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WILLIAM F. ACHTMEYER CENTER FOR GLOBAL LEADERSHIP

no. 1-0001

Excellence in Strategic Innovation Series

E-Business Innovation at Cisco

> "We view the Internet as a prototype of how organizations eventually will shape themselves in a truly global economy. It is a self ruling entity."
>
> - John Morgridge, Annual Report, 1993

In early 2001, Cisco Systems was a very rapidly growing corporation (see financial summary, Figure 1) that sold a wide variety of sophisticated internetworking products. One of their most important business segments was other corporations interested in upgrading their technology infrastructures to enable more efficient business processes, higher quality products and services, and, increasingly, entirely new internet-based strategies. Anticipation of how this "e-business transformation" was going to revolutionize the way the economy functioned inflated stock valuations for information technology suppliers to unprecedented heights.

One constant spokesman for the potential of e-business was Cisco CEO John Chambers, who often used his own company as an example of what was possible. At the time, Cisco enjoyed a reputation as the most sophisticated e-business in the world. As a rule, if anything could be "webified" at Cisco, it was. Nearly 90 percent of all orders were placed on Cisco's website, the Cisco Connection Online (CCO), and nearly 80 percent of all products were built and shipped from a supply partner, without Cisco ever physically taking possession. The company's ability to demonstrate cutting-edge e-business practices provided a compelling argument for CEOs weighing the tough decision to make multi-million-dollar IT infrastructure investments.

While the company had been extraordinarily innovative to date, Cisco was far from complacent about being able to maintain its leadership position in e-business. Amir Hartman, a leader in Cisco's Internet Business Systems Group (IBSG), which consulted to other corporations on information technology strategies, described the angst:

This case was written by Professor Philip Anderson, Professor Vijay Govindarajan, and Professor Chris Trimble, and by research assistant Katrina Veerman T'01 of the Tuck School of Business at Dartmouth College. The case was based on research sponsored by the William F. Achtmeyer Center for Global Leadership and the Glassmeyer/McNamee Center for Digital Strategies. It was written for class discussion and not to illustrate effective or ineffective management practices.

Unless otherwise noted, the information in this case was gathered from one of the following sources: (1) SEC filings, (2) internal Cisco Systems, Inc., documents, and (3) interviews listed in Appendix 1.

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> "What was innovative yesterday, in many cases becomes the standard way of doing business tomorrow. You've got software packages and applications out there in the market that have 90-plus percent of the functionality of the stuff that we custom built for our own company. So…how do we maintain and/or stretch our leadership position vis-à-vis e-business?"

Corporations making heavy investments in IT, meanwhile, wondered what they could learn from what Cisco had already accomplished.

Cisco's Evolution to E-Business

In early 2001, Cisco viewed itself as an "end-to-end" networking company that could meet all of a corporations internetworking needs. Cisco's products ranged from simple bridges and routers to optical switches, software, and even services. (See Technology Note, "Internetworking Products.") Cisco sought to offer products that were scalable, could be upgraded easily, and provided customers with maximum possible flexibility. To reach its customers, Cisco sold through several channels, including the IBSG, a direct sales force, third-party distributors, value-added resellers, service providers, and system integrators.

The Early Years

Cisco had come a long way from its origin in the mid-1980s. Cisco was founded as a router company by Stanford University computer scientists Sandy Lerner and Leonard Bosack, who recognized the need for large-scale computer networks based on industry-standard technologies. While at Stanford, both recognized the inefficiency of the existing computing infrastructure which, in 1982, had 5,000 different on-campus computers and 20 incompatible email systems.[1] With so many mismatched technologies, employees and students found it difficult to share information electronically.

Ms. Lerner and Mr. Bosack enlisted several other Stanford employees and set out to build a better system:

> "…[W]orking without permission or an official budget, [they] first created the interface by which they could connect the DEC minicomputers to a bootleg Ethernet network. The network consisted of a few miles of coaxial cable. The guerrilla team pulled wires through manholes, and sewer pipes–everywhere that made sense.

[1] David Bunell, *Making the Cisco Connection: The Story Behind the Internet Superpower*, pp. 4 and 5

> "The project was a success. The router enabled the connection of normally incompatible individual networks. It allowed data to be read by any computer in the network, even across different operating systems. Soon enough the bootleg system became the official Stanford University Network"[2]

Shortly after their campus-wide success, Ms. Lerner and Mr. Bosack left Stanford to start their own company. Initially, they custom built routers in their living room. They called their products ciscos, a name derived from the last five letters of San Francisco. For the first few years, the company relied heavily on word-of-mouth referrals. Most customers were former colleagues from Stanford and were connected via an early version of email. Ms. Lerner and Mr. Bosack began using email as a promotional medium to supplement the referrals.

The founders recognized that they needed to expand and needed additional funding. After visiting 75 venture capital firms, Cisco closed its first round of $2.5 million in 1987 with a single investor — Don Valentine of Sequoia Partners. Mr. Valentine had a history of backing winning companies, including Apple and Crescendo. Other venture capitalists were unconvinced that Ms. Lerner and Mr. Bosack, technical wizards who had no experience building a company, could turn Cisco into a success without time-intensive senior-level guidance. But Mr. Valentine believed, and took a large gamble. He not only underwrote the initial investment but attracted top-notch executives to the company. Among the most influential of these was John Morgridge, hired as CEO in 1988.

The Morgridge Years

Mr. Valentine did not consult either of Cisco's founders before hiring Mr. Morgridge. The summary demotion of Ms. Lerner to VP of customer service and Mr. Bosack to chief technology officer generated stress between them and the new chief executive officer. While they agreed that Cisco's goal was to please its customers, they disagreed on almost every aspect of how to accomplish this. Ms. Lerner agreed to leave Cisco in August 1990, and Mr. Bosack left not long after.

Mr. Morgridge made changes. For example, based on customer feedback, he modified the name of the company from cisco to Cisco. He hired new senior executives that supported his ideas. And, he cut back on spending, requiring all employees to fly tourist class and to limit their expenditures. His frugality and commitment to maximizing customer satisfaction paid off. Cisco's annual revenues leaped from $1.5

[2] Ibid, p. 6

million in 1987 to $340 million in 1992, a year that saw Cisco's share of the internetworking market rise from 50% to 85%.[3]

Meeting the demands generated by this growth was a challenge. For example, to keep up with customer service requests, Cisco: 1) Hired engineers as quickly as possible, growing the engineering staff at over 160% per year, 2) Extended telephone support hours, 3) Invested in a system to prioritize calls, 4) Built the technology to remotely diagnose problems customers had with their products, and 5) Offered training courses and consultations services to customers.

Cisco also sought to alleviate its growing pains by finding ways to leverage information technology. In 1991 Cisco launched an official Internet site, primarily dedicated to company and product information. It also set up electronic bulletin boards. This foray into online technical assistance was not embraced initially, despite the fact that it promised to ease the burden on its engineers and customer service representatives.

By 1993, customers could download software updates, check manuals, and even email Cisco employees with questions. The company's 1993 annual report stated, "Communications, flowing through internetworks, built largely with Cisco technology, are truly the lifeblood of our enterprise." More than 5,000 visitors a month were logging in. Still, Cisco could not hire talented employees quickly enough. The problem acquired new urgency when customer service ratings dipped to an all-time low.

Mr. Morgridge asked their customers for advice. At the suggestion of Boeing, Cisco "hired" by making its first acquisition, purchasing Crescendo, a 60-person firm that provided "high speed switching solutions for the workgroup."[4]

The acquisition did provide some relief. As Cisco continued to grow, Mr. Morgridge revisited the company's goals. He asked several key executives to write Cisco's first formalized business plan. The key goals identified in the plan were: 1) Provide a complete solution for businesses, 2) Make acquisitions a structured process, 3) Define industry-wide networking protocols, and 4) Form the right strategic alliances.

Growing Pains in Cisco's IT Department

The acquisition of Crescendo was difficult from an information technology standpoint. Cisco's Unix databases were state-of-the-art, but the systems were insufficiently networked and not appropriately scalable. In the process of integrating Cisco's and Crescendo's systems, Cisco began to question whether their infrastructure was adequate given their growth ambitions.

[3] *Boston Globe*, November 3, 1991.
[4] Cisco Press Release, September 21, 1993

Until 1993 all IT had been funded based on a company-wide budget of 0.75 percent of sales. Chief Information Officer Pete Solvik and another senior executive, Doug Allred, approached the board of directors during a board meeting in 1993 and asked if they thought the IT funding mechanism was appropriate. The directors acknowledged that they did not know, and asked the two officers to research other possibilities.

Mr. Allred and Mr. Solvik suggested a system that delegated authority for IT expenditures to individual business units rather than a centralized IT group. This was unconventional — most companies funded IT as a fixed percentage of revenues, and managed IT as a cost center, reporting to the CFO. Mr. Allred and Mr. Solvik named the resource allocation system the Client Funded Model (CFM). (Here the "clients" are the individual business units, served by the central IT group.) The idea was that CFM would allow business unit heads to evaluate IT spending on the basis of increasing sales and increasing customer satisfaction, rather than by the conventional metric of reducing costs.

Further, Mr. Solvik and Mr. Allred created a new Customer Advocacy (CA) group, led by Mr. Allred, to which IT would report. While business units would decide which projects would get funded, IT still had responsibility for determining how to implement them.

Under the CFM, only core IT infrastructure spending was centralized and charged to general overhead accounts. Mr. Solvik believed that Cisco's infrastructure needed a tremendous upgrade, and he made an aggressive proposal to the board.

In early 1994, Cisco's systems broke down and the company was forced to close for two days. In the wake of this debacle, the board approved Mr. Solvik's proposal, including a $15 million Oracle ERP system. This investment *alone* was 2.5 percent of 1993 revenues, more than three times the previous year's IT budget. Total budget for Mr. Solvik's IT upgrade exceeded $100 million. Mr. Morgridge made it clear to Mr. Solvik that his career depended on the successful implementation of this initiative. Mr. Solvik ultimately received a tidy bonus for his work. The upgrade integrated all of Cisco's systems, and provided the company with a centralized information source.

Once the infrastructure upgrade was complete, Cisco revisited its customer service problem. Cisco enhanced the Cisco.com site and launched the Cisco Connection Online, a site for its customers that included a Technical Assistance Center (TAC), a bulletin board where customers could solve technical problems, and a list of product faults and remedies.

The site saved Cisco time and reduced the need to hire. Customers welcomed the opportunity to browse a website and solve problems on their own rather than dialing into a busy support line. Cisco's customer service ranking once again began to improve.

Cisco under John Chambers

In 1995, John Chambers, hired four years earlier as VP of Business Development by Mr. Morgridge, was named CEO. Prior to joining Cisco, Mr. Chambers had worked for IBM and Wang — experiences he credits with shaping his leadership style. At IBM, he was once given a poor evaluation after meeting nine out of ten self-determined objectives. As a result, he tended to focus on a few achievable goals. At Wang, he was forced to oversee the layoffs of more than 4,000 people, an experience he vowed never to repeat.

Mr. Chambers led with a coaching, hands-off approach. He encouraged other executives to lead, make decisions, and take risks. He encouraged mavericks who could lead within the reasonable bounds of the course and direction of the company.[5] Teamwork, risk, responsibility, and especially customer satisfaction made up Mr. Chambers' resounding refrain.

Under Mr. Chambers' direction, Cisco moved to a new campus with room to expand. Each building was wired for state-of-the-art connectivity.

Cisco also began to look for other ways to leverage its website. The sales force complained that they were constantly asked by customers to perform mundane tasks, such as re-printing a customer invoice. In response, in 1995, Cisco expanded the online offerings and allowed customers to reprint invoices, check the status of service orders, and even configure and price products. In addition to making life easier for customers, Cisco employees were spared much data entry. Cisco soon made much more customer information available online by linking customers to the Oracle ERP system.

The IT department began to experiment with other ways to leverage the power of the Internet. The department's efforts led to three separate Internet initiatives: Cisco Connection Online (CCO, for customers), Cisco Employee Connection (CEC), and Manufacturing Connection Online (MCO).

The Cisco Connection Online

In early 1996, customers still had to talk with a sales rep whenever they wanted to make a purchase. In part due to the complexity of Cisco's product line (all orders were in essence custom orders), only 75 percent of orders were entered correctly; the remaining 25 percent had to be re-entered. As a result, Cisco started to think about how it could use technology to improve the purchasing process.

An e-commerce site was completed and launched in July 1996. Within the first four months online, Cisco had sold $75 million worth of products on the Internet. The

[5] *LAN Times*, 7/08/96. Interviewed by Editor in Chief Leonard Heymann, Executive News Editor Jeremiah Caron, and Senior Writer Michelle Rae McLean

site was simple but sophisticated enough to ensure products were accurately configured. As a result, Cisco was able to drop its customer-order error rate from 25 percent to 1 percent. By 1997, 27 percent of all orders were placed using the Internet, a much higher percentage than Cisco had expected. 70,000 registered users were accessing the site 700,000 times a month.

Although Cisco believed that the site was not as user-friendly as it could be, 60 percent of Cisco's technical support was now delivered automatically via the web, saving Cisco close to $150 million a year. Better still, Cisco's customer satisfaction ratings were rising, and Cisco's productivity was improving dramatically — as was their customers.

The CCO underwent considerable revisions and updates. With each, Cisco consulted groups known as Internet Commerce Advisory Boards (ICABs), which included both Cisco employees and customers, and were used to perform market research on customers globally.

As of August 2000, the site had 10 million pages and was available worldwide. The first few page levels were translated into multiple languages, such as Japanese. All prices were quoted in the appropriate currency, based on an accurate exchange rate.

The Cisco Employee Connection

The Cisco Employee Connection (CEC) was Cisco's intranet site. Initially, it was designed to hold company information and act as an internal newsletter. When launched in 1995, it consisted only of a bulletin board of information, simple search engines, and email. But as the CCO grew in popularity and function, the IT group began experimenting with a more advanced site.

At the time, the Human Resources department was overwhelmed, and was handling a variety of inconsistent HR forms manually. To streamline the hiring process, the team working on the CEC attempted to consolidate and digitize a number of the forms. But Java had not yet made its debut, and the project proved too unwieldy and time consuming for Cisco to implement. After months of painstaking effort, the team gave up.

Not long after, the team tried to streamline the process of expense reimbursement. This time, they combined the lessons from their first efforts with fresh ideas and new technologies. The team faced many challenging technical issues, such as linking expense approvals with the American Express corporate card systems, and was met with significant internal resistance to change. Senior executives, who were responsible for approvals, demanded that any new system prove easier to use than the old paper-based system. Consequently, many approvals were eliminated. Cisco's software engineers were forced to design the program internally because there were no off-the-shelf programs that could handle the task. They succeeded. Cisco

employees were able to submit expenses online and get reimbursed by direct deposit within a few days. (Four years later, Cisco was prepared to ditch its own system in favor of externally designed programs, convinced that software companies could build better systems.)

Following the successful launch of the new expense reporting system, the IT department revisited the task of digitizing many HR processes. This time they were successful. All HR forms — for new hires, health insurance, donations, 401K, etc. — were included on the CEC, and directly integrated into the ERP system. The CEC also enabled employees to access certain personnel information, including a directory of all Cisco employees, their calendars, and their positions within the company, including to whom they reported. If they wished, employees could upload additional information, including their photographs.

Despite the site's usefulness, most employees used the CEC sparingly. Few chose it as their home page. An internal poll to discover what employees were using on the internet revealed that the number-one favorite was My Yahoo!, which allowed users to customize their pages. Instead of banning Yahoo, ignoring the problem, or forcing all employees to have the CEC as their home page, Cisco approached Yahoo! about setting up a customized My Yahoo! website for Cisco employees. The site was intended to allow Cisco employees to view sports scores, horoscopes, weather, and other areas of interest, in addition to automatically uploading certain Cisco-only announcements. After several iterations, Yahoo! created a design that Cisco adopted.

The Manufacturing Connection Online (MCO)

Like the CCO, Cisco's Manufacturing Connection Online (MCO) was crucial in allowing Cisco to grow. Just as Cisco had problems hiring enough engineers and customer service reps, it also had long been plagued by problems expanding its manufacturing operations rapidly enough to meet the surging demand for its products. Faced with a choice of limiting growth or outsourcing manufacturing, Cisco chose to outsource.

Originally, Cisco outsourced only a portion of the manufacturing process. Cisco still warehoused components and performed final assembly and testing before shipping finished goods to its customers. Soon, however, in order to cut costs and improve delivery times, Cisco sought deeper relationships with its partners. They asked partners to integrate their IT systems with its own. The result was an automated order fulfillment system known as the Manufacturer's Connection Online (MCO).

Launched in June 1998, the MCO allowed Cisco's partners direct access to customer information, sales projections, and product specifications. Partners could also alert Cisco to work stoppages, part shortages, and other issues. Once a customer placed an order on the Cisco.com site, the manufacturing partner was immediately notified

electronically. The manufacturer's network immediately relayed the order to the actual assembly line.

Later, Cisco developed a system for automatically testing products to ensure they were up to Cisco's specifications and ready to ship — without the product ever leaving their manufacturing partner's premises. Once an order was ready for shipment, Federal Express, Cisco's shipping partner, was automatically alerted, the order was assigned a shipping number, picked up at the manufacturer, and delivered by Federal Express to the customer. In the event of an assembly line problem or auto test concern, the manufacturer immediately alerted Cisco through the MCO, which then alerted the customer. Because the MCO and the CCO were integrated, customers could check on their order's status at any time.

Cisco by 2000

In addition to the Cisco Connection Online, the Cisco Employee Connection, and the Manufacturing Connection Online Cisco's accounting and HR departments boasted an impressive level of automation. Cisco executives could view up-to-the-minute sales figures from around the world at any time. Additionally, Cisco was able to close its books within a day. Automated functions within HR included the capability to accept job applications online and to review and sort candidates by critical variables, such as skill level or former employer.

Flexibility was as critical as functionality to Cisco's e-business systems. When the company reorganized its R&D and marketing departments from multiple business units to only three, the required changes to e-business applications were completed in less than 60 days at a cost of under $1 million.[6]

Through 2000, Cisco continued to grow at an average rate of over 40 percent a year, eclipsed the market cap of even GE and Microsoft in 2000, and acquired more than 70 companies to further develop and expand its market presence, product offerings, technological expertise, and headcount. Along the way, Cisco saved more than $800 million a year ($350 million of which was attributed to the Cisco Connection Online[7]) through the internal use of information technology, a sizable portion of their 2000 net earnings of $2.6 billion.

Maintaining an Edge

By 2001, many of the innovative e-business practices that Cisco had pioneered internally were becoming standard functionality within enterprise software packages

[6] *Net Ready*, p. 252.
[7] Ibid, pp. 258, 268

sold to corporations. This created some angst at Cisco. Senior executives asked themselves:

1. How much should Cisco invest in generating and implementing new e-business practices? What should the funding mechanism be?
2. What is the best organizational model to ensure continued innovation?
3. What should Cisco measure in order to judge the success of its innovative efforts? Can these measures be tied to incentive systems for employees?

Given Cisco's record of success, any change would likely be resisted.

Cisco employees relished the company's culture. Many liked to describe Cisco as "a multi-billion-dollar startup." With more than 30,000 employees, and new hires coming in at a rate of approximately 3,000 per *quarter* (as of summer 2000), Cisco was perhaps too big to be calling itself a startup. Nevertheless, it clung to many of the values commonly espoused by startups, especially a pronounced disdain for bureaucratic politics — i.e., worrying about who gets the credit, who gets blamed, positioning on the org chart, perks, titles, etc. Cisco's culture embraced change, valued creative confrontation, promoted an environment in which ideas could freely be "thrown out on the table," and built a spirit of teamwork built upon trust. An ethos of risk-taking, initiative, and responsibility was fostered, and speed was valued over coordination, efficiency, or perfection.

Doug Allred, SVP of Customer Advocacy, and one of the architects of the CFM, believed that the key to maintaining an edge in e-business was a relentless focus on the customer:

> "When I think about taking the next step, I recognize that every past step that has worked arose from close customer intimacy…from being really well connected to key customers and understanding what they are trying to do, and then addressing their needs in the form of what we would now call e-business functionality."

According to Mr. Allred, where initiatives failed, they failed from being too introverted, and from focusing too much on speed and efficiency at the expense of the customer.

In Mr. Allred's view, Cisco did *not* become one of the most sophisticated e-businesses in the world by setting this as a goal and charting a course to reach it. Rather, the company set up a system that focused on customer satisfaction, gave managers the resources to please customers (via the CFM), and held managers accountable.

There was hardly a shortage of initiative; new ideas spring up everywhere. Cisco had strong entrepreneurial culture and a compensation system that spread more than 40 percent of stock options beyond the management ranks. Further, Cisco employees

were passionate about staying on the leading edge of technology. Opportunities to work on innovative e-business projects were coveted — they were a welcome and motivating break for technologists, who otherwise might be frustrated with the day-to-day work on older systems or older technologies.

While some initiatives came from a combination of inspiration, creativity, and study of the latest technology trends, many more ideas came from customers. Business-unit managers were aggressive about seeking customer feedback through a variety of mechanisms and used this feedback process generate new e-business initiatives.

Within the business units, there was little clear guidance about what percentage of the staff should be devoted to innovative projects. Decisions were made instinctively, influenced by the risk-taking culture, but constrained by immediate needs to serve customers, and the ability to attract quality hires rapidly. Mr. Hartman noted,

> "Cisco is a company that is very focused on execution, short delivery cycles, making its numbers, putting out fires. So management tends to be very short-term focused. How does one continue to do that but at the same time seed, catalyze, grow, and integrate new value-creating breakthrough e-business ideas?"

Once heads of business units decided *how much* effort should be allocated to pursuing new initiatives, they tended to delegate to senior technologists the decisions on *which* of the multitude of possible projects should be pursued. Projects tended to be approached incrementally — assigning a handful of people (5–10), waiting to see what was learned, possibly going to a trial with a leading-edge customer, possibly investing a little more, etc. There were very few huge, several-hundred-person efforts at Cisco; when they existed, it was usually to address a specific and immediate point of pain. (That was the situation in the early to mid-1990s when Cisco developed the Cisco Connection Online [CCO] to address unacceptable levels customer service.)

There was no definitive philosophy on when to "pull the plug" on projects that were not clearly paying off, but since projects typically were only funded for a few months at a time, this decision was revisited frequently. Managerial instincts on this decision were influenced by culture plus the need to keep employees motivated, consistency with the overall company strategy, and the "smell," if any, of a big breakthrough. Decisions were also shaped by the compensation structure, which was based on three metrics — revenue growth, earnings growth, and customer satisfaction.

An Example of an E-Business Innovation at Cisco

Cisco's efforts in the area of standardized B2B commerce platforms illustrated the company's innovation process. By 2000, Cisco had automated the purchasing process for some of its largest customers by writing custom software that integrated the

customer's purchasing systems with Cisco's order management systems. To extend this functionality to far more customers, Cisco, in conjunction with an industry consortium known as RosettaNet, was developing protocols and platforms that would simplify this process and obviate the need for (painful, brute-force) custom solutions.

A group within the customer service staff, which focused specifically on large enterprises, initiated the project at Cisco. They involved a customer advisory group and the IT organization to get sufficient traction to move the initiative forward. The IT group helped populate the RosettaNet consortium with Cisco employees. Naturally, the initiative affected IT systems in several other parts of the organization, particularly the manufacturing and finance systems. As a result, the customer service staff needed to sell the initiative internally. The common goal of improving customer satisfaction would likely be central to their internal sales approach, as compensation incentives for managers throughout the organization were tied to customer satisfaction. If the initiative proceeded in a typical Cisco fashion, the IT department would assume responsibility for surfacing any inter-departmental conflicts as the system was implemented.

Some Drawbacks to Cisco's Approach

While the decentralized system, combined with an emphasis on staying close to the customer, had been incredibly successful for Cisco so far, it was not without problems. First, as the company grew, it became more complex, and the innovation process became more chaotic. Much of the organization was affected when new initiatives were introduced. A major challenge was simply staying connected — keeping employees throughout the organization cognizant of current initiatives and the ramifications of those initiatives. In addition, it was common for different business units to pursue initiatives that were substantially the same. Conflicts or duplications frequently had to be resolved by the IT department as various initiatives were implemented on Cisco's website.

There were also questions about the types of initiatives generated under the decentralized system. Because they were often influenced by customer feedback, these initiatives tended to be of the incremental, short-term variety. It was not clear how much effort was being devoted to creating true breakthrough strategies, nor was the appropriate level of effort clear. In fact, given Cisco's competence in identifying, acquiring, and integrating small companies with innovative technologies and talented employees, it was not clear that it was necessary to pursue breakthrough opportunities in house at all.

Mr. Allred was somewhat dismissive of the possibility that you could actually be *too* close to the customer ("That is a problem I would love to have.") and seemed to view the potential problem as more theoretical than practical:

> "I guess that one could argue that if IBM were selling mainframes to a bunch of people who had a mainframe orientation and they never talked to anyone else, then maybe they would never understand that client-server or peer-to-peer computing was going to be important. I understand that, but in my mind it is not really a problem."

A final issue was that initiatives generated within business units tended to be narrow in scope. It was not clear to what extent "white space" opportunities (those that fell between areas of clear responsibility on the organizational chart) were being overlooked. Developing projects across business units required extra initiative plus the involvement of senior executives to establish initial connections and guide the collaboration. As the company grew, this became less likely. Moreover, it was becoming clear that there were opportunities to co-develop, co-design, and co-engineer new e-business processes with external organizations, including clients and partners, but it was not clear exactly how to approach these possibilities or how to make them routine.

Possible Options for the Future

The alternative to the current decentralized system was some sort of centralized organization that focused on innovation. But there were any number of ways in which the charter of this new organization could be configured. What specific activities would it be responsible for? Who would staff it? How would it be funded? How would it be evaluated? Could it be configured in such a way that efficiencies and elusive "white space" opportunities were captured without destroying the innovative spirit at Cisco or its decentralized culture? Losing either could outweigh any benefits of centralization.

At a conceptual level, Cisco executives were considering at least three possibilities:

1. A Technology Research and Training Team (centralized "think-tank" that studied emerging technologies and keeps business managers informed of what would soon be possible)

2. A "Venture Engineering Team" (centralized technology research and implementation team)

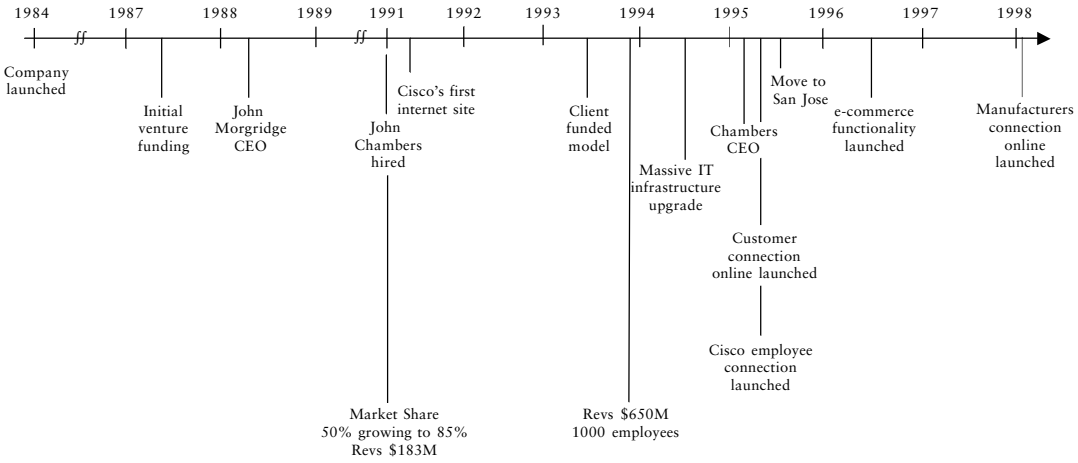
3. An Internal Venture Capital Group (centralized technology business analysis and funding team)

However, the specifics had not been discussed.

Figure 1 — Summary Financials for Cisco

YEAR	1986	1987	1988	1989	1990
Revenues (Thousands)	129	1,485	5,450	27,664	69,776
Revenue Growth		1051.2%	267.0%	407.6%	152.2%
COGS (as % of Revenues)	33.3%	55.3%	44.9%	42.2%	34.3%
Gross Margin	66.7%	44.7%	55.1%	57.8%	65.7%
R&D	38.8%	14.0%	14.0%	7.7%	8.8%
Sales and Marketing	19.4%	7.6%	15.2%	19.6%	20.9%
General and Administrative	36.4%	14.3%	15.8%	6.1%	5.3%
Operating Margin	-27.9%	8.8%	10.2%	24.4%	30.7%
Net Profit Margin	-25.6%	5.6%	7.1%	15.1%	19.9%
Employees				115	174
YEAR	**1991**	**1992**	**1993**	**1994**	**1995**
Revenues (Thousands)	183,184	339,623	649,035	1,334,436	2,232,652
Revenue Growth	162.5%	85.4%	91.1%	105.6%	67.3%
COGS (as % of Revenues)	34.1%	32.8%	32.4%	33.8%	33.3%
Gross Margin	65.9%	67.2%	67.6%	66.2%	66.7%
R&D	6.9%	7.9%	6.8%	8.0%	13.7%
Sales and Marketing	19.0%	17.8%	16.9%	16.9%	17.9%
General and Administrative	3.8%	3.5%	3.2%	3.9%	3.8%
Operating Margin	36.1%	38.1%	40.6%	37.5%	31.3%
Net Profit Margin	23.6%	24.8%	26.5%	24.2%	20.4%
Employees	254	505	882	2,262	2,442
YEAR	**1996**	**1997**	**1998**	**1999**	**2000**
Revenues (Thousands)	4,096,007	6,440,171	8,458,777	12,154,000	18,928,000
Revenue Growth	83.5%	57.2%	31.3%	43.7%	55.7%
COGS (as % of Revenues)	34.4%	34.8%	34.5%	34.9%	35.6%
Gross Margin	65.6%	65.2%	65.5%	65.1%	64.4%
R&D	9.7%	18.7%	19.1%	17.0%	21.4%
Sales and Marketing	17.7%	18.0%	18.5%	20.1%	20.7%
General and Administrative	3.9%	3.2%	3.1%	3.4%	3.0%
Operating Margin	34.2%	25.3%	24.9%	24.6%	19.2%
Net Profit Margin	22.3%	16.3%	16.0%	17.2%	13.4%

Figure 2 — Cisco Timeline



Appendix 1 — Interviews conducted for this case include:

Sanjeev Agrawal	Consultant, Internet Business Solutions Group
Doug Allred	Senior Vice President, Customer Advocacy
Karen Brunett	Marketing Director, Internet Business Services
Todd Elizalde	Director, Customer Service Internet Commerce
Mark Emanuelson	Manager, Internet Marketing Program
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