

Management of Intermediated Channels for High Technology Firms: Achieving Success in a Dynamic and Rapidly Changing Marketplace

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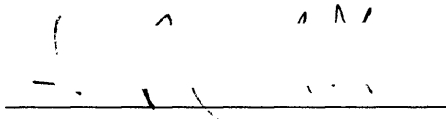
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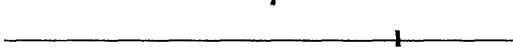
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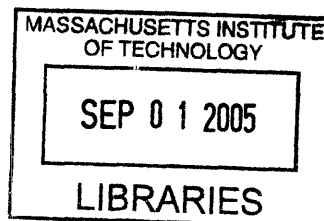

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ABSTRACT

One of the most challenging problems for high technology firms in an increasingly global marketplace is the effective utilization of intermediated sales channels. As product development cycles shorten, there can be a scenario where the rate of product and solutions development and introduction to the market out-pace the manufacturer's ability to sell, service, and support the new products and solutions. There are many challenges to be overcome in providing a third party organization with the knowledge, skills and tools necessary to successfully propose, implement, operate and support high technology products and solutions designed, manufactured and marketed by another company. As firms both large and small look to indirect channels to expand their coverage in existing markets and or to penetrate new markets, significant investments in channel support infrastructure and best-in-class channel management techniques are increasingly a necessity to achieve success in a global channel network.

The objective of this thesis will be to closely examine the enterprise data communications equipment market segment to develop an understanding of how successful firms effectively utilized intermediated channels to attain remarkable market share at the expense of competitors who were not able to do so. From this understanding generalizations will be drawn that will provide a number of management practices that guide other high technology firms in design and implementation of their intermediated channel programs.

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Chapter 1: Introduction

For many businesses today the ability to effectively market and sell their offerings to the largest possible number of consumers globally at the lowest possible cost of sales is a paramount concern of all executive management. The traditional direct sales means such as a captive direct sales force, telesales and direct mail selling and even the relatively new direct channels enabled by the worldwide Internet and e-commerce have inherent limitations. Assuming the goal is to reach as close to 100% of the addressable market as possible, sales and marketing efforts initiated and managed by the company creating the offering itself on its own behalf may not be sufficient. Many potential opportunities and customers are neither identified through direct sales channels, nor are those opportunities adequately pursued and hence, sales are lost to competition or customer needs are left unsatisfied. In the increasingly global economy, traditional direct sales methods can run into significant obstacles, cultural and logistical, resulting from the lack of a regional sales and fulfillment capability. Simply put, it is increasingly harder for a single organization to have the required competencies and global reach to sell and market to all potential customers for its offerings the world over.

As a convention throughout this paper, the words ‘vendor’ or ‘producer’ are used interchangeably to refer to firms originating or producing an offering consisting of goods and in some cases, goods and services. An ‘offering’ as it is used in this paper refers to some good, service or combination of both offered for sale by a producer or vendor. The offering could be a physical product such as a piece of telecommunications equipment or a computer, software, or a service, or a bundle of any and all of the three. The defining characteristic is that the vendor originates something that is sold to a market either directly by the producer or vendor itself, or indirectly through a third party or intermediary that represents the vendor’s offering for sale to end customers either by itself, or as part of a larger solution offered by the intermediary.

For many years companies that develop products or services for sale have turned to indirect channels or intermediaries to market, sell, and sometimes service their offerings. In some cases, these intermediaries are used as the exclusive channel to market—that is the company only provides the offering itself and has no internal sales

organization that interfaces directly with the customers purchasing and using the offering. In other cases, intermediaries are used as augment to the producer's own sales efforts which may include a direct sales force, a telesales force, an e-commerce capability, sales through retail outlets (traditional and or online), or any combination thereof. Typically in these "mixed" models, the intermediary channel partners are used to target specific segments, a vertical market perhaps, or a geography which for any number of reasons the producer does not feel is adequately covered by its organic marketing and sales efforts.

In addition, the utilization of intermediary channels is typically made through one of two primary models: single- and two-tier. In the single-tier model, producers market and sell directly to a number of intermediaries that interface with the end customer. In the single-tier model, the producer retains responsibility for not only selling and marketing to its intermediary partners, but also typically fulfillment of product if applicable.

In the two-tier model a specialized intermediary, called a distributor in some industries, provides services to several different producers in marketing and selling their offerings to a typically large number of other intermediaries that service end customers. In the two-tier model, the distributor takes on some amount of the overhead of managing the transactions with the customer-facing intermediaries including fulfillment and carrying inventory for the producers. The distributor commands a fee for providing this service to the producers utilizing its services, typically paid through a markup the distributor adds when reselling the product to the downstream intermediaries. The downstream intermediaries in turn add markup over their cost from distribution to the price they charge the end-customer.

Different companies utilize these models differently: some utilize single-tier exclusively, others are two-tier only, and a number have some mix, for example relying on two-tier distribution for intermediaries below a threshold level of sales, and enabling their largest and most strategic intermediaries to "deal direct" with the producer. Some companies refer to this latter category of partners as "direct VARs" to reflect the fact that they purchase directly from the manufacturer. There are many different variations on these models in use today.

The customer-facing intermediaries regardless of whether they are operating within a single- or two-tier model are of particular interest in this paper. These

intermediaries are the “feet on the street” so to speak, which are acting as agents for the producer of the offering in segments the firm has consciously decided not to pursue through direct sales. These organizations are marketing, selling and often times providing post-sales support of the producers offering. In the most simple of cases, the intermediary is reselling the producer’s offering and managing the proposal, sale, possibly the financing, and delivery of that offering to the end customer, as-is. The intermediary typically earns a small percentage of the sales price, effectively sharing the margin on the sale of the offering with the producer as well as the distributor in the two-tier model.

Intermediaries must have some level of knowledge and competency with the producer’s offering to effectively position it and in most cases compare and contrast the offering with similar offerings from other producers, but that is the extent of the value-add over and above handling the execution of the transaction if that positioning results in a sale. The relationship between the intermediary and the producer can be relatively arms-length, provided some means for communicating the information for positioning, competitive differentiation, etc. can be extended to the intermediary. This operating model is particularly well suited to the two-tier model, where the distributor assists the producer, serving as a point of aggregation for dissemination of sales and marketing information and basic sales support to a large number of intermediaries. We are all familiar with this type of intermediary, for example everyone has had the experience of purchasing a name-brand product from a retailer. The clerk at the outlet making the sale may or may not have any detailed knowledge of the offering beyond what is immediately discernible. In many cases, the consumer enters the retail outlet relatively sure of what they will purchase, and requires little or no human assistance in completing the transaction. E-commerce has taken this type of sale to previously impossible levels of self service.

In other cases, the intermediary is adding additional value by including services, such as design and implementation and or integration of a total solution that includes the offerings from one or more producers in combination with the services provided by the intermediary. In the business-to-business space, the solution proposal is part of a larger consulting engagement beginning with an examination of the underlying processes that may eventually be automated by some system. The key point of differentiation from the

first case above is that the intermediary is working with the end customer through various phases including defining requirements as well as specifying a solution and selecting the specific components of that solution from amongst the offerings of competitors and complementors.

This type of intermediary may for example design a data network for a business, determining what cabling needs to be installed, what network devices are required and how they will be interconnected and configured, and the management software required to manage the network system based on the customer's request for providing network connectivity for a number of given users and devices that will reside on the network. The design and selection of the producers' offerings, the features and functionalities utilized to deliver the connectivity as well as the actual services performed are specified in the intermediary's proposal which specifies in detail what and how the intermediary will deliver the network connectivity specified in the customer's request for proposal.

The intermediary is typically invited to bid by the end customer because they have the specialized knowledge and skills required to advise the customer on these and related matters, and have established a highly favorable reputation locally or globally. The customer has turned to the intermediary because they don't have the capability internally or believe the intermediary can deliver the solution more cost effectively than an internal organization. The customer may or may not have the knowledge internally to fully evaluate the technical merits or the vendors utilized in the proposed solution—the customer is putting a great deal of trust and confidence in the intermediary in this case. Often times for the largest enterprises this trust emerges from a long relationship and many engagements between the intermediary and the enterprise. The intermediary would upon award of the business complete the activities above, delivering a functioning network system while earning not only margin on the resale of the cabling and equipment and software components, but also for the services required to plan, design, install, turn-up and test the completed system which in many cases is a substantially greater portion of the total margin on the sale of the solution.

In this second case where the intermediary is adding significant value in the delivery of a more comprehensive solution to the end, a far greater level of knowledge and competency with the offering or offerings from one or many producers integrated in

the final solution delivered to the customer by the intermediary is required. In general, businesses that utilize services provided by intermediaries are much larger enterprises so the scale and scope of the opportunities tend to be significantly larger in terms of dollar value. However, it is fairly evident that dealing with these types of intermediaries is significantly different than that required in the simple resale case. These intermediaries require not only intimate marketing, sales and technical knowledge of the producer's offerings they represent—they must also be willing to stake their own reputation on the offerings they propose to their customers. Accordingly, the challenges associated with managing this type of intermediary are more numerous and complex, and it is this type that this paper will be focused on.

Just as all producers of offerings must compete for end-customer mind share; those that utilize intermediated channels must compete for the mind share of the intermediaries that are most capable of achieving the producer's sales goals. This often entails competing directly for the best of the available intermediaries in each market. Competition for mind-share within the channel is fierce in high technology where there is a well-defined upper bound on the number of offerings a single intermediary can represent. For obvious reasons, it is impossible for the practitioners of the intermediary firms that perform the planning, design, integration and operation value-add services to be intimately familiar with the full array of competing offerings from any number of firms that provide the same or similar functionality. Brand recognition within the customer base cannot be discounted, which is often blind to the technical merits, features or even cost-effectiveness of a given offering, but technical competency goes hand in hand—simply put, an intermediary cannot effectively position, differentiate and implement an offering its technicians aren't fully comfortable with, regardless of its technical merits or cost effectiveness. All too often in practice, technical personnel employed by intermediaries just like consumers choose what they know time and again, not because it is the best choice at that point in time, but because it is most familiar. Remember the old saying popularized in the glory days of mainframe computing: “no one ever got fired for choosing IBM...”

Similarly, the power of brand awareness the manufacturer achieves and maintains is omnipresent when it comes to attracting and retaining the best intermediaries. Firms in

the business of delivering solutions are very sensitive to the power of the brands they choose to incorporate in their offerings. “Selling uphill” is a term often used in the industry to refer to the positioning and sales efforts by intermediary channels of products in the absence of brand recognition and effective demand generation efforts by the manufacturer. As will be explored in this paper, manufacturers that rely on intermediaries to sell uphill are often unsuccessful in their attempts to utilize intermediated channels. Many intermediaries will strive to minimize including components in their solutions from manufacturers with little brand equity and in the absence of demand by their end consumers. Significant brand awareness and demand generation activities by the manufacturer are required when using intermediated channels, likely more so than in direct selling scenarios.

With the establishment of industry standards, and the emergence of de facto standards many high tech market segments are converging around an increasingly smaller set of technologies, and complexity is decreasing at an ever increasing rate. As this convergence occurs and the number of potential solutions to customer needs begin to decrease, consolidation and the slow march toward commoditization occurs. In an effort to combat commoditization, vendors often rapidly increase the pace of incremental innovation and product development cycles and efforts to reinforce their points of differentiation and uniqueness of their value propositions. As competing offerings from different producers become increasingly similar, with functionality and feature set increasingly homogenized through standards and other factors, the ability of manufacturers to differentiate on uniqueness becomes increasingly more difficult. Prices begin to converge, and the differences between similar offerings from different producers become hard for their designers to discern, let alone an engineer or consultant employed by a channel partner. The flow of new product announcements and positioning materials from multiple manufacturers can be overwhelming, particularly when the practitioner is well aware that the technology is maturing, complexity is diminishing and more and more entrants are offering lower-cost alternatives. Often intermediaries chose to focus on a smaller number of manufacturers as the technology matures, offering distinct advantages for the manufacturers that move to intermediated channels first and are able to establish a long and loyal relationship with the most desirable partners.

Through this brief discussion of intermediated channels, it can be seen that the management of this type of sales channels can be significantly different and often times significantly more complex than managing a direct sales effort. Increasingly channels management for high technology firms is viewed as requiring specific competencies and experience. In the past, many firms attempted the transition to the use of intermediated channel sales by repurposing their existing direct sales and marketing personnel and infrastructure to the indirect model and supporting intermediaries. Increasingly however a new approach including the utilization of specialized channel management personnel and new infrastructures purpose-built for support of intermediated channels is being pursued by the firms considered to have best-in-class practices and capabilities.

The enterprise data communications equipment segment of the telecommunications industry provides the student of intermediated channels an interesting example for examining in detail how different strategies and tactics in key areas of their channel programs were employed by the different vendors in this space. How the companies competing in this market implemented practices and processes in these key areas and the impact differences had on the effectiveness of the channel program, which arguably can be measured effectively the metrics of worldwide market share for targeted product segments and operating margins. Eventually the effectiveness of any sales effort is measured by these metrics, and every publicly held manufacturer of enterprise data communications solutions has at some point in its history utilized intermediated channels as a primary element of its go-to-market strategy. However as we will see through the thesis, there are often vast shortfalls in sales productivity and profitability expectations envisioned for the utilization of intermediated channels, and what is actually achieved in practice. The purpose of this thesis is to explore in depth how the evolution of the data communications industry as a whole, the evolution of specific companies within that industry, and differences in their intermediated channel management practices led to vastly different results in global sales, profitability and growth of these organizations.

The thesis will summarize briefly the evolution of the enterprise data communications equipment industry and the development of the channel strategies of two companies, Cisco Systems, Inc. and Cabletron Systems, Inc. which eventually competed

head-to-head for share in this market. The thesis will provide an examination of two interrelated aspects of intermediated channel management, using the data communications industry and Cisco and Cabletron as specific examples. The two central questions of intermediated channel management practice to be explored in the paper are 1. What are the different approaches to the establishment and management of the relationship between the firm and its intermediated channels, and 2. How has technology been employed by vendors to enable intermediated channels, to achieve mindshare with the partners' practitioners and to create virtual integration between the vendor and intermediated channel? In the process of examining these key areas of intermediated channels management several other aspects of intermediated channel management by high technology firms will be explored including the importance of building brand awareness and its impact on the successful use of intermediated channels. How the use of intermediated channels is impacted as industries evolve beyond the takeoff stage and into maturity is also examined. The enterprise data communications industry again provides an interesting market to study as industry standardization has resulted in a rather accelerated evolution of the products toward commodity status. How channel management evolves in the presence of commoditization is a topic to be treated throughout the paper.

These central questions are very important in the development of a channel management strategy and its subsequent execution by vendors of high technology offerings that chose to employ intermediated channels in their go-to-market strategies. Certainly the management of the execution of a direct sales effort can be a daunting task in the high technology arena where innovation is rapid and the offerings often technically complex. However, the additional degrees of separation that exist in the multi-channel model, the fact that the sales effort is being entrusted in whole or in part to a third-party over which the vendor can exert limited control, significantly increases the complexity and level of effort required to effectively and economically manage these efforts and is fundamentally different. Through the efforts of researching this paper to determine what the different approaches have been and their associated results, additional insight should be provided to readers practicing intermediated channels management in high technology,

and other similar segments of the economy where intermediated channels are used to add value to the manufacturers offerings.

This thorough examination of these selected elements of intermediated channels management in the enterprise data communications equipment segment should provide the student of channels management with several important lessons from the history of this very exciting high technology market. It is the hope of the author that the reader will also be left with the conclusion that effective management of intermediated channels was undoubtedly one of the many areas of execution excellence and core competency that Cisco Systems utilized to attain domination of a large, complex and to date, highly profitable market segments. Additionally, there are many characteristics of the data communications equipment industry such as open standards, heterogeneity in different market segments and fierce rivalry among competitors that is increasingly the norm. Through the examination provided by this paper it is hoped that readers are able to take away useful strategies and tactics for planning their own intermediated channel programs.

A Note to Readers Regarding the Appendices

There are several key attributes of the evolution of the enterprise data communications market, such as the establishment of open, published standards and the transition from the mainframe and minicomputer infrastructures to the disruptive innovation represented by networked PC and client-server infrastructures. The two appendices included at the end of the thesis beginning on page 146 provide useful additional context for the reader not familiar with the industry and market.

Chapter 2: The Strategic Challenges and Complexities of Intermediated Channels Management

Chapter Introduction

As the introduction stated, the management of intermediated channels is by its very nature significantly more complex than the management of direct channels which are under the direct, internal control of the firm. This chapter outlines several of the major strategic and tactical issues associated with managing intermediated channels both in general and for the high-technology manufacturer in particular. The purpose of the chapter is to provide the reader with a more in-depth understanding of the issues posed by firms expanding their go-to-market strategies to include intermediated channels. The contents of this chapter are provided in order to set the stage for the focused examination of the specific intermediated channel management topics provided in the later chapters of the thesis.

Change Management Complexities

Many high-technology companies with disruptive and or complex offerings often begin with a direct sales force as the primary component of their initial go-to-market strategies. Understanding that many high technology startups have founders with a strong sales background, often times the culture of high technology startups has a strong emphasis on selling. Particularly for disruptive innovations, first-mover firms have little choice but to initially utilize a direct sales force, at least until a critical mass of customers is established and intermediated channels with the necessary competencies eventually become an option. Existing intermediaries in the general market are typically going to wait until the market opportunity is established to some degree before adopting disruptive innovations. At the high end, these intermediaries' reputations are often based on cautious evaluation and rigorous system-level testing and validation before embedding new offerings in their solutions.

The firms developing new and potentially disruptive innovations typically first bring their offerings to the market themselves, fielding typically small teams that often work autonomously to identify and pursue potential sales opportunities. The early sales efforts of these companies often take on mythological proportions and are compared to

small, elite military unit operations due to their reputation for being able to infiltrate and “take-down” carefully studied potential targets. They are in essence the force that gives these new entities or new product lines life by proving the offering does in fact address an unmet need in the marketplace. This is often accompanied by a feeling of ownership of the hard-won accounts by the sales teams involved, and the relationships that develop with the decision makers within these accounts held dear to the individual sales people.

The initial customer base for a high technology firm with a novel offering is drawn from target customers that are known to be the innovators within the target market. That is, they are willing to try and buy the offering with only limited assistance and support from the manufacturer, often without a well-developed solutions-oriented value proposition and rich service offerings available to complement the offering.

Whatever expertise the elite field units involved in initial field sales activities don’t have in their repertoire required to effectively close the first-wave customers, they have virtually unlimited authority to call in “air support” from headquarters to close business. They can draw resources from wherever they reside (e.g., the executive team and investors, design engineering, product management, etc.). In essence for entrepreneurial firms and large firms that bring a disruptive innovation to market, it is basically an “all hands on deck” effort to facilitate initial customer adoption and diffusion of a positive reputation for the company and the offering in gaining early traction and momentum in the market place. Rapid success and the resulting exponential growth in sales as adoption of the offering when the addressable market is very broad are both a blessing and a curse. Amongst many of the difficulties faced by rapidly growing firms is the need to scale the sales effort, often rapidly. In some markets there is no choice but to develop a post-sales support force internally to facilitate early adoption in the target markets. As will be outlined later in the thesis, a large internal post-sales support or service arm can become a significant obstacle to an intermediated channel strategy as this organizational capability of a manufacturer can be viewed as a source of conflict by potential intermediaries.

Inherent limitations to scaling a direct sales force are somewhat intuitively obvious. For an offering that has a compelling value proposition and addresses an unmet need in the market, it is quite difficult to get in front of every potential customer with that

unmet need and the capacity to pay. This is especially the case when the offering and value proposition is complex and requires careful positioning with customers and sales cycles are long. In addition, there are also some not-so-obvious implications regarding the diffusion of the disruptive innovation into the segments beyond the innovator and initial early adopter segments which are often accompanied in high technology with the need to evolve the value proposition from point-product features and functionalities, advantages and customer benefits in a stand-alone model, to positioning it as part of a complete solution in order to attract customers in the late majority and laggard categories. It is not only a matter of positioning and selling, often some amount of post-sales service is required to be bundled with the offering for many customers to even consider adoption. Unlike the technology-savvy innovators that have the competencies required to design and implement the solution, the later adopters often turn to the manufacturer or its representative to assist.

This is very difficult for manufacturers of the offering to do comprehensively on their own. Understanding that the focus of the organization was primarily on engineering—proving the technology and building the offering in a cost effective way then aggressively positioning their offering in the market to get share for the offering, evolving to thinking about what may likely be a multiple technology, multiple vendor solution is exceedingly hard if not impossible for most manufacturers. Placing the competencies aside for a moment, it is also rarely the case that the manufacturer can assemble the resources required to provide solutions to all potential customers profitably. In many cases it makes the most sense for the manufacturer to create a solutions capability for servicing only the largest, most strategic customers which may be serviced profitably by an internal organization. For many astute growth firms, the realization that intermediated channels may be a potential solution for both scaling the sales force and getting the firms offering included in more complete solutions become obvious early in the development of the firm.

Many high technology markets today, particularly those dominated by open, public standards, are characterized by demands from potential customers beyond the innovators to provide not only solutions, but so-called “best of breed” solutions to often complex, business-driven needs. For the largest enterprises, the preferred method for

acquiring best-of-breed solutions is through the consultation of a systems integrator or consultant that professes to be “vendor-agnostic.” These firms provide primarily value-add services and utilize the offerings provided by the vendors of those offerings that choose to utilize intermediated channels. These service firms position themselves as non-biased advisors or consultants to the end customers. Although they have relationships with manufacturers that facilitate the sourcing of their respective offerings, their interests in positioning one vendor’s offering over another’s are not totally economic in nature. Although they make a small margin on the offering that they resell as part of their solution, those margins are not the primary driver in the choice. Instead the vendor agnostic intermediary is relied upon to evaluate the merits of the available competing offerings and chose the best match for the individual customer’s requirements. Manufacturers themselves are viewed for obvious reasons of self interest as being too predisposed to their own offerings and the technologies implemented therein. Not to mention many firms take into consideration the phenomenon documented in Clayton Christensen’s book *The Innovator’s Dilemma* among other sources that makes the argument that even the most innovative firms in the current technology are rarely able to correctly identify the next disruption in their own markets.¹ Seeking out companies that are not necessarily tied to a technology or specific offerings are presumably better able to design solutions that are truly best-of-breed continually evolving those solutions as new innovations come to market, regardless of source. Working with service firms that are vendor-agnostic provides customers not only with the value add services to complement the offering, but assist in the selection of the best-of-breed components that provide the most complete solution for the customer. Lastly, many high technology systems today are by nature multi-vendor. Sourcing a multi-vendor solution can be very resource intensive and when problems emerge can resultant in finger pointing by the various constituencies. Intermediaries in information technology and other high technology segments provide a valuable service for customers by providing the required assembly of the components of the solution, and more importantly stand behind the system as whole, effectively providing the customer with “one throat to choke” should issues with the system arise.

¹ Christensen, C. (1997). *The Innovator’s Dilemma*. Boston: Harvard Business School Press.

Scaling and the sales effort and providing the value-add services required by increasingly more demanding customers as the firm grows motivates the decision to consider adding intermediated channels to the firm's sales mix. One of the most significant issues posed by employment of intermediated channels is management of the change itself, to gain acceptance throughout the organization required to support multi-channel sales operations. Employment of intermediated channels is an outsourcing decision and is often accompanied with the fear, uncertainty and doubt from within the organization typically associated with outsourcing. In the case of the implementation of an intermediated channel strategy, potential concern certainly within the sales function but potentially extending into customer service and marketing as well is likely and should be planned for. The potential for policy resistance, both covert and overt is very high. In the case of firms that have had significant success in the marketplace with direct sales, it is an exceedingly hard to get the entire organization "into the boat and rowing in the same direction." This is essential to success with intermediated channels as will be described throughout the paper, but effecting this change within the culture of an organization can be exceedingly difficult to manage for the executive leadership of most firms. Like any major organizational change, the successful execution of an intermediated channel strategy requires the steadfast commitment of the entire leadership team, especially by the CEO and senior sales executive to prevent the organization from falling into the trap of constant evaluation of the potential downsides associated with intermediated channels and keep the organization focused on implementation and execution of the strategy.

As will be illustrated in the paper, rarely is an intermediated channel strategy outlined completely upon the decision to included intermediaries, and then simply implemented and not evolved over time as the offerings, markets and competitive landscape mature and change. Companies that successfully transition to an intermediated sales channel find that the program evolves significantly over time, and is constantly refined and tuned to fit with developments in the market. However, the underlying principle that the company has made the decision that it is in its best interest to seek out partners in its go-to-market strategy, and willingness to share in its success is crucial and must be constantly communicated to intermediaries as major changes are made.

The Agency Issue

Probably the most onerous strategic issue posed by the employment of intermediated channels is the relationship between the manufacturer and its intermediary partners. Agency theory provides a framework for understanding the relationships that are extremely common in business and other settings in which one party (the principal) delegates work to another party (the agent) that undertakes that work.² Clearly this is precisely the relationship that is entered between manufacturers and intermediaries, particularly high-end intermediaries in information technology and other high technology markets. From the perspective of the manufacturer, effectively it is delegating to the intermediary much if not all of the work associated with selling and supporting its solution to the customers which the manufacturer will no longer service directly. In effect it is relying almost totally on the intermediary as its agent to orchestrate much of the customer experience which may require the intermediary to service the customer over multiple years for many high technology durables. Unlike in many other industries where the interaction between the intermediary and customer is limited to a simple transaction lasting but a few moments, in high technology the intermediary may be the manufacturer's agent for a set of customers for years. Two problems are associated with agency reflecting the conditions of uncertainty and incomplete information that are clearly characteristics of the manufacturer-intermediary relationship: adverse selection and moral hazard. Adverse selection defines the problem that the principal has in determining if the agent accurately represents its ability to perform the functions (e.g., sales and service of the offering, striving for high levels of customer satisfaction, protection of the manufacturer's brand equity, etc.) for which it is being compensated. Moral hazard is the condition under which the principal cannot be sure the agent has put forth maximal effort. Both problems in the context of the relationship between high technology manufacturers and their intermediaries are described below.

Adverse selection is a difficult problem to overcome for the high technology manufacturer selecting intermediaries. Although many of the aspects of a potential intermediary's ability to sell and service the offering such as the intermediary firms'

² Eisenhardt, K. M. (1985, February). Control: Organizational and economic approaches. *Management Science*, 31, 134-149.

infrastructure, credit worthiness, customer list, size of and location of technical staff, training and certifications, etc. can be vetted and then specified in the contract governing the relationship and monitored, many simply cannot. Recall from the discussion in the first chapter that the level of service provided by intermediaries does vary along a continuum, from basic fulfillment only (e.g., handling the sales transaction, delivery and collection) on the one end, to adding significant value to the offering from the manufacturer through embedding that offering in a solution that effectively addresses customer problems at the other end of the continuum. In the short term, the manufacturer may be in fact selecting intermediaries simply in order to scale the sales effort rapidly in order to reach as large an addressable market as possible. However for reasons outlined above and revisited throughout the paper, an intermediated channel strategy often evolves over time as customer adoption requirements shift with the effort to sell to increasingly demanding potential customers, and as commoditization makes competing on uniqueness and technical merits of the offering more difficult in markets dominated by open, public standards. Selecting intermediaries that do in fact have the competency and ability to perform what they claim to can be difficult, selecting those that will mature and not only protect the brand but enhance it by adding significant value can be a difficult strategic issue posed by adding intermediated channels to the sales mix.

Similarly the moral hazard issue is also a primary concern for manufacturers. Many intermediaries will establish relationships with one or more direct competitors with equivalent functionality. One of the key value propositions for the firms that provide high-end systems integration and consulting services in information technology for example, is that they represent multiple manufacturers and have a certain degree of technology and vendor agnosticism as described previously in this chapter. Their solutions pitches are predicated on the fact that as a neutral solutions company, they look to multiple technologies and vendors to develop “best-of-breed” solutions, custom tailored to the individual needs of their clients.

Manufacturers that utilize these firms have a moral hazard problem that is difficult to overcome through the mechanisms often employed to combat such hazards in other similar relationships. The manufacturer must evaluate constantly if its intermediaries are in fact putting the maximal effort into positioning their offering as part

of their solution in their most strategic accounts. Does the intermediary do what is expedient for their firm or do they in fact act in the manufacturer's best interest? If in any given opportunity, the intermediary's proposal raises an objection from a critical decision maker at the account that is potentially biased about the choice of one vendor over another for a part of the proposed solution, does the intermediary stick to their original proposal which presumably was the best choice for the solution, or opt for expediency and make a last minute substitution (assuming of course there is a relationship and that is feasible)? In the case where the intermediary's competitor may have already proposed the offering of the manufacturer's competitor in their original proposal, does the intermediary make the maximal effort to win the account with its original proposal and vendor choices? This is practically impossible to manage on a case-by-case basis for every opportunity, and unlike a direct sales force very hard to combat via direct incentives without creating a conflict of interest concern.

Similarly for manufacturers that have very solid brand equity and market share or a potentially disruptive product, there is a high probability of attracting free riding—attaining an intermediary channel relationship with the manufacturer and simply “passing the paper” on targets of opportunity customers buying on brand awareness primarily. Free riders potentially consume resources of the manufacturer and can do damage to the brand and result in street price erosion which impacts the profitability of the manufacturer. Mechanisms such as including contractual training and certification requirements and limiting access to the more complex products can help in combating free riding but it cannot be eliminated entirely. Some amount of monitoring in the field by the remaining direct sales force and channel management personnel are required to identify and deal appropriately with potential free riders.

One of the solutions that have been applied to other very similar circumstances that result in adverse selection and moral hazard is to tie compensation of the agent to the profits of the firm. The provision of ownership rights reduces some of the incentives for agents associated with adverse selection and moral hazard since it ties agent remuneration to performance, often how much sales volume is generated. However, that is clearly not the complete answer to solving these problems in the management of intermediated channels especially when the intermediary is purportedly vendor agnostic. Unlike a

franchisee who is not viewed by the customer as being unbiased and therefore not conflicted in directly sharing in the success of the franchisor, the intermediary positioning its solutions as vendor agnostic and best-of-breed must be able to maintain at least a perception amongst its customers that they will not directly benefit from the success of any one vendor. The vendor-agnostic solution providers propose their solutions in theory based on what is the best solution for the customer—not because they stand to make more money if they sell more of vendor A than its direct competitor vendor B.

However as will be illustrated later in the paper this is not entirely the case in practice—many manufacturers design intermediated channel programs provide direct incentives such as volume-based discounting to their intermediaries early in the transition to intermediated channels when the manufacturer may be attempting to attract as many intermediaries as possible in an attempt to capture market share.³ Different tiers of intermediary partner certification are designed with the primary criteria for the higher levels providing intermediaries with the best discounts based on sales volume of the manufacturer's offerings. As the market evolves however and customers begin demanding more comprehensive solutions offerings, the rules of the program can be changed from volume-based criteria to other more qualitative criteria such as technical training and certifications held by the intermediary, customer satisfaction level, etc. Shifting the criteria in this manner often provides the manufacturer with the ability to cull its intermediary base as the market begins to mature and the potential for price competition amongst its intermediaries accelerating commoditization of its offerings. An outstanding example of just such an evolution is provided by the case study of Cisco Systems later in the thesis.

³ It should be noted that these volume-based incentives for intermediaries are often not in plain view of the market. Manufacturers typically only publish their list or suggested retail price publicly, and as is the case in many markets with intermediaries between the manufacturer and the end customer, no customer pays MSRP. The automobile market in the US is a good example. In the data communications equipment market as another example, the mechanism behind intermediary pricing is fairly straightforward: the manufacturers agree to provide equipment to intermediated channel partners that buy direct at a set discount off the manufacturer list price of each SKU which can and does often change with sales volume, and can be deal-specific in some cases. Intermediaries earn their margin on the resale of the manufacturers offering via a markup added to their cost of acquiring the equipment from the vendor. The customer is quoted a "street price" for the equipment in the intermediaries' proposal often at a significant discount off the manufacturer's list price—how those prices are arrived at is typically a "black box" process for customers, as is the prevalence of volume-based discounting by manufacturers to their channel partners.

Potential for Shifts in Market Power

In addition to the agency problems, the manufacturer employing intermediated channels faces the potential of market power shifting from the manufacturer to the intermediaries. As aggregators of demand for the manufacturer relying heavily on the intermediated channel, there is a potential for the intermediary to accumulate power in the market as it matures. The shift in market power can result in the intermediary having significantly more bargaining power with the manufacturer in terms of pricing and other terms and conditions of the relationship. As has been shown in the case of Intel, in high technology markets there is the potential for the technology leader (real or created through brand and dominant market share) to counter these forces. Companies have to be keenly attentive to ensuring that their branding efforts, such as “Intel Inside” are effective in ensuring that the although the offering may be incorporated in a system or solution, the end consumer still recognizes the underlying components utilized in that solution. Such recognition and demand by the customer for specific components is important for obvious reasons. Whether or not the customer fully grasps the contribution individual components are making relative to the entire solution, the fact that they request it by name prevents the intermediary from gaining too much power. Like in so many situations, huge brand equity and dominating market share can counteract many other forces.

For the manufacturer not endowed with brand equity and requests by customers for inclusion of its offerings in solutions, preventing the shift in market power can be more complex. In high technology there are other mechanisms that can be used to build dependencies on the manufacturer that counteract these forces. Notably the value-add provided by the manufacturer’s technical support, extremely high levels of quality, or the tools that the manufacturer provides that become embedded in the intermediaries processes. The manufacturer always retains the right to withhold support to the intermediary that tries to exercise its market power. The presence of the factors enumerated above creates a potential switching cost for the intermediary should the relationship with a manufacturer be terminated.

Identifying and Recruiting Intermediaries: Competing for “Shelf-space”

In retail channels such as consumer goods manufacturers compete with the direct competitors for “shelf-space” at the retailers. The parallel construct in high-technology intermediaries is “mind-share.” High technology manufacturers compete for being top-of-mind with the customer-facing personnel of their intermediaries to ensure that the customer-facing personnel position their offering in as many opportunities as possible. In retail, the intermediary is simply providing the end customer with the opportunity to easily purchase the goods self-selected from amongst an assortment of competitor’s offerings. In the high technology space, the intermediary in many cases is assisting the end customer not only purchase, but in addition is assisting the customer in its selection amongst competing technologies and manufacturers as part of the pre-sales service components of the solution. The intermediary then services the solution on the customer premises from installation to obsolescence, often through multiple generations of technology. To get “shelf space,” to provide critical components of a high-end intermediaries solutions is a far more difficult undertaking for manufacturers who follow their primary competitors into the intermediated channels. Displacing a competitor that has had a long standing relationship with the intermediated channel is difficult to do, more so in the later stages of market maturity when offerings are harder to differentiate. This strategic issue again is well demonstrated in the case studies provided later in the thesis.

Closely related to the agency relationship issue outlined earlier in the chapter, it is clearly in the best interest of the manufacturer to strive to build competencies in identifying and recruiting the intermediaries that are best able to meet the goals of providing scale and value-added services to the offering as the market evolves. Manufacturers must compete not only for end customers but also for the most capable intermediaries servicing the marketplace. The high-end intermediaries such as systems integrators and consultants carefully and thoroughly evaluate offerings based on the potential to add value to those offerings in delivering solutions. For the high-end intermediaries, their primary competitive advantage is not achieved from the authorization to resell a number of manufacturers’ offering; rather it is achieved through

the ability to differentiate themselves from their direct competitors via the features, advantages and benefits of their complete solution. As the technology and offerings commoditize, and there become multiple avenues for customers to acquire the components, the manufacturer, through its intermediaries has to minimize competition based on the average selling price of the offerings which could obviously accelerate the commoditization process. The more the offering itself and the manufacturer's commitment to assist its intermediaries in designing and delivering innovative, differentiable solutions, the more attractive the manufacturer is to high-end intermediaries.

Intermediaries are also often concerned somewhat with the extent to which the manufacturer may already have relationships with other firms that intermediary considers to be its direct competitors. The level of distribution the manufacturer has in the marketplace already can be a concern in the early stages of evolution of a market. This concern can be offset to some degree by the ability of the intermediary to wrap services around the offering to differentiate itself by providing better solutions to customers. This is the ideal for the manufacturer; some level of competition in the market amongst its intermediaries is healthy as the market matures as it results in market forces solving the adverse selection issue raised earlier in the chapter. Just as there is likely to be some shakeout in the manufacturers, so to will there be in the intermediated channels in the market. Intermediaries that don't develop the skills and capabilities enabling them to deliver value-add services are unable to compete. Manufacturers can accelerate this process by shifting the underlying structure of their intermediated channel program from incentivizing volume, to incentivizing the intermediary for gaining and maintaining qualifications, capabilities and customer satisfaction as the objectives of its program shift from intermediaries providing basic fulfillment to providing true value-add solutions around the offering.

Beyond these characteristics, intermediaries also pay particular attention to the basic design of the channel program offered by the manufacturer. One function of the channel management organization is the definition of the channel program(s), terms and conditions normally captured in the partnership agreement. The following is a list of

some of the basic terms and conditions typically captured in these agreements address the following:

- The specific offerings the manufacturer makes available to the channel (all or some subset) and how well suited those offerings are to being bundled with the services the intermediary takes to market.
- What various levels of training and certification are required and for which products
- Sales volume commitments—how much dollar-volume of committed sales of the manufacturer's offering is required to attain registration if any
- The discounts provided to the intermediary for purchase of the manufacturer's offerings which determine margin available to the intermediary on resale of the offerings.
- Resources the manufacturer provides (e.g., access to online tools, expedited technical support, joint marketing activities, product return procedures, etc.) to support the intermediary.

Intermediaries often carefully evaluate and perform additional due diligence on the following additional critical components of the manufacturer's approach to intermediated channels:

- How clearly articulated is the manufacturer's strategy for the employment of intermediated channels, at what level is the company publicly committed? How consistent has the manufacturer been, and what has its track record been in the marketplace?
- Does the manufacturer have its own service force, what are the potentials for conflict between it and intermediaries?
- How much brand equity does the manufacturer have in the target markets? Does demand already exist, or will this offering have to be sold uphill?
- What is the readiness of the technical staff of the intermediary to support the manufacturers offering? Can their existing training, certification and experience

be leveraged or will they need new technical training and certifications? How widely is that training available, can it be delivered online or through other media that prevents pulling limited resources off of customer engagements

- What is the readiness of the sales staff to support the new offering? Can they be trained easily and without impacting their productivity?
- What has the manufacturer done to simplify supporting the offering in the field in relation to its competitors? Are their potential cost savings for ongoing support of our solutions enabled by using this offering?
- How easy is it to do business with this manufacturer? Are their systems and tools going to save time and effort for our staff in preparing quotations, placing and tracking orders, making payments, etc? Are those tools easily accessible from a standard laptop or PDA or do they require an investment in new software or infrastructure in order to integrate with their systems?
- What level of support will the manufacturer provide it intermediaries in the field? What kind of demand generation activities do the direct sales force and channel management teams perform on behalf of intermediaries? Are they available to help close business, assist onsite with technical issues and conduct informal training in the field?
- If the manufacturer is going to maintain a direct sales force, what are the rules of engagement between the direct sales force and the intermediaries at various levels? How potential conflicts between the two are resolved, and at what level is the decision made? Are incentives in place to induce the direct sales force to work closely with the intermediated channel partners?
- Does the manufacturer have an offering roadmap and a reputation in the industry for driving innovation and frequently refreshing the product line? Is there a pipeline of new offerings into the future that enable the intermediary to position frequent technology refreshes, with requisite services that enable continued opportunities for future revenues from accounts the firm has invested time and energy into winning and retaining.

- What is the return on investment the intermediary will have to make to develop its internal capabilities and competencies to sell and service the manufacturers offering, do business with the manufacturer and maintain the relationship?
- What is the level of maturity of the quality systems of the manufacturer? Does the manufacturer have a reputation for high-quality offerings in the field?

Just as there are differences among customer groups in terms of their propensity to adopt innovative offerings at different points in the offerings life cycle, intermediaries have varying degrees of internal technical competencies to evaluate offerings and varying levels of willingness to adopt new technologies and offerings. What manufacturers have a tendency to overlook in practice is that the value proposition varies somewhat significantly for the end customer and the potential intermediated channel partner. The potential customers of an offering are typically concerned with solving their needs and desires, costs of acquiring and operating the offering, and the return on their investment. The potential intermediary partner is concerned with those aspects as well as how the offering complements the value proposition of its own current solution offerings, or potentially enables new compelling solutions with equally as appealing value propositions to the intermediary's target customers. First and foremost, how is establishing a relationship with a given manufacturer and incorporating its offerings into the offerings of the intermediary going to make the intermediary firm better off in terms of winning highly-profitable business and growing its customer base for solutions? Much of that has to do with the value proposition of the solutions offered by the firm—what existing or new problems faced by its customers can it solve better or with a better ROI using the offerings of that manufacturer.

If nothing else the reader should be left with the conclusion that this issue of intermediated channels management is not something that occurs naturally within an organization, many of these aspects require careful consideration by the firm almost at inception of a plan to utilize intermediated channels.

Marketing: Selling to and Through Intermediaries

First and foremost as will be stressed throughout the thesis, brand equity for the manufacturer is one of the key strategic issues posed in the execution of an intermediated

channel strategy. The intermediary that will evangelize a manufacturer's offering previous to achievement of significant brand awareness is a rarity. Such intermediary channels are typically reserved only for the number one, and sometimes number two market share holders in an industry. Therefore one of the most important strategic considerations for the company expanding its sales efforts into intermediated channels is the creation of brand equity that the intermediary will rely on as "air cover" in the market. The achievement of substantial brand equity and success in intermediated channels however are often mutually reinforcing, however as outlined above intermediaries are acutely sensitive to what brands are generating buzz in their target markets. Again, in high technology companies branding and corporate marketing efforts are often assigned low priorities early on and that can be a source of difficulties in making the transition to intermediated channels. In the age of the Internet and the importance of word-of-mouth awareness, companies need to dedicate some careful focus on the building of brand as they consider expansion of the sales effort into intermediated channels.

The manufacturer's brand equity in the market place, as well as its market share is an incredibly important aspect in the quest for intermediary mind share. Often it is as much or more important for the manufacturer attempting to establish relationships with the best intermediary partners to have good brand awareness and leading market share as it is to have leading features and functionality—without the former it is hard in many cases to get a leading intermediary to even conduct an evaluation to validate the manufacturer's claims of the latter! It rarely happens that a Power Point presentation is enough to convince a leading systems integrator or consulting firm of the technical value proposition of an offering. By nature, the technical professionals of high-end technology intermediaries are highly pragmatic. Typically it takes weeks or months of testing in the intermediary's facility with their technical experts supported by the manufacturer's experts to validate the value proposition. In determining what is best of breed, intermediaries just like consumers have a tendency to give market share and brand awareness very heavy weighting in their evaluations of potential offerings to include and validate in their solutions for obvious reasons. Despite being agnostic to technology and manufacturers, the reality is such that the number of potential offerings a given intermediary can evaluate, train on, and stay current with is limited. Market share

statistics are one rather straightforward way to create a prioritized list of potential offerings to evaluate and manufacturers to seek relationships with the nature of its resource constraints often lead to the intermediaries relying on brand as a proxy for “best” product.

Selling to and through intermediaries requires different skills for the manufacturer than selling directly to customers. This is another major strategic issue posed by the employment intermediated channels that the manufacturer has to find channel-focused marketing professionals that understand the differences and can create the processes, programs and collateral necessary to market to and through its intermediaries. Often the investment in channel-specific marketing can be substantial, and in many cases manufacturers opt for repurposing existing collateral and programs for the channel, often with less than optimal results. The best results are often attained by the manufacturer that provides the resources to work with the intermediaries early on to provide targeted jointly-developed marketing with its channel. The development of these competencies is the domain of the executive charged with channel management who builds a staff that is responsible for determining best potential partners, marketing to them and selling them on the value proposition to signing with and actively working with the manufacturer, recruiting those partners and maintaining the relationship over time through many high-touch activities. Maintaining long-term relationships with intermediaries often provides more opportunities for value creation over time for value-added solutions development.

In addition, joint marketing programs with intermediaries often provide a valuable avenue for manufacturers to remain in tune with the market place. This information can be channeled back to product development as input for the product roadmap, and also to product marketing which can design bundles of equipment that can form the nucleus of a solutions offering that can be promoted through intermediaries.

Channel Conflict and the Alignment of Incentives

Channel conflict is topic that comes up incessantly in the discussion of the strategic challenges posed by intermediated channels management. There are several potential sources of channel conflict that must be understood and planned for as part of the overall channel strategy. As has been alluded to previously in this chapter at several

points, channel conflict is not always a bad thing when it results in some competition among intermediaries.

For firms transitioning from direct sales to a hybrid model, the first source of channel conflict to be taken into account of course is the conflict between the direct sales organization and the intermediaries. For reasons discussed later in the paper although it seems that this can easily be handled through mechanisms such as “channel-neutral” incentives, it is typically not that straightforward to solve, and can be a source of real difficulties for companies trying to transition to increasing amounts of its business to the channel. For reasons obvious that should be obvious to the reader, the direct sales force often is reluctant to cede account control and resists transitioning existing and potentially new accounts to intermediaries. This policy resistance can be detrimental to building the trust with intermediated channel partners, and delays development of self reliance within the intermediated channel base. In addition to aligning incentives for the direct sales force so their compensation is the same regardless of whether business is done direct or through a channel partner, the leadership of the company must do a number of things. First it must be publicly supportive and provide reinforcement of the company’s goals for transitioning to intermediated channels both internally and externally. Clear rules of engagement must be established and enforced for the determination of what customers will remain direct and by what objective criteria. The sales person will look to see if the company is “walking-the-talk” to ensure that the organization is taking the steps necessary to build the infrastructure required to support a transition to intermediated channels. Beyond concern about their compensation, sales people often care deeply about their customers. They must be reassured that the transition of their customers to intermediaries has the highest chance of success as measured by continued customer satisfaction. If they perceive that the transition to intermediated channels is not being backed up by the firm taking deliberate actions to carefully screen the intermediaries and arm them with the tools and training to be successful in supporting customers, they will resist and the transition to intermediated channels will be long and difficult for the firm. Lastly the direct sales force has to be made to view intermediary channels as a partner in the sales process, not another customer for the company. Specific steps have to be taken

to ensure that the success of the company and the ability to sell through channels are inextricably linked.

Another potential source of channel conflict is that which can occur if the manufacturer maintains a significant service capability, particularly of the sort often called “professional services,” that provide services above and beyond those necessary to provide technical support for the fielded offerings augmenting the first line of support provided by the intermediary. Whether these service organizations are internal to the manufacturer, or result in substantial investments by the manufacturer directly in third-party firms that are essentially intermediary channel firms, raises concerns among intermediaries about the manufacturer being conflicted.⁴ Similarly to the first source of channel conflict, steps have to be taken to define the rules of engagement of these organizations as well, to ensure the intermediary base is clear on when these organizations will be brought in by the manufacturer, effectively competing with them for potential opportunities and reassured that it will be limited to only those circumstances. A large, capable service organization with P&L responsibilities essentially at the disposal of a direct sales force raises significant concern by potential intermediary partners.

Lastly the issue of conflict between intermediaries themselves that can result in the manufacturer becoming “over-distributed” in a segment of the market resulting in many intermediaries competing for the same business, with the same offering at the core of their solution. Different solutions can be brought to bear on this channel conflict situation, often dependent on the stage of the evolution the intermediated channel program is in at the time. If the primary objective is to build scale when the market is immature and multiple competitors are in a land grab for market share, customer demands for value add are relatively low, the manufacturer may pursue many intermediaries in order to capture market share initially, then use the previously described mechanisms to cull the intermediaries so that there are less, more capable intermediaries working the same markets with similar offerings. Early on the manufacturer using this

⁴ However, as will be shown in the Cisco chapter, market leaders taking large positions in very high-end intermediaries such as consultancies (in the case of Cisco, its 20 percent stake in KPMG Consulting in 1998 as an example) can often be overlooked as part of the building of the brand and excused by the rank and file data communications intermediaries as often they were utilized as subcontractors by the consultancies.

strategy runs the risk of alienating the channel and potentially causing earlier erosion of prices. Two levers can be used to control these potential negative effects however: very strong brand that drives demand for the manufacturer's product, and close monitoring of the market to determine when individual market segments are about to tip toward severe over-distribution such that required action can be taken by the manufacturer before price erosion begins to set in. Again, channel conflict can be good at times for manufacturers, as it helps weed-out through natural market mechanisms free riders and low value-add intermediaries that may be more likely to resort to price competition.

Communication across Firm Boundaries

Another strategic challenge posed by the move to intermediated channels is potential loss of market information that traditionally comes from a large sales force. Understanding that in high technology markets the manufacturer often retains a large field force to support the intermediated channel, some market segments are turned over completely to the intermediary. Developments in the marketplace and the actions of competitors and other critical information that in the past may have flowed freely to and from the field force now requires participation by third parties not in the direct control of the manufacturer. This can be a hard challenge to overcome and required careful consideration in determining both the people resources employed by the manufacturer in the management of the channel program as well as the support infrastructure and implementation of programs such as intermediary advisory panels and the like to ensure a free flow of information to and from the field.

The manufacturer has to provide intermediaries with constant flow of information about its products, its programs and other data. Personnel that need that information within the intermediary organizations, the sales and technical personnel of the firm often have limited cycles as they strive for highest amounts of customer-facing and chargeable time. Information from manufacturers has to be delivered in a targeted manner, via a number of optional channels both through face-to-face contact with the manufacturers field force, as well as via electronic means. "Bench time" for the sales and technical personnel of intermediary organizations is severely limited The manufacturer has to be innovative and creative in compensating for the fact that a large portion of the people who deliver the customer experience is no longer a captive audience.

Chapter Summary

This chapter has attempted to outline for the reader many of the issues posed by the implementation of an intermediated channel strategy. It is by no means an exhaustive list. It does however provide the reader some context for the discussions presented in the remaining chapters of the thesis outlining different approaches to management of intermediated channels. Many of the issues outlined in this chapter are addressed directly through the relationship management aspects of intermediated channels, or the support infrastructure. These two areas of intermediated channel management are covered in detail in the next two chapters of the thesis. In addition the material outlined in this chapter is relevant to the detailed comparison and contrast of the execution of an intermediated channel strategy of two companies in the enterprise data communications equipment market. The discussion outlines in detail specific differences in the approach taken by two companies targeting the same market and the same customers essentially. The issues they faced, many outlined in detail in this chapter, were remarkably similar however the management of these companies took very different approaches to intermediated channel strategies.

Chapter 3: Developing Multi-channel Management Capability

Chapter Introduction

The previous chapter outlined many of the significant issues confronting the firm considering the addition of intermediated channels to the sales mix. For the firm transitioning from direct-only to a multi-channel model, there are a number of competencies that must be developed across the company that accumulate in a multi-channel management capability developed by the firm. A great deal of these competencies is centered on the firm's ability to establish and maintain relationships with intermediated channel partners. Often the relationship is greatly affected by how, why and when intermediated channels become part of the go-to-market strategy of a given manufacturer. The level of commitment and the willingness and ability of the company to invest in development of multi-channel management capability is tied to the success of the transformation effort and the goals the firm sets for sales through intermediated channels. There are also many environmental and cultural influences on how and when a given firm expands its go-to-market strategy through the employment of intermediated channels. Among the most important are the state of the target markets, maturity of the technologies embedded in the offerings and the pace of innovation, and the sales culture that is predominant within the manufacturer at the time of transition. Ongoing management of the relationship is important as well for companies that pursue so called hybrid models in which some customers are still serviced by a direct sales force while others are relegated to intermediaries. This chapter will outline several of the relationship management aspects of the effective utilization of intermediated channels, and the development of multi-channel management capabilities.

After outlining the many competencies that a firm must develop to achieve multiple channel management capability, the discussion will shift toward an analysis of the potential internal barriers to achieving the firm-wide competencies underlying the capability. For firms that have a great deal of success through the effective use of the direct sales channel, transitioning to the use of intermediaries can be a difficult process.

Systems dynamics provides a very useful framework for analyzing the underlying dynamics of the processes involved with a firm making the transition from direct sales to multiple channels while continuing to achieve sales expectations. The causal loop diagram presented in this section of the thesis builds upon a generalized process improvement model to explore the potential sources of issues in making the transition, and more importantly provides several insights on their root causes so that they may be managed.

Multi-channel Management Capability as a Complementary Asset

Throughout the thesis it has been emphasized that intermediated channels provide a manufacturer with the ability to add scale to its sales efforts and provides a means for providing value-add services alongside the offerings of the manufacturer. The addition of value-add services is often required for the purposes of providing the solutions required by a large number of potential customers, those customers not in the innovator and early adopter categories. Developing the capability to manage multiple channels can be a significant complementary asset for a firm competing in markets where open public standards or other factors make it difficult to maintain uniqueness. MIT professor Rebecca Henderson identifies two potential methods of capturing the value of effective value creation, namely “uniqueness” and “complementary assets.”⁵ Professor Henderson describes uniqueness as the most direct way to capture the value created by innovation is to have no competition. This is achieved typically through strong IP protection. In industries such as enterprise data communications equipment studied in this paper, the fact that the underlying technologies were effectively available in public standards made value capture through uniqueness almost impossible to sustain. The rate of spillover of incremental innovations from one manufacturer to another was relatively high. This is not uncommon in many areas of high technology today.

The other method of value capture, complementary assets, is described by Professor Henderson in her writings and teachings as follows. Complementary assets of the firm are the things that allow it to sell an offering at a reasonable return despite the

⁵ Henderson, R. (2005). “Making Money from Innovation,” mimeo, Chapter 3 from Strategy and Technology.

fact that the offering itself is not unique.⁶ Effective utilization of multiple channels to market, to include the employment of intermediated channels and a direct sales force can meet this definition. As will be illustrated later in the thesis one firm has utilized multi-channel management as an extremely effective complementary asset in its efforts to dominate the enterprise data communications market. Through the effective use of intermediated channels enabled through best-in-class multi-channel management capability, the company has effectively increased the scale of its sales effort globally and made available to its customers a rich set of complementary services such that its offerings are appealing to a wide variety of customers. In the process they have taken market share from their competitors while achieving superior margins, despite the offerings themselves becoming increasingly difficult to differentiate as commoditization occurs.

What is intensely interesting then is the following: if one firm can do it extremely well, and the relationships with its intermediary partners are essentially voluntary and non-exclusive, why are competitors unable to imitate and essentially coopt the complementary asset? Through the research completed for the thesis there appears to be several reasons that imitation and cooption of intermediated channels in a given market segment is very hard. As will be described later in this chapter it can be difficult for a firm to develop multi-channel capability and transition successfully from a single, direct channel model. Another potential reason is increasing returns gained from significant experience in utilizing intermediated channels.⁷ Clearly there are economies of scale and scope that result from experience in managing multiple channels that accumulates in the multi-channel management capability of the firm. Managing multiple channels effectively is inherently more difficult than managing a single, direct sales channel. There are significant learning curves involved and therefore accumulated experience may give considerable advantage to the firm that develops the largest reliance on channels and the capability to manage a large-scale multi-channel effort. “Economies of scale and scope are at the root of many of the most potent tightly held complementary assets.”⁸ Like many other processes that a firm can develop such as manufacturing and other process

⁶ Henderson.

⁷ Henderson.

⁸ Henderson, page 10.

expertise, multi-channel management capability can become a tightly-held complementary asset and a source of sustainable competitive advantage.

Building Multi-channel Management Capability

The process for developing multi-channel management capabilities required to effectively utilize intermediated channels is not a matter of simply “flipping a switch” and transforming the firm from selling direct to utilizing intermediated channels. This is well documented through the research of the enterprise data communications equipment market completed for this thesis. Chapters five and six of the thesis outline the transition of two competing firms that had significantly different approaches to this process with significantly different results, despite being in the same markets and targeting essentially the same intermediaries. The following sections will outline some key issues regarding the transition, and then go into specific competencies that must be developed by the firm to build multi-channel management capability.

Timing Considerations

For high technology firms, the timing of when to pursue intermediated channel relationships can be difficult. The readiness of the manufacturer’s organization to support intermediated channel sales, gained through the development of multi-channel management capability as described in this chapter is a primary concern. In addition, the readiness of the potential intermediaries’ technical competencies and capabilities to add value to the manufacturer’s offerings, their reach and productivity must also be evaluated before a manufacturer forays into sales through indirect channels. The direct sales force often will find themselves competing in the market with potential intermediaries which allows for direct observation of their capabilities. However, the firm must take deliberate steps to have the sales organization look up from selling and objectively evaluate the intermediaries they encounter in the market.

When there is rapid development of the capabilities and market reach of potential intermediary firms in a market segment, manufacturers walk a fine line as they consider whether or not to pursue a multi-channel model including intermediaries. Manufacturers that choose to pursue primarily direct sales efforts as the potential intermediaries ramp-up, eventually find themselves competing directly with intermediated channel firms, possibly

those representing the offerings of their direct competitors that have already begun using intermediaries. For manufacturers offering some level of services around their own offerings via an internal service capability, continued competition with the intermediaries in their space can be onerous. It is not uncommon for manufacturers pursuing a primarily direct sales strategy to view the intermediaries operating in their space as direct competitors. For obvious reasons, this can be a potential source of resistance from within the organizations if at some point the manufacturer determines to pursue a multi-channel strategy. If a manufacturer's sales force repeatedly finds itself in competition with a particular intermediary the prospects for future relationship can be damaged irreparably on both sides. If competitive situations between a manufacturer and intermediaries occur frequently in multiple locations, that vendor can and will be deemed by the intermediary channel community as "not channel friendly." The manufacturer's sales force on the other hand regards the intermediaries they compete for business with directly as the enemy if the intermediaries are reselling their direct competitor's offerings. Once that label is established in the mind of sales people; it is often very hard to reverse. This is a potential source of policy resistance when the executive leadership makes the decision to pursue a multi-channel strategy and seeks to add intermediaries to the sales mix.

The scenario described above can be seriously exacerbated by a vendor making repeated aborted attempts to utilize intermediated channels before the firm is totally committed, or ready to make the transition. In researching the companies in the data communications equipment space, there are examples of firms that "tested the waters" so to speak by partially rolling-out a channel program and engaging with one or more intermediaries on customer opportunities, but as the deal closes the vendor's field sales personnel "take the customer direct" and cut the intermediary out of the opportunity. Similarly manufacturers may pursue relationships with intermediaries with capabilities at both end of the continuum described earlier in the paper. Often it is incumbent upon the manufacturer to de-conflict multiple intermediaries competing for a single opportunity. How the manufacturer approaches de-confliction is observed closely by the intermediated channel. Through the research it became clear that a manufacturer's reputation for consistency and its ability to deal fairly with channel conflict within the community of intermediaries is very important and once damaged, hard to repair.

That being said, it is probably best to be sure the organization is both committed to multi-channel operations as well as at the adequate levels of readiness across the entire company. Another common thread to the interviews conducted was the stress placed on executive-level commitment to the addition of intermediated channels to the go-to-market mix. This is clearly a strategic decision for organizations and the management of the change has to extend to all levels of the organization, including embrace, steadfastness and visionary leadership by the executive management throughout the transition.

What became clear in the research of the data communications equipment market is that it can be difficult for firms that wait for a significant period of time to move to a multi-channel strategy. Especially in cases where competitors that may have significant market share in the target or closely adjacent markets move first, significant leads in developing multi-channel management capability by one firm over its competitors are highly probable. Moving to intermediated channels with a set of offerings that is very similar to that of competitors that have well-established intermediary channel relationships is significantly more difficult. It is often difficult to displace a competitor with established intermediated channel relationships in part due to the fact that the intermediaries have experience with the competitor's multi-channel management capabilities. Unless there is an extremely compelling value proposition offered by the new entrant, perhaps providing intermediaries with the ability to add new and differentiable services and solutions, it can be very difficult to displace an incumbent.

Transitioning the Sales Force

It is often the case in firms introducing disruptive innovations that the direct sales force has already taken the innovation and the company some distance up the adoption curve, in effect becoming the driving force behind the early market successes. In the process, the direct sales force has undoubtedly won countless competitive battles and established strong relationships with the decision makers of organizations in the innovator and early majority categories perhaps over the course of years. When success has been achieved in the market, the direct sales force are arguably directly responsible for that success and the growth of the firm to date, and many have been compensated handsomely for these efforts. Accordingly there is often significant reluctance from the direct sales force to the concept of utilizing intermediary firms in expanding the sales

effort, despite the intuitive advantages of more “feet on the street” actively positioning and supporting the firm’s offering. The direct sales force often simply does not want to give up the account control described above, not to mention the handsome compensation they have earned in winning business to date.

The very best high technology sales people are often hyper-competitive and focused on individual results and rewards that drive the early successes in taking a disruptive innovation to market. Focus on individual goals and achievements are in fact the characteristics that the successful high technology startup actively recruits in its first direct sales personnel. These traits however often become significant obstacles to overcome in making the transition to intermediated channels for many firms. Like many other organizational changes, the firm making the decision to include intermediated channels into the go-to-market strategy has to recognize this potential obstacle and plan accordingly for it.

There are no clear cut answers to dealing with this part of the transition I found in the research for this paper. The reality is that even in companies that are committed to channels, there are typically some salespeople that never make the transition to the intermediated channel model. As with any organizational change of a significant magnitude, some people embrace it and adapt while others simply refuse and move on, or worse remain with the organization and resist the transformation. In most organizations there is the need for some direct sales executives to manage the accounts that are deemed strategic and not transitioned to an intermediary. These opportunities though are limited. In many of the interviews I had with practicing channel managers, pockets of resistance to intermediated channels often remain in even the most effective channel companies. These managers agreed that it is important to know where the pockets are and to work around them as necessary while constantly reinforcing successes of the intermediated channel partners.

Another aspect of transitioning the sales force that received a great deal of discussion in the research interviews was sales force compensation as the transition to intermediated channels is initiated. Many firms that pursue a multi-channel strategy, maintaining some direct accounts while moving much of the business to the intermediary channel will establish a “joint” sales target per region. In order to reinforce the behavior

of utilizing an intermediary as the primary mode of fulfillment, bringing the partner into the opportunity early and allowing the intermediary to close and fulfill the business, quota relief for the sales through the intermediary is the same as it is for a direct sale. Despite there being more points of margin retained by the manufacturer for business that is taken direct, the compensation for direct business is neutral for the manufacturer's account executive. Often manufacturers will implement incentives to make doing business through the channel more lucrative for the sales force, essentially paying the sales force a bonus for utilizing intermediated channel partners.

Customer and Technical Support

A substantial part of the role of a direct sales force after the sale often includes acting on the customer's behalf when interacting with the manufacturer's internal organizations such as supply chain and technical support. In many cases, the level of customer care provided by the field sales force is significant. The direct sales force can in many cases compensate for the lack of well-defined processes and systems support and other infrastructure that the manufacturer has yet to get into place. With a few well-placed phone calls, the senior sales representative can solve many problems for their customers often long before the customer even classifies something as a problem.

For the firm that has relied on these interventions by the field sales force, transitioning customers to an intermediary organization that cannot avail itself to personal relationships and networks with the internal organizations of the supplier, the level of customer and technical support the customer has become accustomed to deteriorates rapidly. Firms considering making the transition from direct sales to intermediaries have to carefully review their processes and systems underlying their customer service and technical support. It is unreasonable to believe that a third-party, regardless of its level of training and experience with the offering can make up for weaknesses in these highly critical facets of the customer experience. Expecting the field force to continue to intervene in these functions, relying on the intermediary to provide only basic fulfillment defeats the goal of increasing scale by employing intermediated channels. Like many aspects of multi-channel capability, the absence of these competencies—providing solid customer service and technical support via the intermediary channel—can be a factor in the field sales force resisting the transition. A sales executive being called upon to

parachute in and solve customer service and technical support issues for an account transitioned to an intermediary may lead to the conclusion by the executive that the intermediary is not capable of supporting the customer. Whether the manufacturer's systems or processes are at fault for this situation, it likely does not matter. From the sales executive's perspective, the intermediary is not meeting the customer's expectation. The sales executive may take this into account the next time an opportunity arises and she/he makes the decision to include an intermediary.

Technical Training

Another important precursor for a successful transition to successful relationships with intermediaries is the availability of trained and experienced technical personnel with the requisite level of familiarity with the specifics of the manufacturer's offerings. The variety of implementation specifics ranging from features and functionality, user interface and other technical details for high technology offerings makes it imperative that pre- and post-sales professionals are available, preferably already employed by the target intermediaries.

This was incredibly important in the example enterprise data communications equipment market as was indicated in the research. Like many other disruptive innovations, as the new computing paradigm initially began to get traction with customers, there was not an abundance of technical personnel that were qualified to sell and support the offerings introduced by the manufacturers. When the innovation is by nature highly complex and prior to the technology being included in the curriculums at the tertiary and secondary levels, the burden falls on the manufacturer to provide training to the end users of its solutions as well as potential intermediaries. Technical training is much like marketing in the sense that technical training for intermediaries can have different requirements than that designed for end customers. Firms that have designed and built training programs to meet the needs of the end customers often find that the curriculums have to be expanded to meet the needs of intermediaries, including sharing information about the offerings that typically might not be required by the end customers. It is important that the training organization recognizes these differences and addresses training and certification programs that are customized to the needs of its intermediated channel partners.

Establishing a training and certification program that is both widely available and through word-of-mouth develops a good reputation within the technical community can be of great value to a manufacturer. If the training becomes the de facto standard for developing marketable skills whilst the secondary and tertiary educational institutions catch up, these programs can be a powerful augment to other marketing and branding activities. People naturally buy or recommend to others the offerings that they understand best, and have worked with. Vendors that have established their training and certification programs as the most desirable in the technologies embedded in their products have a distinct advantage over their competitors when competing for the mindshare of the best intermediaries. As will be discussed in the next chapter, firms must strive to provide training via a variety of delivery methods to suit the needs of intermediaries and customers. Alternatives such as web-based training and other alternative medium are a necessity for providing a training capability that is attractive to intermediaries.

Brand Awareness and Marketing

The technology embodied in the manufacturer's offerings has to have gained market acceptance as well as some level of brand awareness for the manufacturer in the target customer base. For truly disruptive innovations this is typically achieved by some degree of success in the direct sales efforts to the innovators and probably many of the early adopters. The more widespread the awareness a manufacturer is able to establish for its brand early on and the more successful the early demand generation activities, the more likely that the intermediaries servicing the customer base will be interested in establishing a relationship with the manufacturer. Reputation amongst competitors and customers for technology and product leadership is crucial in high technology markets.

Establishing these beach heads is often gained via the early-stage direct sales efforts, and the establishment of a base of customers that can be referenced. Successes in critical segments of the market such as those that have influence over buyers in the target markets generate awareness for the company among potential buyers and intermediaries. Traditional marketing and communications mechanisms such as coverage in the trade press also assist in the development of customer demand. With the Internet and email relied upon so heavily in the IT and technology sectors of the economy, the word-of-mouth reinforcing loops are highly important for generating interest in the marketplace.

It became obvious in the course of the research that strong brand awareness and most importantly the presence of underlying demand for the firm's offering is a necessary condition for the establishment of relationships with intermediated channels. Simply put, if potential customers in the marketplace are not asking for a given vendor's offering by name the value proposition for intermediaries is limited, often in spite of the offering's technical superiority or better price. In one of the interviews, a seasoned channel sales manager remarked, "Remember, no one is going to be religious about your products other than you!" This is a point I heard repeated over and over again throughout my interviews with practicing channel managers: that the intermediaries' primary role in reselling product is the fulfillment of demand created through other means in the delivery of solutions to their customers. Their ability and willingness to "sell uphill" and create demand or overcome objection by their customers is often limited.

This is a point often missed by companies transitioning to multi-channel operations, that there is a significant burden retained by the manufacturer in continuing to maintain and build brand awareness and generate demand for its offerings. The sales and marketing efforts of the company have to be shifted toward this mode of operation: generating demand and assisting the channel either directly with support in pursuing some opportunities and indirectly in assuring that the intermediaries are well versed in the knowledge and capabilities required for closing business resulting from demand generation activities. As the technology matures, and the latter stages of the technology adoption process described earlier comes into play, the more successful manufacturers assist their intermediaries in offering new and more comprehensive services to increase the value add. These activities require superb execution in many organizations within the company, but in the case of the sales organization transitioning from direct to multi-channel the need for execution is imperative. Typically the majority of the sales organization is redeployed in order to provide direct support of the demand generation and intermediary relationship management activities.

Financial and Revenue Reporting

In the course of the research on the data communications equipment segment for the thesis, several structural considerations that impact the relationship aspect of intermediated channels management were uncovered. One of these is potentially

impactful and important to highlight. Cabletron Systems and Cisco Systems implemented two very different approaches to the recognition of revenues from sales to the channel as they began to employ intermediated channels, commonly referred to as the “sales-in” and “sales-out” models.

Oversimplifying somewhat, in the sales-in model the manufacturer reports as revenue what it is paid by the channel for goods and services at the time of delivery “in” to the channel for eventual resale to customers. That is, inventories of the manufacturer’s offerings purchased by distributors and direct VARs, and potentially held in stock for a period of time prior to eventual sale to downstream customers was booked as revenue when shipped to the distributor or direct VARs. The revenue numbers were eventually reconciled to reflect what was sold to end users, and what was eventually returned to the manufacturer.

The sales-out model effectively holds the inventory of the manufacturer maintained by channel partners on the books of the manufacturer until they are subsequently sold to end customers. In essence, the inventories held temporarily by the channel are not booked as revenues by the manufacturers until they are sold to end users.

The sales-in model held the potential for complicated accounting issues around future returns of product by the channel (should they remain unsold for an extended period, or become obsolete for example), as well as the potential for abuse commonly referred to as “channel stuffing.” Channel stuffing referred to the purported practice of some publicly held data communications manufacturers shipping more inventory into the channel than was needed, typically at the end of a revenue reporting period (e.g., quarter end) knowing that the inventory would be returned after results had been reported. This practice obviously had many potentially negative impacts on the relationships with its channel partners but one stands out as important in this current discussion.

Another conclusion drawn through the research is that the sales-in model also had a potentially more severe negative impact on the manufacturer in regards to the relationship with its channel partners. In the sales-in model, inventory in the channel was effectively viewed by the sales force as being “sold” as it was reported precisely that way. As such it was easy for the sales force with its laser-like focus on the quarterly total revenue number to not be as committed to its efforts to assist the partners with clearing

the inventory in the channel. That inventory in their minds was “sold.” Instead, the account executives could maintain their focus on efforts to support the existing customers that remained direct, and not work actively with the channel in order to assist them in generating demand and selling the inventory in the channel. Effectively with the sales-in model, the channel appeared to the direct sales force as another customer rather than the extension of the sales force it was intended to be by the designers of the channel strategy. The sales force did not necessarily feel ownership for the task of moving the inventory held in the channel.

Although sales-out was more difficult to implement such that accurate tracking of inventories and point-of-sale data from many different firms in the channel that might hold inventory collected near real time, the channel appears very differently to firms using sales-out. The connection of the channel with the sales process, of clearing inventory by generating demand within existing accounts and gaining new ones, was much clearer. The sales-out model clearly established the fact that the sale of the inventory in the channel was a joint responsibility for the manufacturer’s sales and channel management personnel *and* channel partners. This key difference resulted in a markedly different tone for the relationship with the manufacturer operating on the sales-out model with its intermediaries. In organizations where the sales-out model was effectively employed day one, the relationship with the channel was significantly more likely to be viewed as a partnership as opposed to simply another way of making quota. Success in a given sales territory during a period was measured by the combined efforts of the manufacturer’s personnel operating in that region and the efforts of the partners to grow the business together and contributed to preventing an us vs. them mentality, potentially even in situations where the intermediary and the direct force may have at one time competed with one another for the same opportunities. Rather than viewing the channel inventory as sold, it can be argued that in this model the success of the sales effort hinged on both direct and channel activities by keeping the customer- and partner-facing activities of the firm focused on driving channel as well as direct business.

In summary there are many competencies that the firm wishing to transition from direct sales to sales through intermediated channels must develop in order to develop a multi-channel management capability. This is by no means an exhaustive list. Many firm-

level competencies such as achieving excellent quality in their offerings and the maintenance of technology leadership are vital in multi-channel sales operations as they are in direct sales only. The focus of this chapter has been primarily on those competencies that are not directly transferable from one mode of operation to the other. Much of the required capability not outlined in this section is provided through the use of technology and the development of automated intermediary support infrastructure. This is the topic of the next chapter. The main point of this chapter so far has been to address how the issues outlined in chapter two are managed by the firm through the development of multi-channel management capability. Although the need for many of these competencies appears on the surface to be rather intuitive, in practice it is by no means a straightforward or short undertaking by most firms to develop and evolve these capabilities in the long term.

The Dynamics of Transition to a Multi-channel Strategy

The chapter thus far has focused on the development of capabilities by different organizations within a firm that is attempting to transition from direct sales to intermediated channels. The efforts by the line organizations across the firm accumulate into a firm-level multi-channel management capability that can result in a valuable complementary asset for the company as described earlier in the chapter. That complementary asset of course is the ability to harness multiple sales channels including intermediated channels to reach the largest total addressable market while providing the full suite of services many potential customers demand. The focus of this section of the paper will now shift to analyzing why this can in practice be very difficult for firms. Firms that can do it very well then often develop a complementary asset that is very difficult for competitors to imitate.

Systems Dynamics provides a very useful tool for analyzing complex systems which clearly most high technology and other manufacturing firms can be categorized as. There are a complex set of dynamics underlying the transition process shift from selling through the direct channel to the use of intermediated channels.

This section of the paper will adapt a framework developed by the systems dynamics faculty at MIT and outlined in an article on creating and sustaining process

improvement to the development of multi-channel capability by a firm.⁹ The following analysis relies heavily in the generalized model developed in that publication. In this analysis the general case causal loop diagram of a process improvement effort is directly applied to the development of multi-channel management capabilities by a firm, those described in detail in this and the subsequent chapter.

Often in companies making the transition there is a lack of fundamental understanding of the underlying dynamics of the transition process. Making what amounts to fundamental changes in the way that sales are generated by the company can be a complex process and the extent of the complexity often underestimated by firms at the outset. Systems Dynamics provides a useful way to illustrate these dynamics through the causal loop diagram and lead to better understanding of the complexity so that it can be better managed.

Figure 3.1 below outlines the basic dynamics underlying any process improvement program as documented in the cited article. The basic model has been adapted to describe the development of multi-channel management capabilities by a given firm adding intermediated channels to an existing direct sales capability. This is the typical hybrid model described in the Introduction that is often adopted by firms that developed a direct sales capability and later begin employing intermediaries. The process models the accumulation of the capabilities described in this chapter which the organization will need in transitioning from direct sales as the primary channel to a multi-channel model including intermediaries.

⁹ Repenning, N.P. and Sterman, J.D. (2001, Summer). Nobody ever gets credit for fixing problems that never happened: Creating and sustaining process improvement. *California Management Review*, 43(4), 64-88.

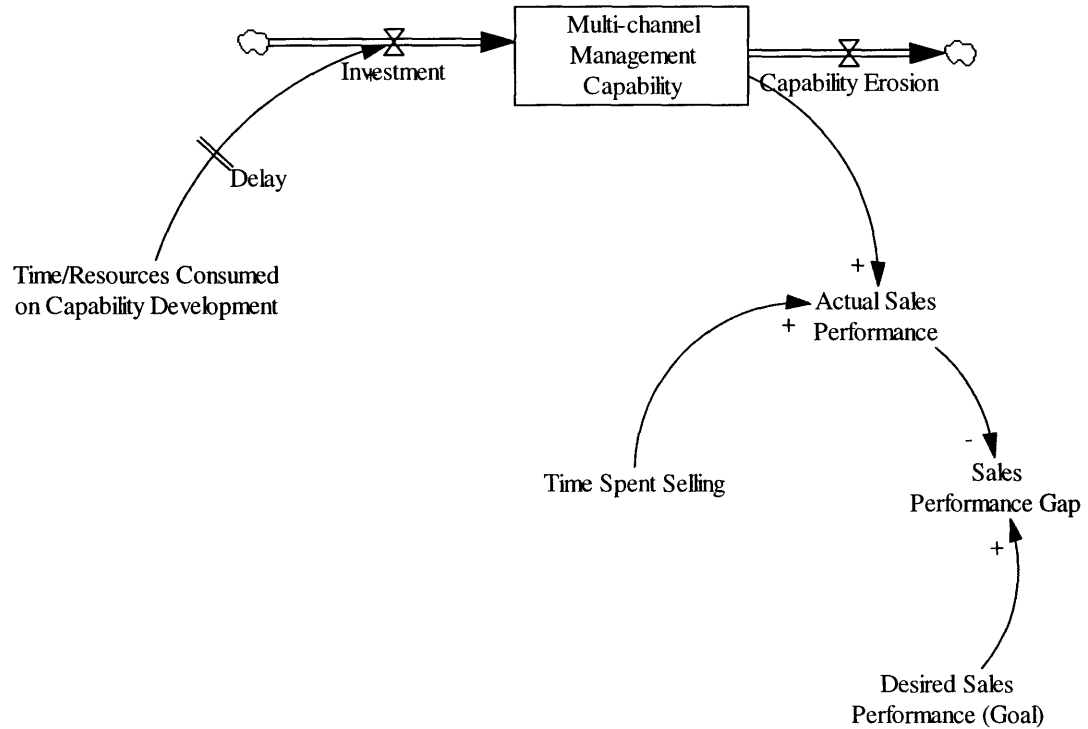


Figure 3.1: Underlying Dynamics of Developing Multi-channel Management Capabilities

Output performance of the system is captured by the variable, *actual sales performance*, which represents the total sales achieved by the organization by all channels including direct sales and intermediated channels. The diagram illustrates the dependency of total sales on two activities of the firm: *time spent selling* which represents continuing to pursue sales by the direct channel as supported by the existing infrastructure of the firm (business as usual), and *time/resource consumed on capability development*. This latter variable represents the sum total investments across the firm in developing the competencies outlined in this chapter which enable the firm to effectively utilize intermediated channels. These investments include both the application of capital or labor by the organizations across the firm including the direct sales force in order to develop multi-channel management capabilities.

Investments consumed in developing the competencies and capabilities within the firm to support intermediated channels have the potential to achieve results that are more long lasting as opposed to increased efforts in selling through the direct channel. If it is in

fact the case that intermediaries can scale up the sales effort and provide the value-added services required to reach a broader market this should be the case. The ability of a firm to manage multiple channels successfully has been illustrated to be a potential source of competitive advantage in the thesis. As such these activities and resulting development of a multi-channel management capability by the firm is in fact a process improvement effort in the traditional sense. Increased effort on the direct channel, business as usual, can undoubtedly improve sales performance in the short run. Relationships with the installed-base, not to mention the familiarity the direct sales force has with effectively positioning the offerings can be brought to bear to increase short-run sales performance in many cases. However, increasing direct selling effort does not address the goal of adding scale and service capabilities in the medium and long-term. Gaining access to the scalability and solutions capability of the intermediated channel is assumed to be the goal of the effort to move into intermediated channels in the first place.

The persistence of the multi-channel management capability built through the investments of effort and other resources is represented by a stock in the causal loop diagram that accumulates improvements in the organizations capability to support multi-channel operations as described earlier in the chapter. An increase in the time and resources consumed on capability development increases the flow of investment which results in an increase in the stock of multi-channel management capability.

Efforts to build these capabilities and competencies do not yield results immediately. This is represented by a delay between the consumption of time and other resources and its increasing the flow of investment which accumulates in multi-channel management capability. In addition, multi-channel management capabilities do not have an infinite shelf life. Because the competencies and capabilities evolve over time, some amount of constant investment is required to maintain and evolve these capabilities and prevent them from becoming outmoded. Accordingly there is an outflow from the multi-channel management capability stock indicating that firms must continue to invest over time or risk erosion of the capability.

Lastly figure 3.1 models the goal for the process, desired sales performance which can be thought as the goal for total sales performance from all channels utilized by the firm at a given point in time. Few operating goals of companies are likely to experience

more pressure for continuous improvement than the generation of revenues and profits. For the public company in growth mode, sales and earnings expectations are constantly moving upward. The addition of intermediated channels to the sales mix is often undertaken during the growth stage for many high technology companies. There is often a great deal of focus both internally and externally on the firm's ability to achieve its sales and revenue goals while achieving consistent growth. In the model this dynamic is captured by the variable *sales performance gap*, which as its name suggests, captures any delta between the sales goal and actual sales performance. When a gap between actual and expected sales emerges, it is highly problematic for companies, those that have invested capital from outside sources including the public markets specifically. These gaps get immediate executive management attention and scrutiny and calls for immediate action to be taken.

As was alluded to above, often the expansion of the sales effort to include intermediated channels is accompanied by high expectations for growth of the top line by internal and external stakeholders. The expansion of the sales effort in terms of feet on the street and the availability of more value-added services to complement the offerings results in the general expectation that the firm will see growth of its sales beyond what could be achieved by the direct sales channel alone. Like the implementation of many process improvement efforts, the expectation is that the effort to expand top line growth through intermediated channels should yield measurable results relatively instantaneous. This stems primarily from the belief that more feet on the street are always better than fewer. Therefore, if gaps do occur it raises significant concern and executive management attention to determine what can and should be done to close the gap.

There are two basic options captured in the causal loop diagram that provide levers that management can use to try and close the gap. The first option, which is extremely tempting considering the acuteness of revenue shortfalls, is to fall back to a reliance on the channel that got the company where it is in the first place: the direct channel. For the purposes of this analysis we will refer to this as the "sell harder" directive. Figure 3.2 below adds this to the causal loop diagram in the form of a balancing feedback loop, labeled B1 in the diagram.

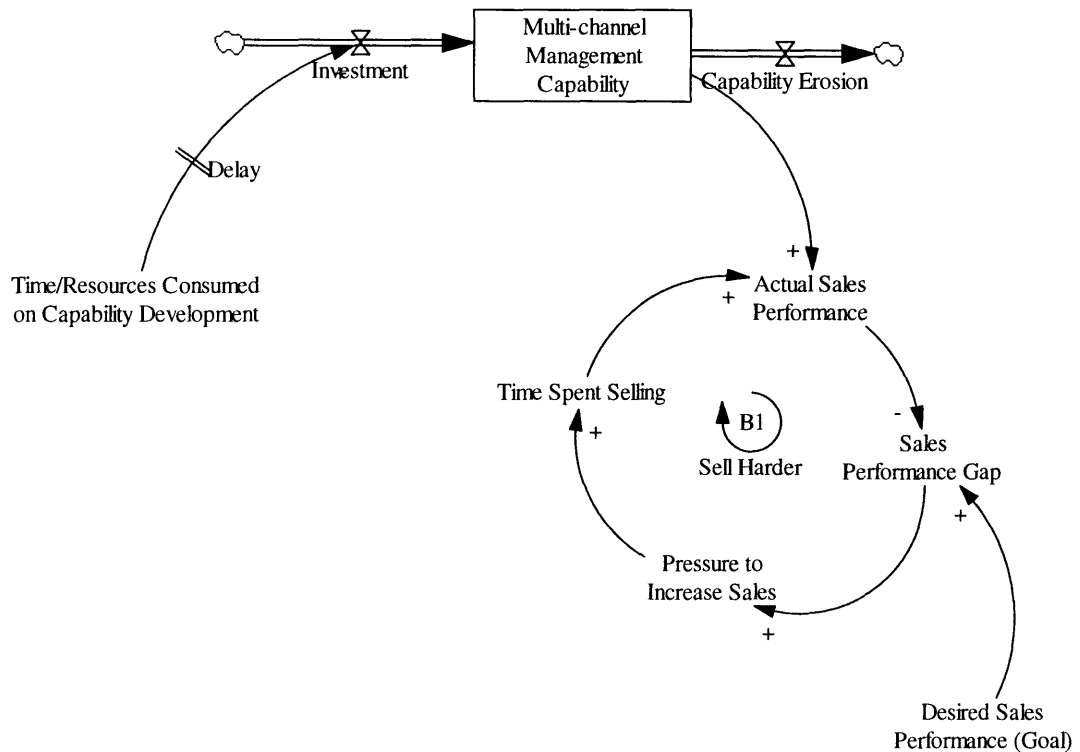


Figure 3.2: The Sell Harder Balancing Feedback Loop

Balancing feedback loops by definition constantly work to balance desired and actual performance. In this case, pressure to increase sales and eliminate the gap results in additional time spent selling via the direct sales channel. The process behind the loop works as follows: upon the appearance of a gap between actual and goal sales performance, pressure mounts on the internal organization with the most control on near term performance, typically the remaining sales force. Because of the confidence the executive team has in the sales force, and the ability of the organization to respond to such pressure from past experience, they will tend to increase direct sales efforts and work to win new business, often independently of their new intermediated channel partners. This is after all the core competency of the sales force, the ability to find opportunities and close business.

The other option of course is to redouble the efforts to get the intermediated channels more productive, to increase the amounts of time and resources across the

However, the delay involved in this loop once again comes into play. Increasing resources and investment to build these capabilities does not result in near instantaneous improvements as can the use of sell harder loop can provide, at least in the very near term. Understanding that if the gap is significantly large, and the company has reported results to its investors, it takes serious commitment by executive management and the board to commit additional resources to these efforts. It is often the case the expectation for top line growth by firms moving to multi-channel sales is also accompanied by the expectation for decreases in operating expenses. It follows that as in any outsourcing decision, the fact that significant amounts of the sales operation is effectively being outsourced to the intermediaries, the expectation is often that the company will be reducing its cost of sales, not increasing it in order to support intermediaries. These factors combined with the temptation to invoke the sell harder loop which promises near term results often results in this lever not being utilized, particularly for the firm that may be in difficulty.

What is more, one of the most often overlooked linkages in these types of systems that are illuminated by the systems dynamics methodology is that between the selling harder and selling smarter loops. As outlined in the chapter, among the resources of the firm that are crucial to the transition from direct to multiple channels including intermediated channels is the direct sales force. Although the company may continue to use the direct channel for some customers, the majority of the direct sales force transitions to direct support of intermediaries. The sales force continues to generate demand for the manufacturer's offering in the field, working closely with intermediaries to pursue opportunities which eventually the intermediary will fulfill. The repurposed members of the sales force play an incredibly important role in the transition in getting the intermediaries up the learning curves necessary to successfully sell and support the offerings of the manufacturer. Again, the number of resources in this capacity is fixed and is sometimes smaller in size than the sales force prior to the decision to move to a multi-channel strategy. If the sales performance gap rises and the sell harder loop is invoked by executive management, the sales force has no choice but to reduce the time and effort spent on its transition activities. As they strive to close the gap they will undoubtedly work harder only to a point, focusing those increased efforts on closing

business which directly addresses the gap and reduces pressure emanating from the executive ranks. Figure 3.4 below adds this linkage to the causal loop diagram.

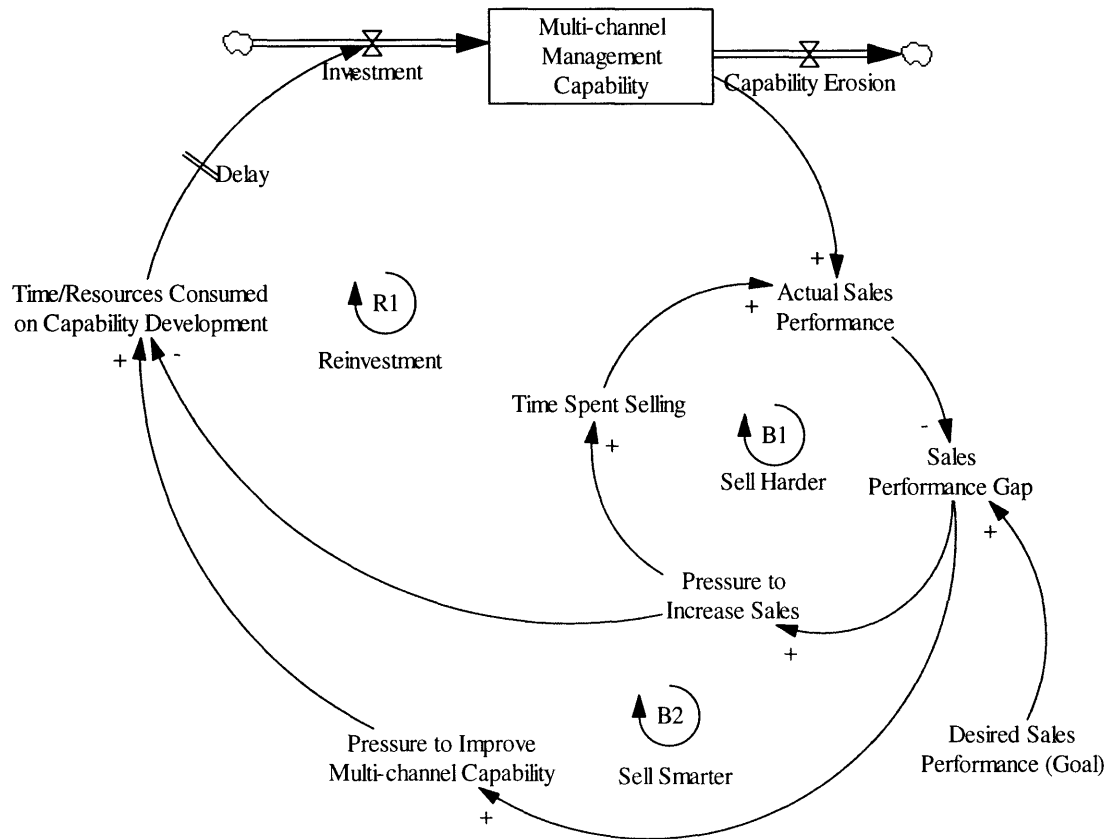


Figure 3.4: The Reinvestment Reinforcing Loop

The linkage added results in a new loop being added to the causal loop diagram, the reinforcing loop labeled R1. This loop is called the “reinvestment loop” in the Repenning and Sterman article cited earlier.¹⁰ The reinvestment loop is a positive feedback loop which reinforces that behavior that currently dominates. Accordingly this loop will create the following process: for organizations that chose the sell smarter loop, potentially staying the course and making investments on the knowledge that after the delay, their multi-channel capability will enable them to be more effective in the market and sales performance will increase dramatically. As the gap between actual and goal sales performance diminishes, the firm will have more resources to devote to further

¹⁰ Repenning & Sterman, page 70.

improvement in capability, maintaining and evolving it over time to prevent erosion. By using the sell smarter lever, the firm can create a virtuous cycle of continuous improvement of its multi-channel management capability.

For firms that resort to the sell harder loop, the reinforcing loop acts similarly but in a different direction, with a very different result. As the sales force dedicates more time and effort to selling and shirks efforts to get intermediaries up the ramp and as the other organizations similarly continue to focus on “business as usual,” the multi-channel management capability of the firm does not develop, or erodes over time. Intermediaries observe manufacturers initiating an intermediated channel strategy carefully, focusing on actions more than words. If at the first sight of sales goal shortfalls, the firm’s sales force abandons efforts to work with the channel in favor of expediting sales, intermediaries become suspicious of the firm’s commitment to making the transition. This can result in a loss of trust that further exacerbates the erosion of capability. Some intermediaries may abandon the manufacturer in favor of a competitor which may significantly widen the gap increasing more pressure to sell harder. In this case the reinvestment loop creates a vicious cycle effectively stifling the ability of the firm to make the transition to multiple sales channels.

In the analysis presented in the Repenning and Sterman article, the authors indicate that through their research they have concluded that is quite often the case that in improvement programs in general, the reinvestment loop typically worked in the downward, vicious direction.¹¹ In an attempt to develop an understanding of why that is the case, another link is added to the general model. Figure 3.5 below shows the addition of the final link and the resulting additional balancing loop which the authors designated the shortcuts balancing loop.¹²

¹¹ Repenning and Sterman, page 72.

¹² Ibid.

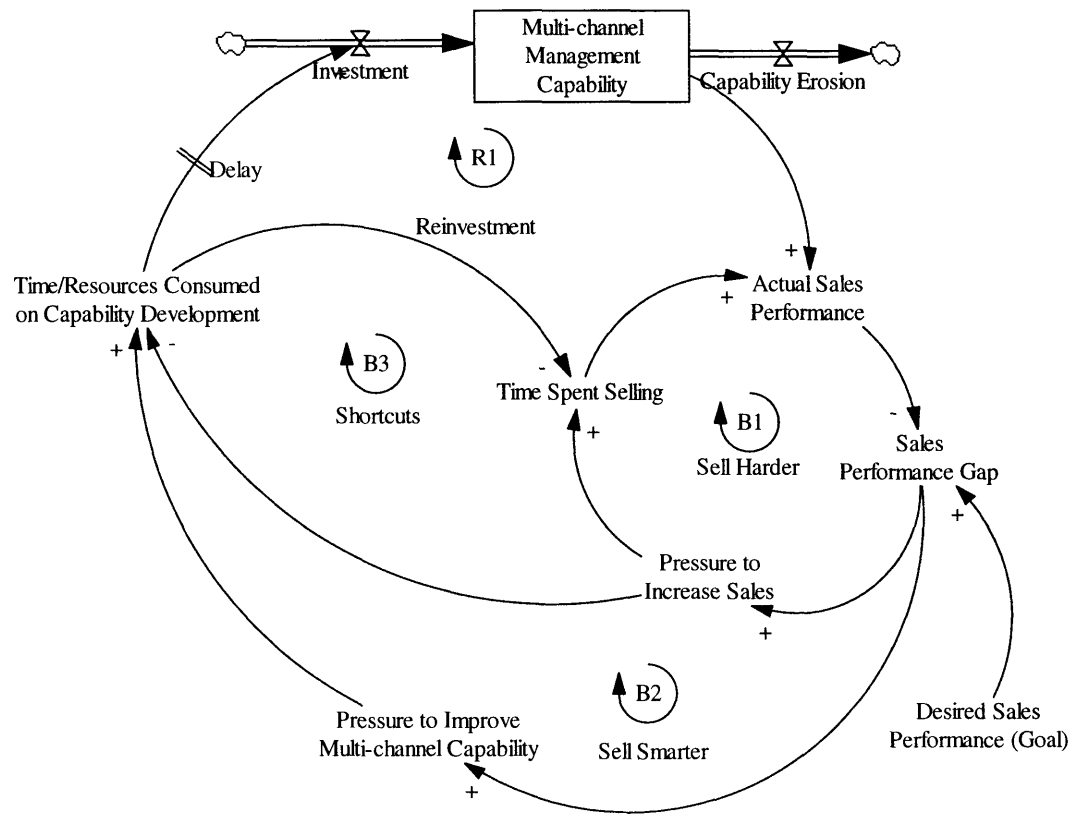


Figure 3.5: The Shortcuts Balancing Loop

The organization cutting time and resources committed to develop multi-channel management capabilities erodes that capability over time, but the erosion in the multi-channel capability is not immediate. Even some activity in the intermediated channels often provides some gains in sales performance. For the operational organizations within the firm such as sales that are no longer actively pursuing efforts to build competencies and capabilities for supporting intermediated channels, they now have additional time available to pursue sales opportunities through the direct channel. This is captured in the causal loop diagram by the link with negative polarity from *time/resources consumed in capability development* and *time spent selling*. This creates the shortcut loop B3 that models the following process: as pressure to increase sales is continually increased, sales people and other individuals involved in the old sales process and transitioning to the new cut back their efforts to develop the new capabilities. This in turn frees more resources for selling through the direct channel which again in the near term closes the gap in sales

performance, hence the third balancing loop added to the causal loop diagram. Because of the delays in the system described earlier, the multi-channel management capability stock does not erode instantaneously. The sales performance improves with the increased effort on the single direct channel at the expense of making the transition to multiple channels. It is only later that the impact of not making the efforts and investments is eventually felt by the organization when it becomes evident that the capabilities to support intermediated channels are still not developed. The shortcuts loop is effective in closing the sales performance gap only because of the lag in the erosion of the multi-channel support capability described above.

Figure 3.6 below is a reference mode showing the relationship of total sales to time, T_0 at the origin is the time of initiation of a multi-channel sales strategy through the utilization of intermediaries. The line marked “desired” depicts the typical expectation for sales performance of such a policy decision for a manufacturer. The thinking being that the employment of intermediaries enables the firm to leverage its sales efforts through additional feet on the street, effectively adding the ability to reach and service significantly more customers without additional resources. The line marked “actual” reflects the effects of the dynamics outlined in the discussion of the causal loop diagram when the dominant loop is selling smarter. The reference mode depicts a “worse-before-better” dynamic that reflects the delay in improvement of capability resulting from investments of time and other resources by the organization. As has been described in detail in this section the gains in performance from utilizing intermediaries in a multi-channel strategy is far from immediate, and more importantly requires some amount of investment significantly in advance of those gains. Short term performance may in fact be worse. The firm opting for the sell smarter lever might in fact have to weather a period of declining sales performance in the transition as the field sales force must utilize time and effort that it typically spent selling to support intermediaries and making them productive. Similarly other organizations throughout the firm may be committing effort and making investments to support the multi-channel capability as well. This is of course being managed in the presence of expectations for an increased top line and decreased operating expense by investors and analysts who are typically not patient.

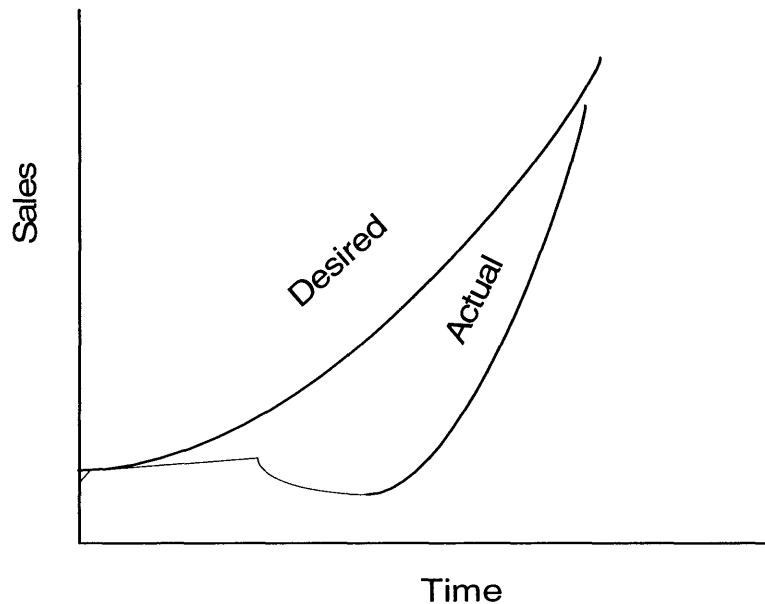


Figure 3.6: Reference Mode of Sales Performance: Selling Smarter

Figure 3.7 below is a reference mode illustrating the other case, selling harder. What is clearly an obvious difference from the prior case is the potential for a “better-before-worse” dynamic with selling harder. In the immediate term, sales performance does increase or at the least stabilizes. However as the reference mode indicates, this performance increase is not sustainable, as the expectation for continued improvements in sales performance continues but because effort and investment required to build multi-channel capability has been shirked within the organization, selling harder impacts the long run ability to achieve expected performance.

In the Repenning and Sterman article, the authors describe the interaction between the balancing shortcuts loop and the reinforcing reinvestment loop creating a phenomenon that they call the *Capability Trap*.¹³ The authors go on to explain that the capability trap phenomenon helps explain why organizations such as manufacturers trying to move to a multi-channel strategy often find themselves stuck in a vicious cycle

¹³ Repenning and Sterman, page 73.

of declining capability.¹⁴ In our example when sales performance of a company receives so much attention, companies in need of an immediate boost in top line performance are very tempted to resort back to direct sales. However, the dynamics described in detail in this section have clearly illustrated how such a move causes the reinvestment loop to work as a vicious cycle.

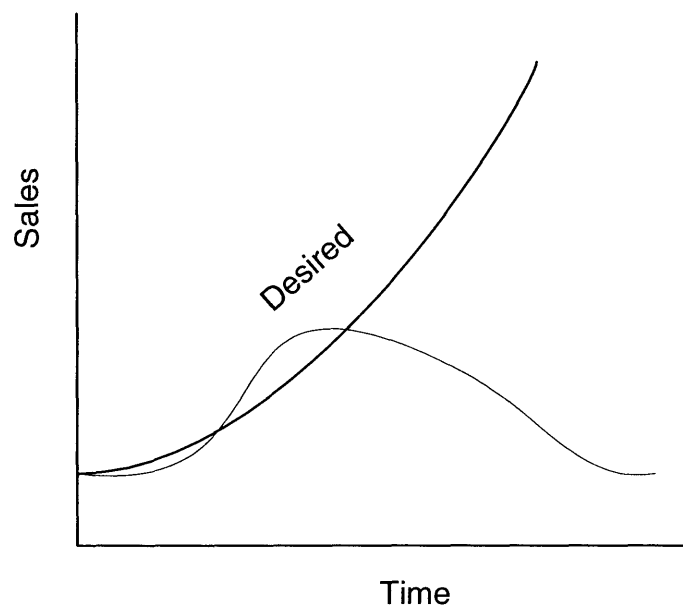


Figure 3.7: Reference Mode of Sales Performance: Selling Harder

Although some of the dynamics may be intuitively obvious they are often overlooked in practice. These dynamics can be troublesome for companies trying to effectively implement a multi-channel strategy and must be well understood by those entrusted with managing the execution against that strategy. For the executive management team, a solid founding in these dynamics is essential when formulating expectations for the move to multiple channels. As tempting as it may be to believe that the investments in effort and other resources to build multi-channel management capability are minimal, and that the ramp-time is short, these dynamics suggest caution.

¹⁴ Repenning and Sterman, page 73.

Management teams have to be careful in managing the expectations of external entities such as analysts and investors. In some scenarios such as a firm being late to move to intermediated channels behind competitors, it had best be prepared to articulate carefully the “worst-before-better” dynamic and how the firm is attempting to minimize it while staying the course to ensure an effective transition. This probably is amongst the most difficult challenges facing the high technology manufacturer making the transition from direct to multi-channel operations.

Chapter Summary

The chapter outlined a number of specific requirements related to relationship management of intermediated channels and the need for organizations to develop capabilities and competencies required for moving from direct to a multiple channel strategy including intermediated channels. This objective of this discussion was to address overcoming many of the strategic issues posed by such a shift outlined in Chapter Two of the thesis. The fact that many of these capabilities and competencies are required in order to enable a firm to make the transition is somewhat intuitively obvious. The management problem then becomes how to develop them in practice. For the firm that has been successful with a direct sales model, making the investments in effort and resource can be difficult without strong leadership. More importantly perhaps is that the organization is effectively making significant changes to its revenue generating function in flight. This is often fraught with difficulties in the real world. In the final section of the chapter a systems dynamics model is presented that enables analysis of the underlying dynamics of the transition process and illustrates why it can be a daunting task for the manager. Through the analysis of this model several important underlying dynamics are uncovered that speak to many of the management challenges associated with the transition phase and through this analysis, several potential courses of action are outlined along with their implications.

Chapter 4: The Role of Technology in the Management of Intermediated Channels

Chapter Introduction

This chapter will provide an exploration of the expanded role technology is now playing in the management of intermediated channels. The use of the Internet for enabling new business-to-business applications has enabled a previously unattainable level of virtual integration between a firm and its partners. In the case of intermediaries where the flow of information between the manufacturer and its channel partners on a just-in-time and highly customized basis is crucial, these applications have and will continue to drive improved productivity for firms that have been able to fully exploit them. From the promulgation of targeted marketing materials, training, to simple order and account management there are potentially many applications of Internet-based tools that can improve effectiveness and productivity while decreasing the cost of sales through intermediaries. In this chapter, experience of different companies and their respective use of technology for this purpose will be examined to explore this assertion.

What started as partner-specific web sites or portals and EDI links between vendors and their channel partners has expanded significantly today. The enterprise software market has added yet a new application area complete with its own acronym, “PRM” or Partner Relationship Management. Firms such as ChannelWave, Comergent and many others offer purpose-built PRM packages while others such as SAP and Siebel have leveraged their order processing and accounting expertise to offer PRM modules to their enterprise applications. Consulting firms specializing in PRM have emerged, and have naturally become intermediaries for these software firms. Clearly technology has a role in modern intermediated channels management and the purpose of this chapter of the thesis is to explore this topic in depth and again to determine based on the experience in the enterprise data networking hardware segment how the employment of technology has or has not been related to success in the channel.

It is important to stress that although a strong support infrastructure can significantly enhance a high technology firm’s ability to effectively manage intermediaries, it is by no means a replacement for the other aspects of intermediated

channels management such as those discussed in detail in the last chapter. Like many other automation tools, partner relationship management software and sophisticated online tools cannot compensate for a weak channel-management strategy and poor execution of that strategy by the firm. However, the objective of this chapter is to outline what tools are available and illustrate how they may be used to enhance execution of some of the more challenging aspects of channel management such as vendor-partner cross communication and information flow. As was outlined in detail in the last chapter, managing the relationship with intermediaries is difficult and challenging for both parties. Utilizing technology has enabled manufacturers to gain several significant advantages including managing more intermediaries with fewer people, increasing end customer satisfaction and most importantly building stickiness with the best intermediaries.

Defining Partner Relationship Management

In recent years there has been a great deal of interest and activity in the Customer Relationship Management space from a business strategy and process standpoint and the emergence of enterprise CRM software companies such as Siebel Systems and others. The emergence of these solutions is resultant in part from the renewed emphasis on customer-centric business strategies, and the need for automation to support these strategies. CRM solutions however are primarily concerned with providing a company with tools to support *direct* relationships with its customers, and not the more complex case of supporting indirect relationships with intermediaries and their downstream customers.

In essence then partner relationship management or PRM systems are software systems purpose-built for the management of indirect channels including intermediaries. At the top level, these systems are implemented by companies utilizing multi-channel strategies for streamlining the recruitment, indoctrination, management of their indirect channels for maximum return. Effective intermediated channel support systems are designed to address many of the challenges of managing intermediated channel partners by providing the manufacturer managing intermediated channels with systems solutions for collaborating with intermediaries and providing them with the services and support they need to drive business for the manufacturer. A more effective intermediated channel implies that the support of the manufacturers offering for the end-customer should be

enhanced as well—this is one avenue that the manufacturer does have available to it to ensure the quality of the customer experience when selling through intermediaries. The quality of the support infrastructure can also drive loyalty as well as productivity among the intermediary community and certainly last but not least, can be an effective mechanism for a manufacturer to lock its competitors out of the most productive intermediaries. It is one very effective mechanism to be used to make use of the intermediated channel an inimitable complementary asset of a firm. Figure 4.1 below is a functional block diagram that illustrates how partner relationship systems integrate with other common enterprise software.

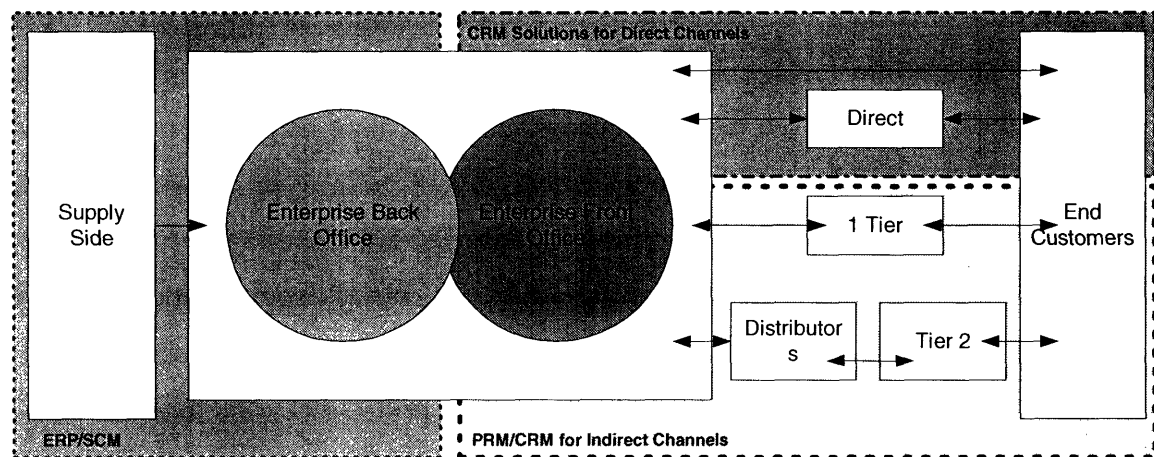


Figure 4.1: Enterprise PRM Functional Block Diagram¹⁵

It is extremely important to keep in mind that the relationship between intermediated channels and manufacturers described in the previous chapter is a voluntary relationship for both the manufacturer and the intermediaries. Although there is some level of desirability for intermediaries to partner with a manufacturer that has achieved a high level of brand awareness and demand for its offering within the markets the intermediary targets it is important to recall that the intermediaries margins on the product portion of each opportunity for the intermediary is somewhat limited. For example, in the data communications equipment space there may only be six to eight

¹⁵ Figure adapted from a ChannelWave whitepaper, *What is Partner Relationship Management (PRM) and Why is the ROI so High?* ChannelWave, Inc. 2002.

points of margin available to the intermediary on hardware such as LAN switches. That is the markup that the intermediary can add to the selling price to the customer in competitive bids is only six to eight percent more than the cost the intermediary can acquire the equipment for through distribution. Beyond having a good relationship with the manufacturer, the discerning intermediary is intensely concerned about the level of effort required to position, sell, deliver and support the manufacturer's offering in the solution delivered to their customers relative to the margin they will earn on that part of the opportunity. Primary currency in these relationships are sales and leads and beyond the relationship aspects outlined in the last chapter, the overall ease of doing business with a manufacturer is a very desirable attribute for the sophisticated intermediary partners, those that are often most capable of truly adding value to an offering. One of the primary concerns in the management of channels for manufacturers is the "stickiness" of the relationship with the most capable and desirable intermediaries in the target markets. Again, although there are agreements that govern these relationships they are by their very nature at-will for both parties. There is a natural agency problem for the manufacturer inherent in these relationships. Effectively some portion of the revenue generation engine for the company is no longer under the tight management and control of the firm. There are naturally a number of carrots and sticks that manufacturers rely on to attract and retain the intermediaries that can drive business for the manufacturer.

Competition for the best channel intermediaries is intense between manufacturers. Clearly brand awareness and demand in the market are very important differentiators of manufacturers considered by intermediaries when selecting which partnerships they will consider and undertake. Except in the cases of total domination (as measured by market share) of a segment by a single manufacturer which can override the ease-of-doing-business concerns, a rich intermediary support infrastructure is necessary for recruiting and retaining the best intermediary channel partners.

So beyond having strong brand recognition, generating primary demand in the field and generating qualified leads that are willingly handed over to the intermediaries by a supportive field organization, the manufacturer of high technology offerings has to be equipped with a support infrastructure, typically with a high degree of automation that specifically addresses the ease-of-doing-business concerns. For manufacturers that have

achieved good brand recognition and demand for their products in the market, this requirement is often overlooked. If the company's direct sales channel has been successful navigating the company's systems and processes that are required to position and deliver offerings to customers successfully surely all that is needed to support intermediated channels are a few minor modifications to the existing systems and the processes the thinking goes. The solution then when intermediated channels are added to the sales mix is providing the intermediaries with a website or partner portal dedicated to their needs (often just repurposing some previously internal-only materials) and possibly implementing some basic EDI or automated order entry and management capabilities. This approach by the manufacturer overlooks the complexity of the intermediary partner relationship management problem and often results in the lack of traction with intermediaries especially those that can really make a difference in the market place. They simply cannot afford to get fully onboard with a manufacturer that requires more cost and effort to do business with, even if the manufacturer's offering itself is compelling or offers even superior functionality, better margins or opportunities for exclusive access in specific market segments. This is especially the case as technologies mature, and differentiation between offerings from different manufacturers on features and functionality is difficult.

Another very important consideration for the manufacturer to consider making the investment in a capable support infrastructure is countering the shift in market power from the manufacturer to their intermediaries. There is of course the potential for market power to be transferred from the manufacturer to the intermediary resulting from the aggregation of demand, and the account control shifting from the manufacturer to the intermediary. One mechanism available to manufacturers to keep that in check beyond the access to their offerings is through the support tools and infrastructure it makes available to its intermediary partners. That is, by creating a support infrastructure that the intermediary comes to rely upon can be a source of stickiness and have a balancing effect on the transfer of market power. Essentially the intermediated channel becomes somewhat reliant on the tools provided by the manufacturer in retaining as much of the available margin as possible in each opportunity the intermediary positions and sells the manufacturer's offering as part of its own solution. Many times these systems can

provide functionality that the intermediary could not cost effectively replace, or offset the loss of efficiency should it become unavailable. Even in industries such as data communications equipment that has experienced marked decreases in complexity with the convergence toward Ethernet and IP, designing a network infrastructure for a large campus is complex but maybe made less so through the use of sophisticated and mature tools. This can be likened to the use of calculators for long division—even though most of us have were taught to do long division by hand the tendency at this point is to reach for the calculator or spreadsheet when we have to do it. Not having that calculator or spreadsheet makes us uncomfortable and more importantly, slows us down. Once an intermediary develops competency and experience with a manufacturer's tools, those tools become engrained in the intermediary's processes much like the calculator.

The time and resource that the intermediary does not spend on doing business with the manufacturer and including the manufacturers' offerings in the solutions it positions and delivers to its customers is time and energy it can focus on its components of the overall solution. Not only do these components generate more potential margin for the intermediary, they are the intermediaries' primary means of competition with its competitors—potentially other intermediaries that may be positioning the same offerings as part of their solutions. The manufacturer that differentiates itself through the support it provides to its intermediaries is able to use this dependency in ongoing bargaining with its most valued intermediary partners. Solid support infrastructure that enables effective partner relationship management can be both a carrot and a stick used to manage the relationship with intermediaries.

Through the research completed for this paper on the data communications equipment market it became clear that intermediaries can in fact become dependent on the tools provided by a manufacturer. For example if the tools provided by a manufacturer enable intermediaries to shorten the time required to build a configuration and bill of materials quickly and accurately so that the time required to respond to an RFQ is shortened, the intermediaries desire to maintain the relationship with its manufacturer partners for the long term—even in the presence issues with the manufacturer. As mentioned above, time and effort *not* spent on working with manufacturers is time that can be spent on differentiation, as well as to competing for

more business. There is typically an investment made by intermediaries as they learn to work with a new manufacturer and hence a switching cost associated with support infrastructure for the intermediary that becomes very tangible when considering moving from one manufacturer to a different competitor for a particular part of their solution that extends far beyond the competitive differentiation. There are indirect network externalities that are created by developing competencies within an intermediary's firm in terms of accumulated training and experience of its personnel in supporting the offerings of the manufacturers it chooses to partner with. This observation suggests that not only is there an advantage of developing superior support infrastructure for intermediary partners, it also suggests that there is a first mover advantage for the manufacturer that complements its channel program with solid infrastructure early as the channel is developing. This can be potentially a source of lock-in of the best intermediaries by the manufacturer; it is preferable to lock-in those intermediaries that offer the most value add and can drive the most business in an identifiable segment, market or vertical effectively locking out competitors.

Components of an Effective Support Infrastructure

Much of the research for this chapter of the thesis consisted of examining the types of support infrastructure provided by several example firms in the data communications equipment marketplace. Although in principle these systems are intended to provide similar functions for the intermediated channel partners, there are vast differences in implementation and effectiveness. At the top level manufacturers look to these systems to provide an ROI via the following means:

1. Enabling the company increase revenues derived through intermediated channel partners through greater effectiveness.
2. Reducing the costs associated with managing intermediated channels.
3. Improving the scalability of the channel management effort—build a larger network of intermediated channel partners without increasing staff and or other infrastructure.

4. Creating “stickiness” with the preferred intermediaries by adding a compelling ease-of-doing-business argument to complement brand awareness and demand in the markets.

Manufacturers have a number of choices for creating this infrastructure. Either they create their own custom software solution, often modifying existing systems or creating new ones purpose-built for intermediated channel support automation. As mentioned earlier in this chapter, there are now a number of specialized enterprise software companies that offer off-the-shelf PRM solutions, as well as offerings from industry leaders in CRM such as Siebel. The claimed value proposition of the off-the-shelf PRM solutions is that they are more cost effective and potentially provide more functionality than custom-built solutions. Clearly there is potentially a sizeable investment required in the design, implementation and operation of these systems regardless of developed internally, purchased or outsourced. The cost of a configuration and quoting application for example that utilizes rule-based systems to verify valid configurations (e.g., verifying a given blade is compatible with a chassis, etc.) as the user develops a bill of materials can be very expensive to develop and maintain. For companies that offer thousands or tens of thousand of SKUs¹⁶ and multiple generations of products with varying levels of backward and forward compatibility can easily reach a cost of several millions of dollars. Unfortunately, these tools which are invaluable for many high technology offerings are often not well suited to customization of off-the-shelf e-commerce and PRM offerings. Such an outlay is often difficult to justify as a multiple-channel strategy is in the early stages of execution as the sales through intermediaries are typically low. However for the reasons outlined earlier in the discussion, it is important for a company seriously considering including intermediated channels in its go-to-market strategy to make the investment in these tools as early as practical. Clearly there are advantages for the firm to begin going down this path well before moving beyond direct sales. These tools are equally as useful to a direct sales force as they are to an intermediary, however many firms wait to make the investment until they are faced with

¹⁶ A relatively recent Cisco pricelist contained nearly 65,000 individually priced hardware, software and service parts!

the challenges outlined in this chapter as they look to third parties to sell and support their offerings. As is often the case with the development of inimitable complementary assets, the firm often has to make significant investments as well as moving quickly.

Regardless of whether they are bought or built, increasingly these tools are made available to intermediaries through web-based applications and interfaces, and are designed to address the functionalities outlined briefly below:

- **Bi-directional communication between the manufacturer and its intermediary partners.** Often this is one of the most difficult challenges in managing a network of intermediaries in a scalable fashion as the network grows larger and becomes global in reach. The manufacturer must communicate product and promotion information, sales collateral and other information necessary to enable its intermediaries to sell and service its offerings effectively, including getting new intermediaries up to speed as they are recruited. Similarly, the intermediaries need an effective way to communicate feedback from the field and customer base utilized for a variety of reasons from product development to services management to the manufacturer. A good system goes beyond reliance on “pull” technologies such as partner-specific websites that rely on the intermediary to pull the information they require, to utilize “push” technologies that deliver customized and relevant communications to individual intermediaries.
- **Lead management.** Lead management is a daunting task for most organizations including those that utilize only the direct channel. It is even more complex for the multi-channel sales operation. Effective lead management requires strong process as well as a unified system that enables the management of leads through the various phases from initial identification to closing regardless of channel. This often requires close integration with the existing CRM system used for managing leads for the direct channel such that leads can be effectively moved from one channel to another. Automation can be very effective in ensuring that leads don't

fall through the cracks, that they are pursued until the customer is closed or until it is determined to be an opportunity no longer worth pursuing.

- **Forecasting and demand planning.** This goes hand-in-hand with the previous function outlined immediately above and pertains to ensuring that the manufacturer has visibility into the sales pipeline to ensure the right offerings are available on demand. Demand planning and forecasting are incredibly important functions in the modern manufacturing organization. Supply chain virtualization and the desire by the manufacturer to maintain very low inventories is significantly more complex when a significant portion of the sales of a company are made by entities not under the direct control of the firm as is the case with the use of intermediated channels. System functionality that assists the SCM function with forecasting demand coming from direct partners and distributors in two tier models is an essential functionality provided by PRM systems.
- **Configuration and quoting.** This is of particular significance to high technology manufacturers. It is not unusual for manufacturers of high technology offerings to have thousands or tens-of-thousands of SKUs in its product line which in some cases are standalone, or are combined in various different configurations to create a system. It is often a daunting task to start from a paper or online catalog of part descriptions and numbers and a general knowledge of the required system-level functionality and develop a bill of materials that is valid (i.e., the individual parts all interoperate) and meets the desired functionality. This is the function of online configuration tools or “builders” that walk the user through the process of configuring a valid system configuration, a bill of materials, and last but not least a quotation for that bill of materials that utilizes the pricing rules applicable to the user (typically specified contractually based on the user’s organization) and taking into consideration any special pricing considerations in effect for the order such as limited time promotions, etc. Often intermediaries are required to

complete certain requirements such as having a number of technical personnel with certifications, or reach a predetermined level of sales of the manufacturer's offerings to get access to the higher end products. A pricing tier structure is defined that specify for each partner level the discount level for each product or product class. These tools have several benefits that are obvious especially for very complex offerings. One that might not be seen immediately is the potential to significantly increase the accuracy of orders coming from intermediaries. As will be discussed later in the chapter, these systems in practice often provide significant increases in order accuracy over orders placed by phone or FAX that ultimately directly impact end-customer satisfaction. For a customer that schedules a complex new installation or upgrade project requiring careful planning and execution in accordance with a tight timeline, there is nothing worse than having the equipment show up on time, but then have the intermediary firm performing the work determine that the equipment received cannot function in the specified configuration. The intermediary looks bad and undoubtedly blames the manufacturer for not making the configuration rules crystal clear. This component of the system is not only a timesaver for the intermediary reduces the amount of person power required from the manufacturer to assist its intermediaries in configuration and quoting, it is another mechanism by which the manufacturer can directly improve the customer experience from behind the scenes. In the research completed for the thesis, this is one of the most consistently cited components of critical support infrastructure.

- **Order entry, order management, and intermediary self-service.** Every consumer that has experienced Internet commerce is familiar with the powerful self-service mechanisms that have become common place. Similarly, intermediaries expect that manufacturers include in their support infrastructures much of the process beyond the creation of the BOM via the configuration tool: the creation of an order, placing the order, making payment, determining scheduled delivery date(s) and tracking the

order from placement to delivery can be done electronically via the Internet, at any time of day or night. It is not unusual for an intermediary in the large enterprise space to be simultaneously managing many projects for their customer base. They are in almost constant need of real-time, accurate information regarding product availability, shipping status, etc. that is used for management of their own schedules as well as management of customer expectations. Automating these functions to the maximum extent possible through integration with the back office ERP and SCM systems enables manufacturers to provide an end-to-end view of the entire supply chain providing the visibility that intermediaries need from anyplace with an Internet connection, at any time 7x24x365.

- **Training.** Another important and useful function of these systems is the delivery of training either through live and or recorded “webinars” and other alternative e-learning medium. This can be a highly effective mechanism for the promulgation of sales training as the corporate-based experts on the manufacturer’s offering can deliver the training once, from their primary location without travel and reach a very large audience to deliver the training when and where the sales forces across the network of intermediaries is able to get time for training.
- **Management of special programs.** Very often manufacturers use various incentives to promote new products or to move ageing inventories through their channels including intermediaries. These may include rebates, future discounts on selected SKUs after a threshold volume of sales is achieved by the intermediary, the award of marketing development funds for the firm and or spiffs for the intermediary’s sales team. Incentives programs of this type often require registration of qualifying transactions including information about the individual wins. Processing these via the web, at the convenience of the people involved in the activities results in better participation and the collection of more detailed data on the opportunities which may be analyzed by the manufacturer and used in the design of future incentive and promotion programs.

This is by no means an exhaustive list of potential applications provided by partner relationship management systems that are in place today. A common thread throughout all these functionalities is their contribution to the scalability of the partner management effort. When these systems are designed and implemented properly, they enable a manufacturer to increase the size and scope of their intermediary base without adding additional personnel or fixed assets. As such, the development of these systems is a critical part of the development of a multi-channel management capability described in the previous chapter. This is essential in really achieving the “force multiplier” effect that is the driving force behind multi-channel strategies for manufacturers. However I have found in my own experience and research for this paper that these systems often suffer from underinvestment, as well as lack of prioritization and executive level involvement and commitment. This can be a factor in performance from intermediated channels significantly underperforming expectations, especially when other manufacturers have set the bar high with their systems. As we will see in the example provided at the end of this chapter, investment in the infrastructure to support these systems can be very large, and their implementation often takes years. Firms hoping to attract and retain the best intermediaries have to be prepared to invest and start building-out these systems early in their growth phases.

One final note, when looking at this list of capabilities the reader may question why many of these functions could or should not be exposed for use by end customers directly. In fact, many manufacturers including those in the data communications equipment market do provide some of these functions for self-service by end customers, effectively bypassing the intermediaries for some purchases. Recall that the value proposition for the intermediaries at this stage of maturity of this market is primarily in the bundling of their own value-add services with the product and service offerings from the manufacturers they partner with. “Handling the paper” as it is referred to: effectively handling the fulfillment of an order for product and services without any value add is not the most profitable activity an intermediary can utilize its time and resources for. An example of where this comes into play is a customer adding spare equipment for replacement of failures. If the manufacturer provides the customer with the option to

simply order and fulfills these orders directly (likely through a distribution partner ultimately), this is not necessarily viewed as conflicting by higher-end intermediaries.

An Example Intermediary Support Infrastructure from the Research

Cisco Systems employment of information technology, including its own products and the widespread use of the Internet and leading-edge applications has received accolades from many constituencies. There are at least five Harvard Business School cases written on Cisco's strategic use of IT, including the development of its very sophisticated web-based partner support infrastructure. Beginning in 1994, the same year it began the extension of its product line beyond routers, Cisco Systems undertook a major redesign of its back-office legacy systems with the overarching principle of utilizing Internet Protocol and the web as the primary interface. In doing so, Cisco effectively "ate its own dog food" but in the process became a case-study for its customers and partners on how these technologies could be used to effectively create competitive advantage. In the case of the utilization of IT for creating virtual linkages with its supply chain partners via linkages with its own ERP and SCM systems, Cisco has assumed a leadership position in the effective and efficient management of a virtual supply chain utilizing the Internet and IP. Cisco manufactures only a small portion of its offerings, relying on a number of strategic component suppliers such as IBM, and manufacturing partners such as Flextronics in several geographies to manufacture its products. By 1997 Cisco began direct fulfillment with several of its manufacturing partners shipping finished goods directly to distribution partners and onto customers without Cisco ever taking physical possession of the products.

Cisco Systems has invested heavily in its IT infrastructure, the core upgrade of its ERP system, web-enablement of its applications an upgrade of its computing infrastructure to a low-cost/high-value architecture came at a 3-year initial investment of about \$115M, including \$15M for the foundational Oracle ERP system which at the time it was approved by the board constituted the single largest capital project approved by the company.¹⁷

¹⁷Nolan, R.L., Porter, K.A. & Darwal, C.L. (2001). Cisco systems architecture: ERP and web-enabled IT, Case Study, Harvard Business School. Cambridge, MA, p. 7.

The return on that investment is hard to measure, although there is some hard data in the literature concerning measurable results that Cisco has achieved with these systems:

1. Cisco's order accuracy rate for orders placed via fax or telephone is one order in four has an error in pricing or configuration. For orders placed via the website utilizing the Cisco Configuration Tool, the error rate drops to one in one hundred.¹⁸
2. By allowing entitled customers and partners to download software and firmware upgrades via the Cisco website, avoids as much as \$25M a month in shipping and administration costs associated with shipping software and documentation via mail.¹⁹

It is also important to note that these results and the return on the rather hefty investment by Cisco did not happen overnight, it was not a matter of flipping a switch or installing several applications. A summary of the major steps beyond the implementation of the ERP and web-enablement begun in 1994 is as follows²⁰:

- 1996: Pricing, configuration and order status viewable on line.
- 1997: Configuring, pricing and ordering online.
- 1998: Cisco's CRM system integrated with their largest direct customer's purchasing systems.
- 1999: Market-specific tools available for customers and intermediaries tailored to service provider, small and medium enterprises, large firms and intermediaries.
- 2000: Integration with selected partners to enable the ordering of related third-party products for ordering multi-vendor solutions.

By 2001, Cisco's network of intermediaries had grown to 36,000 in number and spanned the globe. In a paper written in about this time frame²¹, the then Vice President,

¹⁸ Wiell, P. & Vitale, M. (2001). *Place to space: Migrating to eBusiness models*. Boston: HBS Press. p.227.

¹⁹ Ibid, p. 228

²⁰ Ibid.

²¹ Mitchell, T. (2001). Cisco resellers add value. *Industrial Marketing Management*, 30, 115-118.

Worldwide Channels, wrote about how Cisco was assisting its intermediaries in transitioning from selling standalone network products and basic integration services, that were experiencing declining margins due to commoditization, to selling a broader end-to-end solution to include applications. Cisco was effectively urging its base of resellers to continue move up the value chain by adding more value-add services to their repertoire which dovetailed into Cisco's product strategy that was moving into voice, video, storage and security solutions. The partner support infrastructure has played a central to the effort to help their network intermediaries make this transition. Cisco provided a number of tools to assist their partners with first evaluating their readiness (through a web-based "Value Readiness Tool"), and then makes available resources such as the "Value Compass," another web-based e-learning tool that enable its intermediaries to train their staffs.

Essentially Cisco has continued to evolve its support infrastructure to offer new and more value-added services to its intermediaries. Many of Cisco's direct competitors are still struggling to this day to implement many of the basic e-business intermediary support functions described earlier in this chapter. Having the advanced and feature-rich partner relationship management infrastructure and integration with the back-office ERP and SCM processes and systems that Cisco possess has been and continues to be a source of competitive advantage for Cisco in the enterprise and service provider data communications equipment markets. Like the Cisco-proprietary features it was able to include in the operating firmware of its routers early on, the services it provides for its intermediaries through its support infrastructure such as the Cisco Configuration Tool have resulted in indirect network externalities. The technical and sales staffs of many of the best intermediaries in the field have developed so much experience with these tools as they evolved, staffing and processes have been built based on the efficiencies, accuracy and cost structures the Cisco support infrastructure enables. Therefore, there would be a significant switching costs associated with moving to an alternate supplier. The switching costs combined with Cisco's dominating market share in most segments of the market leaves essentially no choice but to establish and maintain a relationship with Cisco. Cisco has effectively achieved a lock-in of the intermediaries in the enterprise data communications equipment space, locking-out many of its competitors especially at the

high-end of the market where the majority of revenues and only real opportunities exist for taking noticeable market share.

In several of the interviews for the thesis, many of the industry practitioners I spoke with related how much power Cisco has in the channel. Many of the best intermediaries are simply not willing to upset Cisco by establishing relationships with other manufacturers that Cisco may view as a competitor, and risk being cutoff by Cisco. This is often excruciatingly apparent to small, startup firms that may have a very exciting and compelling offering finding they may in fact be denied access to the channels they need to move beyond the innovators. This is an extremely powerful competitive advantage for Cisco. An advantage is arguably sustainable even as the ability to differentiate offerings becomes more difficult as convergence, industry standards, merchant silicon and software continue to drive the equipment towards greater and greater commoditization. Considering the current trends toward outsourcing of non-core functions, and the relatively high complexity of the technologies required to implement and maintain an enterprise network infrastructure in the foreseeable future, it is hard to imagine a disruption that effectively resulted in the obsolescence of the intermediary in this space. Cisco's domination of the intermediary channels for enterprise data communications equipment is due in large part to its sophisticated and feature-rich support infrastructure. The execution of the company strategy through making substantial early investments in a scalable, highly-integrated and universally accessible back-office infrastructure that could eventually provide the foundation for these front-office applications is truly noteworthy. The people directly involved with the project recount the fact that presenting the proposal for the initial ERP implementation that again would be the largest capital project the company had undertaken to date was not a matter of a cost avoidance justification²²—it was more a matter of matching the corporate strategy of focus on the customer and the use of technology to achieve it at a level the competition would be unable to match.

²² Nolan, R.L, Porter, K.A. & Darwal, C.L., page 7.

An Illustration of the Importance of Intermediary Support Infrastructure

In my own professional experience with Cabletron/Enterasys I experienced firsthand the reality of Cisco's lock-in of the channel facilitated in part by the rich support infrastructure they provide. One specific case is illustrative of just how powerful this lock-in can be, and how incredibly difficult it is to overcome at the operational level. In the latter part of the 1990s as Cisco began expanding its offering into the voice over IP space for the enterprise, it found itself suddenly in direct competition with several of the incumbent Private Branch Exchange (PBX) companies including Siemens ICN (Information and Communications Networks). Siemens, unlike its direct competitors Nortel, Lucent and Alcatel that entered the data communications equipment market via acquisition in the 1990s, had taken a more conservative approach to entering the burgeoning data communications market directly deciding instead to remain focused on voice communications and its broad enterprise PBX offerings and gear provided for the telecommunications service providers. Instead of developing or acquiring its own data communications equipment offerings, Siemens partnered with a number of companies including Cisco Systems to offer its large enterprise customer base a data communications solution including integration services which Siemens ICN provided with its large network of regional sales and service offices with notable strengths in the European marketplace especially. Siemens rapidly grew to be among one of Cisco's largest intermediary channel partners achieving annual sales of Cisco equipment and services of several hundred million dollars and in the process, seeded Cisco enterprise data communications equipment into Siemens coveted customer base!

The reader can imagine the concern in Siemens ICN headquarters in Munich that arose when word of Cisco's foray into enterprise IP PBX, first intimated via several acquisitions of small startups in the space, culminating soon after with announcement of Cisco's new AVVID strategy which featured an end-to-end Cisco infrastructure for IP-based voice, video and data for the enterprise! Siemens was developing its own IP-based solutions that enabled its widely installed-based of traditional TDM PBX enterprise customers to take an evolutionary approach to the migration to VoIP, as opposed to the rather revolutionary approach that Cisco was advocating. This put Siemens relationship

with Cisco in an odd place—two companies that were in the previous moment complementors were now almost overnight competitors. By placing Cisco gear in many of their most coveted accounts, Siemens effectively had pushed the Trojan Horse past the threshold and into the inter sanctum of their customers that were hitherto fore locked-into Siemens TDM voice offerings that had yielded handsome margins on parts and ongoing related services over very long periods of times. Unlike many other devices, enterprise PBXs had relatively long depreciation schedule, and once installed were going to stay in place and generate a very attractive annuity stream for the manufacturer (consider that an enterprise desktop digital phone sold for about \$800...) Amongst the largest and most strategic of these customers, Cisco had provided some level of direct customer support enabling the development of relationships between the Cisco representatives and the customer's staff. This made for a very precarious position for Siemens as the reader can imagine—one that would many would say called for an almost immediate and radical change in strategy direction.

Many of Cisco's competitors, Cabletron included saw this as a golden opportunity to replace Cisco at one of its most productive and capable intermediaries with significant market power in several geographies. The catch phrase going around Cabletron at this point was the old adage; the enemy of my enemy is my friend. Siemens needed to be able to provide Ethernet/IP infrastructure to provide the network infrastructure their new VoIP solutions would utilize—the “plumbing” so to speak. The primary requirements of these networks were fairly straightforward: Ethernet LAN switches, routers that provided wire-speed performance and preferably provided some mechanism for Quality of Service. By this juncture, every major vendor of enterprise data communications equipment included in their offerings equipment that arguably could match or exceed the similar Cisco equipment in the key attributes required to construct an Ethernet IP network quite capable of providing simultaneous support of voice, video and data and often utilized a Cisco-like command line for configuration. Arguably Cisco offered a much wider array of equipment with varying capacities, particularly at the very high end. Regardless the Cisco competitors like Cabletron that had remained focused on infrastructure others had very compelling offers to allow Siemens ICN an avenue for extricating themselves from the bind they now found themselves in described immediately above.

Many trips to Munich followed for the teams from Cabletron and other vendors, often with their respective CEOs in tow, for presentations to the Siemens ICN executives and the various groups that managed alliances and partnerships for the entity. After presentations on how the vendor's solution could match or was in fact far better than Cisco's for supporting the Siemens VoIP offerings, hard bargaining sessions followed to discuss terms of a potential relationship, primarily the discount Siemens would get on the equipment it would purchase from the vendor in the event it was chosen as the replacement. Regardless of the impetus for these discussions in the first place, the sheer volume of business that Siemens could bring to the chosen vendor was such that they retained a significant amount of bargaining power. In many cases, the vendors vying for selection as the alternative-to-Cisco offered very lucrative volume-based discounting schemes that would in principle allow Siemens to get significantly more margin on the equipment (despite the overall trend of declining margins on equipment driven by commoditization and intense competition), as well as commitments to provide significant field support to get Siemens field force ramped-up. There were a whole host of bargaining chips that came on and off the table, and as I reflect back on the experience of the negotiations, it was hard to discern which party was more eager at many junctures.

The point of relating this story is more from the experience that occurred once the negotiations were completed. Siemens in fact chose not one but many vendors as alternatives to Cisco and the real work began. Global purchasing agreements were put in place, and efforts began by the vendors to start transitioning Siemens opportunities in the field from Cisco equipment to an alternative in part due to the Siemens ICN executives desire to stop the infiltration of Cisco into its accounts as it began to compete overtly for the voice business. As is traditional in these situations, there is a quid pro quo or "priming of the pump" as it is often called in the industry. The selected vendors offered up qualified leads or even established customers in various regions to the local Siemens ICN office to gain some momentum in the Siemens field operations in keeping with the principle that the currency of these relationships is leads and sales. Often this transitioning of leads or existing accounts came at the expense of relationships with another intermediary that either had been working the lead or account previously, and now sale the vendor introducing a competitor into the account. This can be very tenuous

indeed for a manufacturer that does not have 80-plus percentage of the market, but the stakes were high: any significant portion of the Siemens business held the potential for an immediate up-tick in sales. Damn the torpedoes, full speed ahead!

It was very soon after the stage of beginning the field roll-out that the reality of the lock-in Cisco had attained with intermediaries, Siemens and others, became brutally apparent. Although at the executive level and several layers down the management chain Siemens knew it was in its best interest to stop the advance of its Cisco into its customer base to protect its enterprise voice business that was not universally embraced at the level of the field sales and technical force. Through my experience and the research I completed for the thesis I believe that there were a number of pertinent factors that led to significantly less than expected results for Cabletron and the other contenders in converting a large portion of the Siemens Cisco data communications equipment business.²³ Having worked on these efforts directly, I have concluded that one of the primary factors in why it was difficult to see an immediate conversion of the business despite the drivers discussed was the support infrastructure that Cisco had in place. For the operational people on the ground responsible for the sales and post-sales efforts, the support provided by the Cisco web-based tools was difficult to abandon. When the field staff was faced with putting the new partnership into operation the expectation was that there would be functionally equivalent tools such as the network configuration tool and quote builder, and e-learning facilities. In the absence of these tools, the new vendors were faced with having to compensate for the lack of systems with people which were of course, impossible to scale. Actual sales through this once very lucrative intermediary were far below initial expectations, and accordingly less and less resources were provided to support the effort.

²³ It is important to note that this is a story still unfolding today. With the traction that enterprise VoIP has seen in the past 1-2 years there is a potential for a significant increase in the upgrade of enterprise networks as companies move from traditional TDM PBX to IP PBX—the realization of convergence within the enterprise space. It will be interesting to see which vendor if any benefits significantly from the relationship with Siemens ICN. Although the Siemens Enterprise Networks US page no longer makes mention of the relationship with Cisco, stating instead that its primary infrastructure partners are now Enterasys and Extreme Networks, it would be intensely interesting to know the revenues generated today for each of these players, especially having the knowledge of the dollar amounts of business Siemens once generated for Cisco as one of its key global intermediaries.

I am certainly not arguing that the tools were the only factor involved in the slow ramp of sales through Siemens; clearly there were many causal factors involved as it is a very complex system. First and foremost among them was the fact that the field personnel had made a very nice living selling Cisco equipment and had kept many customers satisfied—they knew the equipment inside out, what it could and more importantly could not do and they positioned solutions accordingly. New offerings and lack of experience could and did result in projects that did not go well initially. Although the margins were increasingly thinner, the field force was knowledgeable and confident about where and how to win competing with other intermediaries. The fact that Cisco had such dominant market share and demand was high, often the level of effort required to win was relatively low compared to having to position a competitive solution. Although Siemens was able to maintain it was expanding beyond Cisco to maintain its vendor agnosticism, that veil was somewhat thin for customers who saw the competitive playing field changing. Field teams had become reliant on standard Cisco configurations and had template proposals that enabled them to participate in more opportunities, and despite the low margin per deal necessitated on primarily competition for this business primarily on price still make quota and get their bonuses. The support that Cisco's channel and direct field sales force provided Siemens previous to the change in competitive posture between the companies was also a major factor—strong relationships in the field continued long beyond the pronouncement from on high to minimize the dependency. Siemens also as a matter of strategy began deemphasizing a lot of the infrastructure business it had done in the past at the height of the Cisco relationship. Much of that business had been low value-add, simply providing the fulfillment function with little opportunity for Siemens-provided services included in the deal. As competition in the space became more intense, and margins began to decrease, Siemens made a conscious decision to not compete for that type of low-value add data communications equipment business focusing its resources on higher value-added, higher margin services farther up the value chain.

In closing, this anecdote helps illustrate several important points that were raised in this chapter. First among them is that intermediary support infrastructure matters on several levels. It can be a very important factor in making the successful use of intermediated channels both scalable and inimitable for the manufacturer of high

technology offerings in markets where standards or other factors make product differentiation difficult. Locking-in the best channels and locking out competitors' access to those channels can be an effective strategy for sustaining competitive advantage over time. More than anything this story reinforces the timing aspect for companies that potentially will need to consider utilization of intermediated channels. Move aggressively to implement the infrastructure required for a multi-channel strategy which today undoubtedly requires a scalable, low-cost/high-value infrastructure that supports best-in-class front- and back-office applications. Such an IT infrastructure is increasingly necessary to "hook the big fish when they are hungry" so to speak, to attract and retain the best intermediaries long enough for the indirect network externalities to become embedded in their organizations. This of course is the precursor to successful lock-in of the intermediated channel and lock-out of competitors that can be one potential source of long-term competitive advantage.

Chapter Summary

This chapter has provided the reader with a detailed overview of how the utilization of technology can be an integral part of addressing many of the challenges of employing intermediated channels. Web-based technologies enable the extension of a firm's own systems to create virtual integration with its partners including intermediaries. The chapter outlines the fact that the development of these systems requires an early commitment to building a foundation of IT systems that can be effectively extended. The example of Cisco Systems presented in the chapter suggests that there is often a significant investment in getting the systems in place that serve as the foundation for an intermediary support infrastructure. The reader is reminded of the systems dynamics analysis presented at the end of the last chapter. The investments required to build a multiple channel management capability within a firm can include a large investment in IT infrastructure.

Chapter 5 – Case Study: Cisco Systems, Inc.

Chapter Introduction

The paper thus far has covered many aspects of the management of intermediated channels pertaining to the enterprise data communications equipment market segment and other similar high technology markets. This chapter and the following chapter will compare and contrast some major differences in the execution of an intermediated channel strategy by two example companies in the enterprise data communications market, Cisco Systems, Inc. and Cabletron Systems, Inc. (now known as Enterasys Networks, Inc.) Particular attention will be paid to the relationship management and partner support infrastructure aspects of their intermediated channel management execution outlined in the two previous chapters. Although these companies had somewhat similar origins and by 1994 were competing head-to-head for dominant market share in several product areas, their respective execution of an intermediated channel strategy varied significantly. Although Cabletron, 3Com and Bay Networks (SynOptics) had significant market share in a segment it helped to create, the equipment used to create enterprise LANs, Cisco aggressively entered that space via acquisitions timed perfectly with the introduction of the highly disruptive LAN switching technology. Cisco used the opportunity afforded it by the disruption to take substantial market share and eventually eclipse not only Cabletron, but 3Com, Bay Networks and several other firms. Cisco's domination of the enterprise data communication equipment segment continues to this day with Cisco taking a leadership position in the next wave in the industry, the migration by enterprises to VoIP.

The highly effective employment of its intermediary channels has been one of the primary driving forces in the success of Cisco Systems. Through this careful evaluation of the two companies, the objective will be to outline some of the specific differences in the companies' management of a multi-channel strategy and the effective employment of intermediaries in an effort to uncover potential root causes of success and failure in the execution of multi-channel strategies. In so doing there may be several important lessons for intermediated channel management that are applicable to high technology markets such as data communications equipment, that were characterized by rapid evolution and

most importantly open public standards. Competing in markets where the differentiation of offerings on uniqueness becomes increasingly more difficult over time as standards drive features and functionality toward homogeneity, and the offerings themselves commoditize at a rapid pace require management focus to uncover alternative means of value capture. Firms in these types of markets must capitalize early and aggressively acquire or build complementary assets that provide opportunities for sustainable competitive advantage. Through this chapter the paper will examine closely how two direct competitors approached the development of one complementary asset, the development of an inimitable effectiveness in the use of intermediated channels, to successfully reach the largest total addressable market, take and retain market share while maintaining superior operating margins.

As has been outlined earlier in the paper, at the time of this writing, Cisco Systems appears to have successfully dominated this market space, leveraging its control of the router and WAN markets into domination of virtually all segments of the enterprise data communications equipment market, effectively displacing the incumbents from their previous leadership of the LAN space. Companies such as Cabletron, 3Com and Bay Networks which arguably had a significant lead in the LAN connectivity space lost significant market share to Cisco, even as the market itself dramatically increased in size. As we will see in this chapter, one of the key tenets of the Cisco strategy to dominate the enterprise data communications segment has been the incredibly effective management of its intermediated channels and superb execution of a complex multi-channel strategy.

Company and Product Origins: Cisco Systems, Inc

The appendices at the end of the thesis outlines the evolution and dynamics of the enterprise data communications equipment market provide a relatively good understanding of Cisco's roots as a single product, technology-focused firm that played a crucial role in the development of the foundational technologies of the IP-based Internet. The reader unfamiliar with the data communications equipment market is referred to the appendices for additional background.

Cisco Systems began life as a company in 1984. The founders, a husband and wife team were members of the computer science department at Stanford University and had been carefully following the evolution of the Internet. They left Stanford to start

Cisco Systems and later received venture capital funding from one of the leaders of the high technology venture capital community, Sequoia Capital. The founders led Cisco until its successful initial public offering in 1990, when they were driven out by the management team brought in by their financial backers led by CEO John Morgridge. Morgridge was a seasoned computer industry executive and he immediately began to assemble and build a professional management team. That team included John Chambers who was hired in 1991, and then replaced Morgridge as CEO of the company in 1995 and continues to lead Cisco to this day. Morgridge has continued on throughout the period since as Chairman of the Board of Cisco Systems.

The professional management brought into Cisco included vast information technology experience gained at Honeywell and IBM at the most senior levels of the company. These were professional managers and strategists with an impressive track record of execution, having learned very valuable lessons about managing the growth of a public high technology company. They were especially proficient in managing the scale of the sales and customer-facing activities. I believe that their collective experience also engrained in them some important principles of competition in high technology markets, and the introduction of disruptive innovations as outlined earlier in this paper. They were well aware of the challenges in positioning innovations to the more risk averse, the segments of customers to the right of the technology adoption curve. Clearly they were well aware of the importance of brand as their marketing and branding efforts were well underway early. Due in part to the influence of the venture capitalists, the company transitioned quickly to a company with mature and capable management that very early on became focused on overcoming the difficulties of managing a company experiencing phenomenal growth rates.

The founders of Cisco Systems initiative to solve several problems with connecting the disparate networks on the Stanford campus provided them with a significant technical lead in the design and marketing of the special-purpose devices that essentially direct packet traffic over the core of the Internet. In parallel to Cisco Systems work on the Internet backbone, it successfully leveraged its technology to develop solutions that enabled enterprises to construct private wide area networks over the service provider networks. Essentially these private WANs were much smaller versions of the

Internet that larger enterprises used to interconnect the local networks of their own sites and potentially to connect with selected partners. These private WANs utilized the same technologies as the Internet as, but access to these networks was controlled by the companies that created them for essentially their own use. In addition to support for multiprotocol routing in its products, Cisco very early on provided equipment for connecting the legacy IBM environments that utilized an IBM proprietary technology called SNA (Systems Network Architecture) that enabled the largest enterprises to bridge the legacy computing infrastructure with the new, client-server infrastructures bypassing the need for purchasing equipment from IBM to do it.

During the early stages of its evolution as a company, Cisco Systems sales activities were fairly concentrated on the service providers and on primarily the largest enterprises that utilized routing for building private WANs to connect locations over long distances and complex intranets. This was not a very large set of customers to call on, and their level of technical sophistication and experience with information technology was typically quite high. The problems they were trying to solve with routing were concentrated as well in comparison with other companies such as Cabletron and SynOptics which were providing the wiring hubs that large enterprise were using to build-out their enterprise LANs.

The dominant role played by Cisco routers in the build-out of the infrastructure of Internet backbone and private WANs combined with the relationship it was able to develop with the service providers was very important for Cisco Systems in the rapidly expanding enterprise data communications equipment market. Enterprises that were connecting to the service provider networks to construct private WANs saw Cisco routers in use with the service providers almost exclusively (to this day it is still estimated that over 80% of Internet traffic is forwarded at some point by a Cisco router), and this had a large influence on the equipment these enterprise customers chose for their end of the connection, often referred to as CPE, (Customer Premise Equipment.) The service providers were incredibly important influencers for a large number of enterprises downstream of their POPs for many reasons including guaranteeing interoperability, access to Cisco proprietary extensions, and leveraging the growing number of Cisco IOS-literate technicians on the technical staffs of the service providers.

The move within large enterprises, global multinationals in particular, toward standardization on a single vendor for routing technology and vendor by enterprises occurred much earlier as well. Because of the high complexity and the need to leverage training and expertise of rare, router-literate technical staff, IT departments found it desirable early on to mandate a single vendor for routers across the company. This is an example of indirect network externalities that can exist even in the presence of public open technology standards. Also it is important to recall that the technology was new, highly complex and the standards ratification often lagged what the manufacturers with the engineering expertise and field experience could add to their products while the standards were in process. Cisco engineers were often driving innovation of features and functionality based on their own experiences and input they were receiving in the field that enabled them to add Cisco-proprietary extensions to the Cisco Internetworking Operating System (IOS—the operating firmware of their routers) often far in advance of the standards. These proprietary extensions, delivered through the operating firmware added useful features to the Cisco offering that did not violate or break the standards, adding very desirable features and functionality ahead of the standards process and ahead of their competitors. Cisco has always been “committed to standards” but when the opportunity presented itself, Cisco-proprietary features were added and positioned with customers experiencing the problems these features were designed to address. While these features were compliant with the standards, they were Cisco-proprietary and typically non-interoperable with the features other vendors had implemented, and often not forward-compatible with a standard that later emerged. Combined with the move by most large enterprises toward standardization of a router vendor, the reader can easily see how Cisco was able to achieve somewhat of a customer lock-in with its routers early on via the indirect network externalities and “soft standards” it created with its proprietary features. The selection of routing protocols and features, vendor, and management of the routed infrastructure was often dictated from corporate headquarters. Cisco Systems had achieved leading market share in routing of over 50 percent by the early 1990s, the number two manufacturer, Wellfleet had a mere 15 percent.

The paper has stressed the fact routing is by its nature amongst the most complex of the technologies used in enterprise network infrastructures today. Throughout the early

1990s, much of the functionality provided by routers was provided via the operating firmware which not only provided the user interface, but also the applications that provided the services that routers performed on the network such as the routing protocol. The routing protocol provides the primary function of the router, intelligently routing packets from one logical network to another, often through a series of intermediate hops. It is important to understand that in order to be compliant with the constantly evolving standards; the applications in the routing firmware had to meet certain specifications in order to enable a *basic* level of interoperability with other standards-compliant devices. As outlined in the appendix, compliance with open, public standards was one of the most important dynamics driving the data communications equipment industry. However, it was completely feasible to design equipment that complied fully with the standards **and** also included vendor-specific and proprietary enhancements to the standard applications, proprietary new applications and user-interface/manageability options.

Through the 1980s and early 1990s the public IEEE and IETF standards were primarily centered on standardization of the required protocols and their basic functionality and interoperability—there were not many options or “bells and whistles” addressed in the standards at this time. In many cases these kinds of features and functionality were added to the standard over time, but in most cases long after a vendor or vendors had already implemented and deployed a similar proprietary solution in the field. A good example of this is a Cisco proprietary interior gateway routing protocol it called IGRP, (Interior Gateway Routing Protocol) which it developed to address some of the scalability and other issues with the IETF standard protocol at the time known as RIP (Router Information Protocol). The routing protocol is used by the routers to determine the routes used to forward IP packets (via other routers) to a destination. For larger enterprises, RIP had some significant limitations that resulted in slow convergence times if a failure occurred and provided no way to make qualitative decisions about alternative routes. The IETF had set about developing a next-generation protocol which became known as OSPF (Open Shortest Path First) but that process took a significant amount of time as it utilized an entirely new approach (link state vs. distance vector). Cisco, while working with the IETF on OSPF created an entirely new routing protocol that was proprietary to Cisco called IGRP that addressed many of the shortcomings of RIP but

retained the distance vector algorithm and introduced it in the IOS significantly ahead of OSPF. Many of Cisco's customers adopted IGRP routing of IP on their networks because it addressed the problems briefly outlined above and generally worked well. There was only one caveat: within a given intranet the IP routing protocol had to be consistent on all routers—in essence, enterprises that chose to run standard IP networks and utilized IGRP as the routing protocol had to use Cisco routers, or routers from an IOS licensee.

The customers which adopted these proprietary features were often times caught off guard. In many cases they did not realize until it was too late that a specific feature that solved a problem for them and they had become somewhat dependent upon was a Cisco-proprietary solution that would only work with other routers that ran Cisco's IOS. Cisco Systems and every vendor for that matter publicly and loudly claimed its commitment to standards and the active role many of its best engineers had in the standards bodies and processes. And after all, the products that had these proprietary features embedded within them were completely standards compliant—it became difficult to discern which features were standards-based and which were proprietary extensions at any one time. At the end of the day in most cases, it did not matter. Often the proprietary features provided functionality that was in need, so the choice for customers was often to be a either purist and wait for a standards-based solution, or accept the fact that they may in fact be going to a path toward lock-in via a soft standard. Understanding the pressures that most IT organizations were under at the time to simply makes things work, it is not all that surprising that many opted for the latter.

Cisco had developed a large and growing base of Service Provider and large enterprise customers that often pushed the Cisco routers to their design limits and were constantly demanding leading-edge features and performance. Recall discussion earlier in the chapter about the hierarchy, router people at the top. Cisco engineers got good input directly from their customers; they undoubtedly received a great many customer requests for functionality that converted well into of opportunities for customization of the IOS to solve problems through enhancements. Enhancements which were in essence “soft standards” got implemented and were standardized on resulting in local lock-in.

These facts are indicative of some very effective positive feedback loops that were responsible for the rapid dissemination of Cisco brand and its dominance in the

routing space. The Service Providers created a strong base of customers/users that provided a solid reference for the Cisco offering to potential enterprise customers. The Cisco-proprietary IOS extensions were acceptable initially because they were still technically compliant with the standards although once customers began to use them and become dependent on them, they needed to stay with Cisco routers. As will be discussed later in the chapter, Cisco embarked upon a very aggressive technical training program on its products and the fundamental technologies of the Internet, wide area networking and routing. As the Cisco training and certification programs were established as the de facto credentials for knowledge in this space, many enterprises utilized these training programs to educate their technical staffs on the technologies but in addition were indoctrinated on the Cisco implementations, command line languages, and workflows which undoubtedly influenced their choice of equipment. As enterprises standardized their routing technology and vendors, the presence of indirect network externalities and soft standards positioned Cisco extraordinarily well. The presence of these loops provides a very plausible explanation for the total domination of the enterprise router segment by Cisco Systems that continues to this day. Much of the functionality provided by routers in the early 1990s and before was accomplished primarily via software such as Cisco IOS; the hardware was not overly specialized and therefore was not a driver of costs. More importantly, customers understood that the functionality was provided in the software and accordingly the IOS, the “brains” of the router was priced separately from the hardware. Cisco was able to partition the feature set in the IOS and accordingly had several levels of functionality with corresponding price points. Because IOS was software, the margins were high (essentially 100% as IOS became distributed primarily via the Internet) across the line but for the high-end functionality needed for large enterprises and service providers, the margins were exceedingly good. The routing business overall enjoyed very high margins, and with market leadership and its domination of the service provider markets Cisco generated a great deal of cash early in its history that it was able to utilize for skillful marketing, developing its infrastructure and assembling a war chest that it would eventually utilize to embark on an ambitious program of product line expansion through acquisition.

Lastly in this discussion of the Cisco evolution as a router company, it is important to go back to the point regarding the hierarchy within IT organizations which clearly put those members of the staff responsible for the routing at the top. LAN equipment was by its design relatively simpler in function. Most of the functionality of a wiring hub was provided in hardware and was essentially “plug and play.” Although wiring hubs evolved to include management functionality provided through the firmware, enabling and configuring management of these devices was considered to be optional. Prior to the introduction of LAN switching, among the hardest task associated with LAN installation was the installation of the cabling, and the installation and configuration of NICs in hundreds or possibly thousands of PCs, often of multiple types from any number of manufacturers. Installation, configuration and operation of enterprise LAN equipment (e.g., wiring hubs) was relatively straightforward in contrast to the efforts required for routed infrastructures. I would suggest from my own experience in the field that installing and operating LANs was considered to be more “blue collar” while routers and WANs were considered to be more of the domain of the intellectual. The routers provide the connectivity to the outside world: customers and suppliers as well as linking the critical internal business systems of the enterprise. Accordingly the routing team received more incentives, and one of the incentives they received was participation in company-sponsored technical training and certification programs. The end result that is pertinent to this discussion is that the router engineers and technicians were typically in higher positions, had more influence in purchasing decisions and were *far fewer* in number—easier to reach via influencers, sales efforts and marketing. Selling to the router group of an enterprise’s organization was essentially selling to the technical elite and Cisco made a key decision early in its history to recruit highly technical sales people. This enabled Cisco to go-to-market in a very different fashion while it was a one-product company. The nature of its concentrated sales effort enabled the company to go to market with small, relatively autonomous field teams consisting of an account executive and sales engineer, relying on the call center for post-sales support. Beyond being responsible for a sales quota, Cisco account teams managed many of the functions around qualification, proposals, and pre- and post-sales customer service from the field without reliance on additional resources from corporate.

The processes described above affected not only end customers of data communications equipment, they also impinged on the emerging data communication intermediated channels described early in this chapter. Many of these firms had recruited and hired technical staff from the service providers and enterprises that had deployed large, routed internetworks and because of the hierarchy, often recruited the most knowledgeable, experienced, trained and eventually certified technicians which were highly likely to have worked with or nearby Cisco products at one time or another. This rather incestuous connection to the enterprise data communications equipment channels was important for Cisco for obvious reasons.

As is outlined in the appendix, routing although incredibly important in the enterprise was but a small part of the total opportunity for data communications equipment manufacturers. The somewhat less complex equipment that was providing connectivity to devices in enterprise LANs had created another market niche that was growing exponentially. Cisco Systems had grown in parallel with companies such as Cabletron Systems, 3Com and SynOptics which battled in the LAN equipment space providing equipment such as wiring hubs that enterprises used to construct the enterprise LANs that Cisco routers were interconnecting. For Cabletron and SynOptics, their primary offering consisted of the wiring hub, the devices that provided connectivity for the end stations connecting to the LAN. In 1992, the revenues of Cabletron and Cisco were roughly even at \$180M. At the time, Cabletron and SynOptics shared roughly 50 percent of the wiring hub market. Innovation in the LAN space was moving rapidly as companies demanded more bandwidth and capacity to support the voracious appetites of enterprises for connecting more and more devices, and the need for greater speed as new client-server applications were implemented. New transport technologies were being positioned such as FDDI and even ATM, not to mention higher-speed variants of Ethernet were being proposed and pursued by the established companies in the space, startups and the standards bodies.

In the 1993, several startups were working on a new, potentially disruptive technology that could potentially change the way endpoints were connected to the network. At the time the technologies used for LAN connectivity including the increasingly popular standards-based Ethernet technology had a serious drawback. The

Ethernet technology designed at Xerox PARC by Dr. Metcalfe and his small team effectively required devices connected to the same network segment to share the available bandwidth, which at the time was 10Mbps. Up until this point of time, the wiring hubs being offered by Cabletron, SynOptics, 3Com all utilized shared-bandwidth technology.

To solve this limitation a variety of startups were already in existence pursuing solutions to the problem of shared access hubs, and providing increases in available bandwidth. One of the most promising approaches was leveraging technology originally developed at Digital Equipment Corporation that allowed the interconnection of LAN segments utilizing a method that operated at a lower level of the OSI stack than routing, but at a slightly higher level than repeating. That technology which became standardized in the IEEE provided functionality called bridging. Unlike repeaters that simply forwarded packets received on one interface out all other interfaces on the device, bridges made an intelligent forwarding decision. Initially implemented in software, the bridging algorithm examined each packet received on an interface and only forwarded packets out the interface it believed the destination end station resided on. This was superior to repeating in that it provided segmentation of traffic. Many innovative engineers saw the potential to utilize this technology to create a device that utilized this algorithm on every port to effectively provide a dedicate segment for each station and end the need to share the available bandwidth. That type of device however would have to have the processing power to run the algorithm on every port, at wire speed. Accomplishing this with a general purpose CPU and software however presented significant limitations.

Several advances in silicon technology had resulted in a new category of integrated circuits called ASICs (Application Specific Integrated Circuits) and the introduction of the RISC processor had made possible the engineering of a device that could potentially handle the intelligent forwarding of packets on a per-port basis. Several startups were formed to pursue the application of a hybrid RISC-ASIC solution to develop what would be called a LAN switch. LAN switches would be capable of applying some very basic forwarding logic per port, while maintaining the line-rate speed of a repeater on several ports simultaneously. LAN switching presented the classic technology disruption scenario for the wiring hub vendors. The first LAN switches were

limited to workgroup functionality, not having the capacity to compete directly with the wiring hub for the wiring closet space. However, the evolution of LAN switching technology evolved very quickly to come up from below the wiring hub technology, and eventually overtake and obsolete it as LAN switching improved and the capacities expanded rapidly.

Cisco was watching the developments in the LAN space intently and I surmise that it clearly saw the potential disruption and the opportunity it might afford to penetrate the LAN equipment space. While others argue that Cisco was primarily acting to protect itself from the competitive threat to routing posed by the LAN switching technology and direct competition from the startups that had begun to compete for LAN connectivity business.²⁴ Many sources cite that Cisco was increasingly encountering the LAN switching startups in its customer base but LAN switches competed primarily with wiring hubs and not the routers that Cisco was offering at the time. I believe that Cisco was in fact exploiting an opportunity to take share in the wiring closet business which was becoming increasingly more lucrative as PC internetworking began to be pervasive. I believe that Cisco was on the offensive and not acting defensively as some have suggested. Specifically it was being opportunistic in seeking an opportunity to displace Cabletron, 3Com and SynOptics lead in the wiring hub segment of the market. Doing so would obviously enable Cisco Systems to compete for the entire enterprise connectivity market which had grown to approximately \$6B by 1994.

Despite the debate that was raging in the industry regarding the role of routing in enterprise LANs, it was clearly evident that routers as they were implemented in this time frame were not going to be utilized to provide LAN connectivity—they had neither the performance nor could they achieve the price-performance ratios required in order to be attractive for wiring closet connectivity. To maintain the stunning growth Cisco stakeholders had become accustomed, Cisco had to expand the reach of its product line into the LAN and wiring closet connectivity segment of the market.

The disruption afforded by the LAN switching innovation provided a unique opportunity. In September of 1993 Cisco Systems made the first of what would be a very

²⁴ Gawer, A. & Cusumano, M. (2002). *Platform leadership: How Intel, Microsoft and Cisco drive industry innovation*. Boston: Harvard Business School Press. 167-168.

long list of acquisitions that it would use to broaden its product line and attack every conceivable segment of the enterprise and service provider data communications equipment market. At this time it acquired a Sunnyvale, California-based startup called Crescendo Communications for \$89M in Cisco stock. The sixty person startup was developing high-speed LAN switching solutions for workgroups, and with this acquisition Cisco was established in the LAN switching business, clearly targeting companies such as Cabletron, 3Com, and SynOptics for the lucrative and coveted LAN connectivity business dominated at the time by wiring hub products offered by those companies. Crescendo as it turns out brought to Cisco both a working high-speed LAN switch product, but also valuable technology leadership in a new variant of Ethernet that offered a 10x increase in performance which became to be known as Fast Ethernet.

In October of 1994, Cisco moved again in what some have called a preemptive strike to acquire a company called Kalpana, Inc. another small startup that was working on Ethernet switching products. Purportedly Cisco swooped in and closed the deal with Kalpana over a weekend while IBM, which was also in negotiations to acquire the company, was conducting environmental testing at Kalpana's office building in determine if it was in compliance.²⁵ What was even more interesting to the discussion of intermediated channels was this quote from then EVP of Cisco Systems John Chambers in the official Cisco press release announcing the acquisition of Kalpana:

"Kalpana provides great value because their products are both cost-effective and high-in-performance. Additionally, because Kalpana markets and supports products worldwide through distributors, value-added resellers and systems integrators, their well-established, indirect channels of distribution complement Cisco's existing sales channels," said John Chambers, Cisco's executive vice president."²⁶

²⁵ Segil, L. (2000, August 21). Alliances: Preemptive Alliances, *Industry Week Online*. Retrieved April 2005 from <http://www.industryweek.com/ReadArticle.aspx?ArticleID=1998>

²⁶ Cisco Systems, Inc. Press Release.(1994, October 24). Retrieved April 2005 from http://newsroom.cisco.com/dlls/1994/corp_102494.html

Cisco Embraces Intermediated Channels

It is intensely interesting to note that Cisco Systems timed the expansion of its sale efforts into intermediated channels concurrently with the expansion of its product line in order to compete for the LAN connectivity segment of the enterprise market. I would characterize this as a deliberate “one-two” combination punch that Cisco Systems conceived of and executed to knock-out its primary competitors in the LAN connectivity space. Specifically targeting those that had been dominant in the pre-LAN switching era, the wiring hub vendors such as Cabletron, SynOptics and 3Com, Cisco seized the opportunity to position itself as the dominant supplier of enterprise data communication equipment and to achieve that through primarily an intermediated channel strategy.

Oddly enough, prior to the 1993-1994 timeframe Cisco had actively established relationships with the wiring hub vendors it was now clearly targeting in order to add Cisco routing functionality to their offerings. In an interesting twist of fate, the very vendors that Cisco began targeting in 1994 were among Cisco’s first intermediated channels! In 1992 in fact, Cisco had established a relationship with SynOptics that potentially included joint development, but failed within a year due to irreconcilable technological differences.²⁷ Before and after the failed agreement with SynOptics which later merged with a Cisco competitor, Wellfleet Communications in October 1994, Cisco had relationships with most of the hub manufacturers servicing the enterprise markets: DEC, Cabletron, LanOptics, Optical Data Systems, and Chipcom (eventually acquired by 3Com). One wiring hub vendor, UB networks not only incorporated Cisco technology but began reselling Cisco’s router products in a true intermediated channel relationship.²⁸

In the interviews conducted for this paper, it was stated that at this point in time the primary driver in the decision to utilize intermediaries was purely a matter of rapidly scaling the sales effort upward. As a router company, Cisco Systems focused initially on a market that required far fewer field resources: namely the service providers and the large enterprise customers that were interconnecting campuses and utilizing Cisco routers to implement private WANs. The fact that routers were deployed in a smaller number of physical locations, and that they could be managed effectively remotely led to different

²⁷ Bunnell, D. (2000). *Making the Cisco connection: The story behind the real internet superpower*. New York: John Wiley and Sons.

²⁸ Ibid.

requirements for the scale of customer-facing sales and technical support forces while Cisco was a single-product company. Its primary sales channel up until 1994 was its direct sales force, augmented with a few relationships with telecommunications service providers to facilitate the build-out of the Internet backbone and private WANs, some high-end intermediaries particularly in markets outside the US, and the relationships with the hub vendors described immediately above.

In fact in my research I discovered these account teams prior to the 1994 expansion of the Cisco product line into the LAN space this is precisely how Cisco Systems managed its customer-facing force: the account executive and sales engineer were responsible for a territory and performed all of the pre and post-sales functions for their assigned accounts, including assisting the customers with installation, configuration and troubleshooting when necessary. There were of course large and strategic customers that might have a team of Cisco employees dedicated to their needs possibly onsite with the customer, but this was an exception. As the number of Cisco customers and opportunities for new business grew in a region, a new team was brought on and the accounts in the region divided. This was a fairly straight-forward method of scaling the sales force, even as the company expanded into international markets. It was possible in large part due to the highly centralized nature of the target customers and markets for routers.

This landscape began to change dramatically in 1994 at Cisco. In addition to the comments made by John Chambers at the time of the Kalpana acquisition which incidentally, were made immediately preceding Chambers taking the reins as CEO of Cisco Systems, Cisco embarked upon execution of its efforts to shift its primary go-to-market strategy from direct sales, to intermediated channel sales. This is reflective of a statement made earlier in the chapter referring to the experiences and backgrounds of Chambers and Morgridge learned earlier in their careers, that companies often have to utilize alliances to extend the reach of a company without impairing its ability to focus and best serve its customers. John Chambers has asserted that Cisco learned early on that it was better to form partnerships and share revenues with partners, including an

intermediated channel, than to do everything itself.²⁹ This was in stark contrast to the philosophy of some others in the industry as will be examined in the next chapter.

There are some other important developments in the market and internally within Cisco described in the appendix and the previous chapter that are worth revisiting. The reader should recall that the 1994 timeframe was also when the Internet and the Worldwide Web really exploded onto the information technology landscape. This is the time period in which Netscape emerged and the browser wars began, and the commercial applications of the Internet such as e-commerce and virtual supply chain integration really became possible through “Internet-powered” applications that began to abound at the time.

This is also the timeframe of the major overhaul described in the previous chapter of Cisco’s own internal information technology system including the move toward using web-based applications both internally and for connection to its manufacturing partners, suppliers, customers and eventually its intermediated channel partners. As was asserted in the appendix, Cisco Systems had a very clear vantage point for previews of the potential disruptions afforded by PCs, client-server computing **and** the Internet. By adopting these technologies itself it likely developed a unique perspective of how the technology was going to radically change the use of IT including its own offerings going forward. These technologies radically changed the landscape for the employment of IT by enterprises and individuals. The use of IT was no longer relegated to only the largest enterprises that could expend the large amounts of capital required to acquire and operate mainframes and minicomputer environments. The new technologies were going to make possible the employment of IT by virtually every organization and individual on the planet. Trying to sell and service that total addressable market was simply not feasible, Cisco Systems was focusing at this time on how to get the market share and margins required in this new model, while constantly keeping its eye on technology development.

Cisco was not the first of the major enterprise data communications vendors to move to intermediated channels. Before the Kalpana acquisition by Cisco in 1994 as it began communicating its intention to utilize intermediated channels for its branch routers, its direct competitor Wellfleet had been in the channel for approximately three years

²⁹ Bunnell.

before and had increased its indirect sales to 55% from 10% around the time of the inception of its own channel program.³⁰ 3Com had a long history in the channel as well, moving to indirect channels in the early 1980s to successfully scale distribution of its network adapter cards for Intel-based PCs which was the engine of that company's growth. As well as announcing plans to begin offering its low-end routers through two-tier distribution in the fall of 1994, Cisco also initiated a major alliance with Hewlett-Packard that extended far beyond the standard inclusion of Cisco routing in HP's hubs. That relationship grew in the following year when HP became the first Cisco intermediary channel partner to both resell Cisco equipment and service its equipment.³¹ Cisco provided the HP field technical staff with training which provided Cisco with a much needed worldwide 24-hour support capability. Even at this early juncture, Cisco was already girding itself for the increase of buying from segments of the market other than large enterprise, spurred primarily in the emergence of the Internet. In an article in September of 1994 announcing plans to utilize indirect channels for its low-end routers, John Chambers was quoted, "This part of our business [sales to small and medium businesses] will grow two to three times faster than our sales to large companies."³²

Like all companies with a large direct sales presence, these announcements by Cisco in 1994 were received with due caution by smaller network VARs. In their estimation Cisco had avoided the channel in the past. The concern was shared not only by the small VARs that were the target intermediaries for these products, but the small cadre of established high-end channels Cisco utilized for its most complex router offerings not currently being made available to the channel. For obvious reasons the small VARs were concerned about potentially being displaced out of deals by the direct sales force, and the high-end integrators were concerned about confusion in the marketplace over the expanding range of products. In reality, most of these concerns were allayed by the forces described at the end of the last paragraph. Many in the industry did not foresee the rapid expansion of the market made possible by the huge demand that emerged from the small and medium business segments for routers, and

³⁰ Dunlap, C. (1994, May 16). Cisco alters approach, taps channel for help. *Computer Reseller News*, 2.

³¹ Bunnell.

³² Willett, S. (1994, September 26) Cisco turns to channel to boost low-end router sales. *Computer Reseller News*, 597, 3-4.

soon for LAN switching solutions for new installations in the case of the small and medium segments, and in the case of the large enterprise, technology refresh of the shared, hub-based infrastructures that had been installed in the first wave of LAN build outs.

Not surprisingly, Cisco communicated several deliberate actions it was taking to build confidence in the intermediary channels it was targeting as it announced its intention to utilize intermediated channels for its low-end routers in 1994. Specifically it provided electronic technical support on the Internet for its intermediated channel partners as described in detail in the last chapter, significantly ahead of its rivals. It initiated agreements with major distributors to enable VARs and dealers to purchase Cisco products through distribution and avoid having to maintain a direct relationship with the company. It restructured its internal indirect sales and marketing organizations to better support potential intermediated channel partners interested in reselling the Cisco branch routers and remote access solutions.³³

By the middle part of 1995 Cisco Systems announced a bold expansion of its channel programs to include its high-end gear, including its routers and LAN switching products acquired in the previous years. It had hired away from one of its chief rivals Bay Networks (formed by the merger of Wellfleet and SynOptics in the fall of the previous year) a top channel executive that went on to become Cisco's VP of worldwide channels. It put into place additional relationships with distributors that would further enhance the effectiveness of its two-tier model which was the mainstay of the VARs and dealers working in the small and medium business markets. As it turns out, the acceleration of buying by the small and medium business segment did not really materialize until the 1997 timeframe, but in the meantime Cisco Systems was having great success in getting its intermediated channel machinery up and running. More importantly for Cisco, the transition within large enterprises from shared hubs to LAN switches was in fact beginning as it was hitting its stride in the channel.

In Cisco System's fiscal year 1996 which ended in July of that year, Cisco Systems had succeeded in transitioning the company from approximately 10% of its sales

³³ Willett, S. (1994, September 19). Cisco rides with HP to sell routers through the channel. *Computer Reseller News*, 596, 102.

through intermediated channels five years before, to an incredible 70% that year.³⁴ The VP of worldwide channels commented: “We have become more and more a reseller-oriented company. The channels we have are helping us grow at 88% year over year.”³⁵ Cisco’s onslaught on the hub vendors with its acquired LAN switching products and the close linkages it was claiming between its routers and switches was gaining significant traction. In an industry poll conducted that year, twenty-three percent of respondents at large corporations claimed to have Cisco switches installed.³⁶ The remaining members of the big four, Bay Networks, 3Com and Cabletron, had 11%, 9% and 5% respectively. Cisco had masterfully recognized a potential market disruption and capitalized on it using an intermediated channel strategy to unseat the incumbents in the LAN connectivity space. While the wiring hub companies were slow to introduce their own LAN switching products, instead relying on “bigger, better” generations of shared technology, Cisco was able to enter and take market share. I would argue that it could not have accomplished this feat with the LAN switching technology alone. It was the one-two punch of the disruptive technology combined with the very successful execution of its strategy to engage and dominate the enterprise data communications intermediaries.

This early success in the LAN switching space gave Cisco another critical advantage: economies of scale. Cisco was selling such volume of LAN switches it was able to adjust its prices downward significantly which resulted in a price war in the beginning of 1997.³⁷ By the end of 1997, for the first time in its history, Cisco Systems was generating more of its revenues from its non-router products than its routers.³⁸ Cisco had successfully transitioned from a one product company, to the preeminent source of data communications equipment for the enterprise worldwide. As is often left out of the many articles and books about Cisco, a significant factor in its achievements in the marketplace was the company’s superb execution of an intermediated channels strategy.

In 1997 the connectivity explosion that was predicted to coincide with the spread of Internet technologies to small and medium business finally began to materialize. Cisco at first tried to pursue these down-market opportunities by creating a new line of products

³⁴ Calderbank, A. (1996, September 16). Cisco grabs switch honors. *Computer Reseller News*, 39.

³⁵ Ibid.

³⁶ Ibid.

³⁷ Bunnell.

³⁸ Ibid.

called Cisco Pro, targeted for distribution and the dealers and VARs. This turned out to be a mistake. Essentially taking their enterprise products and stripping out features and functionality and creating new form factors designed to better suit the needs of these customers at the required significantly lower price points was not well received by the channel. However, Cisco learned from the experience and had the necessary resources at its disposal to make rapid corrections.

Through its acquisitions of technology, abundant resources, and its ability to partition its IOS and port it onto other devices, Cisco was eventually able to create a broad and compelling product line of offerings that met the requirements of essentially all of the segments of the enterprise market. Through skillful marketing it convinced the world that IOS had been the “glue” that enabled it to integrate the many products it added to its line via over nearly 100 acquisitions, despite the IOS having multiple “branches” by the year 2000. Despite its marketing claims to the contrary, the original router IOS and the IOS used in its LAN switches (called Catalyst IOS) are very different. Cisco was committed to utilizing its growing channel of dealers and VARs to service these new customers with the new offerings and specialized packages it was creating. Accompanied with targeted marketing, new training offerings Cisco began to target burgeoning opportunities in the small and medium segments targeting 3Com specifically which had consistently been strong in that segment of the market. Like Cisco, 3Com added LAN switching to its portfolio via acquisition, acquiring a small startup called Synernetics in 1994 and another hub/switching company, Chipcom Corporation in 1996. Going into 1998, that pressure began to mount on 3Com which contemplated making some of its high-end large enterprise routers and LAN switches previously available to only its high-end intermediaries, its Advanced Solution Partners, available to more VARs. Cisco on the other hand was distributing shares of Cisco stock to VARs as an incentive for selling its products through two-tiered distribution in an effort to increase the pressure on 3Com.³⁹ The challenges from Cisco combined with 3Com’s \$6.6B merger with US Robotics was causing strain within 3Com internally at the time. Not the least of which were the channel issues the company faced trying to reconcile its heavy reliance on a large network

³⁹ Presti, K. & Rosa, J. (1998, February 23). High-stakes networking battle to empower VARs. *Computer Reseller News*, 777, 1-2.

intermediaries at the low end of its product lines, the overlap in those channels resulting from the US Robotics merger, and the reliance on a small number of high-end integrators for the large enterprise offerings.

Soon after making these changes in the small and medium enterprise segment, Cisco began working on several initiatives to solidify its control of the large enterprise via the highest-end intermediaries: the technology consulting firms. Late in 1998 Cisco announced the formation of an Internet Business Solutions Group, or “IBSG.” In the press release announcing the formation of this group Cisco explained this group as being formed specifically for sharing its internal experiences with deployment of Internet-powered solutions with customers and the business consultancies such as Cambridge Technology Partners, Ernst and Young and KPMG who would be the first participants in the pilot program. As was outlined in the previous chapter Cisco had “eaten its own dog food” and converted its infrastructure to Internet-powered technologies very early on developing many best practices. Through the IBSG Knowledge Transfer program Cisco would share its best practices with these consultancies about its own internal Internet-based business processes and applications. In return the consultancies would utilize Cisco equipment in their own offerings.⁴⁰ Later in that year, Cisco purchased a 20 percent stake in the KPMG consulting arm⁴¹, the first of a number of alliances and ventures it would enter with consultancies. By this time, Cisco’s internal IT infrastructure had earned a great deal of acclaim and it successfully leveraged that acclaim and its market share to attract the intermediaries that offered the company the ability to effectively penetrate the remaining late adopters and laggards amongst the largest multi-national and global enterprises.

In 1999 however, Cisco announced by far one of the most important coups in the high-end segments of the enterprise data communications equipment market segment. After being rebuffed several times throughout the 1990s by industry stalwart IBM which had tried in vain to stem the tide of IP adoption and clung stubbornly to its own proprietary SNA technology, Cisco and IBM announced an alliance in August 1999.⁴²

⁴⁰ Cisco Systems Inc. Press Release. (1998, December 15). Retrieved April, 2005 from <http://newsroom.cisco.com/dlls/fsfnisapi922b.html>

⁴¹ Bunnell.

⁴² Bunnell.

The announcement outlined how IBM would utilize Cisco equipment in the delivery of its e-business solutions through its Global Services unit, and that IBM would begin the migration of its switching and routing customers to Cisco equipment.⁴³ Even the mighty IBM had yielded to the dominance of Cisco in the Internet generation of networking technology.

In only six short years, Cisco had substantially built from scratch an incredibly powerful intermediated channel capability in both the large enterprise and in the small and medium business segments, making intermediated channels the primary sales vehicle for the company. By 1999, the company was generating 84 percent of the company's US sales and 95 percent of its worldwide sales through its intermediated channels.⁴⁴ In the process of this remarkable transition (recall the starting point in 1994 was less than 10 percent of revenues through other-than-direct, and that figure was probably overstated) the company had grown annual revenues from just under \$2B in 1995, to over \$12B in 1999.⁴⁵ The growth in Cisco revenues while occurring in a rapidly growing market did come at the expense of some of Cisco's competitors. After continued difficulties in the large enterprise space, 3Com Corporation announced in early 2000 its departure from the large enterprise space, discontinuing its high-end routers and LAN switches and impacting 2,500 to 3,000 employees.⁴⁶ Cabletron had announced its plans to split into four new spin-off companies, the parent company but a shadow of its former self after posting increasingly wider losses in 1998 and 1999. Bay Networks was acquired by Nortel Networks in mid-1998 as VoIP and converged voice and data networks clearly became the next major industry disruption on Cisco's radar screen. It still remains to be seen if the combined company resulting from the merger of Nortel and one of the "Big Four" data communications equipment companies will weather the impacts of the bursting of the Internet bubble and Nortel's accounting scandal. In essence, the face of the industry had been changed forever by Cisco's execution in a number of areas, not the

⁴³ IBM, Cisco Ink Alliance. (1999, August 31). CNNMoney. Retrieved April 2005 from <http://money.cnn.com/1999/08/31/technology/cisco>.

⁴⁴ O'Hanlon, C. (2000, February 7). Cisco's channel champion abandons post. *Computer Reseller News*, 880, 5-6.

⁴⁵ Historical financials retrieved April 2005 from www.hoovers.com.

⁴⁶ Duffy, Jim. (2000, March 20). 3Com exits enterprise network stage. *Network WorldFusion*, Retrieved April 2005 from <http://www.networkworld.com/news/2000/03203exit.html>.

least of which was its ability to build a commanding presence in intermediated channels that is very much a factor to this day. Despite attempts by its competitors, established and new entrants alike to unseat Cisco, its grip on its intermediated channels is very strong and remains so to the current day.

Building Brand and Technical Training

Beyond the efforts described thus far that Cisco engaged in while making its transition from direct to intermediated channel sales were the highly complementary branding and marketing activities the company engaged in. One of the primary requirements for manufacturers attempting to employ intermediaries is the development of strong brand awareness for the company, both with end customers and potential intermediaries. The association with the Internet and the service providers was a distinct advantage for the branding of Cisco. Having a legitimate claim on the invention of multiprotocol routers and such a dominant share of the routers used in the Internet enabled Cisco to utilize the connection to the benefit of its brand. While the LAN connectivity providers struggled through simplifying their messaging, Cisco was able to rely on the facts that their equipment provided the core of the Internet, and their equipment was used to connect more enterprises to the Internet than any other manufacturer. This was an incredibly powerful message in the mid-1990s when it mattered most as companies really began to explore the power of this new phenomenon.

Cisco made expert use of its branding efforts to strengthen ties with its intermediated channels. Cisco's first major branding campaign in mid-1997 targeted resellers and service providers that utilized Cisco equipment in their data networks. If the network met Cisco-specified guidelines regarding content of Cisco equipment, the intermediary was able to use the "Cisco-Powered Network" logo in its own advertising.⁴⁷ Essentially this was Cisco's attempt to build consumer brand recognition and association with quality and dependability much the same way that Intel had done with its widely known Intel Inside campaign.⁴⁸ In 1998, Cisco launched a new ad campaign directed toward consumers with the goal of making Cisco a household name. The "Are you ready?" campaign reinforced with consumers the fact that Cisco routers powered the

⁴⁷ Bunnell.

⁴⁸ Bunnell.

Internet and the Internet generation. Cisco paid upwards of \$30M for primetime exposure for these consumer-focused advertisements intended to augment the Cisco-Powered Network campaign before it.⁴⁹

I was privy to the results of a 2003 brand study that tabulated aided and unaided awareness of Cisco Systems as well as positive or negative association with the Cisco brand. The results of that study were incredible in terms of positive, unaided awareness of the Cisco Systems brand. In comparison with the other data communications equipment manufacturers clearly Cisco had evidently done a much better job at branding the company. More impressive was the sheer positive association of the brand. Despite its dominance of its market, similar to that of Microsoft and Intel, the number of people that indicated negative association to the brand was half that of Microsoft and Intel. Cisco is still to this day able to command gross margins in the high sixties, despite the leading IT consultancy for large enterprises writing openly and frequently of the “Cisco Premium” that many customers pay by standardizing on Cisco and not seeking competitive bids. The power of the brand is substantial and that has undoubtedly been a critical element of its success with intermediated channels.

Cisco also made a brilliant move very early in its history by establishing a comprehensive technical training and certification program that I believe significantly reinforced its branding efforts. Understanding that the target end customers for Cisco equipment was primarily other businesses, Cisco needed a way to increase awareness within the IT organizations of companies across the globe. The internetworking technologies embedded in Cisco’s products and data communications equipment in general were very new and in short supply especially as the Internet emerged onto the scene. Cisco launched a comprehensive training program that included training on the technologies using its own equipment for the practical laboratory exercises. By 1993 the program was expanded with the offering of a certification on Cisco routers for technical professionals called the Cisco Certified Internetworking Expert (CCIE), which almost instantly became one of the most coveted technical certifications for professionals within large enterprises. From my own experience, in the mid-1990s companies would often pay for an engineer to attend CCIE training courses and certification testing (originally

⁴⁹ Ibid.

only conducted at Cisco HQ in San Jose), and immediately upon the employee passing the certification exam be compelled to raise the engineers salary just to retain them! At the time, a CCIE had almost unlimited mobility and job. Cisco utilized technical training intermediaries for delivering training it developed internally, and outsourced testing for certification early on significantly increasing the availability of training for the large numbers of IT professionals seeking training in the new technologies across the globe. The quality and wide availability of the training established it as a de facto standard for the industry very early on in spite of the fact that it was totally Cisco-equipment centric.

The technical training and certification program was yet another positive reinforcing loop that Cisco exploited masterfully in conjunction with its traditional branding and marketing efforts. Cisco-trained and certified technicians permeated the enterprise and service provider customer base. In designing its training and certification programs to be viewed as having a good balance of both general technical networking knowledge and Cisco device-specific and user interface (IOS) knowledge. They effectively bridged a gap in what the secondary and tertiary educational institutions lagged in filling at the time—the skills for designing, implementing and operating enterprise and service provider packet-switched data communications infrastructures. In the process they created a large population of Cisco Systems-literate IT professionals in many segments, arguably predisposed to Cisco equipment because of their familiarity with the equipment, and how to design, implement and manage enterprise networks infrastructures built-out with Cisco equipment. These people permeated into many different sectors: service provider operations departments, enterprise IT departments as well as to the VARs, dealers and System Integrators. Cisco places requirements on its intermediaries to employ a number of Cisco-certified technical personnel to ensure competency and enhance customer satisfaction as a requirement of their partnership agreements. To validate how powerful the impact of the training program has been, today most data communications equipment vendors still competing with Cisco in the enterprise and service provider market segments provide a “Cisco-like” mode of their own user interfaces, essentially utilizing the same commands used by IOS. This is done to leverage the large population of Cisco-trained and experienced professionals and overcome the objection to adopting the competitor’s equipment often raised by potential

customers as well intermediaries that they will have to retrain their technical staff who only know Cisco CLI. Most of Cisco's competitors will recognize Cisco certifications and waive their own technical training requirement and certification for their intermediaries. Essentially, the Cisco IOS command line interpreter has become the de facto standard for data communications equipment.

The Cisco training and indoctrination efforts were expanded beyond the contracted instructor-led training targeted at IT professionals, to web-based and video training modules that enabled self-paced study during non-working hours, essential for the technical staffs of intermediaries that are expected to maintain chargeability. In the later 1990s Cisco created a new training initiative it called Cisco Networking Academy that it rolled-out to high schools, colleges and nonprofit educational institutions, ostensibly to teach the vocational skills necessary for high-paying jobs in the IT industry but also to ensure the next generation is familiar with Cisco.⁵⁰ Cisco also has its own series of technical books and training materials, published by the Cisco Press.⁵¹ A quick search of an online technical book store lists 293 titles in the Cisco Press series. A glance at anyone of them will find many references to Cisco products and their command line interfaces in the example configurations. Many of these books are used as augmentation to the technical documentation that comes with the products, and technicians have a tendency to become dependent on these reference guides which constantly reinforces the Cisco brand.

Recent Developments

Command of the data communications equipment intermediated channels by Cisco Systems remains strong as this paper is being written in mid-2005. The company's revenues have continued to soar, Cisco reported revenues in 2004 of over \$22B with an impressive operating margin of 20 percent—significantly higher than it attained during the boom at the end of the 1990s. Its intermediated channel program continues to evolve however especially in regards to focusing on the value-add provided by its intermediaries. Beginning in the summer of 2001, Cisco eliminated volume-based discounts and began

⁵⁰ Bunnell.

⁵¹ Cisco Systems, Inc. Company Web Site. Retrieved April, 2005 from http://www.cisco.com/en/US/about/ac123/ac220/about_cisco_cisco_press.html.

rewarding its intermediaries based on their level of expertise.⁵² In order to achieve this Cisco began requiring its intermediaries to achieve one or more of its technology specialization designations, typically through achievement of technical certifications by a number of its staff, in order to qualify for the different levels of partner certification that drive qualification for the various levels of discounting. Cisco also made its certified intermediaries participate in a customer satisfaction program. Effective with this change was a decided shift from quantity to quality—previously qualifying for the highest discount levels was based on sales volume.

This move marked a deliberate effort by Cisco to both raise the bar for its intermediaries, but also was motivated in part to reduce the sheer numbers of intermediaries authorized to sell its products. This may be viewed as a maturing of Cisco's employment of intermediaries. Initially it was about scaling the sales effort, but as the sales through channels approached 90 percent, clearly Cisco needed to become concerned about the capabilities of its intermediary partners to deliver increasingly value-added solutions to its customers. With this shift it began to incentivize training, certification and customer satisfaction, and deemphasize volume. Considering the power it had in the intermediated channels at the time, this was an action that it could take. As part of this chain Cisco also made available to its channel partners its internal customer service best practices and tools.

It is clearly evident from the abundant press on the subject that Cisco's intermediated channel programs continue to be a work in progress. Cisco intermediated channel program is far from perfect, and perfection is a constantly moving target as commoditization of the equipment continues and there is pressure on margins. Interestingly enough it seems that the conversation regarding channel conflict between the intermediated channels and the direct sales force is never ending—as long as they both exist.

Cisco today generates 92 percent of its business through intermediated channels, and continues to do so profitably for Cisco for sure which routinely reports gross margins above 60 percent. Many of its intermediary partners argue that the Cisco business is profitable for them as well. In the research, channel managers working for

⁵² Hooper, L. (2001, March 5). Cisco's new game plan. *Computer Reseller News*, 935, 32-35.

Cisco competitors repeatedly mentioned the fact that many intermediaries are hesitant to risk potential retaliation by Cisco that may result from working with competitors. For the most part, the most successful and capable intermediaries in the enterprise space are tightly-held by Cisco today. The fact that the company has been committed thus far to a long-term channel strategy was evident to its intermediaries as well and helped build loyalty.

Chapter 6: Case Study: Cabletron Systems, Inc.

Chapter Introduction

This chapter will outline the execution of another data communications equipment manufacturer in order to provide comparison and contrast to Cisco Systems execution of its intermediated channel strategy outlined in the previous chapter. As will be outlined through this comparison, despite the company's beginning at about the same time first as partners in adjacent markets, and then competing in the same markets the paper will point out distinct differences in the management of a transition to intermediated channels. What is particularly interesting in this analysis is the fact that entities that started out roughly equivalent in size and revenues in the early 1990s had by the end of that decade ended up as polar opposites among the "Big Four" data communications equipment providers. As this paper was being completed in April of 2005, Cisco Systems had achieved a market capitalization of \$111B, employing 34,000 employees worldwide and generating profits of \$4.4B on annual sales exceeding \$22B with gross margins in the high sixty percent. Cisco Systems generates over 92 percent of its sales revenues through channels today. In the case of Cabletron, continued loss of market share and declines in the top line have seen that company reduced to just over \$173M in market share, employees numbering only \$1,100 and the company suffering operating losses every year since 2000.

The paper will outline an argument for how a well planned and executed intermediated channel strategy was in part responsible for the tremendous success of Cisco Systems in achieving commanding market share in the most valuable segments of enterprise data networking, effectively displacing Cabletron, 3Com and Bay Networks Nortel.

Company and Product Origins: Cabletron Systems, Inc.

Cabletron Systems⁵³ was founded in the 1983 by two young entrepreneurs from New England. The company was bootstrapped financed—the founders did not accept

⁵³ The reader should note that in August of 2001, Cabletron Systems, Inc. effectively became a new entity with a new name, Enterasys Networks, Inc. The author uses Cabletron and Enterasys interchangeably in this chapter and throughout the thesis.

venture capital financing and held a great deal of animosity for VC-financed companies, particularly those they competed with directly. Initially the company provided only a low technology offering and operated out of the garage of one of the founders. The founders shared President and CEO duties through the company's very successful IPO in 1989 and into the mid-1990s. One founder remained as CEO until 1999 with a short break in service in 1997.

Realizing that enterprises were having difficulty finding the thick coaxial cable used for the initial standards-based Ethernet LANs in lengths that fit their individual needs (the cable was typically offered by the cable manufacturers on huge spools), Cabletron's first business was to offer LAN cabling and associated services to enterprises installing cable plants to support local area data networks. The company's product offerings grew fairly rapidly with the addition of Ethernet devices: transceivers, wiring hubs, and eventually its own line of routers through acquisition in 1998. In the process the Cabletron product line included devices for building and interconnecting enterprise LANs constructed of just about every standards-based technology: Token Ring, FDDI, ATM and support for every LAN variant of the Ethernet standard on copper and fiber optic cabling as well as 802.11 wireless LANs. Cabletron had a large patent portfolio and was considered a leader in several LAN technology areas.

It is important to draw some important contrasts between Cisco and Cabletron. Whereas the heritage of the Cisco technology and first target customers were clearly in the service provider space primarily and enterprise WANs, Cabletron's technology heritage was LAN equipment sold to enterprises of various types and sizes from day one. Its focus was primarily on providing the products and services required for companies to build-out the local area network infrastructures that supported the new client-server computing paradigm, but primarily within the confines of the enterprise. At one time Cabletron held leading market share in the wiring hub category ahead of its primary competitor in the early 1990s, SynOptics. Interestingly enough, Cabletron like most of the hub vendors, licensed the Cisco routing technology early in the 1990s, and offered Cisco routing blades and modules that were supported in Cabletron's LAN devices to enable some limited routing and WAN functionality in their product line.

As outlined in the previous chapter, Cisco and Cabletron became bitter competitors as Cisco entered the LAN connectivity market via acquisition of some of the leading LAN switching companies in 1993 and 1994. The relationship between Cisco and Cabletron had always been lukewarm for a number of reasons. Cisco continued to advocate increasing the use of routers and routing as enterprise networks got increasingly larger, while Cabletron advocated the use of less complex and higher-performance LAN-based technologies. Secondly, the Cabletron founders were disdainful of venture-backed companies and were openly critical of acquisitions. The Cisco-Cabletron relationship came to an abrupt end in the fall of 1996 Cisco refused to renew Cabletron's license agreement for the IOS in retaliation for a series of advertisements and an aggressive anti-Cisco presentation at an industry trade show in the weeks prior to the announcement.⁵⁴ This came at a time when Cisco's onslaught on the coveted wiring closet business of Cabletron and SynOptics with its LAN switch technology acquired in 1993-1994 had swung into full gear, and both Cabletron and SynOptics (now merged with Wellfleet) had fallen significantly behind the end-around initiated by Cisco.

Cabletron as a LAN company did not have the advantage of direct access to the influencing power the service providers had on enterprise buyers discussed earlier in this chapter. LANs are by definition constrained within the bounds of the enterprise and its workspaces. LAN infrastructure equipment was not used in the service provider "cloud" in a visible way like the routers that connected enterprise CPE to the service provider network. Whereas the service provider would often recommend selection (tacitly or explicitly) of the manufacturer and model for the routers an enterprise might purchase and deploy, there was no such influence over the LAN infrastructure. The decision makers for routing versus LAN equipment for a given firm might come from entirely different groups, groups with different skills and experience levels. Most importantly access to that decision maker for the purposes of positioning and selling a LAN infrastructure solution was significantly different than that of routing solutions—closely related but inherently different. Again, the types of tasks, scale of the tasks, physical size and dispersion of an organization responsible for the LANs within a large enterprise were significantly different than those of the organization responsible for routing and the

⁵⁴ Lawson, S. (1996, October 21). Cisco cuts off IOS for Cabletron. *InfoWorld*, 18, 43, 47.

enterprise's WANs. As was mentioned previously, the teams responsible for LANs were often at a lower level of the IT organization hierarchy, and although extremely knowledgeable on their pieces of the infrastructure, often do not have the "big picture" perspective required of the router technicians.

Cabletron's legacy as a supplier of LAN equipment gave it a different perspective on the marketplace. I will refer to this perspective as the "edge-in" perspective as opposed to the "core-out" perspective that Cisco arguably had. The argument can be made that the "edge-in" companies such as Cabletron had a slight disadvantage in recognizing the disruption the commercial applications of the Internet that loomed on the horizon in the early 1990s. Much of the characteristics of firms inability to stay atop of their industries when they confront certain types of market and technological change described in *The Innovator's Dilemma* pertained to Cabletron during this period. The adoption of their LAN equipment was widespread, and accelerating. Cabletron was in the midst of eventually stringing together over thirty consecutive quarters of revenue growth, breaking the billion dollars of sales mark for the first time in 1995 with an essentially 100 percent direct sales strategy. The founders were on the covers of several of the leading business periodicals and the company gaining acclaim as being among the fastest growing firms in the world. Although the Internet was gaining momentum, and routing was absolutely essential technology for connecting enterprises to the Internet, Cabletron did not fully grasp the implications of the Internet on its business and the market for enterprise data communications equipment.

LAN equipment in the early 1990s was relatively less complex than routing. Device-level configuration tended to be straightforward and accomplished through a menu-driven user interface as opposed to the arcane command line interface utilized for routers. Capacities (e.g., number of ports), performance (expected to be "line-rate" or the maximum data rate specified by the standard on all ports), and lastly manageability were the primary points of differentiation for LAN equipment. Differentiation on features was difficult because the device-level functionality of equipment such as wiring hubs was dictated primarily by the standards.

Unlike routers, LAN hubs and the early LAN switches did not provide nearly the opportunities for standards extension—the addition of proprietary features by vendors on

top of the standards functionality which effectively enabled the creation of soft standards and local customer lock-in discussed in the previous chapter regarding the Cisco router IOS. Wiring hubs primary functionality operated at a lower level of the OSI reference model than routers, thus the services they provided on the network were in many ways less sophisticated. Before the advent in the late 1990s of the hardware-based switch-routers that moved much of the support for IP routing into hardware and achieved line-rate routing functionality, it was generally accepted that routers were lower performance devices and were relegated to providing WAN connectivity (WAN links at the time were limited in bandwidth relative to LAN links) and logical segmentation of LANs, and other core functionality. LAN devices such as wiring hubs provided the high data rates needed for connectivity of end stations, servers, printers and other devices interconnected within an enterprise network.

In the first half of the 1990s there was a vast disagreement within the industry of how enterprise network architecture would evolve and whether or not the use of routing within those networks would increase and the numbers of routers proliferate. The edge-in companies such as Cabletron and others argued that widespread use of routing added significant complexity and cost to enterprise network infrastructures, and that the relatively low performance of routers created potential bottlenecks and should only be used for what they were originally designed: as special-purpose gateways that interconnected high speed networks over relatively lower speed WANs.⁵⁵ 80 percent or more of network traffic in these pre-Internet days was contained to the local network it originated on, with only a small portion needing to be routed to other networks. The “core-out” companies such as Cisco vehemently disagreed, arguing that the intelligent segmentation provided by routers operating at the network layer of the OSI model was necessary to overcome the limitations of large, “flat” networks pertaining to the control of some types of traffic that potentially could impact performance and manageability of very large LANs without routers at the core.

⁵⁵ It should be noted that this thinking was not restricted to Cabletron. Microsoft at the time had created the largest, non-routed enterprise campus network, effectively connecting thousands of users and devices on a single, flat network with routers only at the Internet connection that was less complex and provided higher performance.

Cabletron focused a great deal of its R&D resources on creating LAN devices that would radically improve the scalability of enterprise networks allowing for the construction of very large “flat” enterprise LANs that would utilize routers only as gateways to other networks. The result of this effort was a proprietary technology that Cabletron called SecureFast Switching which offered an alternative to adding routers to the LAN in large environments. It was successfully adopted at a number of very large enterprises such as the University of Southern California, at a large number of GM manufacturing plants, Goodyear Tire and Rubber and several large multinationals. SecureFast utilized standards-based technologies such as Ethernet, FDDI and ATM but in addition it utilized additional software running on the devices and an in-band GUI management application to provide advanced services that provided segmentation and advanced security and network management features at line-rate performance. Essentially SecureFast provided an alternative that provided most of the advantages and benefits of routing for significantly less cost, complexity and at much better performance.

The major issue with SecureFast however was the fact that it required an extensive amount of proprietary extensions on top of the standards-based functionality and that was very visible to many customers that considered it as an alternative to the traditional router-centric architectures that Cisco and others advocated. The question of why SecureFast was viewed as being more of a proprietary extension or somehow less interoperable than Cisco Systems use of proprietary extensions is difficult to answer fully. It is easy to attribute it to good marketing versus poor marketing, but that does not explain all of it in the opinion of the author. However, the amount of FUD (Fear, Uncertainty and Doubt) generated in the market about so-called “Flat” networks was significant and SecureFast had complexities and limitations. For whatever reason, networks engineered to utilize SecureFast were considered to be non-interoperable although they were in fact interoperable with traditional LAN equipment and routers. In essence, SecureFast was very similar to the Cisco-proprietary router IOS features discussed in the last chapter in that the special SecureFast functionality could only be realized using Cabletron equipment. Despite that fact combined with offering many advantages over the router-centric architecture being promoted by Cisco Systems, SecureFast never gained significant market traction.

Probably more importantly it may be argued; the R&D focus on SecureFast potentially resulted in Cabletron being late in embracing the LAN switching technology that Cisco eventually used to take the LAN connectivity segment of the market away from Cabletron and the other hub vendors as described in the last chapter. Cabletron was arguably late adding LAN switching products to its offerings due in part to the focus on SecureFast and a very large investment in its second-generation wiring hub. Cabletron found itself playing catch-up in the LAN switching space exacerbating some of other strategic choices outlined in this chapter. Additionally, the intense focus on the enterprise LAN and wiring closet connectivity might have contributed to the delayed realization of the potential disruption that the Internet held in store for the market. Many have commented that the rise of the Internet caught Cabletron by surprise as well. Certainly not having routing and Internet Protocol among its core competencies was a disadvantage for Cabletron and several similar companies.

It should be noted that in addition to data communications equipment, Cabletron had also made a significant investment in the development of an advanced, systems management software application that was used for the management of large enterprise networks. What was interesting about the product, called Spectrum was that it was a standards-based, multi-vendor platform that utilized several technologies that were leading edge at the time and garnered several patents for Cabletron. The product competed directly with OpenView™ from HP, and a number of other high-end platforms. Unfortunately Spectrum was a “software product trapped in a hardware company,” a company that did not necessarily have the competencies to recognize the market potential for a sophisticated enterprise software application. As will be outlined throughout this chapter Cabletron was very reluctant to move into intermediated channels which arguably an enterprise software product absolutely requires to gain traction in the market. Hence the Spectrum product was utilized primarily by the direct sales force selling Cabletron’s hardware as an instrument to win business for Cabletron equipment. Spectrum was eventually spun-off as a separate company ostensibly to go public, but an IPO never materialized and the company was sold to Gores Technology at a fraction of its value then resold to Massachusetts-based Concord Communications in 2004 for \$93M.

Cabletron Sales Strategy

The selling process for LAN equipment such as wiring hubs was very different from selling routers in the early 1990s. Rather than enterprises requiring consulting their service provider for recommendations for customer premise routers, the LAN equipment manufacturers such as Cabletron or the intermediaries of the channel-focused SynOptics had to raise awareness of their offerings, differentiate themselves and finally help the customer wade through many technology decisions in order to develop a bill of materials and network design. By their very nature LANs extended throughout the facilities of an enterprise and the equipment was placed in wiring closets if available, anywhere it would fit if they were not. Rather than being confined to a climate controlled data center, the LAN equipment was distributed throughout the buildings. Determining where connectivity had to be provided, in what quantities and across distances dictated what equipment was required—after the customer had chosen Ethernet or one of the other available technologies at the time. It was a very advanced pre-sales process, followed often by an often long and complex post-sales installation project. This process might be repeated for several different locations of the same company—standardization of LAN technology and vendor across the large enterprises typically occurred well after routing standardization as stated earlier.

Throughout most of the early and mid-1990s it was not entirely clear that Ethernet and IP would become the dominant designs. Early in its history Cabletron's sales effort were focused on the technical decision makers, at the director level and below within an enterprise IT organization or in some cases the facilities managers who would install and maintain the LAN infrastructure.

Cabletron's approach to sales within this target market was to create a large direct sales capability that included a headquarters-based telesales organization. The corporate-based telesales organization developed leads through cold calling, direct mail campaigns and other lead-generation techniques. Early in its history Cabletron was overwhelmingly predisposed to direct sales. Both founders had come from sales backgrounds, and Bob Levine who was president of the company through 1996 was an outspoken critic of the indirect sales model and intermediaries. His open criticism of the intermediated channels established a reputation in the channel community that Cabletron was anti-channel, and

the Cabletron direct sales force had earned the reputation in the marketplace for being ruthless. Part of this was the heritage of the sales force emanating from the reputation of its leader, the president and cofounder Bob Levine. The popular mythology around Mr. Levine was that he occasionally would attend sales meetings in combat fatigues wielding machetes or other weaponry. The legacy of that reputation turned out to be very difficult for the company to reverse as will be outlined later in the chapter.

Leads were qualified further by a headquarters-based inside sales organization that made customer appointments for the field-based outside sales representative, assisting the outside representative with the sales process from end-to-end for an assigned group of accounts, typically within a geographic area. Cabletron had not only a technical call center that provided phone support for customers, but had developed other post-sales service organizations that worked with the sales teams to provide proposals and network designs, cabling and implementation services. In addition Cabletron had developed an organization of post-sales support engineers based in the field that assisted customers with network expansions, upgrades, configuration changes as well as troubleshooting when issues arose. Understanding the multi-vendor nature of these infrastructures, the Cabletron field support force became very knowledgeable on a wide variety of equipment from a number of vendors. In short, there were a number of organizations that Cabletron utilized to support its customers directly, field and headquarters-based, in sharp contrast with Cisco's model of small, autonomous account teams that handled most of the customer needs from the field with limited support from headquarters. The presence of a fairly large and technically Cabletron service organization created an immediate problem for an intermediated channel strategy that should be clear to the reader. Not only did Cabletron's sales force have the reputation for taking deals direct, they serviced these customers when needed with the Cabletron service organization which in essence competed directly with the channel. This was another unique attribute of the Cabletron go-to-market; other manufacturers had very small service organizations that might be utilized to provide direct support of key customers on an exception basis. At one time in the early 1990s the Cabletron US Networking Services group that provided proposal and network design support for the field sales force numbered nearly 100 full time employees. Cabletron built a fairly large service organization and utilized it to provide extensive pre-

and post-sales services to its accounts. This in part earned the company a very high reputation for excellent service amongst a very loyal installed base, due at least in part to the fact that many of these services were provided gratis by the sales team as a way to win opportunities.

Having access to a large post-sales organization for the development of network designs and proposals, assisting customers with installations and troubleshooting created a much different environment for the Cabletron sales organization. The Cabletron sales force built strong relationships with its key accounts and would often utilize post-sales resources to ensure customer satisfaction remained high, often free of charge. In essence, Cabletron had a much larger direct sales infrastructure, not to mention a corporate culture that was undeniably predisposed to direct sales. Like Cisco pre-1994, Cabletron's approach to scaling the sales effort up was very similar: as territories expanded, resources were added. The difference of course was that scaling outside account executives led to potentially scaling the size of the proposals group, the inside sales group, as well as the post sales support groups. As cumbersome and costly as this may have appeared to the outside observer, the company was committed to growth in this manner and it was sustainable for some period of time early in the company's history due to the very healthy margins the company was able to achieve on its intelligent wiring hub products in a rapidly growing market.

By 1994 the Cabletron direct sales force had grown to approximately 1,600, with the majority of them based in the US.⁵⁶ Cabletron's direct competitor in the hub market which was approaching \$3B at the time was SynOptics. [As a point of reference, the market for routers at the time was approximately \$2B, and Cisco had achieved 50% market share at that time] Cabletron and SynOptics controlled over half the market for the intelligent wiring hubs used in constructing enterprise LANs at the time. The sales strategies of the companies could not have been more different. SynOptics had always utilized an intermediated channel strategy—the entire company at this time was approximately 1,200 people, less than the size of Cabletron's direct sales force. SynOptics had built a network of intermediaries reportedly numbering approximately 350 dealers and VARs which resold its hub products and provided the required design and

⁵⁶ Labate, J. (1994, October 31). The battle for your PC network. *Fortune*, 130, 9, 189-192.

installation services; 90% of SynOptics sales were going through the channel at this time. The number 3 competitor in the space at the time, 3Com Corporation also used a primarily an intermediated channel strategy. 3Com focused on the lower-end of the hub market and utilized many of the same intermediaries that SynOptics utilized for its products.

In July 1994 SynOptics and Wellfleet Communications announced a merger, combining the hub products of SynOptics with the router products of Wellfleet after the company began collaborating on a LAN switching product. The new company would be called Bay Networks. Wellfleet at the time held only 15 percent of the router market, a distant second to Cisco and both companies were clearly concerned about LAN switching potentially disrupting the market. The reader might recall from the last chapter that Wellfleet at the time generated roughly 55 percent of its sales through channels, but had a capable direct sales arm as well. At least one article from the research claimed that one consideration resulting in the merger negotiations was enabling SynOptics to access Wellfleet's direct sales force. The article went onto explain SynOptics flat revenues in the first half of 1994 in a rapidly growing market were partially blamed on its intermediaries overestimating demand for SynOptics products and excess inventories. The article suggested that the Wellfleet direct sales force would "wean SynOptics from its risky dependence on outsiders."⁵⁷ No doubt this is also resulted from increasing competition in the space from 3Com and Cabletron, not to mention the emergence of LAN switching that had frozen some hub purchasing decisions as companies evaluated the new technology.

In summary by 1994, as Cisco had completed its acquisitions of LAN switching companies enabling it to begin competing directly with the wiring hub vendors and had announced its own intentions to expand its sales activities into intermediated channels, Cabletron was the last company amongst the "big four" to retain a near 100 percent direct sales strategy. By November of 1994, the company had grown through direct sales to be a \$600M in sales manufacturer of LAN hubs and related equipment, posting 22 straight quarters of earning gains and consistently achieving margins of 60%.⁵⁸

⁵⁷ Labate, page 191.

⁵⁸ Reingold, J. (1994, November 8). Soldiers of fortune. *Financial World*, 163, 23, 54-56.

Throughout 1995 Cabletron held firm to its direct sales strategy, and despite the merger of SynOptics and Wellfleet, several additional acquisitions by Cisco (eight companies total including Crescendo and Kalpana discussed in the last chapter, including another LAN switching company, Grand Junction Networks for \$350M in stock for a company with roughly \$6M in revenues at the time), and the acquisition of LAN switching company Chipcom by its direct competitor 3Com in 1995, the company continued to go to market primarily alone. The founders were very much in control, yet potential issues had begun to surface with the company and its strategy, including its focus on direct sales. Cabletron which was the largest of the Big Four in 1990 was now number four behind Cisco, Bay Networks and 3Com.⁵⁹ In an interview conducted with the founders in January of 1996, Bob Levine, cofounder and then President of the company responded to a series of questions about the executive team's commitment to the current sales strategy:

“Interviewer: What about your direct sales model? Is there a time when you could see changing it?

Levine: No. We think it is paramount to have direct contact with our customers. We need to know what they're doing, what they're thinking and where they want to be going, so that the products we're developing are for real-world applications. We need to know where they're looking to be in five years because the development needs to take place today.

Interviewer: Don't direct sales also limit the market that you can sell into?

Levine: From Wall Street's standpoint, yes. We don't have access to all of the lower markets, and that is by design. We are known for the best support in the industry. If we grow too fast and start to get greedy, start to access additional markets, we can't grow our support infrastructure that fast. So, direct sales is the governor on our growth that we intentionally employ for the benefit of our customers.”⁶⁰

⁵⁹ Nee, E. (1996, January). “Interview: Bob Levine and Craig Benson,” *Upside (US ed.)*, 8,1 page 60-67.

⁶⁰ Nee, page 62.

Competition for the wiring closet was beginning to intensify upon the entrance of Cisco and its LAN switching products which by this time were being sold through its channel. In 1995 Cabletron shipped 160,200 switched Ethernet backbone ports and Cisco shipped 95,000. However in the first half of 1996, Cabletron shipped 209,000 ports while Cisco shipped 612,000 ports in the same period.⁶¹ This reversal was due in part to strength in the workgroup switch⁶² space that Cisco had gotten directly through its acquisitions but was increasingly being leveraged to win backbone and wiring closet business, previously dominated by Cabletron and Bay Networks. Cabletron was slow to develop a workgroup switching product, but more importantly potentially was its reliance on a direct sales force that was experienced in the wiring closet sale and not in the workgroup space. The primary product that Cabletron was relying on to defend its share in the LAN connectivity space at the time provided more capacity than a number of customers needed so the lack of a product to defend against Cisco's onslaught exacerbating limited channels to market that Cabletron had at the time.

At a well-attended industry trade show in the fall of 1996, Cabletron became the last of the Big Four to announce an intermediated channel strategy, surprising both industry analysts and the data communications intermediary channels. Many in the industry commented that it might have been a little too little, a little too late upon the announcement. Understanding that Cisco, the second-to-the-last company to move toward intermediated channels had at the time a two year lead on Cabletron, many questioned the ability of the company to gain ground. The initial plan announced at this time spoke only to a single-tier program directed at "high-end integrators" and dismissed sales through distribution in the near term. Then Executive Director of Worldwide Sales for the company, notably not the CEO or President, cited "losing deals because customers wanted integrated solutions" as the impetus for the radical change in Cabletron sales strategy.⁶³ Details of the program itself were rather unclear other than the program was modeled after what had been deployed by Cabletron in non-US markets earlier that year.

⁶¹ Lach, E. (1996, August 26). Cabletron fights for wiring-closet turf. *Communications Week*, 105.

⁶² Recall the discussion in the previous chapter: like many disruptive technologies, LAN switching functionality did not allow it to compete directly with the incumbent wiring hubs immediately. The first-to-market LAN switching products were modular workgroup products that were eventually scaled-up to compete directly with wiring hubs.

⁶³ Presti, K. (1996, September 23). Cabletron enters channel as competition intensifies. *Computer Reseller News*, 702, 8.

As an initial target for the mix between direct sales and intermediated channel sales, the executive specified 60-40 but went on to say that “we probably won’t be as indirect as some of the other major networking vendors.”⁶⁴ Again, at about the same time that Cabletron was making this change, Cisco refused to renew the Cabletron license for access to the IOS, leaving Cabletron without a routing solution and leaving the status of support for its fielded router modules in question. Although Cabletron was actively positioning its SecureFast technology at the time which minimized the need for routing, it still was left without direct access to routing intelligence for its customers. SecureFast provided no WAN functionality whatsoever. This action by Cisco was part of an overall escalation of rivalry between the two companies both in the marketplace and in the press but the end result was leaving Cabletron without a key part of enterprise data communications equipment.

In August of 1997, Bob Levine cofounder of Cabletron and then President of the company announced his plans to retire in the fall of that year. As part of the change, the company announced that an outsider Don Reed a former top-level NYNEX executive would be taking the role of President and Chief Executive. Reed’s stated intentions at the time of his accepting the role included acquisitions and repair of the reputation of the company with intermediated channels; however he went on to reiterate what was said a year earlier that “he does not anticipate Cabletron becoming dependent upon its channel partners as many of its competitors.”⁶⁵ However, things would soon be changing at Cabletron.

In November of that same year, Cabletron announced a bold acquisition of the remains of once mighty Digital Equipment Company’s networking business for approximately \$430M. The deal was positioned primarily as an attempt by Cabletron to buy its way into an established network of intermediated channel relationships. The Digital Networks Product Group had well-developed intermediated channels to market, including in Asia. The deal was positioned as a net positive for the former DEC VARs as

⁶⁴ Presti, K. (1996, October 14). Cabletron looks to channel. *Computer Reseller News*, 705, 73-74.

⁶⁵ Anonymous. (1997, November 3). Cabletron. *Computer Reseller News*, 761, 72.

it provided access to Cabletron's product line.⁶⁶ Other observers of the market however viewed it as an act of desperation.

In the next month, the new Cabletron chief executive announced the first miss of quarterly revenues by the company in its history followed soon after by announcements of the first large-scale layoff in the history of the company, some 10 percent of the workforce or 600 people. In addition, the press reported that as part of a planned restructuring, Cabletron would replace its direct sales model in the face of criticism that its rivals had captured market share by utilizing intermediated channels.⁶⁷ For the fiscal year ended February 1998, Cabletron would report a wide loss of \$127.1M on sales of just under \$1.4B, its first loss as a public company; in fact the miss in the third quarter of that year ended the streak of 32 consecutive quarters of the company exceeding analyst expectations. In their fiscal year ending July 1998, Cisco Systems, by then far and away the largest of the Big Four, would report *net income* of \$1.35B on sales of \$8.5B. Recall from the last chapter that in 1997 non-router revenues topped router revenues at Cisco for the first time—the major product category generating the most revenue for Cisco was LAN switching, the technology that had displaced hubs and Cabletron from the wiring closets of enterprise LANs.

Cabletron was down but it was not out. In February of 1998 it acquired an enterprise-class routing solution via the acquisition of a silicon-valley startup called YAGO Systems. YAGO was one of the first startups to successfully design and manufacture a new type of router, the “switch-router” that utilized next-generation ASIC technology to “harden” the routing functionality provided in software in traditional routers. The switch-router arguably was a major innovation as it achieved wire-speed routing performance on every port and Cisco was slightly behind in the development of its own switch router. This gave the company some hope to challenge Cisco's stranglehold on the router market if the product could gain traction with the intermediaries such as those Cabletron gained access to via the Digital Network Products Group acquisition.

⁶⁶ Presti, K. (1997, December 1). Cabletron buys its way into channel with Digital deal. *Computer Reseller News*, 766, 10-11.

⁶⁷ Maremont, M. (1997, December 17). Cabletron plans plant closings, 10% job cuts. *The Wall Street Journal* (Eastern edition), 1.

Also in that timeframe, Cabletron moved to turn on its initial e-commerce capability becoming the third of the Big Four to do so. Like Cisco, Cabletron had also made a significant investment in an ERP system in the mid-1990s. Unlike Cisco however, the rollout of that system companywide was not yet completed into the early 2000s. Enterasys' utilization of Internet-enabled IT and next-generation enterprise software applications internally was not nearly to the degree that Cisco had achieved, and its extension of its own network to suppliers and manufacturing partners was not nearly as sophisticated or comprehensive. Its support of intermediaries up until the present day is still at a level far, far below that provided by Cisco which has had a significant lead in this area of intermediated channel management over all the remaining manufacturers. At the time of the first beta release of Cabletron's web-based e-commerce and support capability, Cisco had generated \$2B in revenue in the previous year of operating its own e-commerce website.⁶⁸ Bay Networks followed soon after just before it was acquired by traditional telephony giant Nortel Networks in June of that year.

Cabletron at the same time was trying to accelerate its traction with intermediaries who now had been working and developing relationships with its competitors for four years or more. In 1997, the company was able to sign agreements with 25 US intermediaries, and was hoping to have 75 to 80 by the end of 1998, and eventually exceeding 50 percent of sales through intermediaries.⁶⁹ Despite initially planning only a single-tier model, Cabletron had also signed two distribution partners in the US that would service VARs and dealers. The recently appointed director of Cabletron's channel program held up the CEO Don Reed as a "vocal supporter" of channels claiming that commitment by the new CEO combined with incentives would entice the direct sales force to work with intermediaries in the field and not take opportunities direct.⁷⁰ When questioned what he thought his challenge was in making the transition to a channel-focused organization work, his reply was "It's all the things you would expect-building an infrastructure and educating everybody, getting our internal organizations focused,

⁶⁸ Wallace, B. (1998, March 10). Cabletron to switch on E-commerce site," *Computerworld*, 32, 11, 24.

⁶⁹ Dimitruk, M. (1998, March). Cabletron plays catch-up," *Reseller Management*, 21, 3, 72-73.

⁷⁰ Dimitruk, page 73.

getting people to understand how to work with partners, and getting past our history of channel relationships.”⁷¹

In March of 1998 Cabletron CEO Reed was pushed aside as one of the original founders, Craig Benson, retook control of the company as CEO and appointed a new channel executive that came to Cabletron in the Digital acquisition. In May of that year, Benson articulated his own view of the value proposition Cabletron had for intermediaries willing to defect to its data communications equipment offerings:

“We want the channel to make money. I’ve found that the other major vendors are fairly over-distributed in the channel. That means five guys will show up at one account with the same product, meaning that the lowest margin generally walks away with the business. I don’t think that is helpful to the channel, and I do not believe it’s healthy for the company selling into the channel. We are going to make sure we don’t oversubscribe the channel.”⁷²

The message that Cabletron was looking primarily for a means for fulfillment of its products versus providing offerings that could help intermediaries differentiate themselves in the market was overwhelmingly clear. Most importantly it was indicative of the level at which Cabletron was operating at the time, that being years behind its competitors that were clearly already making the transition between basic fulfillment and a true value-added intermediated channel program. The type of intermediary it attracted at this time was primarily at the fulfillment end of the spectrum, and the effort by the company to “prime the pump,” by turning over additional direct accounts to the channel had negative impacts on both the customer base and the sales force. Often times the channel partner was unable to service the account fully—it simply handled the transaction (often poorly) and the account team had to come back into assist in order to retain the customer. The negative feedback loop created by this issue had a large negative effect on the transition of business to intermediated channels. Despite incentives and other mechanisms to induce the Cabletron sales force to take business through

⁷¹ Dimitruk.

⁷² Presti, K. (1998, May 4). Cabletron forges new allies. *Computer Reseller News*, 787, 115-116.

intermediaries, negative experiences in the field resulted in greater resistance from the direct sales force.

Cabletron continued to try and woo intermediaries to its side, altering its direct sales force compensation to be “channel-neutral,” essentially paying the direct representatives equally for opportunities taken direct or with an intermediary beginning in the first quarter of 1998.⁷³ In addition, it announced plans for a channel marketing program. However, the channel was still wary as the sales performance of the company began to flounder. The stock of the company fell from a high in the summer of 1997 of approximately \$45 a share to \$8 a share in the fall of 1998. In the process Benson had seen the value of his remaining 12 percent stake in the company go from \$855M to \$152M.⁷⁴ Cabletron posted another heavy loss in its year ending February, 1999: \$245M on \$1.4B of sales. Cisco meanwhile increased its top line to \$12.1B and its net income to over \$2B as the telecommunications boom began. Cabletron did not participate in the windfalls of the Internet boom to the extent others such as Cisco did, but it likely gave the company some breathing room in trying to get its channels to market and other issues resolved.

In July of 1999, Benson stepped down from the CEO role and was replaced by the founder of the acquired Yago Systems. Benson was credited with the “significant growth of Cabletron’s channel” in his latest fourteen month stint as the CEO of the company, despite being at the helm for the largest loss in the company’s history.⁷⁵ In the process Cabletron had lost significant market share in the primary LAN technology of the time, LAN switching. It was no dead-last among the big four in market share for switching with 9 percent, trailing number three Bay Networks with 12.7 percent, 3Com with 20.5 percent and new market leader Cisco with 39.5 percent.⁷⁶ On a high note, the business that Cabletron was winning was increasingly going through intermediated channels. Sales through intermediaries now in 1999 accounted for greater than 50 percent of sales up from 35 percent the year before.⁷⁷ In a prepared statement the new CEO outlined his four immediate goals: expand sales to the Fortune 1000 customers, go after service providers

⁷³ Caisse, K. (1998, August 3). Cabletron looking to boost business. *Computer Reseller News*, 801, 24.

⁷⁴ Lyons, D. (1998, October 5). Hub bubble. *Forbes*, 162, 7, 62-64.

⁷⁵ Aragon, L. (1999, June 7). Cabletron gets new chief. *VARBusiness*.

⁷⁶ Ibid.

⁷⁷ Ibid.

(a new market segment for Cabletron), spin-out the company's network management business, and get Cabletron into professional services...⁷⁸ The spokesman went on to reassure its intermediated channel partners about the professional services goal, because it will be careful to continue to support the channel.⁷⁹ Comments such as these however did little to convince intermediaries that Cabletron had really become a channel-friendly company.

Recent Developments

In 2001 Cabletron Systems was broken into four separate and standalone entities. The largest unit named Enterasys Networks was essentially the original Cabletron, focused on the enterprise data communications market. It accounted for roughly 80 percent of the company's original revenues of the company, inheriting the majority of the installed base, direct sales apparatus and the intermediated channel relationships established in the latter part of the 1990s. In 2002 it was investigated by the SEC after accounting regularities with its revenue reporting procedures were discovered internally and self-reported. Subsequent to the investigation, at least nine of the former Enterasys executives were indicted by a federal grand jury on charges related to allegations of fraudulently inflating revenues, and four have entered guilty pleas to various charges, including its former CEO. The company paid \$50 million to shareholders in 2003 to settle claims against Enterasys.⁸⁰

The company continues to operate, fighting desperately to maintain its market share in its core product areas, LAN switching and routing, and continue to get mindshare with intermediaries at the high-end. The company has to adopted a solutions selling approach that it calls Secure Networks™, described on its web site as follows: "Leveraging our own technology and thought leadership as well as the strengths of our strategic partners, we strive to develop flexible, scalable, intelligent solutions that deliver real-world benefits to customers."⁸¹

⁷⁸ Aragon.

⁷⁹ Ibid.

⁸⁰ Enterasys Networks, Inc., Company Overview, Hoovers Online. Retrieved April 2005 from www.hoovers.com

⁸¹ Enterasys Networks Inc. Company Web Site. Retrieved April 2005 from www.enterasys.com.

For the most part, the company continues the work outlined in the comments of one of its first directors of channel programs in 1998: all the things you would expect-building an infrastructure and educating everybody, getting our internal organizations focused, getting people to understand how to work with partners, and getting past our history of channel relationships... The effort to do just that continues to this day, against great odds in displacing Cisco from the most competent intermediary organizations. It is a tough battle. Enterasys has faced adversity from almost day one, emerging in the midst of the largest downturn the industry had seen, an SEC investigation leading to former executives convicted of fraud, to a number of restructurings. Enterasys began as an entity with about 2,600 employees worldwide and was down to approximately 1,100 by the end of its 2004 fiscal year. Recall that Cabletron once boasted a direct US sales force of approximately 1,600 people. In its first full year of operations, it generated only \$484M in revenues and posted a loss of \$114M. In April of 2005 as this thesis is being completed, Enterasys released preliminary results for its first quarter ending in March of 2005 was significantly short of previously provided guidance. This led to a sell-off of the stock the next day driving the market capitalization of the company to a mere \$174M. Unfortunately for Enterasys, since the miss after 32 consecutive quarters of exceeding street estimates, quarterly revenue misses had become quite common.

Obviously the company has descended to its current state due to a number of factors. However, certainly the evidence outlined in this chapter supports the conclusion that Cabletron's rather late decision to utilize intermediated channels, and poor execution of the execution of an intermediated channel strategy was among the stronger causal factors in its loss of market share and general decline of the company. The author believes that there are several important learning to be gathered from these rather extreme examples, Cisco versus Cabletron that hold lessons for any company in the high technology space. The following chapter will provide a synopsis of those lessons, and hopefully provide guidance for intermediated channel managers in future markets.

Chapter 7: Conclusions

The study of intermediated channels provided in the thesis has focused on the areas of relationship management and the use of technology to provide a support infrastructure for an intermediated channel. Through this examination of these topics, it has covered many of the most difficult issues faced by channel managers. The case studies of Cisco Systems and Cabletron Systems presented in the thesis have provided two examples of implementation of intermediated channel strategies. These cases are of interest because they are taken from one of the most rapidly evolving high technology markets in history. The domination of open public standards in that market made value capture through uniqueness difficult for both companies. They were forced to consider the development of complementary assets such as superior channels to market as a primary method of value capture. Their approach to the development of this complementary asset was radically different.

At the time of the writing of the thesis, Cisco Systems has emerged as a dominant leader in virtually all segments of the market. Cabletron Systems, known today as Enterasys Networks has been relegated to a distant last in the enterprise data communications equipment market in a relatively short period of time. Despite the fact that the underlying technologies utilized in the offerings produced by both manufacturers were subject to open standardization making technical differentiation difficult, one company has captured dominant market share while achieving relatively rich operating margins. One of the many factors of the success of Cisco Systems to date has been the tightly-held complementary asset referred to throughout this thesis as multiple channel management capability. A comparison and contrast of the execution of the transition to a multi-channel model by these two companies offers the opportunity for learning for managers in future high technology markets.

The objective of this last chapter of the thesis is to summarize the key takeaways from the study of these two cases outlined in the thesis. Rather than a generalization about what might be best management practice in this area, reviewing the differences in the execution of a transition to intermediated channels by competing firms is likely to yield much more practical information for managers facing similar situations.

The characteristics of competition in high technology markets driven primarily by open and public standards require focus by companies that compete in those markets to begin the accumulation of complementary assets very early on in the life of the firm. Without the benefits of intellectual property protection firms are unable to compete based on the uniqueness of their offerings for an extended period of time. Innovations both incremental and disruptive (such as LAN switching became for the wiring hub vendors as described in the thesis) provided only fleeting opportunities for firms to capture value through uniqueness. These innovations were rapidly incorporated into the standards which enabled firms to catch up quickly. The number of experienced engineers in the industry increased and standards evolved to encompass both “on the wire” and intra-system interfaces and protocols, spillovers of technology were increasingly more rapid.

The thesis illustrates that one of the most valuable and inimitable complementary asset a high technology firm can develop is expertise in the management of intermediated channels. Outlining a strategy to launch from a base of customers won through a direct sales channel to implementing a multi-channel model including intermediated channels can be a very effective way for a high technology firm to gain large and profitable share of a new market. The paper however has outlined how difficult the execution of such a strategy can be. However if one looks to the case of Cisco Systems outlined in the paper, it can be one means to win in an essentially winner takes all market even when open, public standards prevent proprietary lock-in of customers. Essentially Cisco Systems has accomplished a level of mastery of the multi-channel model similar to what Dell Computer has done with the direct channel for personal computers. Essentially what both companies have done in the development and management of their respective channel management capability appears on the surface to be somewhat imitable. Yet neither Dell nor Cisco has faced a successful challenge by their respective competitors to coopt their respective channels, even in the face of commoditization of the offerings themselves. Trying to understand precisely how Cisco Systems overcame the challenges outlined in the paper to become extremely successful in managing the multi-channel model should be of interest to any high technology company pursuing future high technology markets with similar characteristics.

Amongst the most important takeaways is that timing is often critical. Making the decision to move to intermediated channels is a critical decision. Ascertaining the readiness not only of the company, but of the intermediaries themselves is a key concern. In cases of very immature technology markets, at the bottom of the S-curve in the ferment stage, the companies in the space are hard pressed to look up from the business of trying to get to the point of exponential growth to think about sales channels other than the direct channel. However, once the exponential growth occurs and the company and industry are in take-off it can be much harder to make the transition to the employment of intermediated channels. This may be where having an experienced and disciplined leadership team can be of particular importance to the firm. Taking stock of where the company might be on the S-curve and its implications on which sales channels it chooses to employ at a given time can be crucial.

Reviewing the case studies of Cisco Systems and Cabletron Systems presented in the thesis it is interesting to consider the industry landscape in the 1993-1994 timeframe. Especially in the case of Cabletron, the company and its sales force had to have had a very clear view of the developments in the market, including the capabilities that the data communications equipment intermediaries were developing. Cabletron's primary competitor SynOptics Communications relied totally upon intermediated channels, as did the number three competitor in the wiring hub segment 3Com Corporation. Cabletron was clearly making a strategic choice in building a service organization and maintaining its focus on building a direct sales capability and the infrastructure to support it. The executives of the company were outspoken supporters of their near 100 percent direct sales model, dismissing the strategies of their competitors and the industry pundits. Trying to determine what the underlying logic of this management decision to pursue primarily direct sales provides some interesting insights. The reader may recall the quotations of the executive team in the press at this time. Those comments suggested that the primary reasons for this commitment to Cabletron's direct channels was founded in the belief that a direct sales force could maintain a closer connection to the customers in order to sense trends in the market, and that the direct sales model provided a "governor" on the growth rate of the company. Based on the fact that Cabletron largely was blindsided by both the LAN switching disruption and the emergence of the Internet

driving the need for routing solutions in its portfolio, the first of these arguments seems especially weak.

Cisco Systems clearly benefited from the trials and tribulations its primary competitor, Wellfleet Communications had in its own hybrid model of some intermediated channels and some direct. At that point, Wellfleet was only able to achieve roughly 15 percent market share to be the distant second to Cisco. The 50 percent market share it retained in the router market through its primarily direct sales model at the time probably provided Cisco Systems with several advantages as it contemplated the employment of intermediated channels. The relationships it had with both Cabletron and its competitors clearly provided it some insights into what was happening in the first adjacent market Cisco had targeted for expansion. The Cisco executive team clearly decided the channel was ready and focused its efforts on internal readiness, most notably the overhaul of its IT infrastructure. Of the Big Four, Cabletron clearly had the lowest level of internal readiness. The Cabletron executive team had clearly made the decision to stay the direct sales course, regardless of what was happening amongst their competitors or in the market. There is perhaps another lesson in that part of the case that is worth considering. Even if the firm makes the conscious decision to maintain a direct-only strategy it is probably prudent to maintain as positive a relationship with intermediaries as possible, and not attempt to alienate them through direct criticism or through criticism of the competitor's choice to utilize them.

The significantly late entry by Cabletron into the multi-channel model, attempting to repair and forge productive relationships with an intermediary channel after all their major competitors had done so, undoubtedly left them in a very precarious position. The reader will recall that the company announced its intentions to start employing a multi-channel strategy including intermediaries at the time of its first quarterly miss of revenue projections, and first net operating loss in thirty-two consecutive quarters of operations. As the reader will recall, there were also early indications of loss of market share as the Cisco workgroup LAN switching products began to take off. When viewed through the lens of the systems dynamics model presented at the end of chapter three, the potential for the vicious cycle result of the reinvestment loop is quite clear in this example. There was tremendous pressure both externally and internal to the company to deal with the

revenue shortfalls and profitability. This potentially resulted in the sales force not being able to commit to transitioning to support intermediaries, and the company being unable to make other needed investments in order to build multi-channel management capability. This could be a plausible explanation for why the company failed to navigate the transition.

In addition, the company was late with both LAN switching and routing in their product portfolio and lacked a comprehensive small and medium business solution which was a growing sub-segment of the market at this time. Intermediaries considering defecting to Cabletron were faced with a number of concerns: prior reputation of the company as being channel unfriendly, a product line with substantial deficiencies, limited brand awareness outside the Cabletron customer base and a very immature support infrastructure. Although Cisco at the time may have been approaching over-distribution and intermediaries were seeing pressures on the equipment portions of their margins, it may in fact have been too little, too late for Cabletron.

As was outlined in the paper at several junctures execution of an intermediated channel strategy requires comprehensive support throughout the leadership structure of the company. As changes go, making significant changes to the revenue generating machinery of a firm—working on the engine of an airplane in flight so to speak—is a significant change. The commitment to seeing the change through, not to mention all the change management tools and techniques need to be brought to bear. As was described in the systems analysis evaluation of this process in the third chapter, there is the very likely potential of a worse-before-better tradeoff to be experienced in the firm's transition. The executive team needs to be well prepared for this eventuality and prepare the company, investors and financial community as well so patience is afforded the company through the transition.

Drawing from the case studies, this is precisely what Cisco did. The mandate for the expansion from direct sales to intermediaries was directed from the top. Unlike Cabletron, the Cisco executive team had decided and spoke publicly about their decision to not try to do it all. At the time, Cisco Systems was broadening its product line and the market for routing as a whole was expanding rapidly as the power of the Internet for enterprise computing became apparent. Growing revenues in the router market which

Cisco dominated at the time may in fact have provided time for the transition to intermediated channels without an interruption in the revenue stream. Expectations for the new LAN switching line could have been tempered by the fact that it was a new market segment. Such conditions obviously make a transition to an intermediated channel somewhat less impactful. This may have provided the opportunity for Cisco Systems to capitalize on the virtuous cycle with the reinvestment loop outlined in the systems dynamics analysis presented at the end of Chapter Three. By continuing to grow their routing revenues as both the intermediated channels and LAN switching business ramped, this may have prevented the company from experiencing the vicious cycle effect of the reinvestment loop.

As outlined in Chapter Four, a significant factor in the accumulation of the capability to manage intermediaries and multiple channels is having the IT infrastructure in place to support the intermediaries. The state of enterprise software models facilitated by the Internet has made such capabilities practically the status quo today. However, firms must ensure that the architecture that is being implemented supports interconnecting the company virtually to its partners in the supply chain including intermediaries as described in the chapter. These architectural concerns need to be addressed at an early stage of the firm's development and can require significant investments far in advance of potential returns.

Cisco arguably may have had a significant advantage here given its privileged view of how internetworking and the Internet were likely to change this aspect of business. The company also made a rather large investment in these nascent technologies on faith that eventually gave them competitive advantage in the marketplace and with intermediaries. The takeaway is that just as innovative firms have to be vigilante for disruptions that potentially impact their products; they must be also on the look out for technology disruptions that have the potential to impact their processes. Certainly the evidence of firms being able to do either or both notably well is not good, but the lesson remains valuable regardless.

Brand equity and the presence of demand for a manufacturer's offering are very important determinants of success in intermediated channels in high technology. Intermediary firms depend on the air cover the manufacturer's brand equity and

marketing provide for them. Understanding the relatively small margins that the intermediary earns on the product portion of its revenues, the high-end value add intermediary especially, the effort they are likely to put forth to evangelize for a manufacturer is limited. The awareness of the offering and demand for it in the market have to be established to some degree. What this suggests for high technology manufacturers of course is that branding is important. A strong intermediary channel will help build the brand, assuming the quality of the intermediaries is maintained, however the channel cannot start from a position of too little brand awareness. Cisco Systems has been extremely effective in this aspect as well. While other firms have not been as aggressive in establishing and maintaining positive brand awareness, Cisco has taken steps to ensure that its brand is maintained. By continuing to brand aggressively Cisco has effectively prevented the accumulation of market power by intermediaries. Customers still request that the solutions delivered by their chosen intermediaries are “Cisco-powered.”

Lastly, the management of an intermediated channel strategy must be viewed as an evolving process that is capable of being tuned and re-tuned to meet changing market conditions. Flexibility is a necessary attribute of channel program and channel managers. Although intermediaries look for consistency in their manufacturing partners at the strategic level, they appear to be somewhat willing to accept changes at the tactical level as long as they are justified and communicated early. Being able to manage the relationship on this basis establishes the atmosphere of a partnership which is absolutely the key in these relationships. Frequent and seemingly arbitrary changes from the manufacturer can impact the stability of the relationship and loyalty of the intermediaries.

An example of this from the cases comes from Cisco Systems which has made significant structural changes to its channel programs in the last several years. In shifting from volume incentives to more qualitative incentives, it signaled the channel that the market was maturing. Cisco was effectively placing its intermediaries on notice that the expectation was that their intermediaries move up the value chain, and others might have to move out. Being able to deliver such a challenge is an indicator of its dominant market share and its mastery of the intermediated channel. For such a message to be received unaccompanied by defections to the competition, the intermediaries have to believe that

the support that Cisco provides will enable those intermediaries willing to make the investment will move up the value chain and continue to be successful. This is validation of Cisco Systems vast multi-channel management capabilities.

What will be interesting to watch in the near future is how this story progresses, how the evolution of the management of intermediated channels by the dominant player in the data communications equipment space continues—or potentially ceases. One potential outcome is that the hardware and software continue to commoditize until the point that the margins force a radical change in the business model. It is not inconceivable that an IBM-like evolution occurs that results in Cisco shifting its primary focus from “iron” to services, ending or significantly reducing the need for its indirect channels it developed through the 1990s and into the current period.

The convergence of the many types of digital communications beyond data toward IP and wired communications networks towards the Ethernet family of technologies creates some interesting dynamics in the entire telecommunications sector. As the appendices have outlined, there are many strong commoditization forces afoot today in the enterprise data communications market. There is new competition from overseas, most notably the entry by Chinese telecommunications giant Huawei. Data communications equipment offerings coming from Taiwan and other regions are increasingly appearing in the market. Enabled by open standards, merchant silicon and software, and the proliferation of engineering knowledge into many regions of the world, new entrants can offer very similar functionality at significantly lower cost points. Convergence creates both opportunities and challenges for Cisco, the remaining data communications equipment providers as well as the legacy telecommunications equipment manufacturers such as Lucent, Alcatel and Siemens. How the role of intermediaries evolve, and more importantly how the ultimately successful companies evolve their go-to-market strategies over this period should be intensely interesting.

Cisco has unseated incumbents and challenged stalwarts of the industry before, however it remains to be seen how Cisco continues to fuel its growth and profitability in the face of increasing commoditization. Certainly IP telephony is one potential area, as is the storage space. But the ability to differentiate itself solely on the technical aspects of its offerings has always been hard and will get increasingly so in the next few years.

Regardless of what the future holds, the past and present of the data communications equipment market clearly provides several important lessons for those leading the formation and execution of go-to-market strategies for high technology companies in the future. It is the hope of the author that this thesis has highlighted many of the strategic and tactical challenges posed by including intermediated channels in the go-to-market strategy of the high technology firm, and more importantly some practices that proved successful in meeting those challenges.

Appendix 1: The Data Communications Equipment Market, Past and Present

Introduction

In an effort to understand the market for enterprise data network equipment, it is important to have a basic understanding of how the technology and markets for it have developed and evolved, and the trends that will drive its continuing evolution into the future. The purpose of this appendix is to provide the reader unfamiliar with the data communications equipment industry with an introduction to this rapidly evolving market. It is important to realize that this market is relatively new despite its very large size. The evolution of the technology and the market are inextricably linked to the development of intermediary channels and the management of those channels by the data communications equipment manufacturers such as Cisco Systems and Cabletron.

Origins of Standards-based Local Area Network (LAN) Technology

The invention of standards-based, high-speed Local Area Networking (LAN) is often credited to Dr. Robert Metcalfe. This technology and the industry it spawned accelerated rapidly with the invention of the PC and Internet to become one of the primary enablers of the client-server, Internet-enabled enterprise architecture that has become predominant today. Dr. Metcalfe, a graduate of MIT and Harvard, was a researcher in the Xerox Palo Alto Research Center (“PARC”) in the early and mid-1970s at the time of this extremely important invention. In 1976, Metcalfe and his assistant David Boggs published a paper titled, *Ethernet: Distributed Packet-Switching for Local Computer Networks*. While at PARC, Metcalfe had been working with what would later come to be known as the first personal computers, the Xerox Alto. He and his small team were assigned a project to develop a local area networking solution to interconnect several hundred of these computers to another recent Xerox innovation at the time, high-speed laser printers. The goal of the project was to develop a relatively high bandwidth and scalable local area networking technology for connecting many computers to a common network to share these new page-per-minute laser printers. Consider that hundreds of small computers in one building alone was an incredible innovation at that

time—connecting them together with what grew to be an open, non-proprietary, simple and relatively high-speed and low-cost packet-based network was completely revolutionary! This feat was accomplished, based on an expansion of work Dr. Metcalfe had done for his Harvard PhD paper in 1973.

Robert Metcalfe left Xerox in 1979 to promote the use of personal computers and local area networks (LANs) not to mention become one of the most famous MIT entrepreneurs in recent history. He successfully convinced Digital Equipment, Intel, and Xerox Corporations to work together to promote Ethernet as a standard, and license the technology for a fairly modest fee. In 1980 Metcalfe formed the 3Com Corporation which became the first startup in the fledgling data communications equipment market focusing on standards-based Ethernet equipment. 3Com capitalized on Metcalfe's deep knowledge of Ethernet and reluctance by PC manufacturers to integrate Ethernet interfaces into their PCs. The original business plan of 3Com was to design, manufacture and sell Ethernet controllers and other equipment required to connect computers and other devices to standards-based Ethernet LANs. Now an international computer industry standard that has evolved through several iterations, Ethernet is the most widely installed LAN technology today by far. Dozens of companies were spawned to pursue opportunities created by the adoption of Ethernet LANs and complementary as well as competing technologies. In 2003 over 184 million new Ethernet connections were added worldwide, generating \$12.5B in manufacturers' revenues.

The Internet Emerges

Simultaneously to this development of the data communications equipment business was the latter stages of ongoing development of what has become to be known as the Internet.⁸² Most histories of the Internet trace its origins back to 1962 and a series of memos J.C.R. Licklider of MIT discussing his "Galactic Network" concept. In those memos, Licklider described a global interconnection of computers and the interactions that would be enabled through it—very similar to what we know some 40 years later as

⁸² Much of the description of the evolution of the Internet provided in this section was adapted from an online article entitled **A Brief History of the Internet**, by Barry M. Leiner, Vinton G. Cerf, David D. Clark, Robert E. Kahn, Leonard Kleinrock, Daniel C. Lynch, Jon Postel, Larry G. Roberts, Stephen Wolff. Retrieved April 2005 from <http://www.isoc.org/internet/history/brief.shtml>.

the Internet and World Wide Web. Licklider's insights long ago of the technologies which have revolutionized many aspects of the conduct of business and our personal lives over the last 10 years are truly uncanny.

At about the same time another MIT researcher Leonard Kleinrock was researching and writing about communications using packets as opposed to circuits which was a foundational technology for computer networking and the basis for Ethernet. By 1966 many of these concepts had been forwarded within the US Defense Advanced Research Project Agency (DARPA) and quickly culminated in a paper outlining the architecture for the first iteration of what eventually became the Internet, the "ARPANET," a network that would link the computers of several of the most prominent research universities and government research laboratories. In August 1968 the DARPA funded community had refined the overall structure and specifications for the ARPANET; an RFQ was released by DARPA for the development of one of the key components of the network infrastructure, the packet switches called Interface Message Processors (IMP's). The IMP RFQ was won in December 1968 by Bolt Beranek and Newman (BBN).

Due to Kleinrock's early development of packet switching theory and his focus on analysis, design and measurement, his Network Measurement Center at UCLA was selected to be the first node on the ARPANET. All this came together in September 1969 when BBN installed the first IMP at UCLA and the first host computer was connected. A project on "Augmentation of Human Intellect" at Stanford Research Institute (SRI) provided a second node. One month later, when SRI was connected to the ARPANET, the first host-to-host message was sent from Kleinrock's laboratory to SRI. Two more nodes were added at UC Santa Barbara and University of Utah. Thus, by the end of 1969, four host computers were connected together into the initial ARPANET, and the budding Internet was off the ground.

In October 1972 a large and very successful demonstration of the ARPANET was held at the International Computer Communication Conference (ICCC). This was the first demonstration of this new, wide area network (WAN) technology to the public. It was also in 1972 that the initial "killer" application, electronic mail, was introduced. In March an engineer at BBN wrote the basic email message send and read software, motivated by

the need of the ARPANET developers for an easy coordination mechanism. In July, the utility of email was expanded by the writing the first email program to list, selectively read, file, forward, and respond to messages. From these relatively modest beginnings the email application took off as the most important networked application for over a decade, setting the stage for the many client-server applications that followed.

During my own undergraduate work in computer science completed from 1982 to 1986, many of these developments were occurring somewhat under the radar and certainly had not made their way into the mainstream computer science curriculum at most universities in the United States. These two incredibly disruptive technological innovations—Ethernet LANs and the Internet—were rapidly gaining momentum and approaching critical mass as I graduated and entered the military service in 1986. Apple Computer had of course gone public in 1980, and Tim Berners-Lee completed a project while consulting at CERN later that year that is often cited as his first contribution to what would emerge ten years later as the World Wide Web. The PC and home computer was emerging rapidly (I was a proud owner of one of the first affordable home computers, the IBM PC Junior), but enterprise computing was still very much dominated by the time-sharing mainframe and minicomputers through “dumb terminals” and time sharing operating systems.

The transformation that occurred in the period from 1986 when I completed my degree, and when I re-entered the industry in late 1993 after completion of my military service was incredible as I look back on it! Microsoft Windows version 3.1 was released in 1992 and had become the de facto standard operating system for the IBM PC and the plethora of IBM PC clones that had emerged behind it. With relatively wide support for graphical user interface office applications from Microsoft and others, PCs were becoming increasingly more common on the desktops in businesses. Also important at this stage of the development of the industry was the rapid rise of Internet Service Providers (ISPs) such as Prodigy, America Online and many of the other pioneers that had brought the power of the networked PC into homes everywhere. Email and relatively simple access to the very basic online content predating the World Wide Web facilitated by the early ISPs had become to a great extent the “killer” applications that personal computers needed to move beyond the mere curiosities they were in their early,

standalone iterations throughout the 1980s.⁸³ The combination of a GUI operating system and rich, integrated suites of desktop applications had propelled PCs to standard equipment status on the desktops and increasingly into the homes of the rapidly growing numbers of knowledge workers world wide.

In the same year I left the military, the acceptable use policy for the Internet was reinterpreted allowing commercial uses for the first time. This momentous change ushered in e-commerce and a vast number of other potential commercial applications enabled by a world-wide packet switching data network. Not quite a year later, Marc Andreessen and several of his colleagues left NCSA taking their Mosaic Web Browser with them to form what eventually became Netscape. What occurred between that time and the burst of the “Internet bubble” has for all intents and purposes become part of popular culture in most parts of the world.

The Drive toward Open Standards

At some point in his career, Robert Metcalfe formulated what has become to be known as Metcalfe’s Law. Metcalfe’s Law states simply that the *usefulness, or utility, of a network equals the square of the number of users*. According to one source, Metcalfe’s Law first appeared in an article appearing in Forbes ASAP by George Gilder in September of 1993.⁸⁴ Purportedly it was in that same year that the Internet reached critical mass with roughly 2.5 million host computers connected. By November of 1997, that number had grown to over 25 *million* host computers.

Enterprises in all industries across the globe were taking part in the shift to the new enterprise computing paradigm enabled by the networking of PCs. In the rush to deploy PCs and servers, and then to interconnect them, a myriad of issues requiring hardware, software and service solutions not required in the mainframe era were

⁸³ I distinctly remember an internship in the office of the controller in my senior year of undergraduate studies, circa 1985. The Controller’s Office had been assigned a brand new DOS-based Burroughs personal computer, with an early spreadsheet application I believe based on VisiCalc, and a dot matrix printer. My assignment for the internship was to “figure out” what to do with the PC—the Controller himself, who depended on the mainframe-based accounting system to run the college, told me he knew the PC was important but did not know why quite yet. Clearly he hoped the young, bright-eyed soon to be graduate of the CS program could help him figure it out.

⁸⁴ The article by George Gilder, “*Metcalfe’s Law and Legacy*”, was first published in Forbes ASAP, September 13, 1993. Retrieved in April, 2005 from <http://www.seas.upenn.edu/~gajl/metgg.html>.

emerging behind a steady stream of innovations in networking, computing and software. The opportunities seemed boundless as firms the world over rushed to usher in this new age and the opportunities it promised. The birth of a new category of information technology businesses, the enterprise data communications equipment vendors such as 3Com, Cabletron, Cisco and SynOptics and many, many others were formed in the midst of the development of what has evolved into a industry that has generated hundreds of billions of dollars and employed a vast number of people worldwide in the roughly twenty years of its existence. In the process an entire new category of information technology services was created and with it, many thousands of new organizations emerged to service the needs of businesses adopting these new technologies. The services provided by these firms ranged from reselling the equipment manufactured by the new data communications equipment manufacturers to building, maintaining and operating data network infrastructures for enterprises and the telecommunications service providers. The service providers were rapidly adding packet switching capabilities to the global circuit-switched voice network in response to the exponential growth of demand for data transport services.

It is important to note at this juncture that the data communications equipment market has been divided into two major segments since the late 1990s: *enterprise* and *service provider*. Early in the evolution of the data communications equipment market no such designation was necessary. Equipment purpose-built for the service provider evolved over time with the exponential growth in data traffic necessitating a new class of equipment providing the capacities required for the core of the service provider network which has evolved into the Internet today. There are other subcategories such as the relatively new consumer segment which emerged with the service providers delivering broadband service to households, requiring slimmed-down versions of that had been previously been enterprise equipment for the purposes of providing premise connection to the high-speed internet services such as cable and DSL, and increasingly for building out small home LANs with both wire-line and wireless technologies.

The focus of this paper is primarily the enterprise segment. The enterprise segment includes the equipment and channels used by firms of all sizes to provide network connectivity within their facilities (typically called “intranets”), to connect to

partners and suppliers utilizing private WAN links (“extranets”) and of course to connect corporate networks to the Internet itself. The service provider segment—that part of the market focusing primarily on the telecommunications service providers that provide long-haul and last-mile, public and private tariff-based services for individual and business consumers, forms another very large and important segment of this market. Although there are many parallels between these two subcategories, there are also many important differences most notably the types (e.g., capacities and capabilities) of equipment as well as the channels to these markets. It is important to note that many of the vendors covered in this paper sold to both the enterprise and service provider segments. Several of the manufacturers eventually developed different operational organizations including, product development, service, as well as sales and channel organizations that focused on the relatively smaller number of partners in the service provider segment and their requirements. They are not the focus of this paper.

Applications Drive Enterprise Adoption

At the time 3Com Corporation was being formed to bring Ethernet solutions to market, there were other proprietary network protocol offerings on the market already such as ARCNet, IBM’s Token Ring and Digital Equipment’s “DECNet” which at that time (1982) had evolved Ethernet local area network support as the datalink of choice with many proprietary extensions. Several companies such as Novel, Xerox, Digital Equipment and others had introduced specialized software—networking operating systems (NOS) as they came to be called that enabled file and print sharing over LANs residing on the first servers which provided file and print services. As was alluded to earlier in this chapter, probably the most important networked application in this early stage of the industry was email, followed closely by print and file sharing. Print servers allowed for many users to share printers on the network. In the late 1980s and early 1990s, Novell’s NOS that provided file and print sharing services on PC-based servers was a tipping point that drove widespread adoption of LANs for the enterprise.

LAN-based file sharing slowly ended the first PC “networking” protocol, affectionately known to the first computerized office workers as “sneaker-net.” That of course referred to the practice of sharing files by copying them onto floppy disks and hand-carrying the file to those you wanted to share it with. (Typically the files being

shared were accompanied by the latest virus, which unfortunately appeared on the scene very soon after the PC's emergence and the establishment of the precursor of the Internet as a file sharing medium, dial-up bulletin board systems (BBS)). File sharing was enabled by the server-side software of the NOS which enabled the establishment of multiple user "accounts" on the server which provided the user with a standard file structure for storing electronic files. Other users could be given access to that file structure as dictated by server policies established by the server administrator. File and print-sharing were some of the first true client-server applications beyond email discussed previously. The widespread adoption of the Novell NOS on servers brought businesses an alternative to the peer-to-peer networking protocols provided by AppleTalk and Microsoft NETBUI/NETBIOS that allowed some amount of sharing functionality between two or more general purpose PCs, but were never intended for the client-server model and application sharing that immediately followed print and file sharing.

Regardless of what NOS and applications were being used in a environment, the first requirement to take advantages of these new networking capabilities was that the computers, printers and servers and in some cases the legacy mainframe and minicomputer infrastructures all had to be interconnected physically via some local area networking technology. The equipment comprising the physical network infrastructure providing interconnection of devices consists of non-intelligent and intelligent devices such as hubs, switches and routers. This equipment and the software that provided management of network infrastructure was the domain of the data communications equipment companies such as 3Com, SynOptics, Cabletron and Cisco Systems and dozens of other entrants. These companies and this segment are the focus of this paper.

For PC and server connectivity, a special purpose card called a "Network Interface Card" or NIC and additional driver software was added to PCs and Servers to enable the device to communicate on the network, utilizing one LAN technology typically (e.g., standards-based Ethernet, Token Ring, etc.) to enable local area networking with other devices. LANs required the installation of a cable plant within buildings to support the data network. Cabling for LANs was modeled after the voice networks already in place in most businesses which utilized a scheme commonly referred to as "structured cabling." In structured cabling, "horizontal cabling" was used to connect

devices in the workspaces on a floor to a telecommunications closet (often referred to as a “wiring closet”). Wiring closets housed the network devices such as a hub or a switch that provided interconnectivity between the devices on that floor, typically within 100 meters of the closet. In larger and multi-floored buildings the vertical cable plant provided interconnectivity between wiring closets and floors, and to centralized facilities such as data centers and server farms.

Very early on battle lines were being drawn in this nascent industry as the manufacturers of data communications, NOS, PC and related equipment positioned not only their products, but the LAN and network protocol technologies implemented in their offerings. As companies the world over rushed to implement LANs and take advantage of the much vaunted benefits of client-server computing, opportunities to provide LAN solutions to businesses were abundant. As was alluded to earlier, initially the choices of technology and manufacturer were few: ARCNet, Token Ring, DECNet and the new upstart Ethernet standard being promoted by the data communications equipment startups such as 3Com, SynOptics and Cabletron. Companies that had an IBM, DEC or other legacy environment often turned to their incumbent vendor for solutions for transitioning their infrastructures to the new LAN, client-server environments. Other firms that did not have such a legacy, able to utilize PCs, LANs and client server applications provided very fertile grounds for 3Com and the other entrants in the data communications equipment market. These technologies enabled firms of many sizes to begin to utilizing IT for the first time. Mainframe and minicomputer systems were often well out reach economically for many firms. Several data communications equipment companies such as 3Com, SynOptics Communications, Cabletron Systems and Cisco Systems enjoyed very rapid growth through the 1980s and into the early 1990s.

As is the case around technology generally, sides were drawn by the incumbent information technology and the new entrants. The participants on both sides strengthened their arguments with publications from a variety of experts that claimed superiority of one technology over another. As Dr. Metcalfe half-jokingly suggesting one such paper enabled the creation of an entire new market segment that became the foundation of the 3Com product line. That paper was written by an influential MIT professor, Jerome Saltzer. Professor Saltzer co-wrote an influential paper suggesting that Token-ring

architectures were theoretically superior to Ethernet-style technologies. Ethernet utilizes a non-deterministic or contention-based technique that does in fact result in less than 100% utilization of the available bandwidth due to collisions on the shared medium. Token Ring and other more deterministic protocols result in greater utilization of the available bandwidth but at the cost of increased complexity and cost. This result, so the story goes, left enough doubt in the minds of computer manufacturers that they decided *not* to make Ethernet a standard feature on their devices early on, and therefore 3Com could successfully build a business around selling add-on Ethernet network interfaces for PCs. Similarly, in order to interconnect these network-enabled PCs, Cabletron, SynOptics, Cisco Systems and several other entrants pursued building the wiring closet and data center equipment that provided that interconnection. In the case of Cabletron and SynOptics, these companies focused on the design, manufacture and sale of the devices that became to be called wiring hubs. Cisco maintained its focus early in its history on routers which interconnected networks. The combined market for hubs and routers rapidly grew to become an approximately \$6B business by 1994.

As was mentioned earlier in this chapter, while Metcalfe was still at Xerox he organized an effort to reach out to Digital Equipment Corporation and Intel to form a consortium to pursue standardization of Ethernet. The “DIX” consortium published the first formal joint specification of Ethernet in 1980, making it publicly available for a nominal licensing fee. Two years later in 1982, the DIX Ethernet specification was adopted virtually unchanged by an international standards organization, the International Electrical and Electronics Engineers, or IEEE. The new standard, IEEE 802.3 becomes the foundation for the establishment of Ethernet as the global standard for interconnecting computers on local-area networks.

The literature I have reviewed does not go into great detail about what motivated Metcalfe to pursue development of Ethernet into an internationally standardized protocol. Metcalfe’s fundamental work in the invention of Ethernet had in fact been patented by Xerox. Metcalfe was committed however to seeing Ethernet adopted as an open, public standard that could be implemented by any manufacturer while achieving universal interoperability. This decision and activism on Metcalfe’s part undoubtedly was at least partially responsible for the widespread and rapid adoption of the technologies, as well as

the establishment of many companies that both manufacture and service the enterprise network infrastructures that have been implemented in the last fifteen years as the world has adopted PC internetworking en masse. Often I hear people introduce Dr. Metcalfe as the “inventor of Ethernet,” or “founder of 3Com Corporation.” I think this is a huge understatement of what he really accomplished through championing the open standardization of Ethernet and the establishment of the IEEE as the primary standards body for data communications protocols.

Metcalfe’s Law probably provides some insight to his motivations—clearly he believed in the power of network externalities, and possibly he concluded that the proprietary model necessarily slowed down adoption. Certainly his position as the founder of the first company to provide aftermarket Ethernet NICs that could be promoted as compliant with an international standard endorsed by industry leaders such as Digital Equipment, Intel and Xerox was also a motivating factor. Whatever the motivation, Metcalfe was determined to get Ethernet standardized internationally, purportedly pitching IBM that they should join the consortium and migration to Ethernet. IBM resisted, and then moved to standardize Token Ring, but as we shall see Ethernet eventually dominated Token Ring and all other LAN technologies becoming the dominant design again in no small part due to the open Ethernet standard and the innovation driven by competition.

The Evolution of Ethernet

The first iterations of Ethernet was via a true bus topology, implemented using a coaxial cable and devices called transceivers that tapped into the cable and provided connectivity to the NICs installed in the devices connected to the bus. Like any bus, the available bandwidth of the LAN was shared amongst the devices connected to that segment, or length of coaxial cable. As Ethernet LANs began to grow in popularity, several of the incumbent data communications equipment manufacturers and a raft of startups drove further innovations in the Ethernet product offerings and the standards. Infrastructure devices such as multi-port repeaters evolved into the wiring hubs that enabled interconnection of multiple LAN segments in a single device. Repeaters simply extended the LAN by repeating packets received on one port out all other ports. Because repeaters operate at the physical layer and make no intelligent forwarding decision,

achieving wire speed is relatively easy with little or no software in the forwarding path. With repeating though the bandwidth of the combined segments was limited to 10Mbps maximum specified by the standards and was shared among all the stations connected to the multiple segments.

The desire to move toward topologies better suited for large office environments led to revisions to the standard that added support for different cabling, most importantly twisted pair copper which had become popular for telephony applications in office environments. The use of twisted pair in conjunction with wiring hubs enabled what is referred to as the “star” topology for Ethernet LANs. Eventually the star topology became the preferred mode of cabling and topology for Ethernet LANs, and the use of coaxial cable and the associated network devices such as transceivers obsolete.

Digital Equipment is credited with the introduction of the first multi-port repeater. Digital was also among the first companies to offer standards-based Ethernet hubs. Ethernet hubs were utilized to interconnect multiple end stations as the device at the center of the star Ethernet topology. Several other companies including SynOptics Communications (spun-out of Xerox PARC in 1985), and a New England-based startup, Cabletron Systems, Inc. were pioneers in the rapidly growing market for these devices which were foundational to the widespread adoption of Ethernet LANs. By 1989 both SynOptics and Cabletron had completed very successful IPOs, and the enterprise segment of the data communications equipment market was growing at a blistering pace as companies adopted the new paradigm of distributed computing.

Enterprise LANs and the Internet Collide

As was outlined earlier in this chapter, concurrent with this development and evolution of enterprise networking was the emergence of the global Internet onto the scene. A venture-backed startup, Cisco Systems was founded in 1984 by two members of the computer science department at Stanford University. Cisco Systems was formed to design and commercialize a special purpose device which provided the internetworking and routing services, aptly named a “router,” to distinguish it from the Gateways that were utilized previously to interconnect networks. Routers were designed to replace the general purpose workstation or server-based Gateways used in the early days of the ARPANET, dedicating hardware and software to the routing function in a standalone,

special-purpose platform. The two founders of Cisco saw the proliferation of multiple, disparate networks on the campus of the University that were unable to “talk” to one another. Simply described, routers provide the functionality required to interconnect disparate networks.

Cisco Systems began its life as a company that built routers solely, and provided highly specialized devices that provided interconnection of LANs. Into the early 1990’s, enterprises connected geographically dispersed LANs through leased lines—dedicated circuits provided by the telephony service providers. This methodology, and the resulting private long-haul networks commonly referred to as Wide Area Networks or WANs, were utilized for connecting LANs across town, across the country and even internetworking LANs in different countries for the multi-national corporations. At each end of those circuits was a router that provided logical connection of the LANs, but also provided a “translation” function between the circuit-switched, TDM-based transport utilized predominantly by the telephony networks at the time, and the packet-switched, non-TDM technologies such as Ethernet employed in enterprise LANs. In addition, the router provided a translation function between different LAN technologies allowing interconnection of Ethernet to Token Ring for example.

Cisco Systems led the industry with the “multiprotocol” router that not only allowed the interconnection of different LAN technologies but also enabled the use of multiple logical network layer protocols (e.g., IP and Novell, DECNet) on a single physical infrastructure. Multiprotocol routing was a necessity for the largest enterprises that often found themselves interconnecting LANs constructed by different groups within the company utilizing different technologies, as well as interconnecting LANs across circuit-switched LANs. The early days of the race to transition to LANs, PCs and client-server were sometimes uncoordinated and non-standardized as some resistance or lack of resources or knowledge prevented the IT departments running mainframe and minicomputer environments from being able to fully plan and support enterprise-wide transitions. It was not until the latter part of the 1990s, due in some part to the looming year 2000 problem that the largest enterprises adopted centralized control and management of the network infrastructure of the enterprise, and established vendor and

other internal standards. Many companies have yet to complete standardization of their local area network environments.

In addition, as the telecommunications service providers faced increasing demand for data services by their coveted corporate customers, the resulting build-out of the infrastructure they required was highly router-centric and increasingly they turned to Cisco for the equipment and know-how to build out of their own packet-switched infrastructures. By the time Cisco completed its IPO in 1990, it was widely regarded as the leader in the equipment and technology knowledge in the wide area networking and Internet infrastructure and protocols. While many of the new data communications equipment startups as well as many of the other established computing companies continued to focus on the interconnection of computers within the enterprise, Cisco was developing a unique competency and market share in the WAN and Service Provider data communications infrastructure segments. It participated heavily in the Internet community and Internet Engineering Task Force (IETF) which provided the standardization efforts for the Internet. To this day, Cisco has a commanding share of the routers at the core of the Internet as this paper is completed in 2005.

One can make the argument Cisco Systems enjoyed a rather privileged perspective on what was happening in both the enterprise and service provider data communications market segments that few other companies in the space had the benefit of. The connection that the company had with the development of the Internet combined with its exposure to the trends in the development of large enterprise networking, one could argue put them in an advantaged position to “connect the dots” very early on. I have heard many industry insiders, including Dr. Metcalfe claim that they were aware very early on of the power of the Internet, yet did little to capitalize on this development in their corporate strategies to the extent that Cisco did as was illustrated in the body of the thesis.

There were other router-focused startups, such as Wellfleet Communications, and several others. Many entrants have tried to displace Cisco’s control of the routing market, Juniper most recently and with arguably the best success so far. More than any of the other players I would argue, Cisco had an almost unique vantage point for foreseeing not only the universal adoption of increasingly high-speed data networks by firms of every

size, but more importantly the emergence of the Internet as the primary public global telecommunications network infrastructure. The implications the two considered together would have on the evolution of the data communications industry I believe were clear to Cisco, and they developed a strategy for exploiting these two forces and executing on that strategy far better than others. The execution to date of their strategy to be the leading player in the enterprise and service provider markets has been nothing short of extraordinary.

While many companies such as 3Com, Cabletron and SynOptics remained focused on innovations in devices to facilitate interconnection of devices within an enterprise, and some direct competition from Wellfleet Communications, Cisco found itself with feet in two very exciting camps. It expertly triangulated the intelligence that such a convergence of enterprise computing and the Internet was in the offing. While it was building devices that facilitated interconnection of enterprise LANs and was closely following the trends in that segment, it was also actively participating in and driving the creation of a global, next-generation network that would become the public Internet. It participated at virtually every level in both these segments.

Beginning in 1993, Cisco Systems undertook an aggressive strategy of expansion via acquisition to include just about every data communications equipment and software component required for local area, wide area and Internet connectivity for every imaginable market segment: enterprises of all sizes, service providers and most recently the home segment of the market.

At the time of the initiation of the expansion by Cisco, I was employed by Cabletron Systems which had established itself as one of the leading data communications companies, sharing dominant market share in the wiring hub space with SynOptics. I vividly recall how Cisco was perceived within Cabletron as Cisco expanded its product line beyond routers. Cabletron in 1994 had no routing technology of its own; in fact it had an OEM relationship with Cisco at the time which allowed it to offer routing technology in its own products which customers were requesting at an increasing rate. Routing is by its nature one of the more complex technologies utilized in data communications. In the early and mid-1990s it was further complicated by the existence of multiple network-layer protocols, multiple routing protocols and rather arcane,

command-line interfaces. At this juncture, the number of routers in an enterprise network was very small compared to hubs—at the time, a hub port was required for each station connected to the network. One or two routers might be employed to connect the entire LAN, several hundred stations, to remote sites via leased or early Internet connections. The vast number of ports, and manufacturers' revenue was in hubs, not routers at the time although gross margins on routers which had a large software component were incredibly attractive; the bill of materials even for the largest enterprise network infrastructure was heavily weighted toward the wiring closet and the hubs that provided interconnectivity for the end stations.

This chapter has focused heavily on Ethernet while making some mention of Token Ring, and a few others of the original LAN technologies. It is important to note that through the period of the mid-1990s the eventual emergence of Ethernet as the predominant technology or “dominant design” for enterprise LANs was far from certain. Standardization and rapid adoption of Ethernet however for all intents and purposes set a precedent that proprietary networking protocols were doomed to obscurity. Several efforts by manufacturers to develop and standardize alternatives to Ethernet, along with an almost steady stream of revisions and expansions to the Ethernet standard itself were initiated by the established firms and a raft of new startups all vying to be added to the “Big Four” data communications companies as Cisco, Cabletron, 3Com and Bay Networks (resulting from the merger of SynOptics and Wellfleet Communications) had come to be called by 1994.

In the 1994 timeframe, many enterprises were contemplating upgrades to their networks. As was outlined previously, the first standard Ethernet LANs were based on a 10Mbps data rate, and because of the bus nature of the protocol the first Ethernet LANs shared the available bandwidth with all stations connected to the segment. Initially 10Mbps seemed like a great deal of bandwidth despite the fact that it was effectively shared by all users on the same LAN segment, but as the number of nodes attached to the LANs continued to increase, and application sharing and networked database applications such as ERP emerged, the LANs of large enterprises became increasingly bandwidth constrained. Many of the established companies and a steady-stream of new entrants all began to participate what became to be known as the race for “speeds and feeds.”

Existing technologies such as Asynchronous Transfer Mode (ATM) which was well known in the telecommunications service provider space was “adapted” for data LAN and WAN applications. The ATM Forum was established by manufacturers to create a consortium of companies including industry stalwart IBM and many startups such as Fore Systems (eventually acquired by Marconi) as well as Cisco (organically and through acquisition of ATM companies such as Light Stream) to pursue industry standards for the adaptation of ATM for high-speed enterprise network technology alternative to Ethernet. Digital Equipment Corporation put forth its own high-speed technology, Fiber Distributed Data Interface (FDDI) which was standardized by the IEEE. Even the Token Ring standard was increased from 4Mbps to 16Mbps in the early 1990s. Hewlett Packard attempted to introduce an Ethernet-like technology it called 100VG-AnyLAN as an alternative to a higher-speed Ethernet variant. In the backdrop of these developments, continued development of the Ethernet standard and related, complementary technologies also continued at a rapid pace, driven by the incumbents and startups and in close parallel, incorporation in the IEEE standards.

Among the most important developments for Ethernet was the development of a disruptive technology: Ethernet switching. Several startups had emerged that were exploiting rapid improvements in silicon technology and an extension of the IEEE 802.1 bridging technology (originally developed by Digital Equipment Corporation) to effectively provide dedicated bandwidth on each port of a wiring closet device at a price point and level of complexity that was acceptable to the market. At roughly the same time, a working group of the IEEE was already in work on a new version of the Ethernet standard to add a new variant that increased the speed to 100 Mbps per second—a ten fold increase in performance for the Ethernet standard. This increase in speed immediately put Ethernet on the same footing as FDDI, again trading off some effective bandwidth utilization for significantly reduced complexity while maintaining the use of twisted-pair cabling. The pace of innovation in the market place was intense in this period.

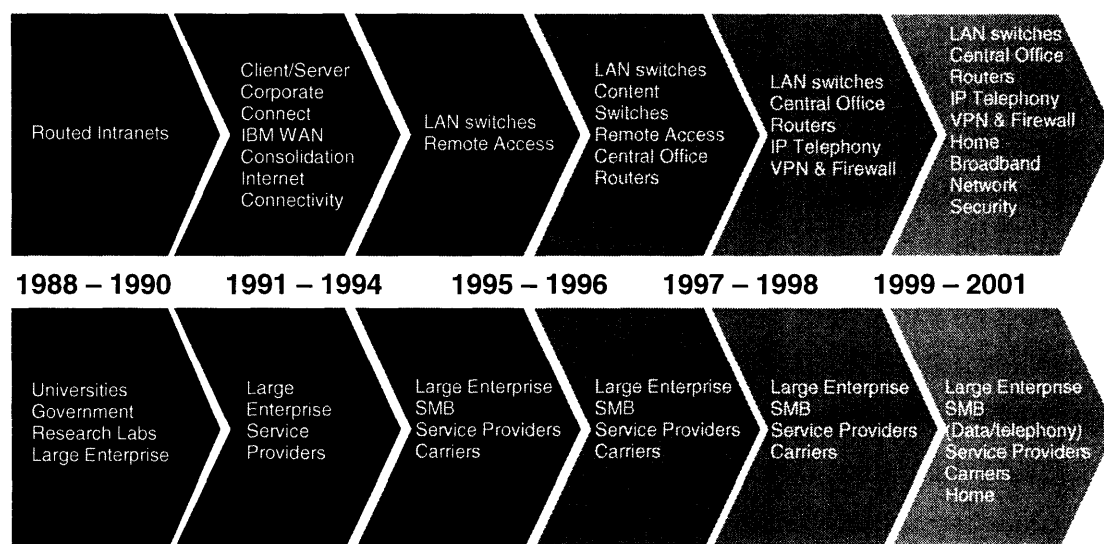
When combined with the switching technology and a staggering pace of cost reductions that followed rapid market adoption, Ethernet LAN switching eventually eclipsed all other technologies in the Enterprise LAN and potentially beyond. The

standard has been expanded include both 1Gbps and 10Gbps variants and distances over single mode fiber optic cable of up to 40 kilometers has been achieved. The industry is currently pursuing a 40Gbps variant of Ethernet. Ethernet is now a serious contender for the service provider networks, potentially resulting in an “all Ethernet” IP network in the near future. In addition, as a function of improvement in silicon performance and cost reductions combined with the emergence of TCP/IP as the predominant network layer protocol on enterprise LANs, as it always has been on the Internet, switch vendors have expanded the functionality of their enterprise LAN switches to include Layer 3 routing support, effectively enabling routing functionality to every port at increasingly lower price points. The combination of Gigabit Ethernet and Layer 3 switching led to a new wave of startups that focused completely on layer 3 Gigabit Ethernet switches, two of which remain as independent companies (Foundry and Extreme Networks) and several others that were acquired by the incumbents. The relatively recent standardization of the 10Gigabit Ethernet variant has resulted in new startups as well, Force10 Networks is one example.

Cisco Systems Dominates the Enterprise Segment

The acquisition by Cisco Systems of two Ethernet switching companies propelled the company beyond offering only routing solutions and into competing directly for the enterprise wiring closet segment of the market, first dominated by SynOptics and Cabletron. In effectively displacing these two market leaders, LAN switching revenues have provided the lion’s share of Cisco’s staggering growth through the 1990s and to the current timeframe. Moving into the lucrative adjacent segment to complement its command of the service provider and enterprise routing segment was directly responsible for Cisco’s rapid growth and eventual domination of most enterprise data communication market segments. It achieved its dominating market share in these segments in less than ten years following these initial acquisitions and the continuing string of nearly 100 acquired companies by Cisco continuing to the present day. Cisco has been at the forefront driving trends in the industry such as the convergence around Ethernet and IP, not to mention the current drive to migrate other communications such as voice, video and storage onto IP packet switched networks and wireless. Cisco’s incredibly aggressive A & D strategy, its ability to foresee and arguably drive trends in the market, and its go-

to-market strategy including the effective use of intermediated and other indirect channels to generate over 90 percent of its sales has established the company today as the “one stop shop” for the majority of the data communications equipment required for the converged network infrastructure for the enterprise, service provider and now the home segments of the market has established it as one the most successful companies of the Internet age. Figure A1.1 below depicts Cisco Systems expansion of its product line:



Source: Going the Distance: Why Some Companies Dominate and Others Fail, Kevin Kennedy and Mary More, Prentice Hall, 2003.

Figure A1.1: Cisco Systems: Product Line Evolution

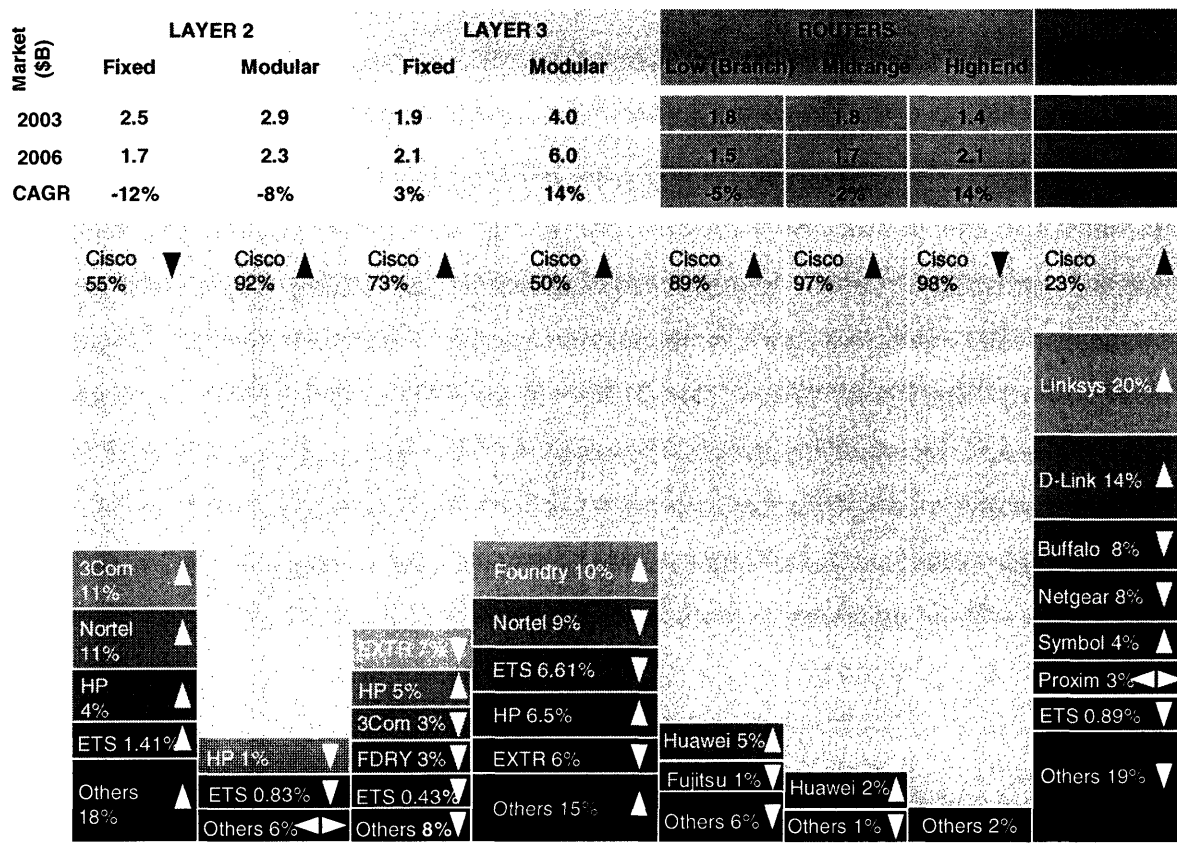
At the time of this writing in the spring of 2005, Cisco’s market capitalization is approximately \$116B, and the company has grown its annual sales from \$1.9B and approximately four thousand employees to over \$22B in annual revenues and thirty-four thousand employees in 2004. The market capitalization of the rest of the “big four”, now part of larger firms or have spun-out parts of the company (3Com spun-out Palm for example) are not nearly as reflective of success. 3Com Corporations market capitalization is now at \$1.4B and in the late 1990s very publicly ceded the large enterprise segment of the market, turning over its large enterprise customers to layer-3 switching startup Extreme Networks. Bay Networks is now part of Nortel Networks, the stalwart of the

legacy telephony equipment manufacturers that commands a market cap of \$13B in the wake of accounting regularities related to revenue recognition that continue to plague Nortel today. Cabletron spun-out three smaller companies outside its core competency in enterprise data communications infrastructure in 2001. The enterprise networking focused component, called Enterasys Networks, commands a mere \$175M market capitalization today and is likely to be among the next to disappear through acquisition as the industry consolidates. The two US-based publicly traded companies mentioned earlier that grew out of the Gigabit Ethernet Layer 3 switching wave in the later 1990s, Foundry Networks and Extreme Networks have market capitalizations of \$1.4B and \$782M respectively. The market capitalizations of the “Big Four” plus the two upstarts combined are only about 15% of that commanded by Cisco at today’s market prices.

Attempts to slow the Cisco juggernaut by the stalwarts of the telecommunications equipment manufacturers such as Nortel through its acquisition of Bay Networks already covered, and a spate of acquisitions by Lucent Technologies that no doubt led at least in part to that company’s recent brush with bankruptcy, have been very ineffective and arguably almost disastrous for both companies. Even Alcatel has tried and failed with its acquisition of a small Ethernet LAN switching companies, Xylan, and one of the early and more successful LAN/WAN ATM startups, Newbridge Networks. Digital Equipment Corporation, after taking part in the initial standardization had a modicum of market success with its Ethernet and FDDI equipment offerings primarily through mining its installed-base of very loyal DEC customers. However, as the inherent limitations of farming that base were reached, the Digital Networking Products Group was sold to Cabletron immediately preceding the acquisition of the remainder of DEC to Compaq. Efforts by other giants such as IBM after the demise of Token Ring have been more of the “if you can’t beat them, join them” category, with many firms for all intents and purposes abandoning the data communications equipment space directly in favor of becoming high-end intermediaries for Cisco Systems. After the failure of the VG AnyLAN effort to unseat Ethernet during the transition from 10Mbps to 100Mbps technology, Hewlett Packard’s Networking division pursued OEM relationships with other manufacturers including Foundry Networks for its high-end enterprise Ethernet Layer 3 switches, and has utilized the emergence of Taiwan-based OEM/ODM data

communications equipment manufacturers to offer enterprise-class Ethernet switching solutions for the small and medium business (SMB) segment with a small amount of success.

In 2003, Cisco commanded dominant market shares in all the key segments of the enterprise data networking market. Figure A1.2 at the top of the next page provides a graphic representation of the relative market shares of the vendors in the most critical segments of the enterprise data communications market. Note the share positions of the other former “Big Four:” 3Com, Nortel, Cabletron (ETS in the graphic, representing Cabletron’s new moniker, Enterasys Networks.) As was examined in more detail in the body of this thesis one of the key strategies used by Cisco in orchestrating this success was the highly effective use of intermediated channels sales strategy that it executed in conjunction with its movement into the wiring closet segment of the market.



Sources: Gartner Dataquest,
IDC, Dell'Oro Group and Infonetics

Market share based on revenue

Figure A1.2: Cisco Market Share in Major Enterprise Segments, 2003

Trends Driving the Industry Today

As the industry entered the twenty first century, several important trends driven primarily through the convergence toward IP and the various flavors of Ethernet have emerged. As more and more it appears that IP-based, packet switched networks utilizing the IEEE Ethernet and LAN standards have won, enterprise data communications is coming into a new stage of its evolution. The standards are well documented and there are now legions of engineers in many regions of the world that have had packet switching and TCP/IP included in their formal education, not to mention many that years of experience building these devices and the associated operating and management software applications previous to and during the Internet boom in the late 1990s. As the standards

have emerged and converged, several silicon companies such as Broadcom and Marvel have implemented many of the features required for Ethernet and IP switching and routing in their mass produced silicon—specialized ASICs that perform much of the enterprise Ethernet switching/routing functionality, the “engines” that drive modern data communications equipment. Previous to the emergence of this off-the-shelf silicon, the development of these ASICs was accomplished through many man-years of effort and at great expense by the pioneers in Ethernet switching and routing. The effort to develop these customized ASICs and the operating firmware provided the primary basis of differentiation of these devices early in the history of the data communications equipment industry. The off-the-shelf silicon solutions often referred to as “merchant” silicon have revolutionized the design and manufacture of some enterprise data communications equipment. These solutions are referred to as “merchant” in the sense that this silicon and the device-level drivers to access the functionality are now available off the shelf from Broadcom, Marvel and many others today—the basic building blocks of data communications systems has been effectively commoditized and has become readily available to potential new entrants. What was once a significant barrier to entry even in the presence of public and open standards has essentially been removed by the appearance of merchant silicon for building switches and switch-routers.

Standards for more than the protocol operation “on the wire” such as Ethernet have been established by the data communications components industry. Standard interfaces and APIs that enable components within a single system (e.g., switch or router) from different manufacture to interoperate, even entire subsystems such as Gigabit Interface Controllers (GBICs) have been specified so that these subsystems interoperate in many different devices from many different vendors. This has enabled the merchant silicon vendors such as Broadcom and Marvel to not only provide the ASICs and other components to system developers, but a more complete solution known in the industry as a “reference design.” The reference design is basically a recipe for building a complete LAN switch or other data communications system using the merchant silicon vendors’ hardware components and low-level software drivers.

Contract electronics manufacturers (often referred to as “CMs”) with design capabilities and operations in low-cost manufacturing geographies, several based in

Taiwan such as Delta Electronics and Accton were approached by the merchant silicon providers with their reference designs. Initially the merchant silicon vendors focused on the less complex, standalone layer 2 Ethernet switches and encouraged the CMs to build turn-key systems for the US-based data communication vendors and others eager to enter the enterprise data communications market to be private-labeled and sold under their brands. These OEM systems were at first suitable primarily for the lowest end of the market: SOHO (Small Office, Home Office) and small-medium business segments of the market which demanded lower levels of features, functionality and performance. By the late 1990s, the drive to build LANs and enterprise networks had spread to every imaginable geography, and many countries demanded low-functionality and performance solutions at price points too hard for many of the US-based companies to achieve profitably, not to mention their engineering competencies were centered around pushing the performance and feature barrier, not building “good enough” solutions.

The Taiwan-based OEMs took in the merchant silicon vendors’ reference designs, sometimes modifying them to reduce the cost of manufacturing and developed the higher-level software applications in accordance with the open IEEE and IETF standards. This operating software was required in order to create a complete, turnkey solution that worked in conjunction with the systems hardware they designed and manufactured according to the merchant silicon vendor’s reference designs. Basic cosmetic modifications were made to the enclosures and user interfaces to achieve common look and feel with data communications vendors adding these OEM products into their lines. The price-points the Taiwan-based OEMs could achieve due to the locations of their plants and economies of scale were very appealing and more importantly, the leading US-based vendors were able to focus engineering resources on their offerings for the much more demanding and lucrative larger US enterprise customers, and increasingly on keeping up with Cisco. The idea of a turn-key low-end solution that could be expected to earn a healthy margin with little cost or effort to design or support these solutions was of interest to many of the established US-based data communications vendors.

The first efforts by the Taiwan contract manufacturers were as one familiar with the complexity of enterprise networking equipment might suspect, fairly poor in many respects with their operating software being remarkably poor. Despite focusing on what

was the low-end of the market, many vendors that established OEM relationships with the Taiwanese vendors early on with the expectation of getting a turn-key solution experienced serious shortcomings in features and functionality, performance, software and hardware quality and many other aspects directly affecting the salability of these products. In some cases reliance on these early offerings for an entry-level product line met with disastrous results on long standing customer relationships built over years on the offerings of the manufacturer that were designed and manufactured in house. Simply put, the expectation that these vendors could produce a market-ready device with little attention from the experienced vendor was a huge miscalculation. A few vendors recognized this early on and developed “hybrid” models and resorted to using their own operating firmware, assisting the Taiwanese companies with manufacturing expertise, quality systems, software testing and even supply chain expertise—essentially providing these CMs with guidance that got them up the learning curve much faster, always aware that the combination of open standards, widely available merchant silicon had the potential for significantly accelerating the pace of commoditization.

In addition to the emergence of the merchant silicon vendors, and partly resultant from the difficulties the Taiwan-based OEMs have had with developing high quality operating software, several startups emerged that specialized on building operating software specifically for the systems built using the merchant silicon reference designs. The emergence of “merchant software” companies such as LVL7 and RadLAN (which was acquired by Marvel) that offered specialization in enterprise networking device firmware is another interesting and potentially impactful development in the continuing evolution of this market. In light of the rapid development of open source LINUX as a real time operating system (RTOS) with many of the operating system level functions required for use in data communications equipment built-in, making it a very viable substitute for embedded system development. Not to mention, as Cisco had become so dominant in the industry and with it the abundance of trained and certified Cisco experts, the Cisco user interface had become a de facto standard. Vendors had and continue to leverage “Cisco-like” command line interfaces that leverage the abundance of trained and experienced Cisco network professionals. What had been a point of differentiation

between vendors at one time, an easier and more intuitive command structure had become “standardized” on the Cisco interface.

The emergence of the merchant silicon companies that leveraged many of the results of the evolution discussed earlier since as open standardization of protocols and essentially a universal user interface, held the promise of the availability of true turnkey solution for the established vendors and more importantly for new market entrants. Professionally developed and high-quality operating software that could be married to hardware that was increasingly attaining higher levels of quality, stability and performance that compared favorably with offerings from the incumbent vendors yet at relatively lower price points has resulted in relatively low technical barriers to entry at this juncture. In addition, there has been for some time the development of primarily software expertise in the data communications space for some time. Many offshore software development companies in India and other geographies such as Wipro and Tata have large numbers of consulting engineers that have worked with the leading US vendors on both system operating software as well as network management software. These firms specialize in providing engineering expertise on a project basis for both new product development as well as sustaining engineering.

As time has gone on, the Taiwan-based companies have in fact got more sophisticated and improved quality, features and functionality and their ability to support their OEM partners. In addition, several of the leaders have added chassis-based and stackable enterprise Ethernet switching solutions as well as 802.11 wireless LAN equipment to their offerings. These CMs have leveraged increasingly available merchant silicon and reference designs while receiving engineering support directly from the silicon vendors as that space grew more competitive. The Taiwanese manufactures introduced their own private-labeled data communications offerings in the Asian and other markets several years ago (Accton under the SMC name, and D-Link under its own name) and have undoubtedly accelerated their progression up the learning curves via supporting users directly. The operating software developed in Taiwan is getting better and has expanded to include layer 3 switching support, and with the emergence of the merchant software manufacturers there are now choices for companies looking to add Ethernet LAN switches and wireless LAN equipment by outsourcing the development to

one or more partners. Data communications equipment at the low end of the market is beginning to commoditize. Prices and margins are under pressure even for the industry leaders. One would argue that for the hardware, and even the basic software functionality that the technology barriers to entry have been effectively removed by the establishment of the standards, the growth of engineering experience and expertise and the emergence of merchant silicon and software.

Another development is worth noting at this juncture: Recently the giant Chinese telecommunications manufacturer, Huawei has entered the data communications equipment space, allied with 3Com and by 2003 had established marketing share in low-end and midrange enterprise routers, an area which Cisco has held 90% or greater market share historically. Huawei's entry into the space was almost immediately responded to by Cisco with a law suit in US courts accusing the Chinese giant of infringing Cisco's IOS, the operating software of Cisco Systems switches and routers protected by copyright. The suit was later dropped, but clearly what was primarily a market dominated by the US firms previously mentioned is now being challenged by entrants from many geographies both indirectly via firms partnering with the ODM/OEM partners, and now directly with the entry by Huawei.

Many of the dynamics outlined in the latter parts of this chapter are still playing out such as the effects of competition from outside the United States for the large enterprise segment of the business. Although many of the factors necessary for the continued commoditization of this equipment is in place, many components used in the largest enterprise and service provider networks in the world are still produced by only a few companies that continue to enjoy very healthy margins. In the past several years the incumbent vendors have become much less focused on differentiating on "speeds and feeds" and "better technology" as Ethernet has become the standard of choice, and wire-speed performance has become the industry norm.

Summary

Increasingly differentiation in the market has turned toward much more focus on value-add functionality such as support for quality of service, suitability of the infrastructure for voice, video and storage and most recently, security. Cisco has of course been able to expand the scope of its offering to include all the infrastructure

components required for IP voice (including IP handsets and the equivalent of IP PBXs in its enterprise line), IP video and IP storage providing it the depth of solution and expertise that it has always used masterfully in its go-to-market activities. Other vendors have stressed the importance of “best-of-breed” solutions and have avoided expanding into this highly specialized equipment and focusing on providing an infrastructure that is enabled with quality of service and other features and functionality that support these next generation applications, allowing customers to choose the other elements from the vendor or vendors that best meet their needs. All vendors however have been compelled to speak to the security issue and focus engineering resources on improving the security of their offerings since the events of September 11, 2001 in New York City.

The dynamic driving continued evolution of the market is that increasingly the hardware is becoming commoditized, as are the majority of the features described in the standards that are implemented through software. Whatever uniqueness can be achieved today is achieved through software functionality, or what is typically called extensions to the standards—that is, vendors find ways of enhancing the functionality specified by the standards by adding features in the specialized ASIC hardware that remains custom-built and are exposed to the user through the operating software. Again, these features have been concentrated around additional functionality and features, such as security and quality of service for reliable support of voice and video, and not around performance or “speeds and feeds.” Often these differences can be hard to tie to a demonstrable customer benefit with a quantifiable Return on Investment (ROI) which has become imperative in the wake of the bubble, or extremely hard to implement or both.

Increasingly the players in the enterprise data communications equipment market are being forced to rely less and less on their uniqueness while placing much more emphasis on accumulating and developing their complementary assets such as channels to market. As illustrated in the body of this thesis, one of the most important complementary assets is a large and loyal intermediary channel with the ever increasing potential of an attack from below—the low cost providers coming from China and Taiwan made possible in large part by the standards themselves and the increasing commoditization of the silicon required in enterprise data communications equipment. Although the equipment itself may continue to commoditize rapidly, the level of

complexity inherent in these offerings makes the potential for a shift to direct-to-customer selling of this equipment somewhat unlikely in the near term. This observation suggests that the remaining manufacturers, particularly those that have well developed intermediary channel programs, will strive to prevent access to the channels by their established competitors as well as the new entrants.

As was outlined earlier in this appendix, in the most lucrative segments of this market it is increasingly less about “buying boxes” for the customer, and much more about attaining complete solutions to their IT needs. Increasingly they need trusted advisors that can not only specify equipment that provides the features, functionality and performance that is needed to solve business problems. Unlike the home user that can order a wireless LAN access point router online, configure his device and connect it to the DSL or cable MODEM and be up and running with a home LAN, the staff responsible for the enterprise network which provides the “plumbing” for transporting the information and applications that are the lifeblood of the modern enterprise need a variety of value-add services into the foreseeable future. Like the firms in the data communications equipment market discussed in depth in the body of this thesis, firms in industries with related dynamics where there is a level of complexity and a customer demand for solutions, it is imperative to develop the necessary competencies to effectively and profitably utilize intermediaries.

Appendix 2: Market Drivers and the Emergence of Intermediated Channels for the Enterprise Data Communications Market

Introduction

The previous appendix provided a relatively detailed overview of the general evolution of the enterprise data communications equipment market. The focus of this appendix will be how the industry evolution drove the development of intermediaries that specialized on the services associated with the new computing paradigm and how industry- and firm-level attributes drove the go-to-market strategies of two types of data communications manufacturers.

As the previous appendix outlined, the enterprise data communications equipment market as it exists today has undergone a very rapid evolution over its roughly twenty year existence. An analysis of that evolution exposes several key characteristics of industry structure and competitive dynamics that are common to other high technology markets and will likely impinge on other similar markets that develop in the future. These characteristics of the evolution of the market are important in a discussion of the employment of intermediated channels as will be outlined in this appendix.

Open Standards Impact on Market Evolution

One of the core determinants of the rapid evolution of the data communications market was the role of industry standards. As the last chapter pointed out, at the time of the discovery of Ethernet data communications technologies were generally proprietary and closed. Multi-vendor interoperability could only be achieved through technology licensing agreements or reverse engineering, which was heavily frowned upon by the giants of the industry at the time. This precedent was set primarily by the mainframe manufacturers and continued into the mini-computer era and was characterized by strictly proprietary data communications infrastructure (down to the cables and connectors) and extended to the communications protocols. The decision by Dr. Metcalfe outlined in the previous appendix to radically depart from that precedent and vigorously pursue open, industry-wide standardization was in this author's opinion a major inflection point in the evolution of this industry that is often overlooked. Theoretically, the early

Xerox/Metcalfe fundamental patents on the Ethernet technology could have potentially been closely-held and exploited by some entity in developing a local area networking solution for personal computers and other devices via a proprietary implementation. Clearly such a move could have had major implications in the adoption rate and the emergence of Ethernet variants as the dominant design, but the world will never know due to the efforts led primarily by Dr. Metcalfe and other pioneers to make Ethernet an open standard such that multi-vendor interoperability was possible practically from day one. That decision unleashed a wave of innovation and entry by entrepreneurial firms and a set of competitive dynamics that were truly new and arguably set the stage for the future of markets where open, public standards are foundational.

At the same time a similar progression was occurring for internetworking protocols and the devices that implemented these protocols, the routers that were used for connecting LANs and for building private WANs. Initially there were multiple proprietary internetworking protocol implementations by Novell, Microsoft and several others mentioned previously. The rise of the Internet into commercial uses and more importantly the rather unique evolution of the Internet community, most notably the Internet Engineering Task Force (IETF), and the strongly engrained Internet culture of “consensus and running code” resulted in firm commitments of that community to standardization and publication in the public domain of all Internet protocols. Very similarly to what occurred with Ethernet as the datalink technology of choice, the open by design TCP/IP communications protocols eventually became predominant as the dominant design for all digital communications, both wired and wireless going into this millennium.

This embrace in the market of industry standards and the resulting convergence on Ethernet and IP is a thesis topic in and of itself, and a full treatment of these dynamics is far beyond the scope of this paper. What is important to this discussion is the end result: in the relatively short amount of time elapsing from the discovery of Ethernet to the time this thesis is being written, data communications and enterprise computing has undergone an irreversible sea change that has extended the applications of these innovations now to all forms of electronic digital communications, changing the nature of telecommunications forever. Vast technological innovations occurred during this period

with the introduction of microprocessor-based desktop computing, client-server applications, the transition from cell to packet-based high speed digital data communications, the move toward incredibly high capacity fiber optics transport replacing traditional electrical transmission over copper cabling, and many more too numerous to mention.

These huge technological innovations in communications technology were accompanied by an even more radical fundamental market change: what was once strictly the domain of proprietary protocols and closed, non-interoperable implementations, tightly-held by a very small number of large firms with oligopoly market powers (arguably closer to monopoly as evidenced by the anti-trust actions against IBM in the early 1970s) had been opened up to what became a torrent of new entrants beginning in the late 1980s and extending into the 1990s. Open standards in data communications infrastructure opened up a Pandora's Box, unleashing competitive forces on the core businesses on the industry icons such as Bell Labs (Lucent Technologies), IBM, Digital Equipment Corporation and many others that few would or could have foreseen. The full extent of the impact of this inflection point on all the telecommunications equipment providers, from those with their history tied to the invention of the telephones and electronic communication and computing, to the upstarts of the 80s and 90s such as Cisco Systems and 3Com Corporation is still far from being fully played out. Consolidation in the space will likely take several more years, and making any firm predictions at this point as to what firms survive and which become a footnote is impossible.

Competition in the Presence of Industry Standards

In the new age of data communications resulting from Ethernet, TCP/IP and the myriad other open, public standards that have become the foundation for the data communications companies capture value from innovation differently than the information technology firms that preceded them. The mainframe and minicomputer manufacturers created proprietary protocols, interfaces, connectors, etc. to purposely ensure that the primary system components (mainframe or minicomputer itself) were interconnected with the peripherals in a non-standard and therefore non-interoperable fashion. Consumers had little or no choice in building-out legacy computing infrastructures; they simply bought all components from the vendor, and often at very

high premiums even for low-technology items such as cables. Certainly at the very beginning of the Ethernet/IP revolution, even given the open standards only a small number of firms had the requisite absorptive capacity to utilize the standards in creating marketable solutions but that lead was significantly shortened as will be explained.

As was mentioned in the last chapter, standardization of Ethernet and Internet protocols were designed to accelerate the adoption, to maximize the network effects of universal interoperability ala Metcalfe's Law introduced in the previous chapter. The IEEE and IETF standards themselves were and are essentially "cookbooks" that enable any entity with access to the requisite engineering skills who wanted to build the components necessary to build standards-based Ethernet networks and connect devices to it to do so. The publication of open standards effectively *lowered slightly* the barriers to entry into the space initially. Lowered because the standards specified the operation of the protocol "on the wire," essentially the parameters and specifications required to ensure interoperability and compatibility. A great amount of the details of the implementation early on in the evolution of the technologies were left up to the engineers and their ingenuity in the implementation. The standards did not necessarily specify "how" early on, the focus was clearly on "what" the devices had to do to comply with the standard and interoperate with other compliant devices.

Accordingly, designing and building the hardware and software components required to meet these specifications and operate correctly as peripherals to PCs and other devices was far from straightforward and a highly complex engineering task in spite of the publication of the IEEE and IETF standards. The early versions of these standards still left potential entrants with significant learning curves for the design and manufacture of data communications equipment. These learning curves resulted in significant barriers to entry, hence a concentration of the early data communications firms in the Silicon Valley and Boston's "128 belt." It was precisely the details of the implementation that were in fact the last bastions of uniqueness that the vendors used for differentiation and value capture in the very early days of the standards-based data communications market. Capacity, performance, stability, reliability, scalability and ease of use—all while maintaining compliance with the standard "on the wire" were the focus on innovative efforts in this phase of industry evolution. More importantly possibly was the intangible

value of standards and standards compliance for the purposes of signaling to customers early on. As LAN internetworking began to gain momentum, the standards effort signaled to enterprise customers the coming of the end of the proprietary interconnect era. Small startup firms utilized standards compliance and participation in the standards body very effectively to combat the “credibility gap” that often plagues small technology startups as they try to sell to the largest enterprises.

More pertinent to the discussion in this paper was how the most astute competitors in enterprise data communications recognized the medium and long term implications of standardization in the data communications markets: that the window for value capture through uniqueness was small and short-lived. The more astute competitors among the data communications equipment manufacturers rapidly applied their resources toward developing complementary assets in building brand, supply chain excellence, and last but certainly not least in relative importance to this thesis, to the exploitation of intermediated channels and multi-channel management in general. As has been outlined in the body of the thesis, the utilization of intermediated channels for the purposes of rapidly scaling up an increasingly global sales effort while providing complementary services can be one means to gain competitive advantage in the presence of open standards. Certainly the facile use of multiple channels to market by a high technology company can enable it to take market share and remain highly profitable, sometimes at the expense of competitors who are not able to rise to the challenges of managing intermediated channels. As the thesis outlines this was certainly a factor in Cisco Systems dominance of the enterprise data communications equipment market. For the most astute management teams of the new data communications equipment manufacturers it became very clear that the nature of this market was going to make it very hard to scale a direct sales strategy to effectively capture leading market share worldwide. This was further complicated by the demand from the customer base that the manufacturer’s offerings be accompanied by value-add services, across multiple industry verticals and enterprises of a wide variety of sizes and internal skills and competencies required to implement and maintain the new technologies.

Enter the Data Communications Equipment Intermediaries

The emergence of PCs and client-server computing had another very interesting impact on the way enterprises purchased their information system infrastructures. In the mainframe and minicomputer eras, the vendors and a relatively small network of complementors provided what was essentially an end-to-end solution for these computing infrastructures. The manufacturers provided just about every component, sometimes down to the furniture used for building the legacy computing infrastructure. In addition to the hardware and software components, the vendors and their partners provided services including design, installation, training and software customization. In essence, the manufacturers provided “one stop” shopping for acquiring, installing, operating and maintaining the infrastructure. It is also important to note that in the eras of the mainframe and minicomputer, the cost and complexity of these information systems, the mainframe in particular, put these solutions out of reach for many enterprises.

In the brave new era of PCs, LANs, WANs and client-server computing these characteristics were no longer the case. PCs, networks and file and print servers were affordable for the smallest firms. In even the simplest environments, the new solutions were multi-vendor by design. Particularly early on, enterprises were purchasing routers from one vendor and LAN hubs from another, NICs, PCs, servers, printers, cabling and equipment racks—often from several different vendors in order to construct their new computing infrastructures.

This presented a whole new set of complexities for IT operations seriously considering implementing the new paradigm for enterprise computing. It was no longer a matter of picking a vendor—now it was a matter of selecting technologies as well as vendors, and most importantly finding help with the integration of disparate devices from different vendors, technologies, command lines, protocols, interfacing with the service providers that provided WAN services. Where the legacy vendors had provided volumes of documentation, and very well organized and executed training programs, the upstart data communications manufacturers focused a great deal of their resources on leading the standards bodies, innovation to drive that leadership, differentiation and delivering their products. Often documentation was scarce or rapidly obsolete and training was hard to come. It is a vast understatement to say that the move to the new paradigm of enterprise computing was a shock to the system of most IT managers, for organizations that had an

existing IT department. Many small and medium sized businesses had no IT infrastructure or people to run it. Increasingly enterprise customers began demanding “one throat to choke,” one organization that would integrate the entire system and stand behind it over time as the startups often came and went quickly, many times via merger or acquisition with other players or simply just went away.

As was outlined in the previous appendix, heterogeneity of demand for data communications equipment was predominant early on even as the standards were being established and began to gain traction. Ethernet was not the only solution available. As 3Com and the other new data communications entrants had begun shipping and installing standards-based Ethernet products, enterprise customers had many choices as was outlined in the earlier chapter—Ethernet and IP were far from their eventual establishment as the “dominant designs.” Many enterprises looked to their incumbent information technology providers to lead them through this transition—many IBM accounts for example turned to IBM itself for Token Ring LAN solutions, before and after the standardization of Token Ring, to interconnect the PCs they were adding to their infrastructures. As is typically seen with industries in ferment, there were many new entrants at the dawn of the era offering a wide variety of products, some based on Ethernet and others promoting the aforementioned alternative LAN technologies and internetworking protocols, proprietary and standards-based, competing for the attention of increasingly overwhelmed, understaffed and under-skilled IT staffs. The IT staffs of the largest enterprises that were trying to keep their mainframe operations up and running while dealing with the onslaught of the new technology were stretched thin. As was mentioned in the previous appendix, for many enterprises the transition to the new computing paradigm was far from orderly—many enterprises ended up with a patchwork of solutions: different LAN technologies and cabling, different NOS solutions, etc. The fact that the transition was not orderly or standardized significantly increased the complexity. Many enterprises were forced to refresh their infrastructures in different segments of their intranets long before they were obsolete or fully depreciated in order to facilitate connectivity or gain efficiencies by standardization. This coupled with a very fast pace of innovation created a bonanza of enterprise buying for not only the data communications equipment vendors, but for a growing number of companies that

complemented the manufacturers with value-added services they bundled with the hardware and software being developed and sold by the enterprise data communications manufacturers..

The heterogeneity of demand and plethora of potential solutions early on in the transition from the mainframe and minicomputer era to the PC and client server eras had another side effect in the market that is very pertinent to the discussion of intermediated channels: it led to the establishment of large and vibrant community of a new category of information technology service firms that assisted customers with the complexities of the new paradigm of enterprise computing, designing, implementing and operating these new, multi-vendor computing infrastructures consisting of very complex local and wide area networks and the devices they connected. These organizations typically referred to as Value Added Resellers (VARs), Systems Integrators (SIs) and data communications consultants were primarily service-providing firms. They bundled their services offerings with hardware and software from multiple manufacturers to offer more complete solutions to business customers. These firms began to appear alongside the data communication startups such as 3Com and SynOptics which relied almost entirely on indirect channels to market.

Many firms that previously provided enterprise telephony system services expanded into the data services business as the cable plant structure for enterprise LANs was very similar to that used for enterprise telephony systems such as Private Branch Exchanges (PBX) and key systems. Early on, extending cable plants certified at high data rates required for LAN connectivity to all the workspaces PCs were suddenly appearing in was a huge challenge in and of itself. In existing buildings that had not been designed to accommodate cabling it was exceptionally difficult. The voice VARs not only were structured cabling experts, they were already familiar with the technologies used for WANs early on (e.g., voice circuits utilized for transport of data). N

Many more startup data communication service companies were formed that specialized purely in data communications services, recognizing early on that the enterprise computing paradigm was shifting—that PCs on every desktop and the data communications infrastructure that required was creating a very lucrative services opportunity across the globe. Many of these firms that had been originated to take

advantage of these opportunities locally found themselves expanding rapidly to become regional providers, and some even expanded into providing services internationally. There was often vertical market specialization as the needs for service specialization varied amongst the industries that were adopting the LAN and WAN technologies, and more importantly the software applications that were being run over them. Some VARs focused on specific verticals, and their reputations grew within the IT organizations of firms in those vertical markets.

By the early 1990s the larger IT services and consulting firms that had emerged and grown up alongside the mainframe manufacturers took notice of the emergence of the desktop PC applications, and the overall paradigm shift to client-server computing and enterprise internetworking. Companies such as EDS, Unisys and even the “Big Five” management consulting firms that were previously providing IT consulting services for mainframe computing, all established additions to their practices and began offering services to the large enterprises who were struggling with managing their increasingly urgent deployment of PCs, LANs and WANs and client-server computing infrastructures and applications. In many cases the addition of these services was done via acquisition of the larger regional systems integrators who had developed the experience, skills and best-practices required including several that had become dominant in specific verticals.⁸⁵ The enterprise computing environment, previously contained to relatively small, climate and access controlled areas behind glass walls was now expanding to just about every conceivable corner of the enterprise. This was causing a great deal of problems for the IT staffs of the large multinationals that were not staffed to deal with this unbridled system scale and scope expansion. Many of the large, prestigious consultants and system integrators were only too happy to try and help with this transition, and many acquired the necessary skills “on the job” as they developed their practices.

These intermediary firms represented a viable channel to market for the data communications equipment manufacturers as their skill set grew, and the demand for data communications equipment began to spread to small and medium businesses.

⁸⁵ One specific example is the acquisition of Shared Medical Systems Corp. by Siemens Medical Engineering Group, Inc. announced in May of 2000. At the time of the acquisition SMS had annual sales of \$1.2B and 7600 employees. In July of 2002, IBM acquired PWC Consulting including the global technology services and business consulting unit for \$3.5B.

Many of the data communications equipment manufacturers themselves plunged headlong into the services business, possibly realizing the huge potential service opportunities early on or perhaps out of necessity. Essentially all of the players added call centers to provide technical support to their customers for issues specific to their fielded equipment (which were abundant in the early days in the area of interoperability and stability). The data communications equipment manufacturers discovered a very lucrative opportunity to provide contract maintenance offerings along with the equipment. These maintenance contracts were essentially extended warranties that allowed customers access to the technical phone support centers, software upgrades to the operating firmware running on the equipment which was frequently updated for both bug fixes and feature enhancements, as well as advanced replacement for equipment that failed in the field. The maintenance contracts were written against individual pieces of equipment or on a complete system and were priced based on a percentage of the original list price of the equipment and provided coverage on an annual basis.

Other manufacturers went further and added additional post-sales service offerings, enabling customers to buy design and implementation services resulting in essentially turnkey data communications infrastructures, built-out of course with the manufacturer's offerings at the core of the solution. In essence, firms that added these services essentially competed directly with the VARs and system integrators that had partnered with the company's competitors. Cabletron is an example of such a firm that added a post-sales service operation that provided design, installation and maintenance services for its customers. Its direct competitor SynOptics avoided the development of sales and services capabilities internally, opting instead to tap into the many intermediaries that had emerged as discussed in the previous section.

The addition of a service capability, internal or otherwise, was of course partially out of necessity. Despite the rapid emergence of the standards, there was an incredible shortage of people who knew how the gear from the various manufacturers worked, how to configure PCs to operate on LANs, and to keep the increasingly mission-critical network systems operating round-the-clock. Companies such as 3Com, Cabletron and SynOptics Communications and many others faced the realities of the early phases of the Technology Adoption Lifecycle of the disruptive LAN technology as was discussed in

chapter three of the thesis. As demand for data communications equipment spread beyond the technology-savvy innovators, increasingly the manufacturers found it necessary to offer more services around their offerings to ease adoption.

At this juncture it is worth documenting a very important element to the development of complementary assets by the various players I found through my research for this thesis that I had not considered previously. The Big Four of data communications: Cisco, 3Com, Cabletron and Bay Networks, provided enterprise data communications products—the equipment and software that was used to build-out the “plumbing” of enterprise communications infrastructures. There was however some amount of market specialization prior to the 1993-1994 timeframe when SynOptics and Wellfleet Communications merged to form Bay Networks and Cisco Systems began its flurry of acquisitions by expanding into LAN switching as discussed in appendix one.

As was detailed in that appendix, 3Com initially focused on the segment that provided LAN connectivity for the LAN environment as did Cabletron and SynOptics Communications, which was initially spun-out of Xerox PARC in 1985 to pursue opportunities in providing fiber optic Ethernet equipment. Eventually SynOptics expanded into Ethernet, Token Ring and FDDI LAN equipment and competed fiercely with Cabletron and 3Com in the LAN hub space. For the purposes of this discussion, the enterprise data communications equipment manufacturers were effectively segmented into two primary subsets in this timeframe; there were the LAN equipment-focused companies such as 3Com, Cabletron and SynOptics Communications, and the WAN or router-focused companies, Cisco Systems and Wellfleet.

Prior to the explosion of awareness of the innovations in business practices made possible by the Internet it is important to recall that the role of the router and routing (Layer 3 switching) was very different from what it eventually became for enterprise networks. Routers and routing, prior to the emergence of the commercial uses of the Internet were used primarily in larger enterprises to connect multiple LANs on the same campus, to interconnect disparate LAN topologies (e.g., Ethernet, Token Ring, and legacy proprietary networks including mainframes), and to interconnect locations across long distances using private WAN links leased from service providers over the legacy telephony network. What is essential to understanding is that the numbers of routers in

even the largest enterprise networks were relatively small, and often they resided in a small number of the largest enterprise data centers. Into the early 1990s, routing was considered highly complex and due to the nature of routing implementations being primarily software-based, performance was limited relative to the LAN infrastructures at the locations they interconnected.

LAN equipment is vastly different in contrast to routers, and not just in technical function. Because LANs extended to every area in the enterprise the personal computer and other networked assets were spreading to, just about every conceivable corner of many enterprises, the scale and scope of the enterprise LAN equipment market was radically different. Prior to the incorporation of an Ethernet controller on the motherboards of PCs and other devices, every network node needed an Ethernet controller (NIC) in order to connect to the Ethernet LAN. In the medium and large enterprises, the telecommunications closets on every floor of an office building that held the equipment required for the voice network had LAN equipment added to support the data network. Initially that equipment consisted of wiring hubs and then eventually LAN switches, a port connecting one device to the network. Today the largest enterprises may have 500 or more LAN ports in a single closet. LAN equipment was distributed essentially everywhere connectivity to the enterprise network was provided, and was not relegated to the data centers and in reach from within the glassed-in network operations centers.

The companies that focused on wiring hubs such as Cabletron and SynOptics faced a far different challenge because of the inherent nature of their target markets. Providing the infrastructure that connected potentially thousands of devices, the wiring hubs that resided in the wiring closets providing the intra-enterprise “plumbing” was inherently more complex due to the pervasiveness of the LANs themselves. The wiring hub manufacturers were faced with a significantly more complex customer-facing function. That challenge started with the cable plant itself, extended to centralized termination in the wiring closets and at the individual device. Although LAN infrastructure devices provided a relatively less complex functionality to in comparison to routing, in the pre-Internet period when multiprotocol routing was still common, there were still significant LAN design issues as well as configuration complexity to be dealt

with. Not to mention a large, campus enterprise LANs required a very large number of LAN infrastructure devices and large building or campus installation projects were often very complex through all the phases. It was impossible for the LAN-focused companies to manage large enterprise accounts with a small team consisting of an account executive and a sales engineer. In order to sell effectively to a large enterprise, the LAN companies had to have a means to service the needs for complex post-sales support as they tried in earnest to develop an installed base of customers and brand awareness.

Another related and important characteristic of the LAN equipment market was SKU proliferation. As some readers will recall, throughout the late eighties and early 1990s before onboard Ethernet controllers became standard equipment on PCs there was a series of peripheral bus standards not to mention significant evolution of the PC operating systems. This led to a large number of NICs and software drivers supported by their manufacturers—there was not a single universal NIC. At the same time the evolution of the Ethernet standard beyond the first version was incredibly rapid. As the supported cable types specified by the standards expanded from thick coaxial, to thin coaxial, to twisted pair to fiber optics, Ethernet hubs became modularized, supporting many of these variants in a single chassis. Many of the largest enterprises found themselves supporting a wide variety of disparate cabling, PCs and LAN technologies, from multiple vendors and often supporting multiple technologies before Ethernet and IP became dominant. Suffice it to say the days of transition from the old mainframe and minicomputer environments to the new client-server infrastructures, not to mention the shake-out of technologies and the insatiable quest for more and more bandwidth made this a fairly complex space to sell and support customers in. In order to provide flexibility for customers, many of the LAN equipment manufacturers added the ability to support multiple cable types and technologies in a single hub, and devices to connect disparate technologies at the link layer (to preclude the need for routing). These capabilities created an explosion of SKUs and added complexity to specification of a solution. New parts with new capabilities were being added rapidly as new customer requirements emerged in the field and hardware solutions were developed by the engineering groups of the LAN-focused companies to address them. This was a very important difference between the routing companies such as Cisco and Wellfleet and the LAN companies such as

Cabletron and SynOptics: new functionality was added to routers primarily through the software services running on the hardware while LAN equipment often required new hardware to address new challenges.

These characteristic differences in the markets for routers and LAN equipment, and how the different members of the Big Four data communications equipment manufacturers went to market undoubtedly influenced their individual corporate strategies immensely. Clearly continuing to innovate to keep up in the “speeds and feeds” and “features and functions” race was the cost of admission although the ability to differentiate products on these performance and feature attributes has become more difficult and complementary assets increasingly have become the primary means of capturing value in the enterprise data communications market as commoditization of the technologies and products continues to this day. It is important to outline how these fundamental differences potentially influenced or shaped the strategies and tactics these companies pursued in building complementary assets such as the ability to effectively employ intermediated channels.

As was alluded to earlier in the paper, much of the brand- and market share-building efforts occurred early on in the router business were focused on the service providers who were buying large volumes of routers in order to support customers all over the world their efforts construct global private WANs. Cisco Systems clearly had a first-mover advantage in this space. The proximity to and participation of many Cisco engineers in the early efforts to build-out the public Internet and establish the Internet protocols provided a significant first mover advantage for Cisco in terms of market share and market evolution intelligence discussed in the previous appendix. More importantly as the number of Cisco routers and the service providers’ points of presence (POPs--the first hop from a company’s data center to the edge of the Internet core, controlled by the long-distance carriers) continued to expand rapidly, there were potential indirect network externalities that induced enterprises to choose Cisco routers as well.

There were two primary inducements early of for enterprises to purchase Cisco routers for their WAN and core routing functionality: 1. Ensure interoperability (although standards theoretically ensured that) and, 2. Leverage the technical knowledge of the technicians at the service provider in setting up and maintaining the customer premise

equipment, which was often the responsibility of the customer early on. Troubleshooting these links required cooperation by both ends of the link—the service provider and enterprise technical personnel spoke often as private WANs became increasingly more common for the global multinationals.

Routing configuration and the management of routed infrastructures was and continues to be to this day very complex. The earliest routing implementations were primarily in software early on and therefore somewhat unstable in the early iterations of routers. The product lines of the router companies were relatively small early on, with several base platforms varying primarily in their capacity, a variety of physical interfaces supporting connectivity to different LAN and WAN network types, and some software options typically. Because the first routers were essentially special purpose computers running highly specialized software, the gross margins were very, very attractive and fueled incredible organic growth for the market share leader.

It is worth noting that the learning curve for building multi-protocol routers was very steep into the mid-1990s, hence the relatively small numbers of entrants. Configuration and management of enterprise multiprotocol routers and private WANs was an art form. Trained and experienced technicians were very hard to find and the router companies such as Cisco Systems spent a lot of time, attention and resources providing training to the service providers and some large enterprises, getting operators of the equipment up the router operators' learning curve which was steep as well. This training undoubtedly included some amount of vendor indoctrination which significantly strengthened their position with this relatively small set of very large service provider and strategic enterprise customers adopting what became to be known as the Internet technologies. This turned out to be an incredibly fortuitous decision on the part of some router vendors as the commercial potential of the Internet for firms of all sizes became apparent. Familiarity built within the service provider community proved very valuable for obvious reasons—there was a propensity to recommend devices that the technicians knew well and had field experience with and possibly have completed formal training and certification for. The service providers linking enterprises via private WANs and eventually the public internet became key influencers of enterprise router purchasing decisions. Eventually the service providers evolved into one of the most important

intermediated channels for the early routing-focused companies such as Cisco Systems into the enterprise data communication markets.

Much of the complexity of routing was around the configuration of the devices to interface properly with the legacy TDM technologies. The technical staffs of the service providers had a great deal of experience managing devices with arcane, command-line interfaces, UNIX and UNIX-like operating systems, scripting and the other tools of the trade that transferred fairly well into the configuration and management of routers. The service providers were technically well suited to lead their enterprise customers through the transition.

One final important point to make about routing related to its complexity and its impact on the hierarchy that exists within enterprise IT departments. In my experience in the field there was in the early 1990s and continues to be today a readily distinguishable order or hierarchy within the technical IT staffs of enterprises: the technical staffs responsible for routing and the closely related technologies are typically at the top of that hierarchy. That is, there is an order of advancement that typically moves from being responsible for LAN equipment early and progressing over time into positions of responsibility for routing and the Internet and WAN connections. It is likely because of the skills required to function in this role and the complexity alluded to in the previous paragraphs, and of course the mission critical status firms' connectivity to the "outside world" has eventually attained, and a myriad of other issues beyond the scope of this paper. The point to take away is that the router people within an enterprise are generally the most senior technicians in these organizations, and even as the role of CIO evolved, these members of the IT department had a tremendous amount of clout and input on decisions regarding choice of technology and vendor in the enterprise infrastructure.

Summary

This appendix built on the general overview of the history of the data communications equipment market provided in the last appendix to outline in more detail how open standards influenced the evolution of the market and the industry. The fact that the industry relied heavily upon open standards was a primary driver of the evolution of the market. Of equal importance was the transformation to multi-vendor solutions. Because the standards made it increasingly difficult for the manufacturers to differentiate

their offerings with uniqueness, complementary assets such as brand and channels to market played a very important role in the establishment of dominant market share.

These attributes were the driving force behind the emergence of services firms that provided integration and other services around the offerings of the data communications equipment manufacturers. Manufacturers were faced by increasing demands from customers to provide increasing amounts of value-added services around their offerings. The emergence of potential intermediated channel partners presented a decision point for the firms competing in the defined segments to either continue to go to market via a direct channel, or chose to utilize intermediated channels. The latter part of the appendix established some key differences of the segments of the enterprise data communications market that existed into the mid-1990s and outlined the characteristics of the target markets and customers,. For the purposes of the thesis the evolution of the market and characteristic differences faced by the competitors had an incredibly important impact on how and when intermediated channels eventually became a crucial element of the go-to-market strategy.