willing to fund and support their initiatives to develop CBITI capabilities and involve them in predeal M&A due-diligence and planning activities. In addition, although prior research finds that large acquisitions of large firms destroy value on a massive scale (Moeller et al. 2004, 2005), our findings show that a subgroup of those firms, i.e., those with superior CBITI capabilities, create significant value in such acquisitions. Thus, large firms possessing superior CBITI capabilities should not refrain from acquiring large targets. Finally, despite the conventional wisdom that targets acquired from the same industry may offer greater synergy potential and may be easier to integrate than targets acquired from different industries, managers can expect to create more long-run value in different-industry acquisitions insofar as their firms have superior CBITI capabilities.

## Electronic Companion

An electronic companion to this paper is available as part of the online version that can be found at <http://isr.journal.informs.org/>.

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## References

- Accenture. 2002. Keys to the kingdom: How an integrated IT capability can increase your odds of M&A success. Report, Accenture, New York.

- Aiken, L. S., S. G. West. 1991. *Multiple Regression: Testing and Interpreting Interactions*. Sage Publications, Newbury Park, CA.
- Andrade, G., M. Mitchell, E. Stafford. 2001. New evidence and perspectives on mergers. *J. Econom. Perspect.* 15(2) 103–120.
- Applegate, L. M., E. Watson, M. E. Vatz. 2007. Royal DSM N.V.: Information technology enabling business transformation. HBS Case 9-807-167, Harvard Business School, Boston.
- Barber, B. M., J. D. Lyon. 1996. Detecting abnormal operating performance: The empirical power and specification of test statistics. *J. Financial Econom.* 41(3) 359–399.
- Barki, H., A. Pinsonneault. 2005. A model of organizational integration, implementation effort, and performance. *Organ. Sci.* 16(2) 165–179.
- Barney, J. B. 1988. Returns to bidding firms in mergers and acquisitions—Reconsidering the relatedness hypothesis. *Strategic Management J.* 9 71–78.
- Bowen, T. S. 2002. Plugging IT into the merger equation. *Computerworld*, Accessed December 22, 2009, [http://www.computerworld.com.au/article/96107/plugging\\_it\\_into\\_merger\\_equation/](http://www.computerworld.com.au/article/96107/plugging_it_into_merger_equation/).
- Brown, C. V. 1999. Horizontal mechanisms under differing IS organization contexts. *MIS Quart.* 23(3) 421–454.
- Brown, S. J., J. B. Warner. 1980. Measuring security price performance. *J. Financial Econom.* 8(3) 205–258.
- Brown, S. J., J. B. Warner. 1985. Using daily stock returns—The case of event studies. *J. Financial Econom.* 14(1) 3–31.
- Brown, C. V., G. Clancy, R. Scholer. 2003. A post-merger IS integration success story: Sallie Mae. *MIS Quart. Executive* 2(1) 15–27.
- Campbell, A., M. Goold. 1998. *Synergy: Why Links Between Business Units So Often Fail and How to Make Them Work*. Capstone Publishing, Oxford, UK.
- Capron, L., N. Pistre. 2002. When do acquirers earn abnormal returns? *Strategic Management J.* 23(9) 781–794.
- Chatterjee, S. 1986. Types of synergy and economic value—The impact of acquisitions on merging and rival firms. *Strategic Management J.* 7(2) 119–139.
- Chin, W. W., B. L. Marcolin, P. R. Newsted. 2003. A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Inform. Systems Res.* 14(2) 189–217.
- Coff, R. W. 1999. How buyers cope with uncertainty when acquiring firms in knowledge-intensive industries: Caveat emptor. *Organ. Sci.* 10(2) 144–161.
- Cortina, J. M., G. Chen, W. P. Dunlap. 2001. Testing interaction effects in LISREL: Examination and illustration of available procedures. *Organ. Res. Methods* 4(4) 324–360.
- Curtis, G. A., R. Chanmugam. 2005. Reconcilable differences: IT and post-merger integration. *Outlook* 2(June) 81–85.
- Dess, G. G., D. W. Beard. 1984. Dimensions of organizational task environments. *Admin. Sci. Quart.* 29(1) 52–73.
- Duthoit, C., R. Dreischmeier, S. Kennedy. 2004. *Clusters and Nuggets: Mastering Postmerger IT Integration in Banking*. Boston Consulting Group, Boston.
- Duvall, M. 2003. Bank of America: When systems don't merge. *eWeek*, Accessed December 22, 2009, <http://www.eweek.com/c/a/IT-Infrastructure/Bank-of-America-When-Systems-Dont-Merge>.
- Farjoun, M. 1994. Beyond industry boundaries: Human expertise, diversification and resource-related industry groups. *Organ. Sci.* 5(2) 185–199.
- Feeny, D. F., L. P. Willcocks. 1998. Core IS capabilities for exploiting information technology. *Sloan Management Rev.* 39(3) 9–21.
- Fuller, K., J. Netter, M. Stegemoller. 2002. What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions. *J. Finance* 57(4) 1763–1793.
- Giacomazzi, F. C., P. B. Pernici, M. Sansoni. 1997. Information systems integration in mergers and acquisitions: A normative model. *Inform. Management* 32(6) 289–302.
- Haleblian, J., S. Finkelstein. 1999. The influence of organizational acquisition experience on acquisition performance: A behavioral learning perspective. *Admin. Sci. Quart.* 44(1) 29–56.
- Harrison, J. S., M. A. Hitt, R. E. Hoskisson, R. D. Ireland. 1991. Synergies and postacquisition performance—Differences versus similarities in resource allocations. *J. Management* 17(1) 173–190.
- Harrison, J. S., M. A. Hitt, R. E. Hoskisson, R. D. Ireland. 2001. Resource complementarity in business combinations: Extending the logic to organizational alliances. *J. Management* 27(6) 679–690.
- Hayward, M. L. A. 2002. When do firms learn from their acquisition experience? Evidence from 1990–1995. *Strategic Management J.* 23(1) 21–39.
- Hitt, M. A., R. D. Ireland, J. S. Harrison. 2001. Mergers and acquisitions: A value creating or value destroying strategy? M. A. Hitt, R. D. Ireland, J. S. Harrison, eds. *The Blackwell Handbook of Strategic Management*. Blackwell Publishers, Malden, MA, 384–408.
- Homburg, C., M. Bucerius. 2006. Is speed of integration really a success factor of mergers and acquisitions? An analysis of the role of internal and external relatedness. *Strategic Management J.* 27(4) 347–367.
- Johnston, K. D., P. W. Yetton. 1996. Integrating information technology divisions in a bank merger—Fit, compatibility and models of change. *J. Strategic Inform. Systems* 5(3) 189–211.
- King, D. R., D. R. Dalton, C. M. Daily, J. G. Covin. 2004. Meta-analyses of post-acquisition performance: Indications of unidentified moderators. *Strategic Management J.* 25(2) 187–200.
- Larsson, R., S. Finkelstein. 1999. Integrating strategic, organizational, and human resource perspectives on mergers and acquisitions: A case survey of synergy realization. *Organ. Sci.* 10(1) 1–26.
- Main, T. J., J. E. Short. 1989. Managing the merger—Building partnership through IT planning at the new Baxter. *MIS Quart.* 13(4) 469–484.
- Markus, M. L. 2000. Paradigm shifts—e-business and business/systems integration. *Comm. Assoc. Inform. Systems* 4(10) 1–45.
- Marsh, H. W., D. Hocevar. 1985. Application of confirmatory factor analysis to the study of self-concept: First and higher order factor models and their invariance across groups. *Psych. Bull.* 97 562–582.
- McKiernan, P., Y. Merali. 1995. Integrating information-systems after a merger. *Long Range Planning* 28(4) 54–62.
- McWilliams, A., D. Siegel. 1997. Event studies in management research: Theoretical and empirical issues. *Acad. Management J.* 40(3) 626–657.
- Mehta, M., R. Hirschheim. 2007. Strategic alignment in mergers and acquisitions: Theorizing IS integration decision making. *J. Assoc. Inform. Systems* 8(3) 143–174.
- Merali, Y., P. McKiernan. 1993. The strategic positioning of information systems in post-acquisition management. *J. Strategic Inform. Systems* 2(2) 105–124.
- Meyer, R. M., G. Rukstad, P. J. Coughlan, S. A. Jansen. 2005. Daimler Chrysler post-merger integration (a). HBS Case 9-703-417, Harvard Business School, Boston.
- Milgrom, P., J. Roberts. 1990. The economics of modern manufacturing: Technology, strategy, and organization. *Amer. Econom. Rev.* 80(3) 511–528.
- Moeller, S. B., F. P. Schlingemann, R. M. Stulz. 2004. Firm size and the gains from acquisitions. *J. Financial Econom.* 73(2) 201–228.

- Moeller, S. B., F. P. Schlingemann, R. M. Stulz. 2005. Wealth destruction on a massive scale? A study of acquiring-firm returns in the recent merger wave. *J. Finance* 60(2) 757–782.
- Pablo, A. L. 1994. Determinants of acquisition integration level—A decision-making perspective. *Acad. Management J.* 37(4) 803–836.
- Petter, S., D. Straub, A. Rai. 2007. Specifying formative constructs in information systems research. *MIS Quart.* 31(4) 623–656.
- Popovich, S. G. 2001. Meeting the pressures to accelerate IT integration. *Mergers Acquisitions* 36(12) 30–35.
- Powell, W. W., P. J. DiMaggio. 1991. *The New Institutionalism in Organizational Analysis*. University of Chicago Press, Chicago.
- Robbins, S. S., A. C. Stylianou. 1999. Post-merger systems integration: The impact on IS capabilities. *Inform. Management* 36(4) 205–212.
- Seth, A. K., P. Song, R. Pettit. 2000. Synergy, managerialism or hubris? An empirical examination of motives for foreign acquisitions of US firms. *J. Internat. Bus. Stud.* 31(3) 387–405.
- Shay, D. 2002. PricewaterhouseCoopers presentation to the Federal Trade Commission on issues in post-merger integration. Hearing (April 23), Federal Trade Commission, Washington, DC.
- Shearer, B. 2004. Avoiding the IT integration blues. *Mergers Acquisitions: Dealermaker's J.* 39(11) 10–15.
- Strassmann, P. A. 2003. Mergers and the myth of synergy. Reed Business Information. Accessed December 22, 2009, <http://www.computerweekly.com/Articles/2003/08/04/196366/Mergers-and-the-myth-of-synergy.htm>.
- Stylianou, A. C., C. J. Jeffries, S. S. Robbins. 1996. Corporate mergers and the problems of IS integration. *Inform. Management* 31(4) 203–213.
- Sumi, T., M. Tsuruoka. 2002. Ramp new enterprise information systems in a merger & acquisition environment: A case study. *J. Engrg. Tech. Management* 19(1) 93–104.
- Tanriverdi, H. 2005. Information technology relatedness, knowledge management capability, and performance of multibusiness firms. *MIS Quart.* 29(2) 311–334.
- Tanriverdi, H. 2006. Performance effects of information technology synergies in multibusiness firms. *MIS Quart.* 30(1) 57–77.
- Tanriverdi, H., N. Venkatraman. 2005. Knowledge relatedness and the performance of multibusiness firms. *Strategic Management J.* 26(2) 97–119.
- Thibodeau, P., D. Tennant. 2004. HP's CIO details ERP migration issues. *Computerworld*, Accessed December 22, 2009, [http://www.computerworld.com/s/article/96049/Q\\_A\\_HP\\_s\\_CIO\\_details\\_company\\_s\\_ERP\\_migration\\_problems](http://www.computerworld.com/s/article/96049/Q_A_HP_s_CIO_details_company_s_ERP_migration_problems).
- Tippins, M. J., R. S. Sohi. 2003. IT competency and firm performance: Is organizational learning a missing link? *Strategic Management J.* 24(8) 745–761.
- Useem, M., J. Harder. 2000. Leading laterally in company outsourcing. *Sloan Management Rev.* 41(2) 25–36.
- Venkatraman, N. 1990. Performance implications of strategic coalignment: A methodological perspective. *J. Management Stud.* 27(1) 19–41.
- Vermeulen, F., H. Barkema. 2001. Learning through acquisitions. *Acad. Management J.* 44(3) 457–476.
- Vielba, F., C. Vielba. 2006. *Reducing the M&A Risks: The Role of IT in Mergers and Acquisitions*. Palgrave Macmillan, New York.
- Watson, J. 2003. Bank reaps benefits of integration plan. *Computing* (September 25) 18.
- Weber, Y., N. Pliskin. 1996. The effects of information systems integration and organizational culture on a firm's effectiveness. *Inform. Management* 30(2) 81–90.
- White, H. 1980. A heteroscedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. *Econometrica* 48 817–838.
- Wijnhoven, F. T., S. R. Stegwee, R. T. A. Fa. 2006. Post-merger IT integration strategies: An IT alignment perspective. *J. Strategic Inform. Systems* 15(1) 5–28.
- Witney, G., N. Boss. 2004. Involve IT from the start to ease pain of mergers and acquisitions. *Comput. Weekly*, Accessed December 22, 2009, <http://www.computerweekly.com/Articles/2004/10/12/205791/Involve-IT-from-the-start-to-ease-pain-of-mergers-and.htm>.
- Worthen, B. 2002. Success factors for integrating IT systems after a merger. *CIO Magazine*, Accessed December 22, 2009, [http://www.cio.com/article/31272/Success\\_Factors\\_for\\_Integrating\\_IT\\_Systems\\_After\\_a\\_Merger](http://www.cio.com/article/31272/Success_Factors_for_Integrating_IT_Systems_After_a_Merger).
- Wübben, B. 2007. *German Mergers and Acquisitions in the USA*. Deutscher Universitäts-Verlag, Wiesbaden, Germany.
- Zollo, M., H. Singh. 2004. Deliberate learning in corporate acquisitions: Post-acquisition strategies and integration capability in US bank mergers. *Strategic Management J.* 25(13) 1233–1256.