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Knowing when to acquire: The case of multinational technology firms☆

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ABSTRACT

This study examines the effects of timing in high-tech acquisitions by analyzing how deviation from routines affects the value captured by the acquirer as well as the price paid. It examines the context of information and communication technology (ICT) acquisitions in which multinational technology incumbents are known to habitually acquire product-related capabilities to facilitate their entry into new product domains. The paper highlights the role of routines in managing technology acquisitions of multinationals, and tests the hypothesis that smaller deviations in terms of target-maturity and acquisition-timing lead to superior outcomes for acquirers. The findings indicate positive relationships between stricter iterations of routines and superior outcomes. The discussion centers on the theoretical implications of acquisition routines, timing and performance of multinational technology companies.

1. Introduction

Multinational companies in high-technology settings often pursue acquisition programs in which they acquire many firms as a substitute for internal R&D to quickly build and improve their multiple market point positions in response to abbreviated product life cycles (Bower, 2001). However, integration efforts often fail because firms do not develop a complete logic as regards the reasons for acquisition, the locus of the value, and the resources (time, effort) that need to be channeled to successfully integrate a target firm (Christensen, Alton, Rising, & Waldeck, 2011). We suggest that success or failure of post-merger integration efforts depends on the *timing* of such acquisitions; namely, the level of maturity of the target firm, as well as the frequency of acquisitions made by the acquirer (Shi, Sun, & Prescott, 2012). This is because timing can influence the acquirer's ability to manage the acquisition.

These aspects of timing impact the selection, valuing, and decisions as to the nature and extent of the target firms post-merger integration.[1] In other words, appropriate post-merger processes are contingent on the target's level of maturity, as manifested by its age and size. For example, younger firms are characterized by relatively under-developed products and technologies but are easier to integrate, whereas older firms contribute more established assets but tend to have a more developed, often rigid culture that creates obstacles and adds complexity to the integration process. An acquirer is more likely to absorb young and small-sized acquisitions, but the case differs significantly when acquiring larger firms with marketable products since their product development units require a certain autonomy. This difference entails unique integration efforts in which the largest targets often require preservation (Haspeslagh & Jemison, 1991). Previous M&A research has considered target size (Ellis, Reus, Lamont, & Ranft, 2011; Finkelstein & Haleblian, 2002) and target age (Puranam, 2001; Ransbotham & Mitra, 2010) as indicators of the difficulty of integration, although a few have examined them together as a better proxy for the target's level of maturity (Chaudhuri, Iansiti, & Tabrizi, 2005; Puranam, 2001).

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[1] Although the type and degree of *post-merger integration* may take very different forms, for example ranging from preservation to complete absorption (Haspeslagh & Jemison, 1991; Puranam, Singh, & Chaudhuri, 2009), the term in its general form applies to all related-acquisitions with which this study is concerned.

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Different levels of target maturity call for different selection and integration processes: "The integration of small acquisitions typically requires very different processes than the integration of large ones" (Ellis et al., 2011, p. 1262). Scholars have employed the notion of transfer effects to explain how target-to-target similarity, particularly in terms of size, influences acquisition performance (Ellis et al., 2011; Haleblian & Finkelstein, 1999; Haleblian, Devers, McNamara, Carpenter, & Davison, 2009). Younger and smaller firms face a greater risk that the technology they have developed is not 'market ready' (Mayer & Kenney, 2004; Ransbotham & Mitra, 2010). Larger and older firms have more established products and technologies, but they can also be prone to rigidity, cultural mismatch, and integration hurdles. As DePamphilis put it: "larger, more mature companies tend to be difficult to integrate, due to their entrenched beliefs about technologies, hardware, and software solutions" (2005, p. 233). This is particularly challenging in cross-border acquisitions where multinational companies attempt to respond to globalization pressure (Shimizu, Hitt, Vaidyanathm, & Pisano, 2004), but while attempting to realize complementary capabilities and products they often encounter complex issues (Park & Ghauri, 2011).

Routines are a vital mechanism through which multinational acquirers enhance learning (Park & Choi, 2014) and drive acquisition outcomes (Park, 2011). Hayward (2002) found that an acquirer's rate of acquisition recurrence represents a trade-off between low frequency (resulting in insufficient practice and knowledge base) and high frequency (that can saturate the organization's capacity to properly manage acquisitions). Combining a target's innovative products and technologies with an incumbent's complementary capabilities in manufacturing, marketing and distribution activities is a goal that is often shared by both the target firm and the acquirer (Doz, 1988; Graebner & Eisenhardt, 2004; Teece, 1986). For the acquirers, acquisitions of innovative products and technologies are viewed as a means of accumulating and re-deploying the upstream capabilities needed for entry into new product-domains (Bower, 2001). While such acquisitions have attracted considerable scholarly attention (e.g., Dalziel, 2008; Graebner, 2004; Granstrand & Sjoelander, 1990; Puranam, Singh, & Zollo, 2003; Puranam, Singh, & Zollo, 2006; Puranam et al., 2009; Ranft & Lord, 2000 relatively few studies have applied a higher level of analysis than the individual acquisition (e.g. Chatterjee, 2009; Ellis et al., 2011; Hayward, 2002; Laamanen & Keil, 2008). That is, most studies have examined the effect of such factors as target firm's size, age, and type, but these variables have generally not been considered in relation to the other acquisitions of the acquirer. Ellis et al. (2011) found that the similarity of the focal target to prior targets determines the extent to which adequate existing routines can deal with the focal acquisition: "target-to-target similarity improves application of acquisition routines and post-deal performance" (p. 1272).

Detailed accounts of some of the most successful acquirers indicate that successful acquisitions, which are often highly replicable (Hayward, 2002; Winter & Szulanski, 2001) are facilitated by the employment of "routines," which can be seen as the organizational equivalent of human "skills" (Nelson & Winter, 1982). Barkema and Schijven explained the success of General Electric in making acquisitions by "its ability to routinize the acquisition process" (2008, p. 595). Haleblian and Finkelstein pointed to the importance of routines for acquirers, noting that "the organizational knowledge from acquisition experience is embedded in such rules and routines" (1999: 36). For example, there are similarities in the acquisition characteristics of Cisco Systems and Banc One, both highly experienced acquirers (Hayward, 2002). This might indicate that there is a broader similarity between high-technology acquirers such as Cisco and chains like Banc One that facilitate growth by replicating downstream outlets in the "McDonald's approach" (Winter & Szulanski, 2001, p. 730). Jonsson and Foss (2011) argued that replicating part of the value chain could be a pathway for firm growth. Whereas chains grow geographically by replicating their downstream operations (outlets), technology firms often grow by increasing their product varieties (one-stop-shop) through replication of upstream activities such as product-development units. Evidence suggests that Cisco, for example, has developed a perspective and a set of capabilities [an Arrow Core, a routine's "ideal" ostensive part (Knott, Gupta, & Hoopes, 2008)] pertaining to the selection and integration of acquired targets, and that it has devoted much effort to replicating the acquisition process and using it as a source of a sustained competitive advantage. Despite the differences between replication of the upstream part of the value chain (in pursuit of new products) and the replication of downstream activities (in pursuit of new outlets), both scenarios require firms to rely heavily on organizational routines to guide their acquisition behaviors. For instance, Cisco Systems bases its acquisition strategy on the rule of acquiring companies with up to 75 employees, 75% of whom are engineers (Eisenhardt & Sull, 2001).

Like any organizational process, replication cannot be expected to produce only perfectly accurate replicas (Winter & Szulanski, 2001). For example, when Cisco deviated from its typical level of target maturity by either acquiring more or less mature targets, this led to lower acquisition performance (Mayer & Kenney, 2004). In addition, Cisco and other acquirers with well-developed acquisition programs constantly seek potential targets to maintain their pace of product innovation (Chatterjee, 2009; Laamanen & Keil, 2008), but sometimes change this pace considerably, thereby creating a disruption in their systems and processes.

Finally, despite the inherent risks of technology acquisitions (Chaudhuri et al., 2005), they are not equally risky for all acquirers, as some firms have developed a firm-specific capability to manage acquisitions successfully (Chatterjee, 2009). This observation is consistent with the resource based view according to which such firm-specific routines play a major role in explaining inter-firm performance differences (Knott, 2003; Knott et al., 2008; Metcalfe & James, 2000; Prashantham & Floyd, 2012).

This article extends research on organizational routines (Feldman & Pentland, 2003, 2008; Pentland & Feldman, 2005; Winter & Szulanski, 2001) by examining the conditions in which a replication freeze (Winter & Szulanski, 2001) continuous exploration (Jonsson & Foss, 2011) or improvisation (Feldman & Pentland, 2003, 2008; Pentland & Feldman, 2005) can lead to improved organizational outcomes. Specifically, it is argued that iterations that deviate from a routine's pattern have a *negative effect* on organizational outcomes. This helps refine Feldman and Pentland's (2003) view of a routine as a level attribute by providing a more fine-grained unit of analysis where routine performance can be analyzed as a quasi-experiment (Feldman & Pentland, 2003; Winter & Szulanski, 2001). We also respond to the call for further empirical research on routines to fill in the gaps needed for significant "conceptual progress" (Becker, 2005, p. 250). We focus on technology acquisitions or "M&A as R&D" (Bower, 2001) in multinational technology firms and provide a multi-method examination (in-depth qualitative and quantitative methods) of specific technology acquisitions. In so doing, we hope to contribute to a better understanding of how multinational companies use routines in their pursuit of technology acquisitions.

In so doing, we provide a first attempt to conceptualize the importance of the performance implications of routine acquirers, as well as identify the maturity of target and timing of acquisition as critical dimensions of serial acquirers' routine behavior. The findings may thus lead to a better understanding of acquisition programs by viewing individual acquisitions not in isolation

(Haspeslagh & Jemison, 1991), but rather against the backdrop of the other acquisitions in the same program.

2. Theoretical background and hypothesis development

2.1. The concept of organizational routines

Organizational routines are a key explanatory mechanism in theories of human organizations (Feldman & Pentland, 2003). The concept of organizational routine captures the idea of repetition which is regularly followed without specific direction or detailed supervision (Stene, 1940). Stene himself recognized that organizational routines, just like individual habits may be 'good' or 'bad;' i.e., they can promote or inhibit "the accomplishment of an organization's objectives" (Stene, 1940, p. 1130). Organizational routines have been regarded as the primary way in which organizations accomplish much of what they do (Cyert & March, 1963; Nelson & Winter, 1982) since they help maximize efficiency and legitimacy and mitigate conflicts (Feldman & Pentland, 2003). However, the dark side of organizational routines is their role in fostering inertia (Hannan & Freeman, 1984) which is a prime source of organizational failure.

An organizational routine consists of two related components: *structure* and *agency*, as found in structuration theory (Feldman & Pentland, 2003; Giddens, 1984). Structure embodies the abstract notion of the routine, whereas agency consists of the actual execution of the routine by specific people at specific times in specific places (Feldman & Pentland, 2003, 2008). However, it might be somewhat misleading to analyze one facet without considering the other since a routine can generate change merely through "improvisation" (Feldman & Pentland, 2003; Pentland & Feldman, 2005). While this flexibility can enable organizations to address and cope with stagnation and inertia, it is also costly to the organization. Thus analyzing the degree of deviation from a routine's ostensive value can lead to a richer analysis than previous abstractions that have tended to focus "on the central tendencies rather than variation" (Feldman & Pentland, 2003, p. 97).

Studies investigating organizational routines often cite the classic example of an academic hiring routine (Cyert & March, 1963; Nelson & Winter, 1982), because it meets all four conditions for an organizational routine: "It is repetitive. It involves an easily recognized pattern of actions that includes attracting candidates to apply, screening applicants, choosing applicants, and, if a positive decision is made, extending an offer. These actions are interdependent, in the sense that the output of one action (e.g., screening) is the input to another (e.g., choosing)... and in most organizations, hiring is carried out by multiple actors; it is an organizational routine, not an individual routine" (Feldman & Pentland, 2003, p. 100).

2.2. A routine-based view of technology acquisition

In a similar vein, acquisitions of technology firms by large multinational technology acquirer meet all four conditions of repetitiveness, a visible pattern of actions, interdependence between activities, and the involvement of several actors (Chatterjee, 2009; Mayer & Kenney, 2004). Hence such acquisitions can be seen as "performances" (Feldman & Pentland, 2003) where each acquisition is another iteration of the routine, rather than a one-time event. Nevertheless, careful adherence to an acquisition routine improves the acquisition performance of similar acquisitions, but prevents capability enhancement with respect to different acquisitions (Hayward, 2002). Conversely, acquiring a series of highly dissimilar businesses helps firms to discover new bases of knowledge and experience, but prevents specialization in any specific type of acquisition (Hayward, 2002). In the long run, firms may benefit from process learning (Keil, 2004) which allows them to improve their performance on subsequent acquisitions (Finkelstein & Haleblian, 2002; Haleblian & Finkelstein, 1999; Hayward, 2002). Learning from past acquisitions (i.e., experience) where underlying organizational policies and practices are questioned (Argyris, 1977; Argyris & Schoen, 1978) leads to modifications in organizational routines. In the short-term, however, the benefits of a tight performance regime are expected to outweigh the long-term potential risks of inertia. Conversely, deviating from the routine's blueprint, or typical execution, is expected to negatively impact short-term performance. In conceptualizing the difference between short- and long-term horizons it is useful to consider Lewin's (1947) view of change and constancy as relative concepts. Thus, any theorizing is contingent on the characteristics of the chosen time horizon.

Winter and Szulanski's (2001) theory of growth by replication started an adjacent research stream in the theory of organizational evolution. They described a strategy of growth by replication as a two-phase process. During the first phase, firms use exploration to identify their replication logic and approximate their Arrow Core, whereas during the second phase they exploit it by engaging replication. Although replication is not expected to produce only perfectly accurate replicas due to changing conditions requiring adaptation, Winter and Szulanski (2001) suggested that freezing the replication logic leads to superior organizational outcomes as compared to continuous exploration. The *replication dilemma* entails a trade-off between precision and learning and adaptation (March, 1991).

In what follows, we theorize why organizational characteristics of target firms and acquisition timing can help explicate selection and integration challenges, and assess the performative aspect of acquisition as an iteration of the acquisition routine (Ellis et al., 2011; Hayward, 2002; Laamanen & Keil, 2008).

2.3. Target related timing: maturity of target firms

Frequent acquirers generate value by cultivating their ability to fill gaps in their product or technology capabilities. One challenge faced by frequent acquirers is integration, as this is a key mechanism to achieve value. The long-term success of these acquisitions derives from the ability to link technological capabilities to human system skills (Bower, 2001; Chaudhuri & Tabrizi, 1999; Puranam et al., 2006; Ranft & Lord, 2000). The successful integration of a target firm depends on firm size; the larger the acquired firm, the higher the integration complexity. In addition, accumulated experience in acquisitions of similar size is expected to enhance the acquirer's performance (Finkelstein & Haleblian, 2002). In high technology acquisitions the major asset acquired is human capital (Bower, 2001; Chaudhuri & Tabrizi, 1999). However, the combination of a target firm's age and size provides a more complete characterization of its level of maturity in technology grafting acquisitions (Chaudhuri et al., 2005; Puranam, 2001). Acquisition targets also differ in the type of value they bring to the acquirer (Puranam & Srikanth, 2007); i.e., what the acquired firm knows vs. what the acquired firm does. This tends to be related to the target's size: younger targets, often referred to as technology and talent acquisitions, tend to be acquired for what they know, whereas more established targets in product or even platform acquisitions tend to be acquired for what they do (Brueller, Carmeli, & Drori, 2014).

Whereas more mature target firms represent an integration challenge, acquiring less mature firms may increase the risk that their technology will not come to fruition as planned (Mayer & Kenney, 2004). Therefore, an acquirer's deviation from its specific Arrow Core (Winter & Szulanski, 2001) in terms of target maturity is expected to create new difficulties and thereby may negatively

affect its performance. For example, the performance of Cisco Systems' acquisition strategy is derived not only from the *ostensive* part of its acquisition routine of target choice [focusing on firms with up to 75 employees (Eisenhardt & Sull, 2001)], but also from the *discipline* that guides its behaviors of attempting to avoid significant deviations. When Cisco deviated from its routines, for instance, in the cases of more established target firms such as Stratacom and Pirelli, it encountered substantial difficulties (Mayer & Kenney, 2004, p. 319). Research suggests that mature companies not only require different integration processes (Puranam et al., 2003, 2006), but are also more difficult to integrate (DePamphilis, 2005). Thus,

Hypothesis 1. The higher the similarity between a focal acquisition and past acquisitions, both in size and in age, the higher the value captured by the acquirer.

2.4. Acquirer related timing: endogenous and exogenous factors

Stene (1940) was the first to point out the importance of continuity and timeliness in the performance of an organizational routine, which needs to "become habitual because of repetition and which is followed regularly without specific directions or detailed supervision by any member of the organization" (p. 1129). This regularity was observed, many years later, in the context of international expansion, in studies showing that deviation in the pace of internationalization hurts performance (Vermeulen & Barkema, 2002; Wagner, 2004). Similar findings were reported by scholars studying the specific context of acquisitions by serial acquirers (Hayward, 2002; Laamanen & Keil, 2008). Hayward (2002) found that in order to optimize acquisition performance acquirers need to avoid "very long and very short intervals between acquisitions" (Hayward, 2002, p. 25). Accumulated experience from previous acquisitions, which benefits the acquirer throughout the various stages of the acquisition process, including the negotiation and due-diligence stage, is best maintained if the acquirer manages to avoid overly long and overly short intervals between acquisitions. To the extent that even pacing of acquisitions helps acquirers avoid overpayment, this should be manifested by a lower acquisition price. Hence, the continuity of acquisitive behavior (Hayward, 2002; Laamanen & Keil, 2008) together with the average acquisition rate taken as a proxy for the ostensive aspect of the acquisition program (Pentland & Feldman, 2005) are likely to help the acquirer to avoid overpayment and vice versa.

While our theorizing has thus far focused entirely on firm-specific timing considerations, we also need to consider the influence of competition prevailing in the market for corporate control. Toxvaerd proposed a model of acquisitions as preemption games where "at each point in time, an acquirer can either postpone a takeover attempt or raid immediately" (2008, p. 1). Overall, under complete information conditions, all acquirers tend to rush simultaneously into merger waves (Toxvaerd, 2008). As a result, even disciplined routine acquirers might be forced into hasty acquisitions and deviate from their routine behavior in an attempt to avoid losing the most attractive target firms to competitors. For example, Mayer and Kenney (2004) describe the rush of established data communications equipment firms to acquire switching companies when it became clearer that switching had the potential to become a disruptive technology. Such a high level of competition over target firms in the market not only interferes with routine-based behavior, but might also bid up a target firm's price, and thus allow their shareholders to increase the portion of the value they capture. This "excess demand" scenario was analyzed in Adkisson and Fraser's (1990) study of bank mergers; they showed that acquisition premiums grow with the number of potential bidders. Furthermore, in times of heightened competition, the number of bidders might increase even further, due to the participation of firms that lack the capabilities to successfully handle acquisitions, but still choose to mimic the strategies of capable acquirers whose behavior is perceived to be more legitimate or successful. This pattern is particularly prevalent in times of uncertainty or change (Karim & Mitchell, 2000). The connection between timing and the degree of excess demand in the market for corporate control enables the use of the time variable as a proxy for the level of rivalry and resulting interference on acquirers' routine behavior. Clearly, rivalry cannot be directly gauged, as many of the targets are privately held entities, and an overwhelming majority of the deals are negotiated, rather than auctioned. Despite the exogenous influence with regard to acquisition timing, Rovit and Lemire found that "constant buyers, which bought consistently through economic cycles... were by far the most successful" (2003, p. 17).

Considering both the endogenous and exogenous factors relating to the acquirer's timing consideration, we hypothesize that:

Hypothesis 2. The more the acquirer's regularity of acquisition timing varies, the higher the acquisition price paid per employee.

3. Method

3.1. Sample

In this study, we focused on acquisitions of multinational companies in information and communications technology (ICT) industries. This is because extending the product offering through acquisitions is particularly attractive for firms in these industries due to the modular nature of IT design, as compared to the organic nature of pharmaceutical products, for example (Bower, 2001). In addition, we examined a sample of acquisitions in publicly traded international technology incumbents for which secondary data are available. The sample was extracted from the SDC Platinum's M&A database and consisted of firms acquiring at least ten target firms in the period between 1996 and 1999; the sample did not include an acquiring firm that had been acquired by another firm. The initial list included 437 international acquisition transactions carried out by 23 acquirers. Given the importance of the number of employees as a proxy for firm size, only cases in which this figure was disclosed were considered, resulting in 159 remaining acquisitions. Finally, list-wise deletion of other missing values resulted in the elimination of additional 58 additional cases. Data analysis was conducted on the final sample which included 101 acquisitions made by 20 international acquiring companies (see Appendix A).

The choice of time period of the sample was consistent with previous studies on technology acquisitions that have focused on the second half of the 1990s (King & Driessnack, 2003; Laamanen & Keil, 2008; Ransbotham & Mitra, 2010), which was a growth period in the economy. This ensured that all measurements were limited to a period of more favorable economic conditions (Ramanujam & Varadarajan, 1989).

3.2. Measures

3.2.1. Independent variables

Deviation from typical target maturity. We assessed deviation from typical target maturity using deviation of target age and deviation of target size. *Deviation of Target Age:* This measure was assessed by the normalized deviation of target age (a target firm age is measured in years by subtracting the effective acquisition

date from the date of company establishment, as indicated in the press releases announcing the acquisitions) from the average age of acquisition targets in the acquisitions each acquirer completed during the focal period. Deviations were normalized by subtracting the age of the focal acquisition from the average target age and dividing it by the corresponding standard deviation. *Deviation of Target Size*: This measure was assessed by the normalized deviation of target size from the average size of acquisition targets as specified earlier. The size of a target firm was measured by headcount, which reflects the fact that the major acquired asset is human capital (Bower, 2001; Chaudhuri & Tabrizi, 1999).

Deviation from typical acquisition rate. We assessed this measure using the normalized rate variability which was estimated by calculating the normalized deviation of the annual number of acquisitions from the acquirer's annual average of acquisitions completed during the focal period. This variable was then normalized by dividing it by the corresponding standard deviation. In addition, we assessed *Deals per year* (the total number of deals concluded by the acquirer during the calendar year) and *Year effect* (the year captures the macro-level effects on intensity of competition in the market for corporate control).

3.2.2. Dependent variables

Acquisition performance was traditionally assessed by using financial ratios (e.g., ROA) (Hunt, 1990). This approach has been criticized because it overlooks the importance of combining different measurement methods (Bower, 2004; Cording, Christmann, & Weigelt, 2010; Lubatkin, 1983). Two measures have been widely used to assess M&A performance return on assets (ROA) and an acquirer's stock abnormal return around the acquisition announcement date (King, Dalton, Daily, & Covin, 2004). However, using stock abnormal returns as a performance measure is problematic since the assumption that financial markets can predict acquisition performance is "preposterous from a strategic perspective" (Bower, 2004, p. 236). Similarly, in a study of the banking industry Zollo and Leshchinkskii (2000) found that complex events, such as the announcement of acquisitions, challenge the validity of the notion of market efficiency. While this weakness could potentially be mitigated by using the third measure of long-term stock performance (Cording et al., 2010), the extended time horizon increases the likelihood of other factors affecting the stock price. Moreover, Hayward (2002) noted that stock prices are problematic even within a short period around the time of the deal when the target firm is much smaller than the acquirer. While the use of abnormal returns is not recommended for deals which fall short of 0.5% of the market capitalization of the acquirer at the time of announcement (Hayward, 2002), many acquisitions in multinational ICT settings do fall below this bar. To somewhat mitigate this problem, the narrowest time window is preferable, for example between day -1 and day +1.[2]

The deal price is an important factor in assessing acquisition performance. In technology acquisitions, a major asset is the human capital of the target firm (Bower, 2001; Chaudhuri & Tabrizi, 1999; Mayer & Kenney, 2004). Mayer and Kenney proposed that a possible "way of measuring the cost of an acquisition is the cost per acquired employee" (Mayer & Kenney, 2004, p. 315). Since the cost of acquisition entails transfer of value from the shareholders of the acquirer to those of the target firms, the deal price can be used to gauge the value captured by the target firms. Since many target firms in technology acquisitions are privately held, a direct measurement of acquisition premiums is not possible.

Acquirer value capture. This measure was assessed by using three performance indices. *Return on assets (ROA)* was based on year-end net profit after deal completion. *2nd Year ROA* was assessed in a similar way but for the following year. *Abnormal Return* was assessed by using short-term abnormal returns around the acquisition announcement date (King et al., 2004). The abnormal returns were measured between day −1 and day +1. Consistent with previous studies (Asquith, 1983; Haleblian & Finkelstein, 1999; Hayward, 2002) the abnormal return was calculated as ARit = Rit-(αi + βiRmt), where "Rit = return on stock I for day t; Rmt = return on the market portfolio for day t; αi = constant; and βi = beta of stock i (measure of non-diversifiable risk)" (Haleblian & Finkelstein, 1999, p. 41).

Target value capture. The target value capture is the difference between the deal price and the stand- alone value of the target. Nevertheless, target value capture relates positively to both the acquisition price as well as the price per employee. Therefore, the value captured by the target was measured using the following two indicators: (1) *Acquisition price*, which refers to the final deal price quoted by the SDC, and (2) *Acquisition price per employee*. We normalized the acquisition price by the number of employees in the target firm at the time the deal was announced such that the acquisition price reflected the price paid per employee (Mayer & Kenney, 2004).

3.3. Data analysis

We tested the research hypotheses using covariance-based structural equation modeling (CB-SEM). This approach is appropriate for theory testing, particularly when latent variables are employed. In our case both the deviation from the routine's ostensive value, as well as performance, are both multi-dimensional latent constructs which cannot be directly measured and are not fully captured by any single indicator. We assessed the overall fit of the model to the data using the chi-square statistic, the comparative fit index (CFI), the incremental fit index (IFI), the normed fit index (NFI), and the relative fit index (RFI). The chi-square statistic is well-known to be oversensitive to sample size and be significant (suggesting that a model does not adequately fit the data) even when the differences between observed and model-implied covariances are slight (Kline, 1998). To reduce the sensitivity of the chi-square statistic to sample size, researchers recommend dividing the chi-square by the degrees of freedom. The overall fit statistics for the models tested are given in Table 3. In addition, we performed multiple regressions to test the effect of the control variables on acquisition outcomes.

4. Results

The means, standard deviations, and correlations among the variables are presented in Tables 1 and 2. None of the correlations exceeded .70, which implies that the data do not suffer from multicollinearity (Makridakis & Wheelwright, 1989).

The results indicate that Models 1 and 2 fit the data well. The chi-square divided by degrees of freedom for Model 1 and Model 2 were 1.134 and 0.839, respectively. In addition, other indices – CFI, IFI, NFI, and RFI – showed acceptable fit with the data (>.90) (Medsker, Williams, & Holahan, 1994).

In Model 1 (Fig. 1, Panel A), normalized deviations of target size and age were both significantly positively loaded by the latent construct representing the focal-target's deviation from the scope of the acquirer's acquisition routine. Contrary to the first model, however, target size came out significant as well. As for the

[2] These selected performance measures are in line with the view of these acquisitions as "a critical means by which technology firms obtain the resources needed to compete in global markets" (Graebner, 2004, p. 751). Since we are concerned with competition that takes place in the downstream (product) markets, the dependent variable was selected in attempt to capture the impact on the acquirer's accounting profitability (or, in the case of the financial indicator, the expectation of such an impact).

Table 1
Descriptive statistics and matrix of correlations, Model 1.

	Mean	S.D.	1	2	3	4	5	6	7
Target age (years)	11.65	16.72	–						
Target size (employee)	759.97	2622.07	.09	–					
Norm. dev. size	.74	.78	.25*	.40**	–				
Norm. dev. age	.70	.62	.55**	.06	.11	–			
ROA (%)	12.10	6.32	−.28*	−.09	.08	−.10	–		
ROA year 2 (%)	10.70	8.37	−.13	−.13	.12	−.13	.52**	–	
Price ($M)/employee	1.84	2.87	−.20*	−.10	.05	−.05	.17	−.05	–

$N = 101$.
* $P < .05$.
** $P < .01$.

Table 2
Descriptive statistics and matrix of correlations, Model 2.

	Mean	S.D.	1	2	3	4	5
Acquisitions per year	7.94	5.43	–				
Deviation from average acquisition rate	.97	.58	.47**	–			
Year	1998.02	1.13	.48**	.49**	–		
Price ($M)	631.57	2352.80	.08	.17	.08	–	
Price ($M)/employee	1.84	2.87	.34**	.18*	.16	.48**	–

$N = 101$.
* $P < .05$.
** $P < .01$.

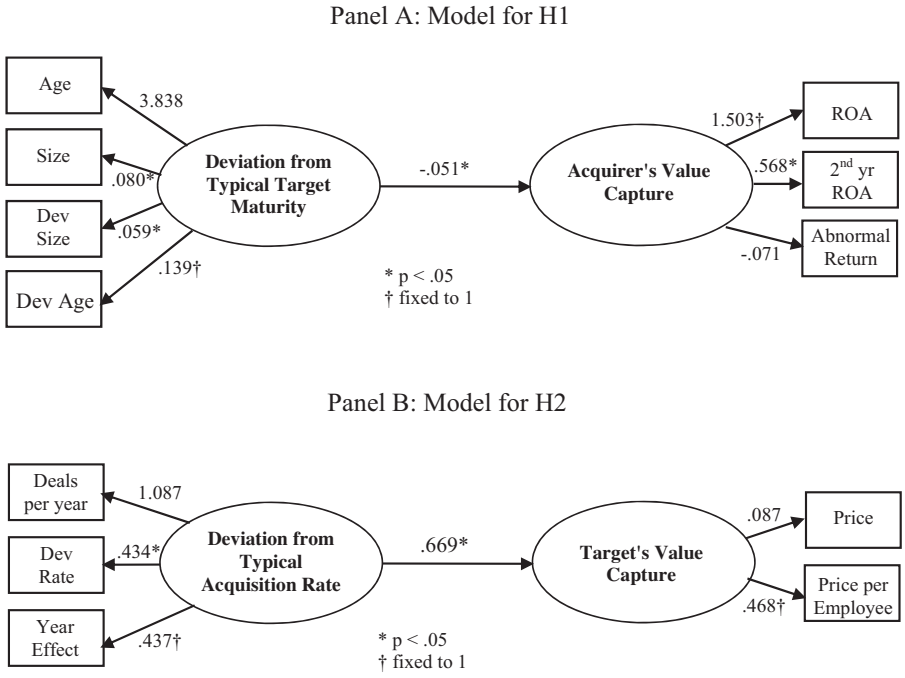

Fig. 1. The Results of the Hypothesized Model.

dependent variable, ROA was a significant indicator of the value captured by the acquirer. However, second-year ROA was not significantly loaded by the latent dependent variable. Financial abnormal stock return was not significantly loaded either.

Table 3
SEM fit-of-indices for Models 1, 2 and 3.

Model	Chi-square	df	Chi-square/df	CFI	IFI	NFI	RFI
#1	13.61	12	1.134	.99	.99	.98	.94
#2	2.52	3	0.839	1.00	1.00	1.00	.99

Note. CFI = Comparative Fit Index, IFI = Incremental Fit Index, NFI = Normed Fit Index, RFI = Relative Fit Index.

In Model 2 (see Fig. 1, Panel B), the deviation in the acquisition rate and the effect of the calendar year were both significantly positively loaded by the latent construct representing the deviation from the acquirer's routine acquisition rate. The rate of acquisitions itself was not significant. The value captured by the target positively loaded the price per employee, whereas the price itself was not found to be significant. Finally, the results indicate that H2 was supported: the more an acquirer's rate of acquisitions deviated from the typical rate, the higher the acquisition price and the price paid per employee. This is in line with the prediction that deviations from the acquirer's typical rate of acquisition would benefit the shareholders of the target firm. Conversely, continuously pursued acquisition strategies

Table 4
Multiple regression results for the effect of control variables on ROA, 2nd year ROA, abnormal return, price, and price per employee.

	Model 1 β (t) ROA	Model 2 β (t) 2nd year ROA	Model 3 β (t) Abnormal return	Model 4 β (t) Price	Model 4 β (t) Price per employee
Constant[a]	.12 (4.55**)	.12 (6.27**)	−11.67 (−2.13)	−.297 (.42)	.25 (30)
R&D intensity	−.02 (−.22)	.01 (.06)	−.38 (−4.06**)	.08 (.82)	.22 (2.30**)
Relative size	−.05 (−.50)	.16 (1.53)	.08 (.810**)	–	.30 (3.69**)
Target (1 = public; 0 = private)	−.09 (−.89)	−.07 (−.65)	−.01 (−.11)	.26 (2.61**)	−.18 (−1.83)
R^2	.014	.025	.153	.068	.15
Adjusted R^2	.00	.00	.126	.049	.124
F for R^2	.455	.818	5.764**	3.56*	5.67**
Std. error of the estimate	.086	.063	18.011	2316.36	2.71

[a] Unstandardized coefficients.
* $p < .05$.
** $p < .01$.

enhanced the outcome from the perspective of the acquirer, by reducing the price paid per employee. Moreover, factors external to the firm, represented by the calendar year, may have had an influence on the extent of divergence from the acquirer's typical rate of acquisitions, and thus impacted the price paid for these acquisitions.

4.1. Supplementary analyses

We also tested the effect of the control variables. R&D intensity, or the investment in R&D as a percentage of sales for acquirers (Benson and Ziedonis, 2008; Puranam & Srikanth, 2007), could increase acquisition performance by building absorptive capacity, which helps utilization of external sources of knowledge (Ahuja & Katila, 2001; Cohen & Levinthal, 1990). Relative size, or the ratio between the numbers of employees of the acquirer and the target, might increase the integration difficulty (Haspeslagh & Jemison, 1991; Kapoor & Lim, 2007). Whether a target is publically traded or privately held is also considered to influence the acquirer's performance (Capron & Shen, 2007; Fuller, Netter, & Stegemoller, 2002). We thus regressed each of the dependent variable against these control variables.

The results of Model 1 in Table 4 indicate that none of the control variables had a statistically significant effect on ROA. The results of Model 2 in Table 4 indicate there were no statistically significant relationships between the control variables and the second year ROA. The findings of Model 3 in Table 4 showed that only R&D intensity had a significant effect on abnormal returns.

5. Discussion and conclusion

In this article, we studied the timing-related aspects of M&As by technology multinationals, using the theoretical lens of organizational routines. We viewed every acquisition as a routine iteration, and examined their outcomes as regards deviation from the Arrow Core or the ostensive value of the routine. Our first hypothesis dealt with the acquirer's performance with respect to variation in the target's maturity, whereas the second hypothesis related to the target's value-capture with respect to exogenous and endogenous acquirer-specific variation in the pace of acquisitions. Examining how timing issues relate both to the target and the acquirer is theoretically important since research has focused on the target or the acquirer but not both. Specifically, the results indicate that deviations on the level of target firm maturity from the ostensive value (acquirer-specific) result in lower returns. We found that the larger the deviation, the lower the return on assets both in the focal year of examination. In addition, we found that the larger the deviation in the acquisition rate, the higher the price paid per employee. The results also indicated no significant relationships between deviations in acquisition maturity and abnormal return of the stock value following the deal announcement, or between deviations in the acquisition rate and deal price. We discuss the theoretical implications of our findings regarding the literature of M&As of multinational technology firms below.

5.1. Theoretical implications

This study contributes to the growing body of research on organizational routines by enriching what is known about the tradeoffs involved in the performance of organizational routines (Feldman & Pentland, 2003; Jonsson & Foss, 2011; Winter & Szulanski, 2001) in multinational technology companies that frequently engage in acquisition activities. We proposed a more fine-grained conceptualization and empirical examination of the ostensive and performative components of organizational routines (Feldman & Pentland, 2003), or Arrow Core and replications (Winter & Szulanski, 2001). Further, our approach is instrumental in that it specifically gauges the deviation of each iteration of the routine from its template or ostensive value. This approach increases our ability to estimate the outcome of individual acquisition iterations, thus enhancing our understanding of the challenges posed by acquisitions that are more remote from the acquirer's core acquisition capability or the ostensive value. Our focus on multinational acquirers sheds new light about the importance of routines (Park, 2011; Park & Choi, 2014) used to enhance both acquires and target firms' value captured. As such, we highlight a way to better understand M&A performance as a function of the distance between the multinational acquirer's capability and the characteristics of focal (target) firm. This approach can be seen as an extension of the literature on the role of distance in international acquisitions (Shimizu et al., 2004).

In addition, by using routine iterations in terms of "the specific actions, by specific people, at specific times and places, that bring the routine to life" (Feldman & Pentland, 2003, p. 94), we provide a means of gauging the ostensive component as the pattern formed by individual iterations (Feldman & Pentland, 2008). This approach also expands on Mintzberg's (1994) notion of 'realized' strategy according to which a firm's reconstructed strategy may be derived from its moves and actions. This is because the ostensive value of routines; namely, the difficulty in identifying, extracting and evaluating the Arrow Core or the way it is conceived are often not given and often are not even explicit within the firm (Feldman & Pentland, 2008; Winter & Szulanski, 2001). Hayward stated that acquiring is a balancing act between exploiting existing opportunities and exploring for new ones (2002, p. 24). This study helps to elucidate the benefits and pitfalls of different performative regimes, ranging from tight to loose. Further, it provides a more nuanced discussion within the routine-based view and allows scholars to estimate the tradeoffs such as the one between narrow and broad acquisition strategies (Hayward, 2002).

From the context angle, we identified target maturity and acquisition timing as key factors in serial acquirers' performance, and showed that routine behavior with a tight performative regime positively affects the acquirers' performance. These findings contribute to the M&A literature that seeks to identify the organizational attributes associated with a positive "transfer effect" (Finkelstein & Haleblian, 2002). Additionally, we found that external factors to the firm, represented by the time variable, also influence acquirers' tendency to divert from their typical rate of acquisitions. In order to avoid paying higher prices for acquisitions, serial acquirers need to be careful when diverting from their typical rate of acquisitions, particularly during periods of heightened competition over targets. This is consistent with practitioners' recommendations to acquire steadily and through economic cycles (Rovit & Lemire, 2003).

Finally, our research points to the importance of considering the complexity level of M&A tasks. We suggest that in less complicated M&A tasks improvisation should be encouraged whereas in highly complex M&As, sticking to a routine-based approach may be more beneficial because improvisation in such circumstances is less likely to generate favorable outcomes. We argue that this is vital especially in multinational companies that are engaged in frequent acquisitions of technology target firms, because the level of complexity associated with these deals often requires a high level of attention to strategic, organizational and functional differences (Anand, Capron, & Mitchell, 2005; Aybar & Aysun, 2009). Clearly, not all multinational companies engaging in acquiring technology target firms face such a high level of complexity, because often companies are mostly interested in talent (e.g., Yahoo under CEO Marissa Mayer). However, even companies like Yahoo must attend to differences between their own and target firms and the appropriate mode of integration.

5.2. Directions for future research

We hope that this study will pave the way for new avenues of research. First, the observed differences between the very few successful acquirers and the multitude of struggling ones (Bower, 2001) implies that firm-specific attributes such as organizational routines and their performative regimes could explain such inter-firm performance differences. An in-depth study of acquirers may shed light on the specific drivers of these performance differences. Second, this study focused on a limited period of time. Future research could take a longitudinal perspective, exploring the outcome of routine iterations over longer periods. Third, we followed Bower (2004), and deliberately limited the scope of this study, both theoretically and empirically, to the specific strategic scenario of technology acquisitions. Thus, we do not claim that our findings are readily generalizable beyond ICT industries to other M&A types. Nevertheless, we encourage scholars to extend the analysis and include other types of serial acquisitions, for example, in geographic roll-up scenarios (Bower, 2001) in which acquirers pursue similar replication strategies, such as in the case of Banc One (Hayward, 2002; Winter & Szulanski, 2001). In addition, our focus here was on multinational technology firms but we did not consider cross-border acquisitions. Future studies can benefit from elaborating on our theorizing of routines and explore how they influence value creation and capturing in international acquisition deals; this clearly would require specifics such as a more fine-grained examination of institutional factors (see Capron & Guillén, 2009) and how a cross-border acquisition influences performance outcomes in the acquirer's home country (Bertrand & Capron, 2014). Finally, we believe that the same approach to the quantitative analysis of routine behaviors is applicable to almost all organizational routines.

5.3. Practical implications

Our study also provides some useful practical implications for firms seeking to design and cultivate strategies for managing acquisitions in high technology industries. This research underscores the importance of organizational routines in facilitating the performance of these complex events. Not all firms pay equal attention to the adoption of focused acquisition strategies in terms of the maturity of the target firms, and pursue them at a steady pace rather than in bursts. For example, it is interesting to contrast the views of two of the companies, both included in our sample, during the timeframe of our study. The first one, Cisco, adhered so strictly to its acquisition selection criteria that it preferred to walk away from deals that did not match its template. As John Chambers, its CEO, stated: "We've killed nearly as many acquisitions as we've made. We killed acquisitions for those reasons even when they were very tempting. I believe it takes courage to walk away from a deal. It really does. You can get quite caught up in winning the acquisition and lose sight of what will make it successful. That's why we take such a disciplined approach" (Rifkin, 1997). The second one was Lucent Technologies, which seemed to have lacked a clear template around which to center its acquisitions. As Pat Russo, Lucent's EVP indicated: "Although we don't have an "acquisition strategy" as such, we are open to acquiring firms that will better enable us to execute our business strategies. For instance, when we find we have a gap in a specific talent, technology, or geographic market, an acquisition may present a strong option for closing that gap" (Jacobs, 1999).

Beyond the direct benefits of a focused acquisition approach, as analyzed in this article, practitioners believe there is also an additional, indirect effect, when targets have a preference for a particular acquirer (Gans & Stern, 2003; Graebner & Eisenhardt, 2004), or even come to see it as an "acquirer of choice" (Chatterjee, 2009). Analyzing how such a reputation influences the decisions of technology startups is of interest to scholars and practitioners alike, but remains beyond the scope of this study.

Appendix A. List of companies in the sample, their assets, sales and profitability

No.	Name	1999 total assets [bln]	1999 sales [bln]	1999 net profit [bln]
1.	3Com Corp	4.495	5.572	.403
2.	ADC Telecommunications Inc.	1.672	1.926	.205
3.	Black Box Corp	.246	.329	.038
4.	Cabletron Systems Inc.	*1.606	1.377*	-.127*
5.	Cadence Design Systems Inc.	1.459	1.093	-.014
6.	Cisco Systems Inc.	14.725	12.154	2.096
7.	CompuWare Corp	1.459	1.676	.349
8.	Computer Associates Intl Inc.	8.070	5.253	.626
9.	Cooper Industries Inc.	4.143	3.868	.331
10.	General Electric Co{GE}	405.200	111.630	10.717
11.	Hewlett-Packard Co	35.297	36.178	3.491
12.	IBM Corp	87.495	87.548	7.712
13.	Intel Corp	43.849	29.389	7.314
14.	Lucent Technologies Inc.	38.775	38.303	4.766
15.	Microsoft Corp	37.156	19.747	7.785
16.	Motorola Inc.	37.327	30.931	.817
17.	Oracle Corp	7.259	8.827	1.289
18.	Sun Microsystems Inc.	8.420	10.091	1.031
19.	Texas Instruments Inc.	15.427	9.759	1.451
20.	Thomas & Betts Corp	2.652	2.522	.148

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