

ECONOMIC ACTION DOES NOT TAKE PLACE IN A VACUUM: UNDERSTANDING CISCO'S ACQUISITION AND DEVELOPMENT STRATEGY

DAVID MAYER AND MARTIN KENNEY

More than any other high-technology firm in history, Cisco has built its dominant market position through acquisition.¹ It has made many more acquisitions than its competitors, has had fewer failures (though, as we will show, it has also experienced failures), and many successes. To understand how remarkable Cisco's success has been, it is only necessary to examine competitors such as Nortel, Ericsson, and Lucent. They also were aggressive acquirers, but today teeter on the brink of bankruptcy. Similarly, startup competitors such as Ciena, Juniper Networks, and Extreme Networks experienced difficulty. Within this market maelstrom, Cisco stands out as the only networking equipment firm with solid finances. Price alone cannot explain Cisco's success, as the prices paid for its acquisitions were comparable to the market. This paper examines the roots and reasons for Cisco's success.

Typically, economists and finance researchers have considered corporate acquisitions as arm's length transactions consummated in a relatively perfect market for corporate control, an appealing fiction no doubt, but it consigns the real world difficulties of managing the acquisition process into a black box. The key to making a successful acquisition does not begin with strategy and end with integration, rather it begins with understanding and participating in the external ecosystem in which the target firm operates and ends with managing the dynamics of integration.² Traditional "economistic" perspectives ignore the social and organizational dimensions within which the acquisition process is embedded. In tandem with the economist's erasure of the social, the temporal and processual dimensions were ignored. Put differently, acquisitions are treated as point-in-time events occurring in an environment that operates like the stock market in which corporate control, organizational knowledge, and employee fealty are transferred as seamlessly as stock shares. These

1 The authors thank Phanish Puranam for the idea for the title. David Mayer thanks James Gibbons and Howard Charney for introducing him to members of Cisco's acquisition team. Steve Cadigan, Mimi Gigoux, Craig Griffin, Mario Mazzola, and Peter Ruh of Cisco are also thanked. The assistance of Gregory Geiling, Kim Girard, Alex Henderson, Paul Johnson, Christopher Stix, Jeffery Young, and Donald Valentine is gratefully acknowledged. Martin Kenney thanks Urs von Burg for providing access to his research interviews. Both authors appreciated the comments by Rafiq Dossani, Paul Duguid, Vibha Gaba, Raghu Garud, Andrew Hargadon, Alan Meyer, Phanish Puranam, and Richard Rosenbloom on earlier versions. The authors are solely responsible for all of the conclusions and interpretations.

2 For a discussion of ecosystems, see Bahrami and Evans (2000).

assumptions ignore the social, temporal, and processual dimensions so critical for explaining acquisition success and failure.

Our assertion of the significance of the social and organizational dimensions does not ignore either the importance of strategic intent and planning or economic considerations. Rather it suggests that these do not exist in a vacuum. Every aspect of the acquisition process has organizational considerations that cannot be separated from strategy and economics. In fast-changing high-technology fields, very often the capabilities of the employees of the acquired firm are a significant, if not preponderant, component of a firm's value, thus their retention is vital for the preservation of the acquisition's value. Put differently, if these employees leave or their practice is significantly disrupted, then the acquisition is almost certain to fail. The successful acquirer must actively manage the social aspects of the acquisition process.

Cisco is an ideal case for examining the organizational and processual aspects of the acquisition process. Executives at other firms such as Craig Barrett (2001) of Intel and journalists (Byrne 1998) have hailed Cisco for its effective use of acquisitions as a central component in its overall competitive strategy. As of January 2001, Cisco had acquired 71 firms for over \$34.5 billion (it has made more since then), and effectively leveraged these acquisitions to become an industry leader. Without these acquisitions it could not have maintained a compounded annual growth in revenues and profits of over 30 per cent from 1987 through 2000, and likely would have been out-flanked by startups.

Cisco's success is especially remarkable as acquisitions in the information technology industries have a long history of failure. For example, Inkpen *et al.* (2000) found that European firms had difficulties integrating Silicon Valley computing and telecommunications acquisitions. In contrast, Cisco Systems has survived and prospered through a strategy that has been termed "acquisition and development (A&D)". Of course, acquisitions have not replaced R&D. In fiscal year 2001, internal R&D was 17.6 per cent of sales. Even when a firm's product line has been acquired, it is mandatory to continue R&D for the later product generations. To put A&D in perspective, John Chambers has said that Cisco creates two-thirds of its intellectual property internally and one-third through acquisition (Charney 2002).

This paper begins with a short review of the literature on mergers and acquisitions. This is followed by a description of our research methods. The third section is a summary description of Cisco's acquisitions. The fourth section examines how the acquisition strategy evolved and how the early successes created a virtuous circle encouraging the firm to undertake yet further acquisitions. This is followed by a description of Cisco's ecosystem involvement as a method for ensuring access to information about changes in technology and the marketplace. It also outlines and describes the mechanics of the acquisition process and demonstrates the importance of the acquisition process for ensuring the integration of the acquired firm and the retention of its employees. This is followed by an evaluation of Cisco's record of success and failure. In this section, we compare, not only, Cisco's relative performance versus its competitors, but also its success in employee retention and market share growth. The conclusion reflects upon Cisco's management of the acquisition process.

RESEARCH REGARDING ACQUISITION SUCCESS

Research on acquisition success has yielded contradictory results. On one hand, there is ample evidence that acquirers frequently experienced insignificant or even negative returns (e.g. Ravenscraft and Scherer 1989; Anand and Singh 1997; Hayward and Hambrick 1997). But others found positive returns (Jensen 1984). In drawing up the balance, Larsson and Finkelstein (1999: 3) concluded there has been no consensus of the effect on firm performance. The lack of consensus prompted the examination of a wide range of variables that might distinguish successes and failures, though unfortunately even the measures of success have been dubious, often based on immediate stock market reactions—an ephemeral variable at best.

Acquisition studies can be divided into two perspectives: the first perspective examines the pre-acquisition attributes of the two firms such as strategic fit, market structure, and even methods of payment for the acquisition. Pre-acquisition characteristics can be structural and include production and/or market-related economies of either scale (Bain 1959) or scope (Seth 1990), and the synergies that come from a broader product line, or from vertical economies (Williamson 1975). Benefits may also be derived from market power due to reduced competition (Scherer 1980). Finally, some research has concluded that larger acquisitions have a greater likelihood of success than smaller ones, because there is greater top management commitment, i.e. there is more at stake so there is greater management involvement (Shelton 1988; Hambrick and Cannella 1993).

Acquisitions have less frequently attracted the attention of organizational researchers. One line of research examines how social networks contribute to target identification (e.g. Palmer *et al.* 1995; Haunschild *et al.* 1998).³ Their strength is that they highlight the role of social networks in target identification, but acquisition process variables are outside their scope of study, though it could be inferred that, if the firms share social affiliations, integration might be eased thereby increasing the probability of success. More explicitly, some studies have found that mergers between firms with similar cultures have higher success rates (Datta 1991; Larsson and Finkelstein 1999), however, the measures used for culture such as bureaucratic or non-bureaucratic management-style are broad.

The second perspective focuses upon the post-transaction aspects of an acquisition. The argument is that acquisition success is not simply the result of excellent target selection; effective integration is also critical. Post-acquisition processes have received little attention from finance and economics, and are largely the domain of organization theory and strategy. The post-acquisition studies are roughly divisible between those emphasizing socio-cultural features and those focusing on integration process variables. Acquisition failure has been associated with culture clashes (Nahavandi and Malekzadeh 1988), lack of communication, and acquired firm employee resistance (Larsson and Finkelstein 1999). These findings suggest human relations' issues are a dimension upon which an acquisition may flounder. Other studies have found that acquisition should be understood from a process perspective (Jemison and Sitkin 1986) in which methodologies used to conduct the acquisition and then undertake

³ This could be inferred from works such as Fligstein (1990) or even earlier Domhoff (1967) where the uniformity of social backgrounds is demonstrated.

the integration affect its ultimate success (Haspeslagh and Jemison 1991). Contributing to this perspective, Cannella and Hambrick (1993) found that acquisition performance was negatively related to managerial and especially senior management turnover. They have also found that the greater the level of integration of the firms, the better the performance (see also Hambrick and Cannella 1993). Zollo and Singh (2002), employing concepts derived from Kogut and Zander's (1992) knowledge-based model of the firm, found that the tacit accumulation of acquisition experience did not impact the performance of acquirers, but that process codification positively influenced performance.

The lack of agreement about which variables are important and how to measure success is striking. Through our intensive study of one firm, we reconnect the dissociation of the strategic aspects of target identification with the processual aspects of firm integration. In the process, we demonstrate that Cisco's acquisition practices are contingent upon its ecosystem involvement and utilization of the social networks and environment in which it is embedded (Granovetter 1985; Uzzi 1995, 1996). Our results extend the findings of the social network perspective, but also link it with the findings of those studying more process-oriented integration studies.

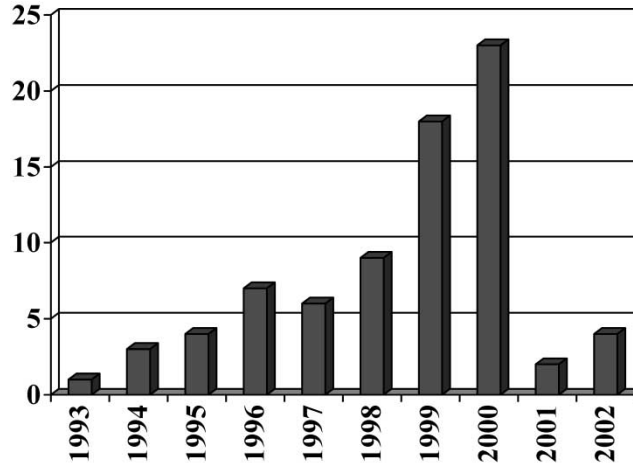
METHODS

The data in this paper were gathered using two methodologies: first, we conducted two rounds of interviews with top-level Cisco and data communications equipment industry executives and venture capitalists. Conducted from 1995 to 1997, the first round consisted of 49 interviews that were part of a more general project on the data communications equipment industry.⁴ A number of these interviews focused on acquisition strategies and benefit from being conducted just as Cisco's acquisition strategy was coalescing. This set of interviews included nearly all the pioneers in the data networking equipment industry. A second round of 15 interviews with Cisco managers and data equipment industry stock market analysts was conducted in 2001. A senior Cisco executive identified the Cisco interviewees as key individuals. These focused specifically on the acquisition process and strategy. All interviews were semi-structured, tape-recorded, and later transcribed. All interviewees could choose to remain anonymous, and three chose this option. Also, we received access to certain internal documents and data on retention rates. Finally, a senior Cisco executive read the paper and provided suggestions. Second, we reviewed all the available written materials. These included articles from the popular press, books, and various filings with US Securities and Exchange Commission. One resource was a case study of Cisco by Charles O'Reilly (1998, 2000). The popular books *Cisco Unauthorized* (Young 2001) and *Making the Cisco Connection* (Bunnell 2000) were another source. Paul Johnson of Robertson Stevens provided information on product categories, market share, and category growth projections.⁵

⁴ This research is reported in von Burg (2001).

⁵ All titles and positions in this paper refer to Cisco prior to its September 2001 reorganization.

FIGURE 1: THE NUMBER OF CISCO ACQUISITIONS BY YEAR.



ACQUISITION CHARACTERISTICS

This section briefly describes the characteristics of Cisco's acquisitions. As of 1 January 2001, Cisco had made 71 acquisitions (see Figure 1). The majority (68 per cent) had 100 or fewer employees and 34 per cent had fewer than 50 employees. In terms of ownership, 61 (86 per cent) were private firms and most of these were closely held. The other 10 (14 per cent) were public firms or divisions of public firms. Of the 66 firms for which we were able to identify the product status, 43 (65 per cent) were shipping prior to being acquired, the other 23 were still in development.

In terms of spatial proximity, as Table 1 indicates, Cisco has concentrated its acquisitions in only a few locales. Forty-four per cent of all acquired firms were located in Northern California. Moreover, the per centage of Northern California acquisitions was highest in the early years when it might be hypothesized that Cisco was learning how to acquire (69 per cent from 1993 to 1996 and only 37 per cent for 1999 and 2000). The second largest concentration (14 per cent) was in the Boston

TABLE 1: THE LOCATION OF CISCO'S ACQUISITIONS BY YEAR^a

	1993	1994	1995	1996	1997	1998	1999	2000	2001
Northern California ^b	1	1	4	4	3	3	5	9	2
Boston	0	1	0	2	0	1	3	3	0
Texas ^c	0	0	0	0	0	3	1	2	0
Israel	0	0	0	0	0	1	0	3	0
Other US ^d	0	1	0	0	2	1	3	4	0
Non-US ^e	0	1	0	1	0	0	3	3	0

^aThere are 71 total acquisitions listed, because two acquisitions did not provide locations.

^bThis includes the seven counties clustered in the San Francisco Bay Area.

^cThis includes all of Texas and includes Dallas-Fort Worth, Austin, and San Antonio.

^dThese are scattered throughout the other states and only Virginia is home too more than one. Also, includes one in Southern California.

^eThese are scattered throughout Europe and Canada and no nation is home to more than one.

area, which has the second largest concentration of venture capital-financed, high-technology startups in the USA and has an entrepreneurial environment most closely resembling that of Silicon Valley (Kenney and von Burg 1999). The final significant concentration was Israel, which also has a startup culture resembling that of Silicon Valley (Autler 2000; Avnimelech and Morris 2002).

THE GENESIS OF THE ACQUISITION STRATEGY

Cisco was established in 1984 to build and sell routers and, by any measure, it was hugely successful (Valentine 1995; Bunnell 2000; Young 2001). Its industry, data communications equipment, experienced remarkably rapid technical change even while the market exploded in size. This made it difficult for any firm to keep abreast of the changes. In the early 1990s, the switch was developed, which, though less functional than a router, was faster and generally less expensive. It soon became clear that switching would be a significant new market and might prove to be a disruptive technology (Christensen 1997). Switching was a rapidly changing technology and when combined with an exploding market for data created numerous opportunities for the formation of new firms.

As is often the case in these fast-changing high-technology markets, the established data communications equipment firms were slow to develop switches. Their dilemma was how to enter the switching segment. Given that the length of time between product generations were between 6 and 18 months, Cisco management decided that it could not afford to be late to the market. John Morgridge (1995), ex-CEO and current Chairman of the Board, described the reason for the switching acquisitions:

we realized that there was demand, but we were late with the product. [Our products] did not come to fruition the way that we had hoped during the time that we had hoped, therefore Crescendo [Cisco's first acquisition] represented a critical acquisition for us.

Ronald Schmidt (1995), a founder and the chief technical officer of one of Cisco's competitors, Synoptics, described the situation:

Cisco basically neglected switching and found themselves out on a limb. So they went out and bought switching companies. 3Com had no switching products so they went out and bought a bunch of companies. We [Synoptics] have done a bad job on executing our switching strategy, so we went out and bought Centillion. The major companies [were] filling holes in their technological and product portfolio.⁶

The first acquisition, Crescendo Communications, was part of a larger process of reorienting Cisco toward switching (Valentine 1995). Crescendo Communications was located in Sunnyvale, California with 60 employees, and had no manufacturing facilities and little overhead. It had just begun shipping a switch that could immediately be integrated into Cisco's product line. The late 1993 Crescendo acquisition cost \$97 million, and by fiscal 2000 the switching business unit, though the beneficiary of further acquisitions, generated more than \$7.4 billion in annual revenues (Wachovia Securities 2000). Interestingly, this critical first transaction was not arm's length, but

⁶ Synoptics merged with WellFleet, the largest Cisco competitor, in 1993 in a stock transaction worth \$2.7 billion to form Bay Networks. Bay Networks was purchased by Nortel in 1998 for \$9.1 billion. At the end of 2002, Nortel was on the verge of bankruptcy.

rather was mediated by existing relationships. Donald Valentine of Sequoia Capital who was Cisco's first investor and Chairman of the Board was the lead investor in Crescendo. Moreover, one of Cisco's largest customers, Boeing Corporation, was considering installing Crescendo switches (Bunnell 2000).⁷ So this first acquisition was not fully arm's length. It had multiple channels of information on the product and the management team.

This initial acquisition set many of the initial conditions. In other words, current acquisition and integration strategy did not spring forth fully formed, rather it evolved in a path-dependent manner and the early acquisitions were critical for creating the future path (David 1985; Garud and Karnoe 2001). When initially proposed, the idea of acquiring firms faced internal opposition. Cisco's board was hesitant, and there was resistance from the internal engineering team. Don Valentine (2001) explained:

Employees as a generalization do not like acquisitions because [the] engineers say "hey we can do that, there is nothing special about that," [but] we are doing [the acquisitions] not because we don't think [they] can, we are doing it because we do not think [they] have the time.

Given that all of the major data communications equipment firms acquired switching expertise, market success would be based upon the quality of the firm purchased, successful integration, and rapid next-generation product introduction. John Morgridge (1995) described the situation:

at the time we made our first acquisition we had a wonderful asset in the form of a channel to sell, install, and service products for the global market. As a result, there was tremendous leverage in acquiring a product that met the market requirement and to put it through our channels. We can take [a new product] and leverage it very dramatically. To a large degree, that has been our strategy with most acquisitions.

In other words, complementary assets in sales and support could be leveraged to make the acquisition a success.

The strength of Cisco's sales and support functions affect an acquisition candidate in two ways. For the startup, these strengths are an incentive, because they can speed the adoption of the product they have created. This is not only gratifying, but also because the target firms' personnel receive significant amounts of Cisco stock options, they benefit from sales growth. There is also an implicit threat. Should a firm refuse to be acquired at a fair price, Cisco will almost certainly acquire a rival whose product will then benefit from Cisco sales and service strength. In other words, Cisco will become a competitor.

The actual metamorphosis from a decision to purchase a couple of switching firms to "follow" the market into a conscious strategy of using acquisitions to expand the company into new areas and, in effect, as an R&D strategy was evolutionary. Knowing the long record of failed acquisitions in Silicon Valley, Donald Valentine (2001), who was then Cisco's Chairman of the Board, described their belief that acquisitions would be more manageable if they purchased small startups predominantly made up of engineers, rather than firms of nearly equal size. In other words, they would acquire small startups that they believed would be amenable to and indeed expecting major changes to occur when the firm went public or was acquired.

⁷ Of the 71 acquisitions, Sequoia had invested in 12 (Venture Economics 2001).

Cisco's methodology was not fully formed at the time of the 1993 Crescendo acquisition. When Cisco first began making acquisitions it appeared to place greater emphasis on the product acquired than on the employees absorbed. At the time, retention was thought to be desirable, but does not appear to have been a salient concern. The success of the Crescendo deal and other early deals such as Grand Junction and Kalpana prompted the then CEO John Chambers to make acquisitions an integral part of Cisco's strategy. In 1994 a manager was hired to focus exclusively upon acquisitions as a business process. Quite naturally, the hiring of an executive to focus on acquisitions reinforced it as a business strategy. However, in October 1994 when Mimi Gigoux joined the human resources team through the Kalpana acquisition, there was still no formal integration process. It was only in 1997 as the pace increased to six acquisitions per year that the HR vice president appointed a full-time acquisition manager. In late 1998, a business integration unit was established to assist in directing the integration process, and by 2001 the HR team devoted to acquisitions had grown to 21 persons.

In 1997 John Chambers articulated five guidelines by which to judge the desirability of potential acquisitions (Rifkin 1997):

1. Both firms must share similar visions "about where the industry is going [and] what role each company wants to play in the industry. So you have to look at the visions of both companies and if they are dramatically different, you should back away."
2. The acquisition must "produce quick wins for [the] shareholders".
3. There must be "long-term wins for all four constituencies—shareholders, employees, customers, and business partners".
4. "The chemistry (between the companies) has to be right." He thought that this was difficult to define, but involved both parties being comfortable with their counterparts.
5. Geographic proximity is important. If the newly acquired firm is located close to Cisco, then interaction will be easier.

What is striking about these guidelines is not that the "economics" need to be right, but rather that three guidelines relate to social and cultural issues. The vice president of BD, Ammar Hanafi, described it this way, "Our model is that every company that we acquire becomes part of Cisco. We really focus on doing a good job in assessing the cultural fit early on, because we don't get a second chance" (Hanafi 2000). Not only is there remarkable attention to the social, organizational, and human resource aspects of acquisitions, but also a recognition that each acquisition has a path-dependent trajectory. The value inherent in the acquired firm cannot be realized without explicitly considering the social and cultural issues.

The historical record suggests that Cisco only gradually became aware of the fact that acquisition was a form of employee recruitment. This occurred after the first acquisitions when it became clear that acquisitions were bringing in managers and executives that could be corporate leaders. Most important, Cisco's management recognized these individuals not as potential rivals, but as contributors who could help build the firm. Initially, the leader of the newly acquired firm was charged with ensuring the development of later product generations. Cisco also found that retaining

the leaders increased the retention of the other personnel. Moreover, many of those leaders went on to become senior executives.

Retention of the executives also had a demonstration effect; it illustrated to the management teams at later target firms that there were opportunities for newly integrated managers. They could be assured that they would not necessarily be subordinated to current employees. Also, those that had experienced a prior acquisition could counsel those considering an acquisition offer. To further encourage retention, Cisco established a “buddy” system, which pairs a current employee with an equivalent manager in the newly acquired firm. This illustrates Cisco’s understanding that managing the social issues is integral to the acquisition process. Effective retention is a cornerstone of the A&D model.

Acquisition began as a response to the tardiness in developing a switch. With the early acquisition successes, internal resistance dissipated encouraging yet more acquisitions. A virtuous circle was set in motion, as the acquisitions succeeded, Cisco became more committed to acquisition, and it also sought to perfect the process. Top management came to appreciate the social and organizational aspects of the process and began to manage them. The ability to effectively manage acquisition evolved into a core competency and competitive weapon (Tece *et al.* 1997). Acquisition became a business process, not a one-time event.

THE ACQUISITION PROCESS—INSIDE THE BLACK BOX

As acquisition became the core expansion strategy, not surprisingly, the process was routinized. The appearance of organization, routine, and “professionalism” reassures the target firm and contributes to a smooth process.⁸ This agrees with Zollo and Singh’s (2002) results finding that having explicit written acquisition policies and processes contributed significantly to success, but we extend this by highlighting the planned, but “softer” and more socio-processual aspects that affect retention. In the next section, we undertake a detailed examination of how Cisco manages the acquisition process.

Ecosystem involvement

The decision to eschew the traditional R&D laboratory approach favored by its established competitors meant that Cisco had to develop another mechanism for providing future products. Cisco’s management learned that one of the best places to find the products of the future was in the startup ecosystem from which it had emerged only a decade earlier. With this understanding, Cisco evolved a portfolio of tactics, formal and informal, to tap the knowledge and capabilities that are constantly emerging in its ecosystem. These included conscious organizational decisions such as creating a Business Development Group (BDG) to monitor the environment. But, as important, are the informal mechanisms that evolved inside Cisco. These informal mechanisms are based on the past histories and qualities of its managers whose experience in establishing networking firms meant they were embedded in the

⁸ This is not a trivial consideration. If the individuals in the firm being acquired have no respect for the acquiring organization, they are more likely to leave.

startup ecosystem in a very deep way. These managers are the human linkages embedding Cisco in its ecosystem. Because of the multiplex linkages and the embeddedness in the ecosystem, we term this a “high surface area” strategy whose aim is to garner as much information as possible about relevant emerging technologies.⁹

This ecosystem involvement is much deeper than the ideas of environmental scanning previously discussed in the literature (Aguilar 1967; Hambrick 1982). To be in the information flow in these ecosystems the firm and its executives must be embedded and active in the startup environment. Scanning has a much more passive connotation that in fast-moving high-technology environments is likely to lead tardy entry. Many of Cisco’s competitors such as Lucent and Nortel were certainly scanning their environment, but were nearly always late in entering new fields, because they became aware of the changes too late, since their managers were not involved in creating the future.

Cisco permits its executives and managers, many of whom had entrepreneurial histories, to remain actively embedded in their previous networks. Quite naturally, as both Cisco executives and former entrepreneurs, these individuals have great credibility and are often contacted to be references, advisors, and even investors in startups. Many Cisco executives serve on the boards of directors or advisory boards of startups and venture capital firms. As an example, Peter Solvik a senior vice president serves in some capacity at six startups and a venture capital fund.¹⁰ Such service embeds these executives in a rich flow of information about new firms and technologies that may in the future become important to Cisco.¹¹

The sales force is another vital source of information about new developments. Many of Cisco’s customers are sophisticated users such as universities, national laboratories, and engineering-intensive firms that often explore new applications and technologies. The purchasing patterns of lead users often provide early indicators of possible future market directions, thereby identifying not only innovative technologies, but also the firms pioneering them. When a customer exhibits interest in a product that Cisco cannot supply, the firm producing it is investigated. For example, in 1998 Cisco acquired the firm Netspeed, because US West wanted to install its DSL technology (Stauffer 2000). This strategy extends von Hippel’s (1988) user-led innovation to user-led identification of existing innovations elsewhere.

The emphasis on gathering environment knowledge is formalized at the Business Unit (BU). Each BU is charged with tracking and assessing new technologies that may affect its market. In the annual business plan each BU must identify emerging technologies and suggest a preliminary make-or-buy recommendation (Gigoux 2001). This encourages BU personnel to scan the environment for competitors and opportunities.

At the corporate staff level, the BDG has responsibility for ecosystem involvement, including venture capital investing, strategic alliances, and acquisitions. It operates as

9 We thank Andrew Hargadon for this formulation.

10 This was confirmed by entering Peter Solvik’s name into the Google search function and counting the results on 3 June 2002.

11 This strategy can create problems. For example, in July 2002, a high-level manager, Robert Gordon, was convicted of fraud for convincing Cisco to invest in a Cisco-affiliated startup, which netted him a \$10 million profit (Reuters.com 2002).

the central repository for information about the ecosystem. Through its relationships with venture capitalists, Wall Street analysts, industry insiders, and its own venture investments, the BD team keeps track of private firms and emerging markets. The BDG's investments in startups are important because 25 per cent of all acquisitions have been portfolio firms, however, Cisco invests in many firms it does not purchase.¹² For example, in 1993 Cisco made a \$2.7 million early round investment in Cascade Communications, but in 1997 Ascend Communications, a Cisco competitor, purchased Cascade. Despite the seeming advantages of being an investor prior to acquisition there are pitfalls. Craig Griffin (2001) the Director of BD describes one difficulty.

There are multiple choices [of firms in an area]. We want to get lots of access to them when we do acquisition due diligence. If we invest in one we increase our information about them and decrease the information about everyone else, because everyone else thinks we are aligned with one player. Therefore [the others] are less willing to work with us. We actually hurt our investment decision net-net if we do an investment in one party.

In firms under consideration for possible acquisition, Cisco usually invests in later funding rounds. Early stage investments are made in businesses that Cisco wants to understand and monitor, but probably will not enter, e.g. semiconductors and optical components, or where it wants to guarantee preferential access to a new component or technology.

In some cases a technology is identified as being important but the BDG is not able to identify suitable acquisition candidates. For these cases, Cisco pioneered a strategy of creating a "sponsored" startup, or what McJunkin and Reynders (2000) called a "spin-in". An example of this was Ardent, which two Cisco employees and a serial entrepreneur established. Cisco guaranteed it would purchase Ardent if it met a set of functional requirements and milestones. Cisco retained 32 per cent of the equity while the founders and their employees owned over 55 per cent of the stock. Sequoia Capital also acquired 11 per cent of the firm. Ardent met its conditions, was acquired, and spun-in (McJunkin and Reynders 2000). Having decided upon acquisition as a core strategy, Cisco experimented with organizational methodologies for "independent" product development startups that were meant to lead to a spin-in. Target identification in the Ardent case meant assisting in target construction. The spin-in strategy is significant, because it is a further development of the A&D strategy.

In 1993, Cisco did not have an acquisition strategy and ecosystem involvement was little more than being located in Silicon Valley. As A&D became an articulated strategy for expansion, the ecosystem came to be seen as part of Cisco's advantage. This prompted the creation of formal mechanisms such as the BDG for managing that involvement. Recognition of the A&D as viable, also gave rise to creative extensions of the strategy with techniques such as the sponsored spin-in. In effect, the new path created new opportunities as it unfolded.

Undertaking the acquisition

1. Target identification. When Cisco identifies a missing product or new market opportunity, a dialogue is initiated between the business units to confirm the need

¹² Authors' calculations based on VentureSource database (www.venturesource.com). An investment does not necessarily presage acquisition.

for the technology. Initially, this is informal and considers whether the product should be developed internally or via acquisition. If it is determined that acquisition is the preferable strategy, then target specifications are articulated. Using existing internal information and proactive market study, a list of acquisition candidates is drawn up. In established markets or those close to Cisco's core markets, this is not too difficult as it is well acquainted with the key firms and, very often, the founders. This process is more difficult when entering areas where Cisco has less experience and knowledge.

Target identification occurs in tandem with considering the proper administrative location for the target firm. This is relatively straightforward for product extensions that will be integrated into a BU. In cases in which Cisco is new to the market, a long-term strategic plan must be developed. For example, for the decision to enter the optical switching area,

[the BDG met] with marketing, sales, and engineering across 10 business units and 3 lines of business to get a road map of where they [were, and what] the next generation products [would be], thereby driving the conversation. (Ruh 2001)

For these larger strategic initiatives, the BD team facilitates dialogue between the different BUs to arrive at a coherent strategy. The process is flexible with overlapping stages, debates about markets, whether to undertake the effort internally, and even the actual nature of the environment and technological trajectory.

Synchronously with target identification, an executive sponsor is recruited to be responsible for assuring that the acquisition and subsequent integration process receives executive-level attention. This is vital, because, as many studies show, after the deal is completed the acquiring management team shifts attention to other issues leaving the newly acquired firm to flounder and often fail. Frequently, the executive sponsor is the one who identified the particular technology as significant, or is a BU executive intending to use the technology or integrate the product into their unit. When an acquisition represents a part of a new strategic initiative for which there is no clear ownership, the BD team finds an executive and solicits their buy-in and willingness to house the particular acquisition in their BU.

Target identification in the acquisitions literature has been treated as a purely outward looking process. At Cisco target identification is organically linked to the organizational process of finding an internal sponsor. Effectively, the internal organization is being prepared even as targets are being identified. At Cisco, acquisition is an organizational process. It is not an egocentric act motivated by the chief executive who then expects subordinates to manage the integration process.

2. Due diligence. Due diligence is meant to establish the true conditions of the target firm. Very often, acquirers conceive of this as limited to the assessment of the physical and intellectual property, i.e. the economic assets. For acquisitions outside high technology this may be justified, however, in high technology the product development teams are critical for the future. Since the acquisition premiums are so great in high-technology firms, the future product stream is critical. For this reason, Cisco's due diligence process examines the organizational health of the firm, the goals and aspirations of its key employees, and its ability to function as a part of a much larger firm. These are vital considerations because the key assets are not merely the

individuals, but especially the product development teams that embody the knowledge capable of introducing next-generation products. Put differently, the acquisition process needs to preserve the team.

The formal process begins when the executive sponsor and the BD manager decide that a target firm (or couple of firms) could meet Cisco's needs. Often prior to the due diligence process and because of their ecosystem involvement, Cisco executives have relationships with the target firm and, in some cases, know the key personnel personally or, at least, professionally. Upon a decision to seriously consider a firm, it is asked to sign a "no shop" agreement guaranteeing that it will not leverage an acquisition offer to solicit a higher offer from a rival. The use of no-shop agreements only became a standard later as Cisco formalized the acquisition process (Charney 2002).

The initial discussions consist of informal meetings between senior management from both firms. During this informal dialogue the acquisition team considers the quality and character of its interaction with the target's management, and how well the management interacts with each other. Mimi Gigoux (2001) described this process:

in our due diligence and assessment [we] set joint initiatives [with the target firm], short-term and long-term goals . . . that is a great way to assess culture, management qualities, leadership styles, and if we like working with each other. Are they excited about the second and third generation product the way we are excited about it? Is there one person who speaks over everyone else? Do some people roll their eyes when one person on their team is talking? I think this is the best way [to assess culture]. It pulls out people's true character.

These human relations (HR) issues are critical, because the value of the firm is in the ability of the team to deliver next-generation products. If the team fails, then the acquisition will fail.

Only after the BD manager is satisfied with the informal dialogue does more formal due diligence begin. HR due diligence is perhaps the most salient effort. Mimi Gigoux (2001) describes the reason for the emphasis on HR, "we don't care about the product that is on the manufacturing floor. The second and third generation product is locked up in their heads." Simultaneously, engineering, financial, and accounting personnel evaluate the company's technology and operations. Also, if applicable, representatives from sales, manufacturing, etc. are dispatched to study the operations.

Since employee retention is critical, it is necessary to thoroughly understand the distribution of a firm's equity and stock options. Also, the equity distribution indicates which individuals management believes are the most important. Cisco's HR group researches the background of these persons to discover whether they would fit in a much larger firm. Important questions include: What has their work experience been? Do they have big company experience? How big are the teams they have led? Have they been acquired before? In many ways, this resembles the due diligence that a venture capitalist undertakes prior to investing in a startup.

HR negotiates directly with the key individuals to understand their post-acquisition intentions. Often their employment terms are included in the purchase agreement. Stock vesting issues are very important. The more rapid the vesting rate or the higher the percentage of options already vested, the more difficult retention can be.

Frequently, employment contracts have “trigger vesting” clauses that automatically vest a certain portion of all outstanding options upon a change of ownership. This clause protects employees who fear that they may lose their jobs (and non-vested options) in the event of an acquisition. Since it does not lay off acquired employees and the goal of any acquisition is to retain employees, Cisco insists that the firm’s employees waive their accelerated vesting rights in return for a more gradual vesting schedule (Cadigan 2001). With gradual vesting, employees are more likely to continue working for Cisco. Also, included in the purchase agreement are non-compete clauses to inhibit key individuals leaving (Gigoux 2001).¹³ Upon the successful completion of due diligence, a term sheet is drafted including milestones and incentives. This motivates the acquired firm’s employees to assist in the integration process by aligning their economic interest with Cisco’s goals for integration.

Oddly, valuation, the most publicized aspect of an acquisition, is usually not the most important negotiating point. There is a generally accepted formula used to value private companies (Gigoux 2001). Michael Volpi, the Chief Strategy Officer, was quoted in O’Reilly (1998: 9) as saying, “acquisitions are not financial—we don’t do them because we can swing a good deal—they are strategic. We do them to grow [Cisco] in the right direction.” Since Cisco has paid between \$500,000 and \$20 million per acquired employee, retention was far more important than negotiating the lowest acquisition price.

Due diligence, which at first glance, would seem to be the economic process whereby the firm to be purchased is assessed for its value; in fact is far more a process of examining a target’s organizational health. Dysfunctional teams or excessive turnover can turn what on the surface appears to be an excellent acquisition in terms of technology and/or strategic fit into a complete failure.

3. Prior to deal announcement. When an agreement is imminent, typically 6–8 weeks prior to the announcement, integration preparations commence. This is facilitated by the BDG, which has two dedicated units, Merger and Acquisition and Acquisition Integration consisting of approximately 60 persons whose purpose is to oversee the process.¹⁴ They are responsible for ensuring that Cisco interacts directly and frequently with the target firm to create a shared understanding and trust. The integration manager (from the BD group) forms a team including public relations, sales, BU, HR, and marketing personnel, from both the BU and the target company. The HR team members include a Senior Project Manager and an HR specialist who manages payroll migration, employee file conversion, uploading HR data into Cisco’s human resource system software, immigration status, recruitment support, benefit plan transfer, documentation, presentation, and communications of the acquisition

13 Non-compete clauses are difficult to enforce in California, so their function is likely psychological (Gilson 1999; Stuart and Sorenson 2002). However, we have heard anecdotally that the venture capitalists that funded the firms being acquired by Cisco have warned entrepreneurs that if they violate these agreements they will find access to venture capital difficult. This is understandable, because for the venture capitalist Cisco’s enmity would cut off a significant source of exit opportunities.

14 The lack of outside assistance did not appear to have resulted in significantly higher (or lower) prices than the market would have set (Jo 2000), and eliminating the investment bankers and consultants may have produced a saving.

both internally and to the public. Also, the future organizational structure and location of the firm is finalized.

Initially, the BD manager and executive sponsor share equal responsibility, but as the integration process advances the BD manager transfers acquisition responsibilities to the executive sponsor. The integration team's proactive role is an important element of the acquisition formula. Peter Ruh (2001) explains:

You have a level of coordination saying, I'm going to be the center of all the activity and the integration manager plays that role [in terms of] the meetings, the HR, the management, getting the right people engaged so there is a plan out of the gate and a sense of continuity in terms of communication to the acquired company, as well as to the business unit . . . This adds a sense of calm to a pretty emotional process for both sides.

The integration team holds weekly meetings to discuss progress. The BD unit maintains an acquisition integration website cataloguing the progress in 10 areas such as human resources, product marketing, finance, etc. Next to each of the 10 areas, there is a green, yellow, or red circle indicating the degree of completion. Cadigan (2001) described the site: "The [web-site] is great to keep a big team focused on the right things. To have a tool that is a central source of information is huge in a dynamic process like acquisition integration." The site also has an event timeline, on-site visit log, fact sheet, and archived minutes from past meetings. Thus prior to announcing the deal, the integration plan has been completed, and all parties have been given concrete plans to guide and measure the process.

4. The announcement and closing period. With the announcement, employees at both firms and the public are informed about the acquisition. Though senior managers have known about the acquisition, now the other employees are informed about what the deal means to them. Immediately after the announcement, HR conducts communication meetings at the acquired firm until all employees have been provided with information on key issues such as the reasons for the deal, the impact upon them, their role and location in Cisco, how their compensation and benefits will be affected, their new titles, etc. Peter Ruh explained:

[the HR contingent of the BD integration team] is heavily involved in the first 35–40 days . . . getting as quickly as possible titles, comp plans, stock plans, benefits, all the "me" issues out of the way. So we can get engineers thinking about engineering instead of "what am I going to be paid and where am I going to work". (Ruh 2001)

The announcement is a critical moment, because it is at this time that employees experience the maximum uncertainty. The prior discussions, the clear plan, and the professionalism of the acquisition team dampen the apprehension that plagues most acquisitions. This is reinforced by the fact that the leaders of the acquired firm already know their positions and responsibilities within Cisco, and thus are able to reassure their employees. Prior planning avoids a prolonged period of uncertainty and chaos that could retard progress and devalue the acquisition.

5. First 90 days. After the deal closes, the business integration team takes over the majority of post-announcement integration responsibilities. The plans that the BD has developed are executed. The HR systems are converted. Integration of the acquired

company's network and conversion of voice and data systems is undertaken. The sales, service, and marketing strategies and manufacturing plans are put into effect. For example, if the acquired firm has sales persons they are trained and integrated into the Cisco sales force, even while the Cisco sales force is familiarizing itself with the new product. During these 90 days, the employees of the acquired firm experience a professional and non-disruptive integration. All the while there is a continuing process of integration of the new employees.

6. 90-180 days. The BD integration team continues to operate until all plan parameters are met, including, in most cases, shipment of the acquired company's products under the Cisco name through the Cisco sales channels (O'Reilly 1998). The team also evaluates and refines 6, 12, and 24 month initiatives, and fills out acquisition headcount. Finally, the planned and actual results are measured and the reasons for discrepancies are investigated. At the end of the period, the acquisition should be entirely integrated, often with the same executive team and a somewhat altered culture.

The ability to accept various cultures is unusual. The former CEO of an acquired company described the situation:

with Cisco, because they have these business units each with its own culture, you have to be able to adapt how you do things to the Cisco way in terms of a level of services, but you do not have to change the culture within your own business units for the most part. (Anonymous Cisco consultant 2001)

Early and complete due diligence emphasizing a cultural fit and continuing communication throughout mitigate uncertainty and confusion. The acquisition and integration process was choreographed to retain the employees, and not interrupt the acquired firm's product development.

Acquisitions are an integral component of Cisco's overall competitive strategy and have become one of its competencies. To further this it has consciously managed the acquisition process and developed a set of routines that it uses to manage the acquisition process. In the next section, we examine Cisco's acquisition success on the dimensions of personnel retention.

ACQUISITION SUCCESS AND FAILURE

It is difficult to link an acquisition to corporate performance, not only because of measurement and access problems, but also because the goals may vary. For example, some acquisitions are undertaken to provide an end-to-end solution, even if the acquisition, in itself, was not profitable. Prior to examining two indicators that Cisco managers believe are highly correlated with acquisition success, retention and market share, we provide some more general indicators of success. Then in the final section, we examine acquisition failures.

General indicators

Since its inception the firm has faced two sets of rivals: startup firms such as 3Com, Wellfleet, Synoptics, etc. and established telecommunications equipment makers such

as Lucent, Nortel, and Alcatel. Of the four major data communications rivals established in the 1980s, 3Com, Wellfleet, Ascend, and Synoptics, only 3Com remains independent, but had a market capitalization of \$1.9 billion in December 2002 compared to \$108 billion for Cisco. Among the originally larger telecommunications rivals, Lucent also followed the Cisco strategy of acquiring firms to enter new data communications equipment areas. For example, Lucent purchased Ascend Communications for \$6.3 billion. In 2001, Lucent recognized multibillion-dollar losses from failed acquisitions including Ascend Communications, and by late 2002 its total market capitalization had fallen to less than \$25 billion, and there were concerns about Lucent's survival. In December 2002, Lucent announced the closure of the entire Ascend acquisition. Another important competitor Nortel also joined the acquisition spree and purchased many firms. In the third quarter 2001, Nortel recognized a special charge of over \$12 billion, a significant portion of which was due to the devaluation of three acquisitions, Alteon Websystems, Xros, and Qtera. Nortel's value had fallen to less than \$8.6 billion. Thus by December 2002 Cisco had overtaken what had been much larger established rivals and its fellow startup rivals were no longer significant. The most significant competition was coming from a new generation of startups. These are strong aggregate indicators of success, and since acquisition was a significant component of Cisco's total corporate strategy, they indirectly provide confirmation of the strategy's success.

Retention

Cisco believes retention is closely linked to success. However, the direction of causality is not fully specified. For example, Craig Griffin (2001), the Director of Corporate Development, explained: "If a deal is not succeeding then generally people leave. If a deal is very successful then people stick around. Generally [turnover] is strongly correlated [to success]." Conversely, since the assets of small high-technology startups are intellectual property and product familiarity, i.e. assets directly embodied in people, turnover can directly devalue the acquisition. The retention strategy's success is shown by the fact that in 2001 over 90 per cent of the entire Crescendo workforce were still with Cisco.¹⁵ In a fast-moving high-technology industry, retention is critical, but by no means certain. During the late 1990s, in Silicon Valley employee turnover averaged 30 per cent per annum (O'Reilly 2000: 50) and according to a 2000 Best Practices survey in the first year post-acquisition turnover is approximately 33 per cent per annum (Thurm 2000). As we will show, by these standards Cisco's retention rates were excellent.

The revenue from the existing product generation cannot provide a sufficiently large return to justify an acquisition, so the success of follow-on product generations is vital. Retention of the engineers that developed the current generation is the key to the future generations. For this reason, top management monitors retention carefully. John Chambers stated:

15 One way of measuring the cost of an acquisition is the cost per acquired employee. During the stock market bubble of the late 1990s, the cost increased from roughly \$1.8 million per person prior to 1996 to an average of \$5.6 million in 2000.

TABLE 2: CHARACTERISTICS OF FIRMS WITH HIGHEST TURNOVER LEVELS (> 5 PER CENT FOR EITHER ENGINEERS OR TOTAL)

	Annual total turnover	Annual engineer's turnover	Category	Year founded	Location	Price per employee
Compatible Systems	6.71	2.11	R	2000	Boulder, CO	3.2
Geotel Communications	8.12	2.71	NGV	1999	Lowell, MA	6.2
Amteva Technologies	7.28	3.15	NGV	1999	Glenn Allen, VA	1.2
Cocom A/S	5.51	3.8	C	1999	Copenhagen, Denmark	1
Fibex Systems	5.46	4.13	DSL	1999	Petaluma, CA	
WheelGroup	6.41	6.06	SW	1998	San Antonio, TX	1.6
Sentient Networks	9.83	6.42	ATM	1999	Milpitas, CA	
Webline Communications	9.4	7.55	SW	1999	Burlington, MA	2.7
Precept Software	8	8.7	R	1998	Palo Alto, CA	1.7
Altiga Networks	8.38	13.33	R	2000	Franklin, MA	7.5
Netsys Technologies	7.78	13.33	S	1996	Palo Alto, CA	1.6

R=Routing; NGV=Next Generation Voice; C=Cable; DSL=DSL; ATM=Asynchronous Transfer Mode; SW=Software; S=Switching.

Source: Authors.

When we acquire a company, we aren't simply acquiring its current products, we're acquiring the next generation of products through its people. In the average acquisition, 40 to 80 per cent of the top management and key engineers are gone in two years. By those metrics, most acquisitions fail. (O'Reilly 2000: 58)

Mimi Gigoux (2001) described the interest, "The VP's and John Chambers ask for [retention figures] all the time, weekly, monthly, quarterly." Retention is particularly difficult because executives that have successfully sold a firm are recruitment targets for venture capitalists seeking entrepreneurs and managerial talent to staff their portfolio firms.

Using data Cisco provided, we calculated the total annual turnover for 44 acquisitions and the engineering turnover for 38 acquisitions.¹⁶ On an annualized basis as of 2001, 100 per cent of the acquisitions had an overall annual turnover rate under 10 per cent ($n=44$) and 95 per cent had an annual turnover rate among engineers of under 10 per cent. In terms of turnover, we examined all the acquisitions with a greater than 5 per cent annualized turnover for either total employees or engineers to see if there were any commonalities (Table 2). The first commonality was that, with the exception of one firm, all high-turnover firms were acquired in 1998 or later. There are a number of possible explanations for this. The first explanation is that turnover is highest during the first year of acquisition. The second explanation does not exclude the first, but adds that during 1999 and most of 2000 the labor market for experienced employees in the data communication equipment industry was torrid making job-hopping pervasive. Though our evidence is anecdotal and speculative, it is possible that many of these firms were, in the terminology of the period, "built to

¹⁶ There were missing data points, most of which were firms that had been acquired for less than 1 year.

flip", and the entrepreneurs upon selling their firms, resigned and took as many of their team as possible to start another firm. These explanations are only partial, but likely explain a portion of the turnover story.

Less executives were retained than were other employees, but from anecdotal information about other firms in the data communications field, Cisco performed very well. As of January 2001, 67 per cent of CEOs of Cisco acquisitions were still with the company (Cisco 2001: 18). Former CEOs led two of Cisco's three lines of business. Charles Giancarlo, the founder and former CEO of Kalpana, managed Cisco's Commercial Line of Business. Mario Mazzola, formerly of Crescendo, managed Enterprise Line of Business. Howard Charney, the former founder and CEO of Grand Junction, was a Senior Vice President. Andreas Bechtolsheim, a founder of Sun Microsystems and then Granite Systems, continued as an executive after the purchase of Granite Systems. As of May 2001, eight Crescendo alumni were vice presidents or higher at Cisco. Four senior vice presidents and 14 vice presidents came from the first eight acquisitions.¹⁷ We identified 35 vice presidents or higher recruited through acquisition. Establishing the recruitment source of managers below the vice-president level was not possible, but acquisitions were a significant contributor. As a point of comparison, consider Lucent, which also made a large number of acquisitions during the late 1990s; of the top 20 executives at Lucent not one had startup experience (www.lucent.com 2002).

The retention record has been significantly better than the average in Silicon Valley; in terms of both total and engineering turnover. The retention of key personnel, exactly those individuals with the greatest number of other opportunities, was remarkable, even in 1998 and 1999 when turnover increased especially acquisitions that were not located in Silicon Valley.

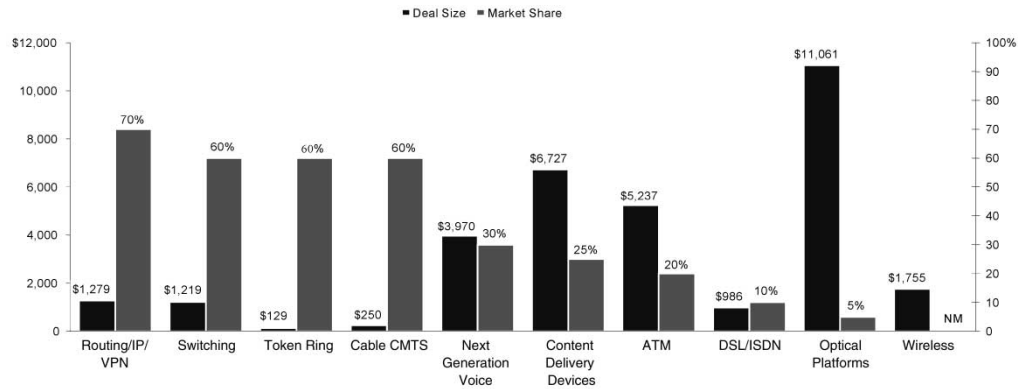
Market share growth

Market share growth is an important indicator of success, and in communications and computing industries it can be critical. Moreover, given its approximately 60 per cent profit margins, market share growth in rapidly growing markets results in enormous returns and justifies high acquisition prices. John Chambers defined Cisco's overall objectives, "to be No. 1, No. 2 or (not) compete; to have a 50 per cent share in every market, as an objective; and never to enter a market where we can't get at least a 20 per cent share right off the bat" (Rifkin 1997). So, the market share resulting from each deal is an important indicator of success.

In 2001, when this study was completed, Cisco had 12 general product categories: Switching, Routing/IP/VPN, Network Management/Internet, Security Components, ATM, Token Ring, DSL/ISDN, Optical Platforms, Next Generation Voice, Cable CMTS, Wireless, and Content Delivery Devices. In general, the greater the aggregate deal count and the aggregate deal size, the more valuable the market should be. The three areas in which it has been the most acquisitive were Next Generation Voice (11), Routing/IP/VPN (8), and DSL/ISDN (8). From this perspective, the Optical Platforms category dwarfed the others accounting for 32.2 per cent of total acquisition

¹⁷ Authors' compilation based on data provided by Cisco.

FIGURE 2: THE VALUE OF INVESTMENTS VERSUS MARKET SHARE.

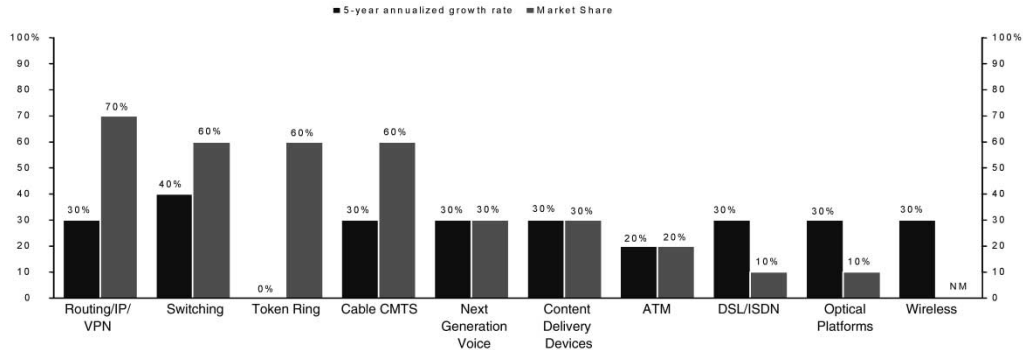


expenditures, and this is despite having made only seven acquisitions. Here, price was a direct function of the telecommunications bubble of the late 1990s. Optical Platforms, contains Cisco's most expensive and fourth most expensive acquisitions, Cerent (\$6.9 billion) and Pirelli Optical Systems (\$2.15 billion). Content Delivery Devices (\$6.7 billion) and ATM (\$5.2 billion) rate second and third in deal size rankings.

The amount invested and market share in each market category is shown in Figure 2. Security Components and Network Management/Internet categories are omitted, because they are not sold as stand-alone products. Cisco gained dominant market positions in the Routing/IP/VPN (this was Cisco's birthright), Switching, Token Ring, Cable CMTS, Next Generation Voice, Content Delivery, and ATM sectors. In three categories, DSL/ISDN, Optical Platforms, and Wireless—all industries with entrenched competitors—Cisco has failed to capture 20 per cent of the market. From this perspective, 21 acquisitions with an aggregate deal size of \$13.8 billion have not met Chambers' criteria of success. Despite significant investment in acquisitions in the Optical Platforms market, it has yet to gain meaningful market share. Though there is one important exception, namely in the metropolitan optical networks market, where the acquisition of Cerent made Cisco a market share leader (*Business Week* 2002). Not surprisingly, the greatest difficulties in capturing market share have been experienced in segments boasting entrenched competitors.

As we showed earlier, using acquisitions as a methodology for purchasing R&D and market share growth assumes being able to identify emerging areas of fast growth, select the correct acquisition target, and then after acquisition gain market share quickly. Figure 3 illustrates the growth rates in the markets and market share (these growth rates were prior to the 2001 telecom meltdown). According to Paul Johnson (2001), Robertson Stephens data communications equipment analyst, at the time, the DSL/ISDN, Optical Platforms, and Wireless markets were projected to grow 30 per cent per year for the next 5 years (these have since proven to be unfounded). These three were the next fastest growing markets, behind switching, which was projected to grow at 40 per cent per annum. What Figures 2 and 3 indicate is that despite the acquisitions, Cisco failed to develop significant market share in some of the fastest

FIGURE 3: NETWORKING MARKETS GROWTH RATES VERSUS MARKET SHARE.



growing markets. On the other hand, significant market share was captured in two other high priority emerging markets, Next Generation Voice and Content Delivery Devices, both of which were areas without entrenched competition.

Acquisition failure

The definition of failure is always somewhat subjective, because a failure can yield benefits even if it is little more than learning from a mistake. Despite the remarkable success, Cisco has experienced failures. This is not surprising. In terms of research, identifying the failures was difficult, because our interviewees were unwilling to provide us with the names of the failures. Therefore, the main information source was the press and SEC filings, however, these rarely provide the reasons for the failure. Thus this section is tentative, but illustrates the difficulties even an experienced acquirer experiences.

The one pair of difficult acquisitions were those of relatively established firms. In the cases of Stratacom and Pirelli, Cisco violated its policy of buying small firms. Stratacom was purchased in 1996 for \$4.8 billion. It was a public firm and had approximately 1,400 employees. The reason for the purchase was that this was the only way to rapidly enter the ATM switching market. The deal did facilitate entry, however, there were difficulties. One salient difficulty was the differing sales compensation schemes. This prompted a number of members of Stratacom’s sales team and the CEO Richard Mobley to leave. Mimi Gigoux (2001) acknowledged these difficulties, but believed, “It wasn’t the size of the deal, it was the timing that threw us off.” Despite these problems, in 2001 Cisco had 20 per cent market share in the ATM area and annual employee turnover was well below 10 per cent (3.07 per cent for engineers and 2.62 per cent total). In this case Cisco violated its strategy of purchasing small firms, but the deal provided an ATM offering and substantial market share.

The December 1999 purchase of Pirelli Optical Systems for \$2.15 billion was the greatest deviation from Chambers’ principles. This fiber optics division of the Italian Pirelli industrial conglomerate, though it had US operations, was headquartered in Italy, far from Cisco not only in geographic terms, but also organizationally. Pirelli

was very hierarchical and operated according to the long decision cycles of the telecommunications monopolists. Pirelli did have customers, but it was not a market leader, and therefore significant market share was not acquired. Though Cisco would not confirm the success or failure of the acquisition, in mid-2001 it was widely reported that the Pirelli acquisition had failed (Hardy 2001; Mehta 2001).

There have been problems with other acquisitions. By May 2001, Cisco had written off five acquisitions: the Richardson, Texas optics firm Monterey Networks, Silicon Valley wireless firm Clarity Networks, the Israeli ATM firm HyNEX, the DSL firm Maxcomm Technologies, and the unified messaging services firm Amteva. In the case of Monterey Networks, the product was late and not competitive, and in April 2000 the entire operation was shuttered. The Clarity and HyNEX product lines were discontinued in 2001 (ITworld.com 2001). The reasons were not turnover, but rather problems with either the products or markets. Though not confirmed by Cisco, there is reason to believe that the dramatic acceleration in pace of acquisitions from 1998 to 2000 overloaded Cisco's ability to undertake adequate due diligence.

Despite the belief that retention is highly correlated with success, in optics, wireless, and DSL, even with good retention, Cisco has yet to become a leader in these fields. This failure can be attributed to three factors: the first factor is that prior to 1997 nearly all acquisitions were made in markets that were just emerging. Therefore, there were no entrenched competitors to be dislodged, so Cisco could leverage its complementary assets to occupy the market niche. As it entered markets with established competitors, this advantage did not exist. The second factor is that the new fields such as optics and wireless technologies differed from Cisco's competency in electronics and software. Also, these markets differ in terms of product cycles, evaluation standards, and business cultures. Even a sophisticated integration process can be stymied by market-specific differences.¹⁸ The third explanation suggested by Chambers in a 2002 *Business Week* article is that during the telecommunications bubble, because stock values were increasing so quickly, there was a perceived need to acquire firms that had not yet shipped a product, thus Cisco had to gamble that the product would actually come to fruition—and a number did not. We were able to establish the product status for 66 of the acquisitions and we found that 44 (67 per cent) of its acquisitions were shipping their product when purchased. From 1993 to 1996, of the 13 acquisitions, 12 (92 per cent) were shipping their product. However, from 1997 through 2000, of the 53 acquisitions, only 32 (60 per cent) were shipping their product. During the froth of the Internet Bubble, Cisco was compelled to purchase firms earlier in their life cycle, thereby increasing the risk of failure.

Not every acquisition was successful, and during the later stages of the Internet Bubble the acquisitions were more expensive and had a higher failure rate. There may also have been a larger percentage of failures in sectors further from its core competency in electronic data communications. Success was also lower in fields with entrenched competitors as was the case in the Pirelli acquisition. As in the case of all R&D strategies, A&D was not infallible.

18 This can be explained by the communities of practice perspective, which suggests that knowledge and capability will be concentrated in specific communities and an outsider may not be able to function as well in such communities. See, Wenger and Lave (1991) and Brown and Duguid (2000).

CONCLUSION

Acquisition success was predicated upon a process of ecosystem involvement that went far beyond environmental scanning. This is captured in our concept of a high surface area strategy for securing information from the ecosystem. The purpose of Cisco's BDG was to be involved in the ecosystem through funding startups, participating in industry forums, and interacting with other actors in the environment. These formal methodologies were important, but they were accompanied by the activities of executives investing in and even participating on the board of directors of startups and venture capital firms that consulted the ecosystem in which Cisco operated. These informal activities will be difficult for most of Cisco's larger competitors to reproduce. It would require executives who had experienced the startup process first-hand and been deeply involved in the startup culture.

The importance Cisco attaches to the social and organizational was confirmed by the centrality of HR in the due diligence process. Most firms evaluate the product, market, and, perhaps, the executives, but there is far less attention given to the small firm's development team, though in these smaller firms this is the wellspring of value. A due diligence process that does not appreciate the core dynamics of the acquisition will almost certainly result in a greater number of post-acquisition surprises. Of course, due diligence can never be perfect, and it was not perfect for Cisco, however, Cisco experienced far fewer catastrophic acquisitions than did its competitors. We believe that the central role of HR in due diligence likely diminished the number of surprises.

The importance Cisco placed on dialogue in facilitating the acquisition and integration process was noteworthy. Dialogue about a potential acquisition had two components: internal and external. For many of these acquisitions, Cisco did not use intermediaries such as investment bankers and consultants. This meant that Cisco had direct access to the firm's decision-makers and thus experienced less opportunity for the garbling of information. Also, these direct relationships help create mutual understanding. As important was the fact that Cisco had intensive *internal* communications regarding acquisition as part of the process of finding an executive sponsor. This prepared Cisco as a recipient—something often ignored by the acquiring firm whose employees often see themselves as the conquerors who have merely added a little bit of territory.

No matter how excellent the strategy and due diligence was, ineffective integration leads to failure. If there is uncertainty or even worse resistance to the acquisition process, then the probability of a successful acquisition decreases. Already, in the due diligence process Cisco has considered the feasibility of integration. Cisco developed formal processes to organize the integration process. The highest priority is placed on retention of the employees of the acquired firm. Confirming the results of Cannella and Hambrick (1993), Cisco operates under the assumption that if key managers leave, the acquisition will fail. However, Cisco has gone much further in its thinking about integration. Not only is retention important, but Cisco also works to minimize the distractions caused by an acquisition. This is important, because the speed of change is so great, that even if the target firm's product development teams are distracted, they will be slowed contributing to acquisition failure. So, integration must be rapid and reassuring or, in a word, professional.

This study has shown the importance of socio-cultural and organizational variables for acquisition success in fast-moving high-technology industries where the knowledge embodied in either individuals or small R&D teams is an important critical corporate asset. We extended earlier research by providing evidence that non-economic variables such as location, the type of financing, and the organizational health of the acquisition provide important indicators for the probability of successful acquisition outcomes. Research on acquisitions is remarkably devoid of microlevel ethnography and detailed histories of the acquisition process. Sociology, anthropology, history, and organizational studies have largely ignored merger and acquisition as a field of research that could make important contributions to theory building, while simultaneously assisting in the creation of better acquisition practice.

REFERENCES

- Aguilar, F.J. 1967: *Scanning the Business Environment*. New York: Macmillan.
- Anand, J. and Singh, H. 1997: Asset redeployment, acquisitions and corporate strategy in declining industries, *Strategic Management Journal*, 18: 99-118.
- Autler, G. 2000: Global networks in high technology: the Silicon Valley-Israel connection. Master's thesis, Department of City and Regional Planning, University of California, Berkeley.
- Avnimelech, G. and Teubal, M. 2002: Venture capital-start-up co-evolution and the emergence of Israel's new high tech cluster. Paper presented at 2002 DRUID Summer Conference on Industrial Dynamics of the New and Old Economy—Who is Embracing Whom?, 6-8 June.
- Bahrami, H. and Evans, S. 2000: Flexible re-cycling and high-technology entrepreneurship, in M. Kenney (ed.) *Understanding Silicon Valley: The Anatomy of an Innovative Region*, pp. 165-189. Stanford, CA: Stanford University Press.
- Bain, J.S. 1959: *Industrial Organization*. New York: John Wiley.
- Barrett, Craig 2001: Clawing for market share is back, 13 March (http://www.businessweek.com/2000/00_11/b3672014.htm).
- Brown, J.S. and Duguid, P. 2000: Mysteries of the region: knowledge dynamics in Silicon Valley, in C.-M. Lee, W. Miller, H. Rowen and M. Hancock (eds) *The Silicon Valley: A Habitat for Innovation and Entrepreneurship*, pp. 16-45. Stanford, CA: Stanford University Press.
- Bunnell, D. 2000: *Making the Cisco Connection*. New York: John Wiley.
- Burg, U. von 2001: *The Triumph of Ethernet*. Stanford, CA: Stanford University Press.
- Business Week* 2002. Cisco: behind the hype, 21 January.
- Byrne, J.A. 1998: The corporation of the future, *Business Week*, 31 August.
- Cannella, A. and Hambrick, D. 1993: Effects of executive departures on performance of acquired firms, *Strategic Management Journal*, 14: 137-152.
- Charney, H. (Senior Vice President, Cisco Systems, Inc.) 2002: Personal email communication, 29 August.
- Christensen, C. 1997: *The Innovator's Dilemma*. New York: Harper Business.
- Cisco Inc. 2001: Internal PowerPoint presentation.
- Datta, D.K. 1991: Organizational fit and acquisition performance: effects of post-acquisition integration, *Strategic Management Journal*, 12: 281-297.
- David, P. 1985: Clio and the economics of QWERTY, *American Economic Review*, 5: 332-337.

- Domhoff, W.G. 1967: *Who Rules America?* Englewood Cliffs, NJ: Prentice-Hall.
- Fligstein, N. 1990: *The Transformation of Corporate Control*. Cambridge, MA: Harvard University Press.
- Garud, R. and Karnoe, P. 2001: Path creation as a process of mindful deviation, in R. Garud and P. Karnoe (eds) *Path Dependence and Creation*, pp. 1-40. New York: Lawrence Erlbaum Associates.
- Gilson, R. 1999: The legal infrastructure of high-technology industrial districts: Silicon Valley, Route 128, and covenants not to compete, *New York University Law Review*, 74(3): 575-629.
- Granovetter, M. 1985: Economic action and social structure: the problem of embeddedness, *American Journal of Sociology*, 91: 481-510.
- Hambrick, D.C. 1982: Environmental scanning and organizational strategy, *Strategic Management Journal*, 3(2): 159-174.
- Hambrick, D.C. and Cannella, A.A. 1993: Relative standing: a framework for understanding departures of acquired executives, *Academy of Management Journal*, 36(4): 733-762.
- Hanafi, A. 2000: Acquiring minds: an interview with Ammar Hanafi, *Packet Magazine*, Quarter 4 (<http://www.cisco.com/warp/public/784/packet/oct00/netizens.html>).
- Hardy, Q. 2001: Cisco kidding?, *Forbes.com*, 14 May.
- Haspeslagh, P. and Jemison, D. 1991: *Managing Acquisitions*. New York: Free Press.
- Haunschild, P.R., Henderson, A. and Davis-Blake, A. 1998: CEO demographics and acquisitions: network and cognitive effects of educational and functional background, in R. Leenders and S. Gabbay (eds) *Corporate Social Capital*, pp. 266-283. New York: Addison Wesley.
- Hayward, M. and Hambrick, D. 1997: Explaining the premiums paid for large acquisitions: evidence of CEO Hubris, *Administrative Science Quarterly*, 42: 103-127.
- Hippel, E. von 1988. *The Sources of Innovation*. New York: Oxford University Press.
- Inkpen, A.C., Sundaram, A.K. and Rockwood, K. 2000: Cross-border acquisitions of US technology assets, *California Management Review*, 42(3): 50-73.
- ITworld.com 2001: Cisco sells recent acquisition to Israeli firm, 18 June.
- Jemison, D. and Sitkin, S. 1986: Corporate acquisitions: a process perspective, *Academy of Management Review*, 11: 145-163.
- Jensen, M.C. 1984: Takeovers: folklore and science, *Harvard Business Review*, 62(6): 109-122.
- Jo, H. 2000: Venture capital syndication and firm value: entrepreneurial financing of Grand Junction Networks. Working Paper, Department of Finance, Leavey School of Business and Administration, Santa Clara University, January.
- Kenney, M. and von Burg, U. 1999: Technology and path dependence: the divergence between Silicon Valley and Route 128, *Industrial and Corporate Change*, 8(1): 67-103.
- Kogut, B. and Zander, U. 1992: Knowledge of the firm, combinative capabilities, and the replication of technology, *Organization Science*, 3: 383-397.
- Larsson, R. and Finkelstein, S. 1999: Integrating, strategic, organizational, and human resource perspectives on mergers and acquisitions: a case study of synergy realization, *Organization Science*, 10(1): 1-26.
- Lucent 2002: www.lucent.com, 15 January.
- McJunkin, J. and Reynders, T. 2000: Cisco Systems: a novel approach to structuring entrepreneurial ventures. Graduate School of Business, Stanford University Case Number EC-15, February.
- Mehta, S. 2001: Cisco fractures its own fairy tale, *Business 2.0*, May.
- Nahavandi, A. and Malekzadeh, A.R. 1988: Acculturation in mergers and acquisitions, *Academy of Management Review*, 13(1): 79-90.

- O'Reilly, C. 1998: Cisco Systems: the acquisition of technology is the acquisition of people. Case Study HR-10, Graduate School of Business, Stanford University, Palo Alto.
- O'Reilly, C. 2000: *Hidden Value*. Cambridge, MA: Harvard Business School Press.
- Palmer, D., Barber, B., Zhou, X. and Soysal, Y. 1995: The other contested terrain: friendly and predatory acquisition of large U.S. corporations in the 1960s, *American Sociological Review*, 60: 469-499.
- Ravenscraft, D.J and Scherer, F.M. 1989: The profitability of mergers, *International Journal of Industrial Organization*, 7: 101-116.
- Reuters Company News 2002: Former Cisco exec pleads guilty to fraud charges. Reuters.com, 31 July.
- Rifkin, G. 1997: Growth by acquisition: the case of Cisco Systems, *Strategy and Business*. Booz, Allen and Hamilton.
- Scherer, F.M. 1980: *Industrial Market Structure and Economic Performance*. Chicago, IL: Rand-McNally.
- Seth, A. 1990: Value creation in acquisitions: a re-examination of performance issues, *Strategic Management Journal*, 11: 99-115.
- Shelton, L.M. 1988: Strategic business fits and corporate acquisitions: empirical evidence, *Strategic Management Journal*, 11: 99-115.
- Stauffer, D. 2000: *Nothing But Net*. Milford, CT: Capstone Publishing Company.
- Stuart, T. and Sorenson, O. 2002: Liquidity events, noncompete covenants and the geographic distribution of entrepreneurial activity. Unpublished manuscript, 4 January.
- Teece, D., Pisano, G. and Shuen, A. 1997: Dynamic capabilities and strategic management, *Strategic Management Journal*, 18: 509-533.
- Thurm, S. 2000: Cisco defies the odds with mergers that work, *Wall Street Journal*, 3 March.
- Uzzi, B. 1995: The sources and consequences of embeddedness for the economic performance of organizations: the network effect, *American Sociological Review*, 61(4): 674-698.
- Uzzi, B. 1996: Social structure and competition in interfirm networks, *Administrative Science Quarterly*, 42: 35-67.
- Venture Economics 2001: 30 September.
- Venturesource.com 2001: www.venturesource.com, 31 March.
- Wachovia Securities 2000: George G. Hunt, Robert D. Strauss and Bert D. Barre. IJL Financial Center, Charlotte, NC, 16 November.
- Wenger, E. and Lave, J. 1991: *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- Williamson, O. 1975: *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press.
- Young, J. 2001: *Cisco Unauthorized*. Roseville, CA: Prima Publishing.
- Zollo, M. and Harbir, S. 2002: Post-acquisition strategies, integration capability, and the economic performance of corporate acquisition, *Strategic Management Review*.

APPENDIX

Cited interviews

- Anonymous Cisco consultant (former executive at Cisco) 2001: Tape-recorded interview by David Mayer (5 February).
- Cadigan, Steve (then Senior Manager of Acquisitions, Human Resources, Cisco) 2001: Tape-recorded interview by David Mayer (14 May).

- Gigoux, Mimi (then Director of Acquisitions, Human Resources, Cisco) 2001: Tape-recorded interview by David Mayer (12 March).
- Griffin, Craig (then Director of Corporate Development at Cisco) 2001: Tape-recorded interview by David Mayer (22 March).
- Johnson, Paul (Networking Analyst, Robertson Stevens) 2001: Tape-recorded interview by David Mayer (17 May).
- Morgridge, John (ex-president and at the time Chairman of the Board of Directors at Cisco) 1995: Tape-recorded telephone interview by Urs von Burg and Martin Kenney (8 November).
- Ruh, Peter (then Director of Corporate Business Development at Cisco) 2001: Tape-recorded interview by David Mayer (22 March).
- Schmidt, Ronald (Founder and former Chairman of the Board at Synoptics) 1995: Tape-recorded telephone interview by Urs von Burg and Martin Kenney (5 June).
- Valentine, Donald 1995: Tape-recorded interview by Urs von Burg and Martin Kenney.
- Valentine, Donald (first venture capital investor and ex-Chairman of the Board at Cisco) 2001: Tape-recorded interview by David Mayer (15 March).