Akamai Technologies: 
An Analysis of Product and Platform Growth Strategies 

by 
Victor L. Piper 

B.S. Electrical Engineering, University of Massachusetts Lowell, 2008 
M.S. Electrical Engineering, University of Massachusetts Lowell, 2010 

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Signature redacted 

Signature of Author

Victor Piper 
System Design and Management Program, MIT 
March 25, 2013 

Signature redacted 

Certified By

Michael Cusumano 
Sloan Management Review Distinguished Professor of Management and Professor of Engineering Systems, MIT 
Thesis Supervisor 

Signature redacted 

Accepted By

Patrick Hale 
Senior Lecturer, Engineering Systems Division, MIT 
Director, System Design and Management Program
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by

Victor L. Piper

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Abstract
Akamai Technologies has achieved market leadership in content delivery and application acceleration services and is pursuing aggressive growth. Akamai has advised the market that growth to $5B by 2020 is achievable by exploiting opportunity within its key markets. However, the internal consensus is that Akamai's legacy business practices are incapable of scaling at the rate of market growth. What must Akamai do to execute on its revenue goals and, more broadly, how can Akamai maintain a leadership position within a dynamic and rapidly expanding market?

The goal of this thesis is to discover the elements of Akamai’s legacy and emerging growth strategies and to identify strategic options that Akamai may pursue. To gain perspective into evolution of the business and the rationale for current strategic initiatives, a series of interviews with Akamai managers was conducted and a review of an Akamai case study and corporate quarterly earnings was completed. This information yielded insights on the challenges of growth, actions for overcoming these challenges, and motivations for selecting those actions.

To gain insight into best practices in growth strategy, a survey of the business strategy literature and case studies of successful technology platform companies was conducted. The literature differentiated between product-based business strategies and platform-based business strategies. Analysis of the differences between these strategies provided insights into Akamai’s current challenges.

Thesis Supervisor: Michael Cusumano
Title: Sloan Management Review Professor of Management and Engineering Systems
Department: Massachusetts Institute of Technology, Sloan School of Management
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This thesis stands as part of a dream of mine, after an MIT presentation on engineering and the hard sciences lit a fire in my imagination as a middle schooler, to go to MIT and learn how to think. The System Design and Management program, is unique among all MIT degree programs, in that it provides the flexibility that allows people to benefit from this learning while still fulfilling obligations as spouses, parents, homeowners, employees, etc. Were the program not designed with this in mind, I could never have hoped to apply, could never have been so astonished as to have been accepted, and could never have grown as I have among the most brilliant and hardworking professionals it has been my privilege to know.

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## Contents

List of Figures .................................................................................................................. 6  
List of Tables ..................................................................................................................... 6  
Chapter 1 – Overview ........................................................................................................ 9  
  1.1 Introduction .............................................................................................................. 9  
  1.2 Motivation ................................................................................................................ 10  
  1.3 Problem Definition ................................................................................................. 10  
  1.4 Research Questions .................................................................................................. 11  
  1.5 Research Approach .................................................................................................. 11  
  1.6 Organization of Thesis ............................................................................................. 12  
Chapter 2 – Literature Review .......................................................................................... 13  
  2.1 Value and Value Capture ....................................................................................... 13  
  2.2 Value Creation – Innovation .................................................................................. 18  
  2.3 Value Creation – Market Understanding ............................................................... 20  
  2.4 Value Creation – Channels to Market ..................................................................... 21  
  2.5 Value Creation – Sales ........................................................................................... 32  
  2.6 Value Creation – Industry Platforms and Platform-Mediated Markets ............... 36  
Chapter 3 – Akamai Technologies Inc. .......................................................................... 50  
  3.1 Akamai History ........................................................................................................ 50  
  3.2 Akamai Solutions ..................................................................................................... 58  
  3.3 Akamai Channels ..................................................................................................... 63  
Chapter 4 – Akamai Growth Strategy ............................................................................ 70  
  4.1 Product Strategy ...................................................................................................... 70  
  4.2 Platform Strategy .................................................................................................... 81  
Chapter 5 – Platform Strategy Case Studies .................................................................. 85  
  5.1 Platform Lever 1 – Scope of the Firm .................................................................... 86  
  5.2 Platform Lever 2 – Product technology ................................................................ 88  
  5.3 Platform Lever 3 – Relationships with external complementors ....................... 89  
  5.4 Platform Lever 4 – Internal organization ............................................................... 92  
Chapter 6 – Analysis of Akamai’s Platform Growth Strategy ........................................ 94  
  6.2 Four Levers Analysis – Akamai Technologies ...................................................... 95  
  6.3 Platform Leadership Strategy – Coring vs. Tipping .............................................. 100  
  6.4 Conclusion ............................................................................................................... 103  
Bibliography ..................................................................................................................... 105
List of Figures

FIGURE 1 TRENDS OF AKAMAI YEARLY REVENUE AND YEARLY INTERNET TRAFFIC, 1999 – 2011 .............................................. 9
FIGURE 2 THREE DIMENSIONS OF DISRUPTIVE INNOVATION .......................................................... 19
FIGURE 3 CHANNEL VALUE-ADDING CAPABILITY DECREASES AS COST-EFFICIENT SCALABILITY INCREASES .......... 23
FIGURE 4 ILLUSTRATION OF THE MARKET PENETRATION LEVERAGE OF INDIRECT CHANNELS .......................................... 24
FIGURE 5 ROLE INTERACTIONS IN PLATFORM-MEDIATED NETWORKS ............................................................... 38
FIGURE 6 EXAMPLES OF OPEN AND CLOSED PLATFORM ROLES ........................................................................ 39
FIGURE 7 PLATFORM GOVERNANCE MODELS DEFINED BY OPEN VS. CLOSED PLATFORM SPONSOR AND PROVIDER Roles .................................................................................................................. 40
FIGURE 8 INNOVATION MODELS WITH OPEN OR CLOSED .......................................................................................... 41
FIGURE 9 OPTIONS FOR CORING AND TIPPING PLATFORM MARKETS ........................................................................... 49
FIGURE 10 AKAMAI’S LONG TERM GROWTH OUTLOOK ............................................................................................... 58
FIGURE 11 ABANDONMENT RATES OF AKAMAI DSA VS. CDN AS A FUNCTION OF PAGE LOAD TIME .. 60
FIGURE 12 AKAMAI’S 2012 REVENUE BY CHANNEL PERCENTAGES .................................................................................. 64
FIGURE 13 AKAMAI’S DIRECT SALES PROCESS ........................................................................................................ 65
FIGURE 14 AKAMAI REVENUE BY MARKET VERTICAL ................................................................................................. 65
FIGURE 15 AKAMAI SALES REVENUE AND CUSTOMER COUNT BY DIRECT CHANNEL ............................................................................. 66
FIGURE 16 AKAMAI ACQUISITIONS, 1999-2012 ............................................................................................................ 72
FIGURE 17 AKAMAI’S HISTORICAL PLATFORM MODEL ............................................................................................... 84
FIGURE 18 AKAMAI’S EMERGING PLATFORM MODEL ...................................................................................................... 84
FIGURE 19 AKAMAI SHOULD BE AWARE OF GOVERNANCE IMPLICATIONS OF ADDING PROVIDERS AND SPONSORS ... 84
FIGURE 20 FORECAST OF CLOUD MARKET GROWTH ................................................................................................. 104

List of Tables

TABLE 1 INTENSIVE CHANNEL COVERAGE ........................................................................................................... 26
TABLE 2 SELECTIVE CHANNEL COVERAGE ............................................................................................................ 27
TABLE 3 EXAMPLE HYBRID CHANNEL TO PRODUCT-MARKET MAPPING ................................................................. 27
TABLE 4 HORIZONTAL STRATEGIES FOR PLATFORM GROWTH .............................................................................. 44
TABLE 5 VERTICAL STRATEGIES FOR PLATFORM GROWTH .................................................................................... 45
TABLE 6 EFFECTIVE PRACTICES FOR PLATFORM LEADERSHIP ..................................................................................... 48
TABLE 7 AKAMAI’S PRODUCT-MARKET COVERAGE .............................................................................................. 64
TABLE 8 AKAMAI’S PRODUCT-MARKET COVERAGE: DIRECT, INDIRECT, AND PARTNER CHANNELS ................................................... 78
To Judy:
Chapter 1 – Overview

1.1 Introduction

According to McKinsey Global Institute,\(^1\) in 2012 the internet economy accounted for 3.4% GDP and 21% of recent GDP growth in the 13 most connected countries - and this growth is accelerating. Driving this expanding e-business ecosystem is the rapid innovation of e-business models, such as ad-serving, social networking, and digital media, enabled by increasingly pervasive connectivity. Firms are challenged to stay on top of emerging trends, to control costs, and to deliver compelling experiences anytime, anywhere, and on any device.\(^2\)

Akamai Technologies Inc. of Cambridge, Massachusetts has grown as an enabler of these trends (Figure 1) and has positioned itself as the market leading provider of cloud optimization services. Akamai's growth has come from its ability to expand network access, to bring innovative complementary offerings to market, and to create business value through the sale and service of customized solutions. As Akamai pushes past $1B annual revenue, senior management perceives that changes in company structure, operation, and strategy are needed to sustain double-digit growth required to hit a goal of $5B in revenue by 2020.

![Akamai Yearly Revenue, Internet Traffic](image)

**Figure 1** Trends of Akamai yearly revenue and yearly internet traffic, 1999 – 2011

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\(^1\) (Pélissié du Rausas, et al., 2011)

\(^2\) (Akamai Technologies Inc., 2012)
1.2 Motivation

In 2010, Akamai achieved a 5-year stretch goal, and an impressive benchmark, of $1B yearly revenue. Following this achievement, CEO Paul Sagan presented a new long-term goal of reaching $5B by 2020. This goal would be achieved by capturing a share of the growing mobile, media, enterprise cloud, and SaaS markets, but how will the company execute? Historically, growth has come from new product innovation, expansion into global markets, technology acquisitions to facilitate entry into complementary markets, and contract acquisition tenacious and knowledgeable salesforce.

These practices have proven effective as performance demonstrates, however the company is proactively identifying risks and limitations to future growth. For example, thinking in terms of scale, increased revenue comes in large part from increased volume of new service contracts and contract upgrades, but expanding a consultative direct salesforce is slow and expensive. How can Akamai grow more efficiently?

Objectively, Akamai is in a strong position entering 2013. They are market leaders, have strong market capitalization, and are well regarded for their technology, industry expertise, and innovativeness. Yet the internet economy waits for none. The blistering pace of innovation and the strength and smarts of the competition mean that Akamai cannot lose momentum. For this reason, it is imperative that Akamai continue to accelerate innovation and market execution.

1.3 Problem Definition

The realities of the high-tech industry and financial markets necessitate that ‘small’ companies like Akamai maintain strong growth to remain relevant. Investment in innovation is critical to sustained growth and corporate longevity. Losing momentum in innovation dooms technology companies to flat-lined or declining growth at which point acquisition by stronger competitors or market exit are increasingly likely.

In early stages of the business, the resources needed to fuel innovation typically come from venture capital or private equity. When the company becomes strong enough to go

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3 (Akamai Technologies Inc., 2011)
public, it can then access funds via the financial market. However, the company then must commit to sustaining growth in earnings per share to sustain and grow share price. Strong demand for shares then enables the firm to raise funds for investment in innovation, such as IP or company acquisitions, thereby fueling growth. As the company matures, if particularly successful, the firm may grow war chest of cash and investments and become less reliant on investors. Consequently, for reasons of survival, ambition, and fiduciary responsibility Akamai is strongly focused on revenue growth.

1.4 Research Questions

Nancy Leveson, MIT Professor of Astronautics and Aeronautics and the Engineering Systems Division, notes that problems should be framed in a way that increases the problem solver’s ability to find a right solution. For this reason, this thesis starts from the abstract definition of revenue as value capture.

A supplier creates value by discovering customer needs, bringing a value proposition, creating a sale, and delivering the value. Innovation is the process of creating value potential, typically in the form of products and services. Marketing is the process of creating value opportunities, typically in the form of market segments and sales leads. Selling is the process of creating customers, typically in the form of contracts or agreements. Therefore, Akamai’s revenue growth challenge will be addressed by thinking about innovation, markets, and sales.

Where is Akamai making key strategic decisions about how to grow through innovation, marketing, and sales? What does the literature suggest about how innovation, marketing, and sales should be managed most effectively? Going forward, how can they capture as much of the cloud optimization pie as possible? What can Akamai learn from other market leaders about how to shape innovation in the ecosystem to favor their business model as other ‘platform leaders’ as Intel and Cisco have done?

1.5 Research Approach

The approach taken in this thesis combines in-person interviews with literature review and company case studies. Over the span of three months the author interviewed 35 Akamai Managers, Directors, VP’s, and Executives across Product Management, Product Operations,
Product Marketing, Channel Marketing, Channel Sales, Pre-Sales, Direct Sales, Services, Customer Service, IT, and Finance. Concurrent with these interviews, business strategy literature was sampled with a focus on innovation, business-to-business marketing, channels to market, sales, and platform strategy. This literature provided a view into best practices and theoretical constructs within which to frame Akamai’s actions and options.

Lastly, a review of pertinent company case studies provided examples of how industry leaders manage innovation, marketing, and channels. Intel provided insights on how to develop an ecosystem to stimulate innovation among a population of complementors and thereby drive adoption of Intel’s processing platform. Cisco, by contrast, provides excellent insights into growth through partnering and acquisitions.

1.6 Organization of Thesis

The thesis is organized as follows. Chapter 1 provides an introduction to Akamai and the motivation for studying its revenue growth strategy. Research questions are posed and the methods employed to answer these questions are presented.

Chapter 2 reviews the literature as pertains to value creation, innovation, marketing, channels to market, sales, and management of industry platforms.

Chapter 3 presents a detailed view of Akamai as a company. The history of the company is provided, to establish context for the current state. Then, the products and channels to market are described.

Chapter 4 describes Akamai’s current growth initiatives and considers salient differences between product-based and platform-based strategies.

Chapter 5 provides examples of platform strategies through case studies of Intel and Cisco. These studies yield important insights into practices that stimulate growth through ecosystem development.

Finally, in Chapter 6 we analyze Akamai’s current strategy in the management of growth as a product company and as a platform company in light of best practices identified in the literature and in the case studies of Intel and Cisco. We conclude by enumerating some points where Akamai could focus future efforts.
Chapter 2 – Literature Review

2.1 Value and Value Capture

The focus of this research is on revenue growth. In this chapter we define revenue, discuss implications of revenue in managing business growth, and present a framework of capabilities for revenue growth.

Revenue and Customer Value

Value, as defined in the marketing literature, is “the worth in monetary terms of the economic, technical, service, and social benefits a customer firm receives in exchange for the price it pays for a market offering.”4 In other words, customer value is benefit received and is accompanied by costs of obtaining that benefit. Revenue is a portion of the buyer’s cost of obtaining benefit, specifically the price paid to the supplier of a market offering.

The ‘fundamental value equation’ elaborates upon this definition of value by asserting that the supplier’s offering must create surplus value, value created less price, greater than a competitor’s next best alternative.

\[(\text{Value}_1 - \text{Price}_1) > (\text{Value}_2 - \text{Price}_2)\] 5

This equation implies that supplier prices can be higher than competitor prices provided that the surplus value creation favors the supplier. Of course in practice, there are limits to revenue potential due to constraints of the buyer’s budget and to limitations on the ability of the customer to realize an offering’s full value potential. Within these limits, the equation suggests that the supplier can obtain a premium depending on the level of surplus benefit created by the offering relative to the next best alternative. Alternatively, the supplier’s offering can create superior value by lowering prices. Such actions can also yield revenue growth if the increase in sales volume is great enough to offset the discount. In short, the model implies two revenue growth options: increase value capture and increase sales volume.

We caution that the value creation model above does not apply to all market structures. Consequently the revenue creation options are not useful for shaping value creation strategy

4 (Anderson, Narus, & Narayandas, Business market management: Understanding, creating, and delivering value, 1999)
5 (Anderson, Narus, & Narayandas, Business market management: Understanding, creating, and delivering value, 1999)
within all business models. The model applies to traditional, bi-lateral markets where value is exchanged between customer and either the supplier or the competitor. Within such markets product-based business models grow revenues by increasing value capture from customers and by increasing sales volume.

In multi-sided markets, by contrast, value is created and exchanged among multiple categories of participants. In such a regime, value capture dynamics are more complicated. Optimal strategies may reduce value capture from some participant categories in order to grow value capture from other categories. We explore this topic in section 2.6 when reviewing concepts related to platform-based business models.

For now, we limit the discussion to traditional product-based business models. Within product-based models, successful value capture depends strongly the pricing of offerings. If prices are too high relative to benefit, then customers may lose motivation to purchase or they may be pushed toward lower-priced competitive offerings. On the other hand, prices must be high enough to motivate market participation of the supplier. Four common pricing methods include cost-based, customer-based, competition-based, or value-based pricing.

Value Capture - Pricing

As implied by our definition of value, the supplier firm benefits from value-creating relationships and transactions by capturing a portion of the value through price-setting. The most common methods of pricing in business-to-business markets are cost-plus pricing, customer-based pricing, competitive pricing, and value-based pricing. Online business models have created a number of innovative pricing models, such as freemium, which are becoming increasingly relevant, but here we consider the four more common methods.

In cost-plus pricing, the firm calculates total cost of a product or service and defines a percentage profit to add on top of that cost. The sum of profit and calculated total costs defines the price of the good or service. Typically this cost includes COGS, operational and capital overhead, and distribution costs. As such, effective cost-based pricing relies on detailed cost accounting models to arrive upon a good estimate of total cost. In competitive markets,

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6 (Parker & Van Alstyne, 2005)
7 (Nagle, Hogan, & Zale, 2010)
cost-plus pricing is viewed as sub-optimal because of the risk of overpricing in weak markets and underpricing in strong markets.  

Customer-driven pricing is an alternative method in which the supplier prices at the level that buyers appear willing to pay. Implementation of this method may involve market studies early in the product life cycle and tracking of sales data as the market matures. A shortcoming of this method is that purchasers are skilled at not revealing their perceived value of the supplier offering, particularly when the supplier reveals flexibility. Moreover, if the offering is unfamiliar with the offering, their estimates of value may be far from the ‘true’ value. Both factors contribute to the likelihood that pricing where the customer appears willing to buy is likely to ‘leave money on the table’ and is unlikely to maximize profitability. 

In competitive pricing, the basis for price definition is competitive market offerings. Prices are determined by setting goals on market share and pricing relative to competitive offerings. In this mode, price cutting is the easiest way to gain market share. However, due to price-matching of competitors, the benefits are often short-lived and come at the expense of long-term margin reductions. 

Finally, in value-based pricing the basis for price definition is the value of the total offering as perceived by the customer. In this model, the supplier and business customer have a role in co-defining what the market offering is worth to the customer – typically in terms of cost avoidance or revenue generation. For value-based strategies to succeed, the firm must identify market segments where the market offering can create value sufficiently in excess of supplier costs. In these segments, the supplier assists the customer in discovering the value created by the offering, relative to next best alternative, and then negotiates price as a portion of that surplus value.

As described above, sales volume and revenue are determined in part by pricing of offerings which must take into account supplier profitability, customer’s willingness to buy, and competitor offerings. However, pricing based on a single such factor can result in low profitability and can be detrimental to positioning of high-end brands. In the marketing

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8 (Nagle, Hogan, & Zale, 2010)  
9 (Nagle, Hogan, & Zale, 2010)  
10 (Nagle, Hogan, & Zale, 2010)
literature many advocate a value-based approach because it avoids some of the shortcomings of other methods, maximizes potential value capture by focusing on value created for the customer, and also shifts the supplier-consumer relationship from a zero-sum dynamic to win-win.1112

Stakeholder Value

Up to this point, value has been defined in terms of supplier-customer relationships. However, enterprises comprise value exchange relationships with a variety of other stakeholder types, such as employees, suppliers, partners, investors, directors, and community members. The relative importance of these stakeholder groups shapes business strategy and organizational goal setting. For example, management philosophies such as Lean, Quality, and Voice of the Customer tend to stress the importance of the customer and express organizational goals in terms of minimizing non-value added waste, zero-defects, increasing customer satisfaction, respectively. Prioritization of stakeholders can change depending on trends at the level of society, economy, industry, market, region, stage of firm growth, and etc.

This thesis focuses on revenue growth because the $5B by 2020 goal is very visible at Akamai and shapes a lot of internal decision making. Before proceeding, we consider factors motivating a focus on revenue growth.

First, profitable revenue growth results in increased earnings per share (EPS = [Net Income – Dividends on preferred stock] / Average outstanding shares). EPS is often considered the most important determinant of share price.13 Share price and dividends are the primary means of creating shareholder value, so a push for revenue growth is consistent with the corporate mandate of creating value for company owners, the shareholders.

That being the case, one might ask, why not set goals on net profits directly, instead of revenues? Indeed, depending on the business environment, it may be more appropriate to cut costs than to invest in revenue growth. There is little leverage in optimizing costs in the face of significant market potential – particularly when margins are good. Consequently, we can infer

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11 (Anderson, Narus, & Van Rossum, Customer value propositions in business markets, 2006)
12 (Sharma, Krishnan, & Grewal, 2001)
from Akamai's focus on revenue that the organization is willing to forego some conservatism with respect to cost in order to aggressively pursue revenue growth opportunity.

Second, rising share prices reflects demand for shares. Companies need capital to fuel investment in future growth; strong demand for shares enables the company to raise capital by issuing new shares instead of taking on new debt. A complete discussion of debt versus equity financing is outside the scope of this work, but it is worth noting that low debt to equity ratios have been shown to correlate to reduced earnings volatility, which in turn correlates to better share value performance.¹⁴

Lastly, revenue growth also creates value for employees. On the one hand, Akamai employees are also owners because they receive stock as part of their compensation. Employees know that their efforts to grow the business contribute directly to growth of their own investment portfolios, so they are literally invested in the success of the business. On the other hand, revenue growth is also valuable as an indicator that employee’s work matters. Akamai employees care about the impact of their work and see that impact reflected in revenue growth.

In short, the goal on revenue growth indicates confidence that there is significant market potential and motivates an accelerated pace of business to favor maximizing growth before optimizing profitability.

**Revenue Growth**

In traditional markets, the primary means of growing revenue are by increasing the level of value capture from supplier-customer relationships and by increasing the count of value-creating relationships. The level of value capture is determined by the bundle of benefits the buyer receives. All else equal, the greater the customer benefits, the higher the price of the offering. The volume of transactions depends on the scope of offerings, the size of markets in which the offerings ‘fit,’ the scale and performance of channels to serve those markets, and the nature of the customer relationships created by the sales force. In the following sections we discuss the capabilities driving revenue growth in product-based businesses models: innovation, market understanding, channel leadership, and sales.

¹⁴ (Barnes, 2002)
2.2 Value Creation – Innovation

Innovation Models

The marketing literature defines innovation as improvement in the value of a market offering or the creation of new value in a market offering.\(^{15}\) ‘Value improvement’ leaves benefits and functionality unchanged but creates additional surplus value by decreasing total costs for the customer. Alternatively, new benefits can create value through new functionality or through performance improvement of existing functionality. Creation of new functionality enables the firm to define new market offerings, which expand value creation opportunities and thereby grow potential for revenue generation.

The technology management literature extends the definition of innovation. Utterback and Abernathy proposed a lifecycle model of innovation driven by technological developments that give rise to ‘discontinuous’ innovation at the level of the product.\(^{16}\) After early-phase experimentation in which generation of multiple design concepts eventually yields a dominant design, the scope of product innovation subsides as experimental efforts yield fewer performance gains. In this regime, innovation shifts to the process level where innovations drive cost efficiencies in production. This lifecycle model was later augmented to incorporate the role of services, where innovation shifts to customization and use of the product.\(^{17}\)

Clay Christensen cautions that the strategy of incrementally improving offerings through improvements to functionality and performance creates the “innovators dilemma,” which pertains to the mismatch between two rates summarized in Figure 2 and also to the distinction between two types of innovation: sustaining and disruptive.\(^{18}\) First, the rate at which the customer is able to absorb new value is limited, as represented by the dashed line. Second, the rate of improvement in market offerings is typically greater than the customer’s absorption rate. Third, there are different types of innovation. Sustaining innovations target high-end users who are willing to pay for improved performance or new functions. By contrast, disruptive innovations do not improve the offering for existing markets, but instead they create

\(^{15}\) (Anderson, Narus, & Narayandas, Business market management: Understanding, creating, and delivering value, 1999)
\(^{16}\) (Utterback & Abernathy, 1975)
\(^{17}\) (Cusumano, Kahl, & Suarez, “Product, process, and service: a new industry lifecycle model, 2006)
\(^{18}\) (Christensen & Raynor, 2003)
a new offering improvement trajectory. Early offerings along the new trajectory offer inferior value, but at lower costs, and are acceptable to lower-end users or open new markets to previous non-consumers of the incumbent market offering.

![Diagram showing three dimensions of disruptive innovation](image)

**Figure 2 Three Dimensions of Disruptive Innovation**

**Sourcing of Product Innovations**

Creation of new functionality or improvement of performance and costs can be accomplished in one of three ways: build internally, partner with an external party, or acquire technology through procurement of intellectual property or purchase of an outside firm possessing technical capabilities.

Build, buy, partner is a key strategic decision for companies because of the complex tradeoffs involved, foremost among which are cost, time to market, characteristics of the market offering, and long-term competitive advantage.

Part of the rationale for assessing these tradeoffs involves Net Present Value analysis of revenue curves, the operational and capital costs of realizing those curves, and time shifting.

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19 (Christensen & Raynor, 2003)
NPV analysis may support innovation acquisition if time to market benefits improve market capture or yield pricing premiums improve resulting revenues sufficient offset cost disadvantages in acquisition. However, management academics advise that NPV is an insufficient basis for assessing build, buy, and partner decisions. Drawing from dynamic capabilities theory and implications of the resource based view of the firm, Cusumano notes that long-term competitive advantage of firms stems from development of internal capabilities. He states, “Deep capabilities, combined with strategy, enable the firm to offer superior products and services as well as exploit foreseen and unforeseen opportunities for innovation and business development.” This perspective on capabilities development favors the option to build in-house those technologies that are likely to be core to future offerings. Also, it suggests that firms acquiring a core technology should invest heavily in retaining technical employees to ensure that capabilities are absorbed and not lost.

2.3 Value Creation – Market Understanding

Going to market with offerings capable of creating superior value requires that the firm understand deeply what the customer does and would value. To prosper, however, firms must be able to sell at a profit, which they do by creating economies which permit large numbers of transactions at low marginal cost per transaction. Strategies for creating scale economies, for example, include designing product-market relationships that exploit commonality of need across multiple customers. In this way, the firm can sell in volume while minimizing the expense of customization. To accurately map offering benefits to categories of customers requires a predictive theory commonly referred to as market segmentation.

Anderson et al define market segmentation as “the process of partitioning a market into groupings of firms that have relatively similar requirements and preferences for market offerings. Christensen notes that managers frequently use the wrong customer and product attributes when building customer segmentation models. He advises that the goal of market segmentation is to accurately theorize which products have strong value potential for their

20 (Cusumano M., 2010)
21 (Anderson, Kumar, & Narus, Value merchants: Demonstrating and documenting superior value in business markets, 2007)
customers and that managers must segment markets according to the circumstances of the purchaser.

"Why do the innovation strategies based on these categorization or segmentation schemes fail so frequently? The reason, in our view, is that these delineations are defined by the attributes of products and customers ... theories based on attribute-based categorizations can reveal correlations between attributes and outcomes. But it is only when marketing theory offers a plausible statement of causality and is built upon circumstance-based categorization (segmentation) schemes that managers can confidently assert what features, functions, and positioning will cause customers to buy a product." 22

In summary, market segments define groups of potential customers that can be addressed with a high probability of creating sales. In this way, segmentation is a powerful lever for creating revenue growth opportunities. Realizing these opportunities requires linkages, or channels between the supplier and customer.

2.4 Value Creation – Channels to Market

Anderson defines marketing channels as “sets of interdependent organizations involved in the process of making a product or service available for consumption or use." 23 Channels are the means by which offerings are brought to markets and so define an interface between the firm and the markets to be served. Channel-based approaches to revenue growth involve increasing the number and type of market interfaces employed, increasing the value created in the channel, and improving performance of the channel participants.

The number and type of market interfaces and the scope of value creation assigned to each interface are elements of channel design. Through thoughtful channel design the supplier can ensure channel-market fit so that the right number and types of channels are in place to serve product-markets in the way that customers want to buy. Making sound channel design decisions requires market understanding, as discussed in the previous section, but also requires

22 (Christensen & Raynor, 2003)
23 (Anderson, Narus, & Narayandas, Business market management: Understanding, creating, and delivering value, 1999)
that the product fit the channel through which it is to be sold. After establishing channel-market fit and product-channel fit, the channel coverage of product-markets can be optimized for profitability. In conjunction with profitable allocation of product-markets to channels, the channel designer should consider how channels are to interact along the lifecycle of a sale. That is, how should a particular channel to market be composed, what role should channel partners play in selling, and how can inter-channel conflict be mitigated?

With a channel design in place, it must be actively managed to drive continuously improving performance. However, the aim of continuous improvement is only effective insofar as there are discernible goals. Ultimately, any authority in the matter of goals must come from an understanding of value from the perspective of the end customer. Rangan asserts that, within a given demand chain, the supplier or a distributor/service provider with the best and most complete customer value information can cultivate a position from which to credibly coordinate definition of improvement goals and can coordinate improvement activities in pursuit of those goals for mutual benefit along the demand chain.²⁴

Channel Design

Types of Channels to Market

Figure 3 presents the spectrum of channel types along dimensions of cost and value-add.²⁵ Channels designed to create value by adding benefits beyond the core offering tend to be more costly. By contrast, channels designed to increase surplus value through lower prices tend to have reduced cost structures. Selection of channel type depends on the supplier’s motivations, on the compatibility of the offerings with the channel, and on the willingness of customers in the target market to pay for channel-added value.

²⁴ (Rangan, 2006)
²⁵ (Furey & Friedman, 1999)
To begin our review of channel-based growth strategies, we first explore the motivation of firms to build new channels to market. Consider the example of a growing firm with a single channel to market that is looking at new channel options to accelerate growth. The firm sold comprehensive offerings into large enterprises via direct sales. It became a market leader in the top end of the market and targeted mid-market sales to sustain revenue growth rates. To maintain a given rate of revenue growth by acquiring smaller, mid-market customers requires a significant increase in contract acquisition rates because contract values are typically much smaller. The firm found it difficult to scale contract acquisition through direct channels.

In consultative sales to the mid-market, sales volume per salesperson will likely not increase much because the sales cycle depends on complexity of the offering, not on the size of the deal. Moreover, growing the direct sales organization is time consuming because of the long training cycle necessary for new salespersons to become expert in the offerings and the customer. If the firm stayed single-channel direct sales, growth would be slow and gross margins would fall due to increased ratio of selling cost to contract revenues. These factors serve as motivation for firms to add lower-cost, more scalable channels, such as Value-Added

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26 (Furey & Friedman, 1999)
Resellers to sustain gross margins and quickly scale representation in the market, as illustrated in Figure 4 adapted from Furey & Friedman.

<table>
<thead>
<tr>
<th>Direct Channel</th>
<th>Indirect Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier</td>
<td>Supplier</td>
</tr>
<tr>
<td>Customers</td>
<td>Resellers</td>
</tr>
<tr>
<td></td>
<td>Customers</td>
</tr>
</tbody>
</table>

Product-Channel Fit

When firms decide to add a lower-touch channel, such as Value Added Resellers, the supplier must enable their new partners to perform. Partner enablement may involve generating marketing materials and training partner representatives to sell and service accounts. When moving to lower-touch channels, the key is to make the offerings easy for the partner to handle. Furey & Friedman offer a set of product attributes, summarized below, to consider when ‘channelizing’ products.

- **Definition** – Products may fit in lower-touch channels if they can be sold as a recognizable and easily understood object, have evident usage and purpose, and have well-articulated benefits. Low definition offerings tend to require a lot of knowledge transfer in the sales process and are therefore better suited to direct sales or value-added partners.

- **Customization** – Standardized products, as mentioned above, tend to be readily understood and consumed across a broadly-defined market segment. However, some

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27 (Furey & Friedman, 1999)
28 (Furey & Friedman, 1999)
29 (Furey & Friedman, 1999)
customers require adaptation to meet their specific needs. Value-added channels are more appropriate where customer and supplier must work together to configure the offering to the customer’s requirements.

- **Aggregation** – Stand-alone products tend to be easier to define and consume than products that must be ‘aggregated’ or built into a larger solution. Where products must be configured to interface with other components of a larger product-system, the customer may require the expertise found in direct channels.

- **Exclusivity** – Low-cost channels tend not to be frequented by customers seeking exclusivity in their purchase. For this reason, suppliers of ‘premium’ offerings may prefer to create ‘premium’ channels to accommodate the need for differentiated purchasing experiences.

- **Customer Education** – Where the product is well-defined and easily consumed, customers may require little additional information during the purchasing process and may find low-cost channels adequate.

- **Substitution** – If an offering can be easily substituted by a competitive offering, then the supplier may prefer to sell via direct channels where it has influence over sales and distribution and can more easily create differentiation.

- **Maturity** – As a product moves along a lifecycle of introduction, growth, maturity, and obsolescence, the definition of the product and changing use of channels.
  - During product introduction, the product may be ill-defined and may require heavy customization to the needs of the customer.
  - During growth, the firm wants to grow its share of the market and selling across multiple channels is an efficient way of doing so. The firm can get additional lift from lower-touch channels as the product definition matures.

- **Customer Risk** – High risk products require deep product expertise and deep industry knowledge to assist the customer in making wise purchase decisions. This level of service requires high-touch channels.
Negotiation – Where products are complex, high risk, or unique, pricing and contract terms will be similarly complex. In such cases, the seller will require representation capable of handling face-to-face negotiations in the sales process.

In addition to these attributes, Clay Christiansen notes that the extent to which an offering disrupts existing markets must also be considered. This is particularly true for low-end disruptions because the lower prices mean a lower share for the channel partner. Christensen asserts that channel fit in this context means finding channel partners for whom the disruptive offering represents a move up-market. In short, when bringing new offerings, the supplier must ensure offerings complement, and do not disrupt, the channel.

Product-Market Coverage

Table 1 and Table 2, from Furey & Friedman, shows two example mappings of channels to product markets. Table 1 shows an ‘intensive channel coverage’ map where product-markets are served by multiple channels. Table 2 represents a ‘selective channel coverage’ map where individual channels are assigned to specific product markets. Intensive coverage permits customers to buy through multiple channels, which may allow the firm to capture a broader range of transactions, but at the expense of potential channel conflict.

Table 1 Intensive Channel Coverage

<table>
<thead>
<tr>
<th>Key Accounts</th>
<th>Field Sales Force</th>
<th>Indirect Channels</th>
<th>Internet</th>
<th>Telechannel</th>
<th>Direct Marketing</th>
<th>(No Sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Sized Companies</td>
<td>Supplies and Peripherals</td>
<td>Standard Product</td>
<td>Customized Solutions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small Companies / Individuals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Customers / Products</th>
</tr>
</thead>
</table>

30 (Christensen & Raynor, 2003)
31 (Furey & Friedman, 1999)
It is more common to see hybrid coverage maps that have dedicated channels for high-priority product-markets and shared channels for other product-markets. An example hybrid coverage map is shown in Table 3, adapted from Furey & Friedman. The logic employed in this mapping reserves high-touch, high-cost channels for customers willing to invest in the added value while pushing lower-value transactions to the lowest-cost channel suitable to the task. Following this principle, field sales product and industry expertise are employed in the sale of high-value customized solutions, but only for opportunities of sufficient size to justify the investment of scarce field resources. In this way, the supplier can control value delivery in these priority markets while ensuring that sales in other product-markets are not lost due to lack of coverage.
Furey & Friedman summarize the principles of channel mix selection as follows.

- Align intensively-covered markets with the ‘critical buying mass.’ – A mix of channels should collectively be targeted at the critical mass of business activity taking place in a market.

- Manage the channel mix for profitability, not just sales. – Ensure that channels provide lift, new sales. Shifting revenues from one channel to another just adds cost. Not all channels will be profitable in every product-market, so set a maximum selling expense not to be exceeded by any channel.

- Save selective coverage for when it really counts. – Few high-priority product-markets warrant selective coverage, most others are better served by a flexible set of channels.

- Beware of conflict, particularly with indirect channels. – Equalize pricing between channels, define channel-specific product configurations, and use market growth as a guideline for setting channel density.

Channel Conflict

Where multiple channels serve the same product-market there exists the potential for channels to compete directly for the same sale, this is known as channel conflict. Channel conflict is not necessarily a problem when sales migrate between direct channels, but if sales migrate from indirect to direct channels then channel partners may become hostile to the supplier perhaps resulting in lower revenues, margins, or partner defection.

There are a variety of options for mitigating channel conflict. First, the supplier can take action to remove incentives for the direct sales force to compete on deals with indirect channels by restructuring the assignment of revenue credit. Some firms go so far as to provide dual compensation. Where direct and indirect compete for mid-market sales, dual compensation incentivizes the direct channel to shift efforts away from smaller deals toward larger sales. Second, conflict can be reduced if the supplier creates channel-specific offerings by differentiating price, packaging, or configuration. Effectively, this manages the conflict by separating product-markets. Lastly, conflict will be reduced if there is adequate room for

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32 (Furey & Friedman, 1999)
33 (Rangan, 2006)
growth within the product-market. Lacking that growth, the supplier may need to reduce channel density.

Channel-to-Market Composition

The channel designs discussed so far have assumed that a given channel is responsible for entire range of activities along the sales lifecycle. Such designs are either vertically integrated, in that the supplier performs all functions from demand generation to fulfillment, or they are third-party delegated and rely on other channel members for all functions.

The advantage of vertically integrated channels comes from tight coupling among organizational elements along the sales lifecycle with those responsible for marketing and product development. This tight coupling improves the flow of information from the customer and channel back to the rest of the value chain. Firms that harness this information have the potential to orchestrate the value chain to shorten time to market of customer-focused innovations. Zara is a very successful example of a vertical channel composition.

Third-party systems do not provide the supplier with the same level of control and insight, but can provide excellent coverage and profitability. Lack of control of third party channels can make it difficult to enforce channel policies and to drive performance improvements. Perhaps more importantly, the lack of visibility of customer purchasing and usage behaviors reduce the ability of the supplier to bring to market the offerings that customers want. However, if the supplier is able to establish trust, commitment, and free flow of information along the value chain, then the third-party structure can provide significant market lift. Cisco is a good example of a market-leading third-party system.

More common is a composite structure, where some activities are retained in-house but others are assigned to channel partners. This approach enables the supplier to optimize costs and value creation potential, while preserving control over critical functions. For example, some firms choose to outsource time-consuming and low-value activities, such as lead generation and support, to third parties which allows the direct sales force to pursue more deals, but only in value-adding stages of the sale.

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34 (Rangan, 2006)
Channel Performance

As noted in this section's introduction, channel revenue growth comes either from broader market coverage or improved channel performance. We presented concepts for building multi-channel structures to grow market coverage and now turn attention to performance. After building channel structures capable of scaling with demand and defining channel roles to optimize cost vs. value-add, the channel must be managed to ensure near-term efficiencies and long-term performance improvements. The channel management texts reviewed for this paper each advocated a metrics-based approach to improvement of channel performance, which entails goal-setting, performance monitoring, and influencing execution against the channel goals.

Metrics, Goals, and Performance Monitoring

The basis for goal setting differs across the texts reviewed for this paper. Furey & Friedman focus on managing channels in alignment with corporate goals. Whereas Rangan and Rackham & DeVincentes advocate starting from the perspective of the end user and formulating goals that improve on value delivery. Basing goals solely on the firm's siloed view of the demand chain results in decisions that are sub-optimized for the interests of the participant instead of optimizing value delivery for the end user. This, Rangan contends, undermines the demand chain and all firms in it.

To set channel goals aligned with a particular firm's corporate goals, Furey & Friedman see the challenge as making the translation of performance at the corporate and business unit levels down to goals relevant to each channel partner. Rangan offers similar advice, but states that goal setting must be led by a particular participant in the value chain who holds a "thorough understanding of the key drivers that shape and influence [the demand chain] at any given time." This participant, which Rangan dubs "channel steward," assists demand chain members in aligning individual goals to a system-level goal of improving the channel's overall economic performance.

Some guidelines for formulating goals include simplicity, ease of interpretation, and focus on the specific role of the individual channel member. In translating corporate goals to

35 (Furey & Friedman, 1999)
36 (Rangan, 2006)
channel-level goals, it is recommended to think in terms of sales objectives under categories of revenue growth, profit growth, or customer loyalty.37

For revenue growth, sales objective should focus upon account acquisition, expansion of the customer base, market penetration, and increased selling into existing key accounts. In defining channel goals in support of these sales objectives, the performance metrics must derive from activities that the channel partner performs in the sales process. Further, they should be specific and quantified, time-bound, forward-thinking, and manageable in number (2-3 per channel).

After establishing performance expectations by setting goals, the supplier needs to manage to against those expectations. This requires monitoring of indicators and definition of plans to bring performance in line with goals. The key issue in selecting operational indicators is that they should enable managers in the partner firm to focus attention on the key activities that impact the performance metrics against which channel goals have been specified. Rangan argues that this can only be done effectively when there is transparency between categories of demand chain participants. In this way, not only does the participant understand effectiveness downstream, but also has visibility to dynamics affecting inputs arriving from upstream participants.

Influence and Improvement

In addition to driving management of near-term objectives, Furey & Friedman provide advice for driving longer-term improvements in order to achieve longer-term corporate objectives. By recording current performance levels and specifying the performance levels needed 18-30 months out, performance gaps can be identified. With these gaps identified, supplier and partner can work together to plan specific actions to help the channel close the gap.

However, it is challenging to lead performance improvements across company boundaries. It may be possible to effect change through power plays, but Rangar advises against this approach.

37 (Furcy & Friedman, 1999)
“If power is exerted merely to affect the allocation of profits without expanding the pie then it becomes a zero sum game and partners become winners and losers. “

“Gaining channel influence recognizes that in an effective channel value chain, all intermediaries mutually depend on one another target goals. But for the channel value chain to become a team effort, it means that something other than power must become the primary driver of change.” “The most salient influence is the benefit gained by all parties when the demand chain and channel capabilities are truly matched.”

In short, to effectively lead performance improvements within the channel, the supplier must be able to speak credibly about performance from the customer perspective and must also have a thorough understanding about the drivers of demand along the chain. Moreover, the supplier must also have established trust among the channel participants that with that knowledge, goals, policies, and changes are defined in a way that grows the pie for the entire system and does not disproportionately benefit the supplier.

2.5 Value Creation – Sales

As we noted in earlier sections, suppliers can grow revenues by increasing the volume of transactions and by increasing the value created per transaction. It can be expensive and slow to scale transaction volume by growing the direct sales organization, so firms often look to resellers or other low-cost channels for sales volume. Value creation can be improved through productivity-oriented initiatives, such as matching the sales approach to the needs of the customer, narrowing the scope of activities to those that are most valuable, and focusing on the largest accounts. In this way the supplier ensures that scarce sales resources are employed in creation of the value that that the customer is willing to pay for, but only for those relationships that will provide adequate returns.

Rackham & DeVincentes propose a customer segmentation model along the dimension of the value requirements of the customers. 38 We review these customer types and discuss ways to grow revenues from each.

38 (Rackham & DeVincentis, 1998)
**Intrinsic Value Customers**

For some customers, value is intrinsic to the offering itself. These customers see the offering as a substitutable commodity lacking in strategic importance. Intrinsic value customers have a good understanding of the offering and know how they will use it. Consequently, they see little opportunity to obtain value within the sale and seek to minimize acquisition costs in order to obtain lower prices. Rackham & DeVincentes offer four strategies to suppliers facing increasingly transactional customer relationships within commoditized markets.

First, the supplier may adapt by reengineering sales system to strip out costs. Suppliers that wish to compete for the business of intrinsic value buyers must recognize that sales in this context are mere transactions. In response, suppliers can develop sales systems and processes that reduce cost, risk, and difficulty in acquiring the supplier's offering. Alternatively the supplier may move to lower cost channels, such as the internet or resellers.

Another strategy is to differentiate and escape transactional sale. In this strategy, the objective is to find ways to create benefits for the customer that they are willing to pay for.

Third, some companies have responded to commoditization of offerings by developing systems that enable them to monetize the transaction itself. EBay and the SABRE flight reservation system are examples of this strategy.

Lastly, the company might exit the market. This is a viable option where resources may be better spent supporting non-commoditized product-markets.

**Extrinsic Value Customers**

Extrinsic value customers seek value beyond the offering itself. For example, extrinsic value customers may not understand fully how the offering can be best used in their context so they are willing to pay for additional advice, customization, or support. If the supplier recognizes the opportunity and has a sales organization with the necessary consultative capabilities, then there is significant opportunity for the supplier to create value in selling to extrinsic value customers.

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39 (Rackham & DeVincentis, 1998)
40 (Rackham & DeVincentis, 1998)
Transactional selling methods are fine tuned to efficiently achieve the goal of closing the sale. Consultative selling aims to maximize customer benefits and uses more open-ended, exploratory methods to that end. The process of learning about the buyer's business issues and discovery of solutions represents significant investment of time and resources for both parties so the supplier-buyer relationship is generally longer-term. Because the methods, goals, and timelines in consultative selling differ, so to must management practices.

Consultative selling organizations tend to be resistant to change, which makes it challenging to implement long-term performance improvement, such as revenue growth, via sales-based initiatives. To improve the manageability of the sales force, Rackham & DeVincentes advocate a process-based approach which includes definition of process steps; use of objective, outcome-oriented metrics; and training programs to develop consultative sales skills in the sales force coupled with coaching skill development in front-line sales management.

Whereas Rackham & DeVincentes suggest that direct sales revenue performance improves with excellence in execution of end to end activities, Furey & Friedman suggest the following techniques to narrow the scope of direct sales activities to those that provide highest return.41

- Focus direct sales on large accounts which comprise the most important and complex selling opportunities.
- Where product and market characteristics permit, other channels should be used for lower-value selling tasks, such as lead generation and qualification.
- Provide technological enablers that improve the quality, accessibility, and relevance of information; facilitate collaboration with supporting functions; and improve account planning and management.
- Build training programs that emphasize large account management skills, needs analysis techniques, and coordination with other channels.
- Align performance measurement and compensation with large account focus to reduce time spent on smaller, less profitable transactions.

41 (Furey & Friedman, 1999)
Strategic Value Customers

Strategic value customers have value creation goals beyond the use of the supplier’s offering. Instead, the aim of strategic value customers is to leverage the supplier’s core competencies, in conjunction with their own, to create ‘an extraordinary level of value.’ Rackham & DeVincentes use the term ‘enterprise selling’ to describe the relationship between firms that enables creation of extraordinary value through integration of core competencies.

‘Selling’ core competencies between companies requires a very different relationship than does the simple exchange of products and services between supplier and customer. Products and services, on the one hand, are pre-defined offerings and channels to market are interfaces that enable transfer of offerings across the supplier-customer interface. Capabilities, on the other hand, arise from coordination of diverse skills and technologies and require collective learning and communication across organizational boundaries. Enterprise selling can be thought of as the definition of a channel by which enterprise capabilities can be exchanged. The enterprise sale, therefore, creates interfaces across which the various functional areas coordinate their efforts. The flows of information, products, and services across the enterprise sale interfaces are much more complex and broader in scope than in consultative sales. Consequently, the enterprise-selling relationship cannot be managed by a single salesperson or sales team, but instead must be led a senior manager with a broad sphere of influence.

Rackham & DeVincentes identified a set of preconditions to creating a productive enterprise selling relationship, which we discuss here.

First, both parties must be prepared to make changes to the way they do business in order to operate across the new interface. Preparation, in part, involves sufficient definition of firm capabilities. Capabilities may emerge organically from interactions among people with complementary skills, abilities, and perspectives and as such may be lacking in formal definition. In enterprise selling, it is helpful to have clearly defined processes, roles, and communication paths between functions to ensure that internal organizations are aligned in vision and coordinated in execution.

(Rackham & DeVincentis, 1998)
(Prahalad & Hamel, 1990)
Another key part of preparation is cultural. If internal operations are too rigid or if management is unwilling to adapt to the needs of the new relationship then value creation potential may be greatly limited. Further, the organizational values of the two firms must be compatible. Because there will be such broad engagement between the two firms, conflicting values, beliefs, and assumptions will make it difficult to secure cross-functional commitment and trust needed to work together.

Second, there must be great enough value creation potential to warrant allocation of resources to the relationship. If, after integration costs, the value created by the combined efforts of both partners is significantly greater than the value they would have created individually, then the enterprise sale may be worthwhile.

Lastly, there must be access to strategy on either side. To create greatest value within an enterprise sale, the partner firms must have access to the offerings, technologies, and competencies that have greatest strategic potential. With this access, the firms can engage in creative dialogue to identify new options enabled by the integration of their respective capabilities.

2.6 Value Creation – Industry Platforms and Platform-Mediated Markets

In section 2.1, we presented a value creation model applicable to traditional product-markets where suppliers appropriate revenues by creating customer value superior to that offered by competitors. Value, in this model, flows from supplier to customer and a portion of that value is captured by the supplier through pricing determined by the customer’s perception of value and willingness to pay. Revenue growth is achieved by increasing the price paid and by growing transaction volumes. We discussed the roles that innovation, marketing, channels-to-market, and sales play in creating that growth.

In this section, we turn attention to platform-mediated markets, which differ from traditional markets by the greater number of participant roles and the more complex flow of value among participants. Comprising platform markets are individual platforms upon which multiple sides can innovate and transact and which create potential for network effects. The more complex value pathways create potential for external sources of innovation and for
returns to scale that give rise to value creation and value capture options unavailable to firms transacting in traditional markets.

In this section, we review decisions available to firms seeking growth through entry into a platform market or through expansion of a mature platform. First we present core concepts in platform-mediated networks.

**Industry Platforms**

The term ‘platform’ commonly refers to ‘product platforms,’ which are “subsystems and interfaces that form a common structure from which a company can efficiently develop and produce a family of ... products.”44 Companies use these ‘internal platforms’ within modular product designs to create efficiencies and flexibility in design and production.

In other usage, such as by Gawer and Cusumano, the term platform refers to ‘industry platforms’ or ‘external platforms,’ defined as “products, services, or technologies developed by one or more firms and which serve as foundations upon which a larger number of firms can build further complementary innovations, in the form of specific products, related services, or component technologies.”45

Unlike technical products, which are designed to create direct benefits for the user via pre-defined functionality, at the core of an industry platform is a “system-like” product that is perhaps not very valuable in itself, but becomes valuable with the addition of complementary products or services.46 When platform companies expose the ‘enabling’ functionality of its technology through externally-accessible interfaces and permit third-parties to monetize offerings built upon the platform, then conditions are created for a network to develop and grow with the platform as its center.

The terms ‘supplier’ and ‘customer’ are not sufficient to describe the roles played by participants in such platform networks. Here we present a commonly used set of role definitions before moving on to discuss dynamics of value creation and value capture among these participants.

44 (Gawer & Cusumano, Industry Platforms and Ecosystem Innovation, 2012)
45 (Gawer & Cusumano, Industry Platforms and Ecosystem Innovation, 2012)
46 (Cusumano M., 2010)
Platform-Mediated Networks

Eisenmann et al. define platform-mediated networks as “comprised of users whose transactions are subject to direct and/or indirect network effects, along with one or more intermediaries that facilitate users’ transactions.” The network participant roles defined by Eisenmann et al., depicted in Figure 5, describe a flow of value from supply-side to demand-side users, mediated upon a platform infrastructure which also creates value for users.

- Platform Sponsors – hold property rights and are responsible for determining who may participate in a platform-mediated network and for developing its technology.
- Platform Providers – serve as users’ primary point of contact with the platform.
- Supply-Side Platform Users – offer complements employed by demand-side users in tandem with the core platform.
- Demand-Side Platform Users – are the end users of the platform and complements.

Open versus Closed

Each of the platform roles may be open or closed, as illustrated in Figure 6. For the purposes of illustration, in the following section we consider open/closed to be binary conditions but in reality there are varying degrees of openness, as implied by the “open, but not open” strategy coined by Yoffie and Cusumano and its counterpart “closed, but not

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47 (Eisenmann, Parker, & Van Alstyne, Opening platforms: How, when and why?, 2008)
48 (Eisenmann, Parker, & Van Alstyne, Opening platforms: How, when and why?, 2008)
49 (Yoffie & Cusumano, 1999)
Eisenmann et al. describe openness as the extent to which restrictions are placed on development, commercialization, or use of the platform, and the extent to which restrictions apply uniformly to various participants or participant roles. Eisenmann et al. provide Linux as an example of a fully-open platform which anyone may install and use (demand-side), for which anyone may build compatible applications (supply-side), which any firm may bundle into their computing hardware (provider), and which any party can contribute to the core OS (sponsor). This platform model stands in contrast to the iPhone which any subscriber of an authorized carrier may purchase and use (demand-side), but for which complementary applications are strictly controlled (supply-side), of which Apple is the sole manufacturer and distributer, and for which Apple alone creates the platform technology.

<table>
<thead>
<tr>
<th>Demand-Side User (End User)</th>
<th>Linux</th>
<th>Windows</th>
<th>Macintosh</th>
<th>iPhone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply-Side User (Application Developer)</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
<td>Open</td>
</tr>
<tr>
<td>Platform Provider (Hardware/OS Bundle)</td>
<td>Open</td>
<td>Open</td>
<td>Closed</td>
<td>Closed</td>
</tr>
<tr>
<td>Platform Sponsor (Design &amp; IP Rights Owner)</td>
<td>Open</td>
<td>Closed</td>
<td>Closed</td>
<td>Closed</td>
</tr>
</tbody>
</table>

Figure 6 Examples of Open and Closed Platform Roles

In terms of governance roles, platform sponsor and platform provider, the platform is open if multiple firms participate in the same role and closed if only a single firm holds the role. The 2x2 matrix of Open or Closed Sponsor and Provider roles shown in Figure 7, from Eisenmann et al., depicts four possible governance models: Proprietary, Licensed, Joint Venture, or Shared. 50

In proprietary platforms, a single firm plays both the sponsor and provider role. By contrast, shared platforms have multiple sponsors creating and releasing different, but compatible versions of the platform. Joint venture platforms have multiple platform sponsors who avoid competing with each other by going to market upon the same platform. Lastly, platforms that follow the licensing model are sponsored by a single company but go to market through multiple licensed providers.

50 (Eisenmann, Parker, & Van Alstyne, Opening platforms: How, when and why?, 2008)
Who Provides the Platform *(Provider Role)*?

<table>
<thead>
<tr>
<th>Who Controls Platform Technology <em>(Sponsor Role)</em>?</th>
<th>One Firm</th>
<th>Many Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Firm</td>
<td>Proprietary</td>
<td>Licensing</td>
</tr>
<tr>
<td>• Macintosh</td>
<td>• Palm OS</td>
<td></td>
</tr>
<tr>
<td>• Playstation</td>
<td>• American Express-branded MBNA cards</td>
<td></td>
</tr>
<tr>
<td>• Monster.com</td>
<td>• Scientific-Atlanta set-tops</td>
<td></td>
</tr>
<tr>
<td>• Federal Express</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Many Firms</td>
<td>Joint Venture</td>
<td>Shared</td>
</tr>
<tr>
<td>• CareerBuilder (created by three newspaper groups)</td>
<td>• Linux</td>
<td></td>
</tr>
<tr>
<td>• Orbitz (created by several major airlines)</td>
<td>• Visa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• DVD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• UPC barcode</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 7 Platform Governance Models Defined by Open vs. Closed Platform Sponsor and Provider Roles**

In platform markets the sources of innovation are the sponsor and supply-side users. The sponsor role is considered closed if only a single firm can contribute technology to the core platform. Openness of the supply-side role is determined by the level of control the sponsor exerts over selection and development of complementary offerings.

Cusumano notes that market-leading platforms may open or close either or both sponsor and supply-side roles. Closing both roles implies a product-like business model and little or no network effects on innovation. Closed innovation may reduce the scope of the firm’s offerings and thereby narrow revenue generating opportunities, yet value-capture opportunities may be stronger because of the reduced supply. However, proprietary products may be more profitable for the platform owner because of the exclusivity in value-capture opportunities. By contrast, platforms with open interfaces increase incentive to innovate but if there are too many complementors within a given category then prices – and sponsor revenues – may decline.

In part, the decision to close or open sponsor and supply-side roles depends on the kind of problems being solved and on the scope of the firm’s internal capabilities. Pisano and

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51 (Cusumano M., 15.358 The Business of Software and Digital Platforms, Course Notes, 2012)
Verganti provide a 2x2 matrix of Sponsor (governance) open or closed and Supply-side open or closed, as shown in Figure 8.\(^\text{52}\)

<table>
<thead>
<tr>
<th>Innovation Mall</th>
<th>Innovation Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>A place where a company can post a problem, anyone can propose solutions, and the company chooses the solutions it likes best. <strong>Example:</strong> InnoCentive.com website, where companies can post scientific problems.</td>
<td>A network where anybody can propose problems, offer solutions, and decide which solutions to use. <strong>Example:</strong> Linux open-source software community.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elite Circle</th>
<th>Consortium</th>
</tr>
</thead>
<tbody>
<tr>
<td>A select group of participants chosen by a company that also defines the problem and picks the solutions. <strong>Example:</strong> Alessi’s handpicked group of 200-plus design experts, who develop new concepts for home products.</td>
<td>A private group of participants that jointly select problems, decide how to conduct work, and choose solutions. <strong>Example:</strong> IBM’s partnerships with select companies to jointly develop semiconductor technologies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GOVERNANCE</th>
<th>PARTICIPATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchical</td>
<td>Open</td>
</tr>
<tr>
<td>Advantage: You control the direction of innovation and who captures the value from it.</td>
<td>Advantage: You receive a large number of solutions from domains that might be beyond your realm of experience or knowledge, and usually get a broader range of interesting ideas.</td>
</tr>
<tr>
<td>Challenge: Choosing the right direction.</td>
<td>Challenge: Attracting several ideas from a variety of domains and screening them.</td>
</tr>
<tr>
<td>Enablers: The capability to understand user needs; the capability to design systems so that work can be divided among outsiders and then integrated.</td>
<td>Enablers: The capability to test and screen solutions at low cost; information platforms that allow parties to contribute easily; small problems that can be solved with simple design tools, or large problems that can be broken into discrete parts that contributors can work on autonomously.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flat</th>
<th>Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantage: You share the burden of innovation.</td>
<td>Advantage: You receive solutions from the best experts in a selected knowledge domain.</td>
</tr>
<tr>
<td>Challenge: Getting contributors to converge on a solution that will be profitable to you.</td>
<td>Challenge: Identifying the right knowledge domain and the right parties.</td>
</tr>
<tr>
<td>Enablers: Processes and rules that drive parties to work in concert to achieve common goals.</td>
<td>Enablers: The capability to find unspotted talent in relevant networks, the capability to develop privileged relationships with the best parties.</td>
</tr>
</tbody>
</table>

**Figure 8 Innovation Models with Open or Closed Governance (Platform Sponsor Role) and External Participation (Supply-Side User Role)**

In their analysis, a closed approach to supply-side innovation works when "you have identified the knowledge domain from which the best solution to your problem will come, and ... you can pick the right collaborators in that field." Otherwise, an open approach will improve the chances of attracting the right collaborators. They go on to assert that a closed approach to sponsorship (governance) works if the "organization has the capabilities and the knowledge to

\(^{52}\) (Pisano & Verganti, 2008)
define the problems and evaluate proposed solutions.” Lacking this expertise, open sponsorship is preferred.

Adoption, Appropriability, and Network Effects
Two core challenges in platform growth are to incentivize user adoption by providing value sufficient to offset adoption costs and to provide superior value to that offered by non-interoperable platforms sufficient to permit pricing high enough to warrant market participation.

The factors motivating users to adopt a platform are more complex than those that motivate customers to purchase from a supplier. In addition to cost and functionality, adopters are also influenced by the presence or absence of network externalities. A significant portion of user value in platform networks is derived from the participation of other users, particularly where value increases as other users adopt the platform. The phenomenon of increasing returns to scale is known as 'network effects.' Network effects experienced within a class of users are known as 'direct' network effects, whereas network effects experienced between classes of users are known as 'indirect' network effects.

The presence and strength of network effects is a primary factor in driving user adoption and appropriability; a telephone is useless without other telephones to call. For new entrants into platform markets this constitutes a 'penguin problem.' A certain number of users must adopt the platform for network effects to build up but until a critical mass is reached, adoption may present more risk than benefit. In the absence of strong network effects, strategies such as subsidies or other price-related mechanisms act to stimulate adoption by shifting the value equation in favor of participation. That is, adoption rates can be increased within a role by trading off appropriability of the role.

In mature platforms, by contrast, adoption rates decline as the market becomes saturated. Market size can be expanded by adding functionality that attracts a broader market, by supporting interoperability with other networks, and by enveloping functionality from

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52 (Katz & Shapiro, 1986)
53 (Gawer & Cusumano, Industry Platforms and Ecosystem Innovation, 2012)
54 (Eisenmann T., 2008)
55 (Rochet & Tirole, 2003)
adjacent layers in the technology 'stack.' We review these growth strategies in the following section.

**Strategies for Platform Growth**

Platform sponsor revenue is a function of licensee and user adoption rates and the ability to create conditions and opportunities to appropriate revenues. The primary mechanisms for influencing adoption and appropriability are the scope of the platform and the openness of the platform roles. In this section, we summarize platform growth strategies developed in three works. First, we present horizontal and vertical strategies proposed by Eisenmann, Parker, and Van Alstyne, followed by a review of Gawer and Cusumano's Levers for platform leadership, and lastly Gawer and Cusumano's more recent platform coring and tipping strategies.
Horizontal Strategies

Horizontal platform strategies include decisions regarding openness of platform technology and decisions regarding openness of the platform governance model, as summarized in Table 4.

Table 4 Horizontal Strategies for Platform Growth

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interoperability</td>
<td>Openness of platform technology to users of other platforms, enabled by converters.</td>
<td>Converters may be costly to maintain.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If network effects are strong, larger user base may increase user willingness to pay.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increases market share if interoperability does not incent adoption of non-interoperable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In low-growth markets, incumbents may be able to deter entry of platforms by restricting interoperability.</td>
</tr>
<tr>
<td>License New Providers</td>
<td>Openness of platform provider role to multiple parties.</td>
<td>May put downward pressure on prices as providers compete for users.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May recover some revenue by charging licensing fees to new providers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Differentiated providers may provide greater value to differentiated user segments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May increase adoption rates and accelerate return to scale.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Platform providers may demand higher share of revenue and increased influence on technical and strategic trajectory of platform.</td>
</tr>
<tr>
<td>Add Sponsors (Supplier role today)</td>
<td>Openness of platform sponsor role to multiple parties.</td>
<td>May reduce costs of innovation and platform maintenance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increased options of platform technology to incorporate into a standard may result in best options being adopted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Joint development of technology invites feedback and may yield improved quality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group dynamics may create dysfunction such as bureaucracy or least common denominator outcomes.</td>
</tr>
</tbody>
</table>

57 (Eisenmann, Parker, & Van Alstyne, Opening platforms: How, when and why?, 2008)
Vertical Strategies

Vertical strategies are concerned scope of the products and services that the platform sponsor will offer versus those that will be offered by complementor; openness within the complementor role, including exclusivity rights; and openness within the demand-side user role specifically with respect to compatibility and pricing.

Table 5 Vertical Strategies for Platform Growth

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backward Compatibility</td>
<td>Openness of new platform versions to platform complementors.</td>
<td>Compatibility extends platform openness to the extent that it enables interoperability of complementary products on new versions of the platform. Adoption of new versions impacted by compatibility and price discrimination. If new version is much superior, can charge higher prices by making new versions incompatible.</td>
</tr>
<tr>
<td>Platform Exclusivity</td>
<td>Openness of complementors’ access to rival platforms.</td>
<td>Sponsors can accelerate user adoption when valuable complements are exclusive to the platform. Sponsors of early-phase platforms mitigate complementors’ adoption risks by providing economic advantages in the exclusivity agreement. Platforms can generally charge higher fees if valuable complements are exclusive to the platform.</td>
</tr>
<tr>
<td>Category Exclusivity</td>
<td>Openness of complementors’ scope on the platform.</td>
<td>Sponsors can encourage complementor adoption by providing exclusivity. By reducing competition, sponsors can charge higher fees from sole providers of a category of complements. If complementors are not monetized, the sponsor can increase end user adoption by commoditizing complements.</td>
</tr>
<tr>
<td>Absorb Complements</td>
<td>Close platform to complementors by incorporating functionality into core platform.</td>
<td>Bundling functionality of commonly used complements into the platform can increase adoption rates, retention rates, and willingness to pay. Providing functionality may build confidence in an emerging market for a category of complements. Compete in new platform markets through cross-layer envelopment – absorb functionality found in adjacent layers.</td>
</tr>
</tbody>
</table>

58 (Eisenmann, Parker, & Van Alstyne, Opening platforms: How, when and why?, 2008)
Platform Leadership

In their 2002 book, Gawer and Cusumano present case studies of three market-leading technical companies, Intel, Microsoft, and Cisco. These ‘Platform Leaders’ achieved market leadership through actions that fostered growth of platform ecosystems, comprised of third-party firms and products with the platform leader at the center. Gawer and Cusumano argue that platform leadership comes from astute management of the architecture of the platform technology and the provision of business opportunities for third-party innovators. They proposed a set of “Four Platform Levers” that constitute the top-level elements of platform strategy as discussed below and summarized in Table 3.59

1. Firm scope – Which complements to make in-house?

   The competitiveness of the platform depends on adoption rates, retention rates, and willingness to pay of platform users, which are influenced by the functional scope of the core platform. Platform success also depends on participation and success of external innovators, which in turn also impacts user adoption. Decisions about scope of platform functionality and scope of in-house complements depend on whether capabilities exist in-house to build the complements in question and, if so, the extent of the impact to complementors and their markets.

2. Technology design (degree of modularity) and IP strategy (open vs. closed, free vs. fee)

   For external parties to build upon platform functionality, the platform owner must construct interfaces by which to expose that functionality. However, the platform owner is motivated to keep parts of the platform proprietary and differentiated, which is at odds with opening the platform. One approach to balancing these motivations is to provide open access to interface technical specifications, while keeping functional technology proprietary.

3. External relations with complementors – How to promote third-party investment in complementary innovations.

   To become a ‘platform leader,’ within Gawer and Cusumano’s definition of the term requires that the platform owner succeed in incentivizing third-party firms to invest in complements that increase the value of the platform. The motivations and actions of the platform leader and the other firms in its ecosystem must align in ways that benefit the

59 (Gawer & Cusumano, Platform leadership, 2002)
ecosystem as a whole, and don’t unevenly benefit the platform owner. A balance of consensus-building processes and control-based leadership are needed to create technical and business conditions that benefit the whole of the ecosystem. For example, development of technical standards and specifications that ensure broad interoperability among complementors requires active participation and agreement among ecosystem participants. However, consensus building among independent – perhaps competing – firms is difficult to achieve without establishing the parameters of the choice to be made. The platform owner is in the best position to develop a vision for the platform, promote that vision among key players, and to facilitate the process of consensus building about how the vision is to be achieved.

(4) Internal organization – How the company establishes structures and processes for managing conflicts, such as when the platform leader makes complements that compete with ecosystem partners. (i.e. use of Chinese firewall to prevent undue advantage)

It is challenging to balance simultaneous competition and collaboration with complementor firms. Intel serves as a powerful example that such challenges can be managed organizationally, such as by having some groups responsible for competing (business units) while others are responsible for collaborating (Labs).
### Table 6: Effective Practices for Platform Leadership

<table>
<thead>
<tr>
<th>1. Firm Scope – Which complements should be made in-house?</th>
<th>2. Technology design (degree of modularity) and IP strategy (open vs. closed, free vs. fee)</th>
<th>3. External relations with complementors – e.g. initiatives to promote investments in complementary innovations.</th>
<th>4. Internal organization – company structures and processes that help manage conflicts should they arise, such as when the platform leader makes complements that compete with ecosystem partners. (use of Chinese firewall to prevent undue advantage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop a vision of how a product, technology or service could become an essential part of a larger business ecosystem.</td>
<td>Build the right technical architecture and ‘connectors’.</td>
<td>Build a coalition around the platform: Share the vision and rally complementors into co-creating a vibrant ecosystem together.</td>
<td>Evolve the platform while maintaining a central position and improving the ecosystem’s vibrancy</td>
</tr>
<tr>
<td>a. Identify or design an element with platform potential (that is, performing an essential function, and easy for others to connect to).</td>
<td>a. Adopt a modular technical architecture, and in particular add connectors or interfaces so that other companies can build on the platform.</td>
<td>a. Articulate a set of mutually enhancing business models for different actors in the ecosystem.</td>
<td>a. Keep innovating on the core, ensuring that it continues to provide an essential (and difficult to replace) function to the overall system, making it worthwhile for others to keep connecting to your platform.</td>
</tr>
<tr>
<td>b. Identify third-party firms that could become complementors to your platform (think broadly, possibly in different markets and for different uses).</td>
<td>b. Share the intellectual property of these connectors to reduce complementors’ costs to connect to the platform. This should incentivize and facilitate complementary innovation.</td>
<td>b. Evangelize the merits and potentialities of the technical architecture.</td>
<td>b. Make long-term investments in industry coordination activities, whose fruits will create value for the whole ecosystem.</td>
</tr>
<tr>
<td>c. Share risks with complementors</td>
<td>c. Share risks with complementors</td>
<td>c. Share risks with complementors</td>
<td>c. Share risks with complementors</td>
</tr>
<tr>
<td>d. Work (and keep working) on firm’s legitimacy within the ecosystem. Gradually build up one’s reputation as a neutral industry broker.</td>
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<td>d. Work (and keep working) on firm’s legitimacy within the ecosystem. Gradually build up one’s reputation as a neutral industry broker.</td>
</tr>
<tr>
<td>e. Work to develop a collective identity for ecosystem members.</td>
<td>e. Work to develop a collective identity for ecosystem members.</td>
<td>e. Work to develop a collective identity for ecosystem members.</td>
<td>e. Work to develop a collective identity for ecosystem members.</td>
</tr>
</tbody>
</table>

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60 (Gawer & Cusumano, Industry Platforms and Ecosystem Innovation, 2012)
Strategies for Platform Leadership

After identifying practices of Platform Leaders, Gawer and Cusumano proposed two strategies by which platform owners might become leaders within their market: coring and tipping. Coring a platform market refers to the strategy of creating a platform market where none existed before. Tipping, on the other hand, works to tip an established platform market in favor of the platform owner by building market momentum. Figure 9 lists Gawer and Cusumano's suggested technical and business actions for coring and tipping platform markets.

<table>
<thead>
<tr>
<th>Strategic Option</th>
<th>Technology Actions to Consider</th>
<th>Business Actions to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coring</td>
<td>• Solve an essential &quot;system&quot; problem</td>
<td>• Solve an essential business problem for many industry players</td>
</tr>
<tr>
<td></td>
<td>• Facilitate external companies' provision of add-ons</td>
<td>• Create and preserve complementors' incentives to contribute and innovate</td>
</tr>
<tr>
<td></td>
<td>• Keep intellectual property closed on the innards of your technology</td>
<td>• Protect your main source of revenue and profit</td>
</tr>
<tr>
<td></td>
<td>• Maintain strong interdependencies between platform and complements</td>
<td>• Maintain high switching costs to competing platforms</td>
</tr>
<tr>
<td>Tipping</td>
<td>• Try to develop unique, compelling features that are hard to imitate and that attract users</td>
<td>• Provide more incentives for complementors than your competitors do</td>
</tr>
<tr>
<td></td>
<td>• Tip across markets: absorb and bundle technical features from an adjacent market</td>
<td>• Rally competitors to form a coalition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Consider pricing or subsidy mechanisms that attract users to the platform</td>
</tr>
</tbody>
</table>

Figure 9 Options for Coring and Tipping Platform Markets

61 (Gawer & Cusumano, How companies become platform leaders, 2008)
62 (Gawer & Cusumano, How companies become platform leaders, 2008)
Chapter 3 – Akamai Technologies Inc.

3.1 Akamai History

The World Wide Web
While working at CERN as a software engineer, Tim Berners-Lee developed a software system for linking and organizing documents on his local computer. Berners-Lee released a developed version of that concept, known as the World Wide Web, for consumption over the global internet in 1991. In June of 1993 there were 130 linked web sites 1.5% of which were *.com. Two years later the web was growing exponentially 23,500 sites, one third of which were .com.63 As the web and the internet grew, more and more people were surfing the web and frequenting popular sites, such as Yahoo.com. However, performance was not guaranteed. Popular sites were sometimes inundated with traffic causing the site to go offline. Moreover, the architecture of the internet caused bottleneck-related delays and packet loss.64

Web Performance – The World Wide Wait
‘First mile’ delays related to issues in scaling centralized web site infrastructure. As site traffic and site complexity grew, data center costs increased and processing delays added up from the handoffs among load balancers, switches, database servers, application servers, and web servers. Such issues in the ‘first mile’ infrastructure accounted for 70% of performance degradation. Performance would continue to degrade as the web became more popular and web sites became more complex and content-heavy. ‘Backbone’ delays arose from handoffs along the network backbone service providers where delays are introduced as traffic was routed through an average of 17-20 routers to and from the web servers. ‘Peering’ delays resulted from the network of networks architecture of the internet. Network service providers hand off traffic to peer providers for global delivery. However handoffs are optimized for cost, not performance so traffic may be routed circuitously or through congested pathways. Lastly, the ‘last mile’ infrastructure includes lines from the internet service provider to the user where service provider infrastructure is subject to capacity limitations.65

63 (Gray, 1996)
Technical Solution and Business Concept

In 1995 Tim Berners-Lee, as a member of the MIT faculty and leader of the W3 Consortium at MIT's Laboratory for Computer Science, challenged his colleagues to find way to use distributed algorithms to improve internet content delivery.\(^{66}\)

Up to that point, solutions to the content delivery problem were localized in certain parts of the network. In the 'first mile' web publishers could expand by investing in larger data centers or by mirroring the site across multiple hosting companies. This meant duplicating whole sites, even infrequently accessed content. In the 'last mile' internet service providers (ISPs) could build higher-bandwidth networks or host additional client servers for regional improvements in service. Alternatively, popular content could be cached closer to the user, but outside of the control of the publisher. This solution was suboptimal in that it led to stale content and skewed usage statistics.\(^{67}\)

Tom Leighton, MIT Professor of Applied Mathematics, began working on Tim's challenge. Daniel Lewin, a graduate student in Theoretical Computer Science at MIT advised by Leighton, dedicated his Master's thesis to working on the problem.

Lewin approached Leighton with the idea of entering MIT's $50k Contest in 1998 with a business plan based on the results of his thesis. Lewin and Leighton recognized that much of the information required to present web pages consisted of large objects. If delivery of these objects could be accelerated, then overall site performance would improve. The proposed solution was a Content Delivery Network, a distributed network of servers that offloads traffic from overloaded web servers (origin servers) and optimizes caching and routing of content to the end user. Using an innovative new algorithm invented by Lewin in his thesis, the team would build network capable of solving some of the problems plaguing web publishers. Together with Sloan MBA student, Jonathan Seelig, the team pitched the business plan.\(^{68}\)

While they did not win the competition, the concept attracted the attention of venture capital. By late 1998 a working prototype was constructed with Yahoo.com as a key beta user. In 1999, the company went public and brought its FreeFlow offering to major web companies.

\(^{66}\) (Akamai Technologies Inc.)
\(^{67}\) (Spinrad, 1999)
\(^{68}\) (Akamai Technologies Inc.)
including Yahoo.com and CNN. With some name brands on contract and positive publicity, Akamai had the attention of market analysts. Within the first week of initial public offering, market valuation climbed to $145 per share.

1999-2000, FreeFlow

To lead the fledgling company, Akamai’s venture partners assisted in recruiting top tier management. Paul Sagan, formerly President of Time Inc., joined Akamai as Chief Operating Officer in January 1999 later becoming President and CEO. George Conrades assumed the helm as CEO, after having held posts at IBM as SVP of U.S. Operations and at BBN Corp as chairman and CEO. With their combined leadership experience, Conrades relationships at IBM and in the networking industry, and Sagan’s media background and savvy in the web publishing business, Akamai was well positioned to grow its network and customer base. 69

Akamai went to market with their FreeFlow service offering to speed delivery of ‘heavy’ web content. Web developers would tag objects to be served over the network, so that when users hit the site, HTML came from the source while large web objects were delivered from the network edge. Service came with a service level agreement guaranteeing 24x7 uptime and faster delivery than alternatives. In addition to performance and uptime guarantees, customers benefitted from decreased operational expenditures as data center bandwidth requirements were reduced around 50%. 70

From the beginning and until present day, 70-80% of revenue was generated through direct sales with the balance coming from hosting companies, system integrators, and telecom carriers reselling Akamai services, typically at a 30-45% discount off retail.

Early on, Akamai formed partnerships with key industry leaders. As a result of Conrades close relationships, IBM was one of Akamai’s earliest partners both in technology development and as a reseller of Akamai services. Apple and Microsoft also partnered early, investing $12.5M and $15M, respectively, to ensure compatibility of the Akamai network with QuickTime and the NT operating system. 71 Since that time, both companies have been two of Akamai’s

69 (Walter, 1999)
71 (Reference For Business)
largest customers, using Akamai's network to deliver Windows Updates and playing a central role in delivery of iTunes content.

With a solid base of respected clients and partners and with leadership driving execution, Akamai was positioned to grow quickly. In the third quarter of 1999, Akamai posted gross revenues of $1.3M from 44 recurring customers on a net loss of $19.2M. Market acceptance of the FreeFlow service was accelerating with fourth quarter revenues more than doubling to $2.7M and with net losses of $29.8 on a customer count up 515% to 227. By year's end, share values peaked at $345 per share.

Akamai continued aggressive growth in 2000. Leveraging strong market capitalization, Akamai made some high-profile acquisitions buying Network24 Communications Inc. for $200M in cash to enable acceleration of streaming media content. Next, InterVU was purchased for $2.8B in stock to add support for Windows Media and Real Networks video streaming support. Lastly, Akamai paid $6M for CallTheShots Inc., a company developing technology for user-targeted web content customization.

During the year Akamai expanded its presence from 2000 servers in 100 global networks to 8000 servers in 473 networks. By year end, the company had over 3600 customers, including 1337 under recurring contract. Q4 closed with $37M in revenues with a normalized net loss of $57.8M.72

2001-2003, EdgeSuite

The dotcom crash of 2001 resulted in a loss of %12 of Akamai's recurring contracts as customers went out of business or could no longer afford service. Akamai's stock price fell to $2.52 in September 2001. In October, cost cutting measures led to a layoff of one third of the workforce. During the same year, Akamai sought to recover revenues by introducing a new service which expanded Akamai's involvement in managing their client's web presence.73

EdgeSuite moved Akamai from delivery of content to the assembly, presentation, and delivery of customer data and applications. Central to this new service was a markup language called Edge Side Includes (ESI) developed as an open standard in an industry consortium led by Akamai and Oracle and endorsed by adopters including IBM and BEA Systems. This technology

72 (Akamai Technologies Inc., 1999-2012)
specified cachability and allowable cache life span of critical web content, thereby providing web publishers and service providers with close control over presentation and aging of content. Using this technology, Akamai’s network could dynamically assemble pages and present whichever content was available locally or serve expired and non-cached items along an optimized path from the origin.74

In addition to improving site performance, EdgeSuite helped customers to reduce the size and complexity of their data centers thereby cutting hardware costs and operational costs of maintenance. Moreover, customers further reduced their bandwidth consumption as even less content was served from origin. Scalability improved as Akamai’s distributed network could seamlessly absorb spikes in traffic. Lastly, EdgeSuite provided security benefits as denial-of-service attacks were handled at the network edge rather than propagating back to the origin servers.75

Owing to the demonstrable cost savings that EdgeSuite provided, Akamai found strong take-up of its new service despite the challenging business environment. However, selling such a comprehensive offering required a different set of skills than selling the FreeFlow service. As Paul Sagan put it, selling FreeFlow to buyers in small web operations teams “...was pretty easy; we were often just dialing for dollars. With a strong value proposition, we could close a sale in a couple of weeks...”76 However, selling EdgeSuite often meant changing the client’s IT cost structure and required a more consultative sale involving more decision makers along a longer timeframe.

The worsening macroeconomic environment led to a loss of 260 customers during 2001, yet the compelling new offering resulted in take-up by 152 valuable EdgeSuite customers. By year end, EdgeSuite accounted for 20% of quarterly revenue which after peaking at $43M in Q2 had retreated to $37M for net growth of 0% from the year prior.77

In addition to the challenging business environment, for Akamai 2001 held deep personal tragedy in the loss of co-founder Daniel Lewin during the terrorist attacks of Sept. 11. Daniel was aboard American Flight 11 and is remembered for having fought against the

77 (Akamai Technologies Inc., 1999-2012)
terrorists to defend the flight attendants and the cockpit. Tom Leighton remembered Lewin in a speech at the naming of Lewin’s thesis as STOC Best Student Paper, “to this day, those of us who knew him well can’t figure out how only five terrorists managed to overpower him.” Daniel’s memory is kept alive through commemoration of the park adjacent to Akamai headquarters and through yearly observation of a moment of silence on the anniversary of the attack.

In 2002, the market continued to suffer and share values fell to a low of $0.56. Further workforce reductions of 29 percent left Akamai with 550 employees at year end, down from a high of 1299 in late 2000 and early 2001. For the first time, the size of the network shrank. Moreover, quarterly revenues declined to $35.4M in Q4. Despite the revenue loss, EdgeSuite continued to be a success posting 44 percent of Q4 revenues from 270 EdgeSuite customers.78

The following year marked an inflection point as economic recovery and continued success of the EdgeSuite product resulted in Akamai’s first profitable quarter with net normalized income of $1.5M in Q4 2003. Revenues rose 28 percent from the year prior to $45.2M on a customer base that rebounded from a low of 955 in the prior year to 1126, half of which used EdgeSuite.

In this same timeframe, Akamai developed its first application delivery offering through a partnership with IBM. Predating Amazon’s Elastic Cloud Compute offering by three years, Akamai and IBM jointly announced the release of EdgeComputing for WebSphere. This service allowed Java applications developed in IBM WebSphere to run in Akamai’s distributed Edge network. Akamai pitched EdgeComputing as enabling rapid and cost-effective deployment of business process and web applications by outsourcing to Akamai’s ‘cloud’ rather than investing and maintaining costly private infrastructure. Early adopters used the capability to offload common and computationally intensive tasks such as user registration, search, and user prioritization to Akamai’s ‘cloud’ computing environment. While technically successful, the offering did not win many customers.

78 (Akamai Technologies Inc., 1999-2012)
2004 to 2009, Segmented Offerings – Media, High Tech, Commerce, Enterprise

Because the value proposal of EdgeSuite was so strong, by 2003 most of Akamai’s customers had adopted the service. By 2004, Akamai was largely a single-product company. However, they saw opportunity to grow per-customer revenues through more targeted offerings addressing more specific business needs. In 2005, Akamai introduced a new product schema with offerings targeted by industry vertical.

For Media & Entertainment customers, offerings focused on video streaming and downloading of media and software. As the offering gained traction, subsequent innovations would target phases of the media and content management lifecycle. In the second quarter of 2005, Akamai made its first acquisition in five years, purchasing Speedera for 12M shares of common stock valued at approximately $130M. This acquisition grew the market of potential customers by adding Flash streaming to the portfolio, increased Akamai’s count of recurring contracts by 22%, and expanded the corporate footprint into India.79

Dynamic Site Solutions was targeted to e-Commerce customers seeking to improve site performance. To enable value-based pricing of the solution, Akamai studied the relationship between customer behaviors and site performance, noting a sharp decline in click-through rates after 2-3 seconds delay in page loading. By ‘Akamaize-ing’ their site, customers could expect more persistent user behaviors resulting in greater sales conversions. Subsequent offerings would provide upgrade options for improved site availability, security, mobile optimization, and value-added analytics.80

In 2005, Akamai developed Web Application Accelerator (WAA) for Enterprise customers seeking to bring business grade performance to web-based applications. Unlike EdgeComputing, WAA did not execute the application within the distributed network nor did it impose compatibility requirements upon the target application. Unlike hardware based solutions, such as Riverbed’s Steelhead product, WAA did not require new infrastructure. To activate WAA required a simple DNS change to activate secure, optimized routing across the

80 (Piper, 2012)
Akamai network.\textsuperscript{81} WAA’s simple approach and solid results made a successful and enduring product.

The new bundled solutions had benefits across marketing, channel, and sales. For marketers, each offering was targeted at specific types of customer problems which made communicating value much easier than with a single product sold into an undifferentiated market. Customers would better understand the benefits of each solution without mixed messaging on use cases that didn’t apply to their business.

In sales, the new bundled offerings provided more favorable price negotiation dynamics. EdgeSuite was a blanket offering sold across all customer types. However, significant customization occurred during the sale. A la carte style feature offerings resulted in line item pricing which created opportunities for the customer to negotiate prices for each item. By selling bundled solutions into targeted segments, complexity was removed from the process and was abstracted up from the feature level to the package level. Prices started higher and were less susceptible to erosion.

Over time, new variants of the bundled solutions were added that included popular value-added features; the original variants and a la carte features remained available. After a few years, the catalog grew cluttered. Salespersons could create multiple different solution configurations with identical functionality. Because products were sold a number of different ways, it became difficult to maintain consistent pricing at the product level. Moreover, the wide number of possible representations of the same solution created challenges in securing internal order approvals and in representing and processing orders and invoices.\textsuperscript{82}

\textbf{2010 to Present – Scaling in Key Markets}

Despite the complexities involved in managing an increasingly diverse set of product lines, between 2003 and 2009 Akamai achieved 24 out of 26 quarters of double digit year over year revenue growth. In 2010, Akamai posted yearly revenues of $1.02B. During the 2010 Investor Summit, Akamai’s executive team laid out a goal to grow revenues to $5B by 2020.\textsuperscript{83}

\textsuperscript{81} (Akamai Technologies Inc., 2005)
\textsuperscript{82} (Piper, 2012)
\textsuperscript{83} (Akamai Technologies Inc., 2011)
As illustrated in Figure 10 Akamai believed growth to $5B was achievable by scaling business in its core markets, Media and Entertainment, e-Commerce, Enterprise, and High Tech, with additional opportunity in new areas such as security, big data, and mobile. Akamai leadership defined market-aligned branded solution families to enable more effective management of the product portfolio. Next, Akamai began re-architecting its channels to market for broader and deeper market penetration. Lastly, they began sweeping internal restructuring of the organization, key business processes, and IT infrastructure to improve scalability of the business. In the next sections, we consider the industry and market context in which Akamai is operating and review how Akamai is building product and channels to market to execute on its $5B revenue goal.

3.2 Akamai Solutions

During Akamai's 2012 Customer Conference, senior management communicated plans for growth in key product areas, Site Performance, Application performance, Media, Security, and emerging products. In these presentations, Akamai's business leaders were clear on the value that the products bring to their respective markets, but key themes were consistent across all product lines. Akamai's products make the internet faster, more secure, predictable, and scalable.
By 2010, Akamai had a broad catalog of productized network services, centered on three core offerings: Media and Software Delivery (Streaming, Storage, and Downloads); Dynamic Site Accelerator; and Web Application Accelerator. From the standpoint of technical performance, these solutions brought compelling, differentiated value to clients. However, the branding was not effective in communicating that value and a complex catalog structure contributed to operational inefficiencies.  

The first step in organizing the offerings and clarifying their value was to organize them within branded solution families. The Aqua family of products, including Dynamic Site Accelerator (DSA), delivered site performance with particular focus on e-commerce. Terra was aimed at the Enterprise and SaaS markets with the Web Application Accelerators as the core offering. Media offerings, such as streaming, downloads, and storage found a home in the Sola solution family.

Next, differentiated security offerings like the Web Application Firewall (WAF) were grouped into the Kona solution family. Under the previous catalog structure, WAF was sold as an add-on to the DSA, WAA, and media core offerings. As such, customers may not have had good visibility into the value it contributed to the total offering. Elevating security offerings to the solution family level enabled the business to focus resources in developing a product roadmap and also improved value communication to the customers.

Lastly, the Aura solution provides network operators with options for building Akamai’s CDN technology into their networks. Options range from fully Akamai owned and operated to licensed models that operators own and operate.

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84 (Piper, 2012)
85 (Akamai Technologies Inc., 2012)
Aqua

The Aqua product line aims to "remove complexity associated with delivering fast, high quality Web experiences to end users regardless of browser, device or network types," and to improve site reliability and performance.

The core offerings in the Aqua line are Dynamic Site Accelerator and its successor, Aqua Ion. Today's online customers expect a rich and highly interactive online experience. To provide this experience requires both highly dynamic content and crisp responsiveness to interaction. Sites that fail to perform suffer from increased rates of abandonment, as shown in Figure 11.

Figure 11 Abandonment rates of Akamai DSA vs. CDN as a function of page load time.\textsuperscript{86}

\textsuperscript{86} (Akamai Technologies Inc., 2011)
The DSA and Ion products deliver improved performance using content caching and origin route optimization, much like the original FreeFlow service. Ion brings an additional layer of optimization by detecting end-user situational variables, such as device type, connection type, and application, to provide front-end optimized site behaviors such as image resizing and image compression. Akamai believes this 'situational awareness' and optimization to be a key value proposition to site operators because to achieve comparable results would require significant overhead – for example managing multiple copies of the same image but in a variety of scales and compressions.

**Terra**

Increasingly, companies are taking advantage of the cost benefits and improved global accessibility of cloud-based applications. However, global use of cloud services introduces problems with latency, availability, and security that can degrade user experience and inhibit user adoption of cloud applications. The Terra suite enables enterprise grade application performance and availability, whether hosting is distributed or centralized.

Akamai’s Web Application Accelerator, released in 2005, uses multiple layers of optimization to ensure application availability and responsiveness. For example, route optimization selects fastest paths from user to origin and connection optimization adaptively compresses and pre-fetches content. The Terra Alta product adds two new features. Object deduplication reduces data transfer by updating only changes in large objects rather than sending the whole object and load-balancing ensures computational loads are distributed optimally across data centers.

The Terra line also includes Akamai's Cloud Catalyst product which enables Infrastructure-as-a-Service and Platform-as-a-Service providers to offer Akamai performance solutions as a value-added service to their own clients. For Akamai, Cloud Catalyst is both a product offering to the service provider but also a scalable channel for serving clients whose budgets do not allow consumption of Akamai’s premium services.

**Sola**

Within the Sola solution family Akamai has created products that define an online content management lifecycle. Sola Vision is a cloud-based media platform which provides
content protection and transcoding to multiple formats and resolutions. Sola Sphere, the CDN component, stores and delivers content across the global network. Lastly, Sola Media Analytics provides quality of service monitoring and insights into audience behaviors down to the level of the individual viewer. The Sola media offerings are aimed at Media and Entertainment companies, such as Hulu, Netflix, or Brightcove.

**Kona**

In 2009, Akamai released the industry’s first cloud-based Web Application Firewall. The WAF service protects against common threats such as SQL injection and cross-site scripting by filtering traffic at the network edge. Controls are applied at the application layer to screen out types of requests and at the network layer where IP white lists and black lists can be defined. Further controls on the rates of incoming traffic are aimed at blocking DDoS attacks. Kona Site Defender includes additional value-added features such as origin cloaking which restricts incoming access to origin servers to a select subset of Akamai servers.

Unlike performance products, security functions require 24 hour monitoring. It is common for internet-based companies to outsource management of security functions to ‘managed security service providers’ who specialize in management of diverse security solutions across a variety of third-party providers. Consequently, to efficiently sell advanced security products like as Site Defender Akamai might define a partner program specialized to the needs of MSSPs.

**Aura**

The centerpiece of Akamai’s business infrastructure is a distributed network of 127,000 servers. These servers are installed within 1,150 regional networks where physical space and bandwidth are typically provided for free by the network operator in exchange for the reduced transit bandwidth costs and the data-delivery performance benefits valued by subscribers. Many operators are interested in the revenue potential and cost savings realized by offering CDN-based products and are reluctant to give that opportunity over to third-party CDN providers. The Aura product line provides CDN solutions for operators who wish to add CDN products to their portfolio.

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The four Aura offerings vary in the level of operator involvement in ownership and maintenance of the CDN infrastructure. At the low touch, low benefit end, the operator may engage Akamai as an Accelerated Network Partner in an arrangement similar to that described above. At the high-touch, high-benefit end, the operator may license Akamai technology but fully own and operate the CDN infrastructure. In between is a managed option that permits the operator to define its own CDN applications or add-on third party services and outsources management of the infrastructure to Akamai. Both the licensed and managed solutions have the option of federating with the broader Akamai network so that the operator can sell CDN services to third party content owners and offer global access through Akamai's network.

In November of 2012, Akamai announced the purchase of Verivue in order to acquire its technology for licensing CDNs to network operators. The following week, Akamai announced a strategic alliance with Orange, one of the world's leading telecom operators. The scope of the alliance includes adoption of Akamai's Aura technology and formation of an "innovation steering committee to identify areas of innovation in the field of CDN solutions."88

3.3 Akamai Channels

From its founding to the present day, Akamai has maintained a multi-channel structure comprising Direct Sales and Indirect channels. Figure 12 shows Akamai's 2012 revenue by channel. Akamai's Direct Sales organization is comprised of Strategic Account Sales, Major Account Sales, and the Emerging Customer Group. Indirect sales come primarily from Strategic Resellers, such as Verizon Business (Terramark) and IBM Global Services, which provide access to exclusive accounts. In 2011, to create new channels as part of its growth strategy, Akamai formalized a partner program that is starting to produce revenues. We discuss these new channels in more depth in section 4.1.

Historically, 75-80% of revenues have come from Direct Sales with the balance coming from Indirect Sales. Though customers served through indirect channels differ in purchasing preferences, they receive the same customized solutions as direct customers. Since Direct and Indirect channels serve essentially the same product-markets, Akamai's market coverage is 'intensive.'

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88 (Young, J.; Akamai Technologies Inc., 2012)
As indicated in the product-market mapping, shown in Table 7, both Direct Sales channels and Resellers sell into each account tier. The sales process is summarized in Figure 13. Due to the complex nature of Akamai's product and the need for administrator-level access to sensitive network variables during product implementation, Resellers do not execute the Akamai sale after Lead Identification. Instead, Akamai engages in a sell-with capacity to qualify sales, conduct pre-sales, close the sale, and complete post-sale implementation and support. For Akamai, this model loses profitability because sales costs are about the same as direct, prices for Resellers are discounted by 30%, and full commission is paid to the Direct Sales person but gains access to some big clients.
**Direct**

Akamai employs approximately 250 in its Direct Sales division with 41 regional offices across the globe. The Direct Sales division is organized primarily by market: Digital Media, High-Tech, Commerce, Enterprise, and Public Sector. This structure enables the sales teams to become experts in business challenges particular to their customers and helps to reduce intra-channel conflict by ensuring that the sales teams’ engagements don’t overlap.
As shown in Figure 14, a third of Akamai's revenues come from the Media & Entertainment customers; one fifth of which comes from the top four customers. The same is true for Akamai’s High Tech customers, where the top six customers generate more revenue than the other six hundred customers combined. These customers are considered strategic to Akamai and the relationships are managed by Strategic Account Executives. Outside of this group of critical-to-business customers, the sales organization employs Major Account Executives to sell within other enterprise and mid-size accounts and the Emerging Customer Group to focus on high-potential small to mid-size accounts.

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Strategic Accounts

Akamai's largest customers are some of the most respected names in the online industry. Although these strategic customers comprise only 5.6% of accounts, as shown in Figure 15, revenues from these customers make up 30.6% of total revenues. These high revenues are an indicator of the unique and strategic value Akamai delivers for these customers.

For leading web-based businesses, it is critical to ensure service quality and availability for perhaps hundreds of millions of global users. Akamai is currently the only company that can
deliver high-performing online services, at global scale, at its price point. Because Akamai's services are strategically important and not readily substitutable, these customers are seeking a relationship that acknowledges this importance and Akamai delivers on this need by employing Strategic Account Executives. SAE's are members of the Direct Sales team and responsible for aspects of the supplier-customer relationship with key Akamai customers, including coordinating beta tests of upcoming products.

Major Accounts

Akamai's Major Account Executives (MAEs) impact Akamai's business by acquiring and growing large customer accounts. By selling within an industry vertical and region, they develop deep market expertise and also become experts in the business issues of their customers.

For many customers, Akamai's value proposition represents a significant changes to IT cost structures and organizational requirements. Selling this value requires the sales person to work with a broad set of customer stakeholders to uncover opportunities and tailor solutions to the specific needs of the customer's business. Such consultative engagements and the custom solutions they product require significant coordination with a broad number of Akamai internal stakeholders.

In Pre-Sales, the MAE works with Sales Engineering in development of the technical solution that will meet the customers' business and technical requirements. Once a solution is identified, a draft quotation is generated and reviewed by a Sales Analyst who coordinates internal approvals. If the package includes non-standard combinations of products or products sold at non-standard price points, then the Deal Desk is involved in developing price structures that are both competitive and profitable. When the proposed solution and pricing fall outside of guidance, Product Managers may be asked for final approval of the deal.

When the quotation is accepted, an order will be drafted. If the customer asks for non-standard contractual or billing terms, then the Sales Analyst will work with Legal to evaluate the language to limit financial and legal liabilities. Also, Professional Services approval may be required if there are special terms on integration.
In short, significant internal effort is taken to ensure that the custom solution makes sense technically, limits liability, is profitable, can be delivered within the desired timeframe, and is consistent with product-level goals. Selling customized solutions increases sales cycle time, which results in higher sales costs. The higher costs of customization are accepted because adaptation of standardized products, pricing, and terms should result in a greater proportion of closed sales. Trading-off profitability for deal win rate makes sense if the deals are large, but this approach loses its appeal for smaller customers. To improve the profitability of selling smaller deals, the Emerging Customer Group was formed.

Emerging Customer Group
Highly knowledgeable MAEs spend their time most efficiently by developing large accounts. When they sell down-market, margins fall as sales costs eat up a larger portion of the smaller revenues. However, it is important for Akamai to have presence in the lower end of the market since good online business models start small but can grow very big. The concern is that if such companies grow up with a competitor then it can be difficult to bring their business over to Akamai. By creating a lower-cost channel, the Emerging Customer Group Akamai can more efficiently capitalize on such opportunities.

Indirect
Since its early days, Akamai has recognized that it cannot accomplish its objectives by working alone. They formed enduring and profitable partners a few large national and international vendors who provided credibility, access to key customer accounts, and global presence.

Strategic Resellers
Two quarters after going public, Akamai and IBM announced a strategic alliance. IBM Global Services would become a systems integrator and reseller of Akamai services and Akamai would purchase and deploy IBM Netfinity enterprise-class servers as Akamai expands their network. Since that time, the IBM and Akamai partnership has remained strong, co-developing Akamai's first cloud-compute service, 'EdgeSuite for Java based on IBM WebSphere,' and selling Akamai within their own managed accounts.

89 (International Business Machines Inc., 2000)
In 2011, reseller relationships with IBM, Verizon Business (Terramark), and HP, accounted for approximately 7.5% of revenues much of which came from key public and private accounts including many Fortune 500 companies.

Regional Resellers
Another 5.5% of revenues come from international resellers including Latin American telecom giant Telefonica, which partnered with Akamai in 2000 as a global reseller.
Chapter 4 – Akamai Growth Strategy

4.1 Product Strategy

In Chapter 2 we discussed two ways of increasing revenues: increase the number of customers or increase revenues per customer. Depending on the business model of the company, different means are available for achieving these ends. Product companies have options related to development of products, packaging, and pricing; definition of markets; creation and management of channels; and selection of sales strategies and methods.

As a vendor of productized network services, Akamai is executing growth strategies that leverage core capabilities in innovation, market understanding, channel development, and sales to achieve its growth goals.

Innovation

Akamai Technologies Inc. owns and operates a global network of 127,000 servers which run the Linux-based ‘Akamai Intelligent Platform.’ This platform implements a variety of network services, such as content storage, processing, and distribution and traffic filtering and route optimization. Prior to the release of the Aqua, Terra, Kona, Sola, and Aura branded solution families, Akamai had productized its network services for sale horizontally across internet-based vertical markets such as digital media and entertainment, e-commerce, and high-tech software distribution. Within the new solution families, Akamai clarified its value proposition to the aforementioned key markets while adding Terra for the growing market of IaaS/PaaS/SaaS vendors and customers, Aura for the nascent Operator CDN market, and Kona security for sale horizontally across all markets.

By re-focusing on key markets, Akamai can develop innovation roadmaps aligned with the distinctive needs of these markets. Based on interviews with Akamai management this innovation roadmap includes initiatives with varying levels of risk and with focus both on increasing contract values within existing accounts and on growing the base of contracts. Below, we discuss several such initiatives including acquisitions, value-added products, joint offerings, market adaptation, and product localization.

90 (Akamai Technologies Inc.)
Acquisitions

Akamai considers itself an engineering-centric organization, and as such has generally preferred to develop technologies and solutions in house. However, Akamai also plays in acquisitions which it uses to complement market offerings, to strengthen market position, and to enter adjacent markets. A timeline of these acquisitions is provided in Figure 16.

In its early years, Akamai had high market capitalization and significant funding from venture capitalists and strategic partners. From its founding in 1998 until the collapse of the tech bubble in 2001, Akamai invested heavily in scaling the network and growing the organization. In 2000, Akamai also used its cash and stock position to make three acquisitions.

Network24 and CallTheShots.com were technology acquisitions that supplemented Akamai’s streaming solution and advanced Akamai’s content targeting capabilities, respectively. That same year, Akamai also acquired INTERVU in a stock-swap valued at approximately $2.8B. From that deal, Akamai gained streaming technology and high-profile customers that solidified its market position as the world’s leading service provider for Internet audio and video solutions.

It wasn’t until Akamai had recovered from the collapse of its stock value and achieved profitability that it made another acquisition. In June of 2005 Akamai announced the acquisition of Speedera, a competing content delivery network provider, for 12 million shares of Akamai common stock. With this acquisition Akamai grew its customer base by 22%, technology, supplemented its customer-facing service configuration portal, and entered the Indian labor and customer markets.

In 2006-2007, Akamai completed three additional acquisitions: Nine Systems, Red Swoosh, and Netli. Nine Systems and Red Swoosh were both essentially technology-motivated acquisitions but the motivations differed between them. Nine Systems was a rich media publication service provider whose business whose technology would provide added value within Akamai’s media delivery solutions. Red Swoosh, by contrast, developed a content delivery architecture based on client-side P2P protocols, which was very different from Akamai’s own architecture.
Akamai Acquisitions

Value-added Streaming Technology
Core Streaming Technology, Strategic Customers (CNN, NBC, etc)
Site Personalization Technology
Enhance Web Application Accelerator
Rich content management framework, Tech did not integrate well
Contributed Front-End-Optimization tech, Used in new Aqua Ion product
Contributed mobile content-adaptation tech, Tech did not integrate well

Contribute Operator-CDN technology for Aura product
Contribute network optimization technology, Core platform functionality
Acquire security technology, Expand site accelerator customer base

Count of Acquisition Count | Sum of Acquisitions

Figure 16: Akamai Acquisitions, 1999-2012
The outcome of both Nine Systems and RedSwoosh acquisitions was essentially the same; the technology was not capable of being integrated with the Akamai platform. Arguably this was value wasted for Akamai, but in the case of Red Swoosh Akamai was able to more closely evaluate the potential P2P as a CDN competitor and neutralize the nascent market.

The third acquisition, Netli, provided technology that contributed to Akamai’s Web Application Accelerator which became one of Akamai’s core offerings alongside Streaming Media solutions and ‘Dynamic Site Accelerator’.

Following the acquisition of Netli, Akamai acquired Acerno in 2008 and used the technology to enter an adjacent market with the Akamai Advertising Decision Solutions product. This product was operated and sold independent of the rest of the portfolio. The product gained 270 customers, including some household brand names and revenues of a few tens of millions of Dollars per year. Ultimately, the business did not find an enduring role in the strategic roadmap and so the product technology and all related assets were sold to ‘MediaMath’ in 2013.

The next three acquisitions, Velocitude in 2010, Blaze in 2011, and Cotendo in 2012, provided technology that drives site performance through content and connection optimization based on the user’s device and data connection. Velocitude had built mobile content optimization technology, which in the end did not integrate well in the Akamai platform and was shelved.

Next, after high-profile acquisitions of front-end optimization startup companies, such as Riverbed’s acquisition of Aptimize in 2011, it became clear that FEO would be a must-have in Akamai’s next generation products. To cut time to market in building FEO into Aqua Ion, Akamai acquired the technology through a $268M cash purchase of Blaze in 2011. Blaze’s technology worked well and became a key value-added feature in the Aqua Ion product.

In 2012, Akamai purchased Cotendo, the only serious competing vendor of dynamic site acceleration and mobile acceleration services. Cotendo had high-profile customers and a technology licensing agreement with AT&T. So through acquiring Cotendo, not only did Akamai become by large margin the market leader in DSA, but also AT&T had one more reason to
partner with Akamai in implementing CDN in the AT&T network.\textsuperscript{91} AT&T and Akamai disclosed this strategic alliance in December 2012.

Akamai’s most recent two acquisitions were announced late 2012. FastSoft, a Caltech startup, was acquired for an undisclosed amount of cash in September 2012 in order to obtain IP in TCP optimization. By contrast to the feature-level technologies obtained through other recent tech acquisitions, this purchase signified commitment to continued development of Akamai’s core platform.

Lastly, in December 2012 Akamai acquired Verivue in order to accelerate time to market of Akamai’s Aura Network Solutions. Verivue had developed infrastructure for licensed CDN which had found acceptance by several important network operators. The acquisition of Verivue was followed closely by announcements of strategic alliances with AT&T and France-based telecom Orange.

By enabling partnerships with large Telco’s the Verivue acquisition was highly strategic. For example, Orange is not only a leading telco that can drive significant CDN revenues, but it is also a global leader in Managed Security Services which makes it a potential reseller of Kona offerings.

In summary, Akamai has been effective in making acquisitions that provide advantageous market positions and accelerate time to market for products on the critical path to growth. This success speaks to strong strategic thinking, good connections in the VC community, and effective processes for managing the complex task of integrating organizations and technologies.

Incremental Value-Add

Like all technology products, Akamai’s products are subject to downward price pressure and loss of customers due to decreasing differentiation relative to alternatives. To keep ahead of commoditization and to improve customer retention, Akamai has been upgrading its cash-cow products with new value-added features and releasing them as branded, next-generation offerings.

\textsuperscript{91} (Rayburn, 2011)
Web Application Accelerator, for example, was re-released as ‘Terra Alta,’ a branded product within the Terra solution family. A key new feature in Terra Alta is Deduplication, which sends only the differences in objects, such as large files. This value-added feature reduces data transfer requirements of the application which improves performance and may permit the Alta customer to downgrade their ISP link.

By incorporating new features and optimizations into mature products, Akamai can sell the new bundle for prices proportional to the added value. The improved performance and cost savings provided by Alta enables Akamai to capture revenues five times that received for WAA. While an Incremental Value-Add strategy can be effective in growing revenues from the existing client base, incremental improvement to core functionality is unlikely to create new product-market fit unless some critical new need is met or performance tips a threshold.

Joint Offerings

Although Akamai is a market leader in performance optimization at the network layer and TCP layer, many of Akamai’s products face stiff market competition in other layers. By combining complementary characteristics of their respective technologies to create co-branded solutions with would-be competitors Akamai is able to capture revenues from previously inaccessible customers.

In February of 2012, Akamai and Riverbed jointly announced availability of the Steelhead Cloud Accelerator product (SCA) as a subscription add-on to customers of Riverbed’s Steelhead product. Steelhead is the market-leading accelerator of WAN intranet-based applications, but the product does not offer any performance improvement for traffic traversing the public internet. SCA is intended for hybrid-cloud applications where global users of the WAN still have to traverse the public network to access remote application servers. By combining Riverbed’s WAN-optimization capabilities and Akamai’s public internet optimization capabilities, customers of the SCA gain 5x to 100x improvement over non-accelerated access to cloud applications such as MS Office 365, Google Apps, and Salesforce.com.

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(Riverbed Technology Inc.)
Adapting Products to New Markets

Akamai innovates products and services that improve performance, security, and availability of for online services in the Media & Entertainment, E-commerce, High-Tech, and Enterprise markets at significantly lower marginal costs per end user. Since its founding, Akamai's focus on these markets and value proposition has proven sufficient to drive growth to $1B. As Akamai looks toward $5B, it is beginning to invest in products for markets where Akamai technologies disrupt current solutions.

Such initiatives are risky due to the uncertainties in applying technology to new purposes, in identifying markets and determining market requirements, and in configuring channels to reach those markets.

The market tends to punish Akamai stocks for failing to meet guidance on revenue and earnings, so Akamai is incented to place low-risk bets with high probability of success to stay on guidance. However, placing bets on higher risk, higher return initiatives creates potential for exceeding guidance and increasing share value. At present, Akamai leadership believes it has reached a point where it is able to take on additional risks.

Product Localization

With over 40 offices worldwide, Akamai has established presence in global markets, with particular focus in Europe and East Asia. One way to accelerate customer acquisition in global markets is to improve product-market fit by adapting the product, pricing, and marketing to local language and currency.

The content-focused part of localization deals with adapting messaging and language on a regional basis. With translation technology still in early stages, content processing is still a manual process. As such, the product development process must account for the time required to translate and validate at the regional level. In addition to language, application publishers should also consider adapting date formats, numeric formats, collating sequences, color schemes, images and sounds, interface navigational to local conventions.

In addition language-related adaptation, localization of currency and pricing is imperative. In Akamai's case, variation in telecommunications infrastructure ownership and

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93 (Duhl, J., 2008)
94 (Collins, 2002)
cost of access ought to be considered when defining prices. Akamai evaluates the cost of providing service when quoting prices for prospective clients. The extent to which infrastructural variation can or should be accounted for in calculating COGS is an open question.

**NetAlliance Partners**
A key consideration in Akamai’s growth strategy is how to grow the customer base at low marginal cost per customer. To reduce selling costs while delivering premium, custom solutions, Akamai created the Emerging Customer Group as a low-cost channel discussed in section 3.3. Because the ECG channel sells customized solutions, ECG Account Executives require the same level of product expertise as do the Major Account Executives. Consequently, scalability remains an issue with ECG.

Because solution selling is time and labor intensive, deep market penetration of custom solutions is difficult and expensive to achieve. Knowing this, Akamai is aggressively pursuing revenue growth through reproducible selling of standard solutions via low-touch channels. Central to this strategy is development of a channel partner program, which is expected to account for 40% of total Akamai revenues through partners by 2016.

In 2011 Akamai announced its NetAlliance Partner program, within which third-party firms may embed Akamai services within their own offerings or to resell Akamai services within integrated solutions. To enable these partners to be effective in selling Akamai solutions, Akamai is developing channel-specific marketing materials, sales and support training programs, and a set of standard products to be sold within a broader solution.

Table 8 shows Akamai’s product-market coverage including the partner channels. Strategic Resellers and Akamai’s Direct Sales teams create customized solutions for mid-to-large size companies, whereas arms-length intermediaries such as Resellers, VARs, and ISVs, sell standardized products for smaller customers.
Table 8 Akamai’s Product-Market Coverage: Direct, Indirect, and Partner Channels

<table>
<thead>
<tr>
<th>Strategic Accounts</th>
<th>(No Sales)</th>
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<tbody>
<tr>
<td>Major Accounts</td>
<td>(No Sales)</td>
</tr>
<tr>
<td>Mid-Sized Companies</td>
<td>Resellers, VARs, Integrated Solution Vendors,</td>
</tr>
<tr>
<td>Small Companies</td>
<td>Resellers, VARs, Integrated Solution Vendors,</td>
</tr>
<tr>
<td>Customers / Products</td>
<td>Standard Product</td>
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Partner Roles

The NetAlliance program partner types vary in the way that Akamai services will be incorporated into partner offerings.

- Application or Infrastructure Service Partner – “These service providers offer cloud services, IaaS/PaaS/SaaS, by using hardware and/or software from other vendors and integrate it with their own cloud services or by developing their own integrated solution and offering it to clients.” By attaching Akamai services, these partners improve quality of service, reduce costs and achieve scale by off-loading tasks to the Akamai network.95
- Cloud OEM – IaaS/PaaS providers have the option of employing Cloud Catalyst and in doing so; completely absorb Akamai services into the offering.
- Hardware, Software, and Consulting Integration – These firms offer “hardware and/or software solutions and/or consulting/advisory services to their clients. They are typically Value-Added Resellers or System Integrators.” These partners attach Akamai services to add additional value to custom-built solutions.96
- Digital Media Solution Partner – NetAlliance partners specializing in digital media can use Akamai’s media workflows to sell through Akamai to current Akamai customers.

95 (Akamai Technologies Inc., 2012)
96 (Akamai Technologies Inc., 2012)
• Operator CDN – Telecom infrastructure operators who partner with Akamai via the Aura suite of O-CDN offerings.

• Accelerated Network Partner – Telco partners who wish to obtain the benefits of hosting a CDN within their network without ownership or operational responsibilities.

• Global Alliance Partner – Strategic and Regional resellers bringing Akamai into accounts in a sell-with capacity to create custom Akamai solutions.

Product-Channel Fit
Because in-house direct channels are product experts as well as market experts, they can create solutions customized to the needs of the client through consultative selling processes. Channel partners, like those described above, do not sell Akamai products exclusively and so do not have the same depth of knowledge. Consequently, the offerings sold through Channel partners are more standardized and the marketing and sales of these offerings are more standardized also.

Direct Sales
To achieve the breadth and depth of coverage needed to scale the business to $5B revenue, Akamai is modifying its channel strategy with a much greater role for intermediaries from which most of the new business is expected to come. However, there is still significant opportunity for direct sales to support revenue growth within key accounts and incremental customer acquisitions. Shifting from big account acquisition to in-account selling and mid-market selling requires that Akamai refactors its sales methodologies for broader engagement within accounts and invests in improving back-end processes, IT infrastructure, and sales tools to accelerate the pace of direct sales activity.

Same-Store Sales
Akamai’s strong market share in the top-end of the cloud optimization market means that there are fewer and fewer large customers to win. Going forward, in-house sales will invest more effort in growing accounts within its installed base. This shift of focus to same-store selling dovetails nicely with the incremental value-add product strategy since a simple upgrade to a next-generation service, such as Aqua Ion, Terra Alta, and Kona Site Defender, can easily double revenues on that line item.
Traditionally, Akamai’s sales force targeted IT stakeholders with a well-proven set of value propositions related to reducing IT costs and complexity. Akamai’s sales leaders believe that growing within accounts will require the sales team to connect with business needs of a broader set of stakeholders in the customer organization. Selling in that broader context will be less about ‘communicating the value’ of Akamai services and more about discovering needs and working with the customer to create business solutions. Akamai investing significantly in training programs to strengthen value selling capabilities of its sales force.

Sales Process and Infrastructure

A somewhat mundane, but critical, prerequisite for growth is to ensure that the back-office processes are capable of scaling with minimal errors and cost. To get ahead of expected increases in sales volumes and restructuring of the product catalog, Akamai is making strategic investment in new infrastructure and sales tools. The new IT systems are expected to represent increasingly complex product configurations and billing models while improving visibility into the sales and service lifecycle.

Summary

With a goal of hitting $5B in revenue by 2020, Akamai is making significant changes to the way it does business to scale the customer base and to grow revenue per customer in key accounts. Akamai is investing in smart, strategic acquisitions to accelerate time to market of those products with strong upside potential. However, they are also providing strong support for in-house innovation capabilities including riskier new-market initiatives. Akamai foresees challenges in sustaining double-digit growth through direct sales of custom solutions and so is pursuing a variety of new channel initiatives that bring revenues at lower incremental cost per sale. Lastly, Akamai has a significant install base of large enterprise customers which are able to afford investments in solutions that drive business results. By strengthening the ability of the salesforce to create value with business stakeholders outside of the IT unit and by bringing to market innovative, value-added products to market Akamai is positioning itself for strong revenue growth from in-house accounts.
4.2 Platform Strategy

Historically, Akamai's growth has come through direct sales of custom solutions, with a more recent push for greater product standardization and market differentiation. Direct Sales, while unmatched for generating high-margin business, is not capable of scaling quickly enough to meet Akamai's aggressive growth targets. Akamai management is exploring options to engage its ecosystem in new ways.

In the words of senior management Akamai is initiating an 'ecosystem play,' which suggests that a new logic has been introduced into managerial decision making. To accelerate growth, Akamai will seek initiatives that use platform characteristics of its technology to interact with the market in ways that enable scalable adoption of the Akamai platform in volume and at low cost.

In section 2.6, we reviewed strategies for broadening platform markets, accelerating platform adoption, and driving platform appropriability. The strategies described include options for opening the platform in terms of technology and participant roles as well as strategies for leveraging innovation in the ecosystem. Akamai's emergent platform strategy includes elements of both vertical strategy, such as increased scope of the core platform, and horizontal strategy, such as licensing of new providers.

Vertical Strategy

Absorb Complementary Functionality

We discussed Akamai's value-added product strategy and its role in the overall revenue growth strategy. Value-added products increase the value captured on existing contracts by adding functionality that both complement an existing offering and increase customer willingness to pay. This approach of incrementally adding functionality to existing bundles may also increase product adoption within existing or new markets.

Knowing that absorption of functionality is also considered a 'vertical strategy' for platform growth, the question arises, "how do strategies for incremental absorption of functionality differ between product and platform companies? Clearly the difference lies at the level of the offering. When implemented as a product strategy, new functionality is available to purchasers of a product or complement. By contrast, when new functionality is absorbed into
the platform, the value of the platform may increase for all users. That being the case, the potential exists for platform functional absorption to create network effects that compound the added-value.

Most of Akamai’s acquisitions have been focused on enhancing existing media and acceleration offerings and were intended to drive growth through sales of a particular product. More recently, however, Akamai made two acquisitions aimed at extending the platform. The acquisition of Verivue provided technology and credibility for Akamai’s Operator-CDN products. Verivue’s technology increased the value of the platform by providing potential platform sponsors new models of infrastructure deployment including, licensed, managed, and fully outsourced, to accommodate operators’ needs for time to market and ROI.

By providing more flexible options for network operators to enter the CDN market, Akamai creates new opportunities to expand the platform footprint. End users in the expanded network receive improved performance of services offered by Akamai customers (content and application providers). When end-users of the expanded network experience improved content and application performance, they may become accustomed to the new level of performance and so begin to demand similar service quality from other providers. In this way, cross-sided network effects may be created.

In addition to the Verivue acquisition, Akamai purchased FastSoft. FastSoft’s proprietary TCP optimization algorithms complemented Akamai’s core platform technology, improving performance of sites, applications, and media delivery.

In short, acquisitions of functionality that enables expansion of the network or improves performance of core network services are evidence of Akamai’s emerging platform growth strategy. The impact of this vertical strategy will be all the more powerful when absorbed functionality has potential to create network effects.

**Horizontal Strategy**

Closed, but not closed Platform Provider Role – PaaS Providers

Through consultative, direct selling Akamai has successfully penetrated the top end of their key markets. However, to gain measurable revenues from the mid-to-lower end of the market requires more scalable channels.
Akamai is taking a platform approach to scalably penetrating the SaaS provider market. Through partnerships with platform providers, Akamai is delivering base-level services to SaaS companies enabled by Akamai’s Cloud Catalyst solution to which platform providers subscribe and pay Akamai based on their clients aggregated usage. This is a clear example of closed, but not closed strategy on the provider role. New providers are contracted to conduct Akamai business subject to conditions, to offer a subset of the total range of Akamai services, and to remit a significant portion of the value back to Akamai. However, providers may service their own users at will and without signing Akamai paper.

Closed, but not Closed Platform Sponsor Role – IaaS Providers / Telco

We presented Akamai’s purchase of Verivue as an example of platform-focus in acquisition of new technology. In addition to the vertical strategy of absorbing key platform functionality, the acquisition of Verivue also supported a horizontal platform strategy of opening the platform sponsor role.

By opening the sponsor role, Akamai enables Telco/Internet Service providers to monetize their networks in new ways through in-network CDNs. This strategy opens the infrastructural side of the Akamai platform by permitting Telco/ISP customers to own and operate the CDN hardware, as illustrated in Figure 17 and Figure 18. The services side of the platform is still closed in that the software is still Akamai proprietary.

As Akamai assists Telcos in building their CDN infrastructure, there may be an opportunity to benefit from Telcos’ vast engineering resources by enabling them to innovate new network services within the Akamai Platform. If Akamai can modularize its platform architecture such that core IP is hidden behind a service layer, there may be opportunity to open that service layer for development of core services or complementary services. For Telcos that are part of the federated Akamai network, this would represent an opportunity to monetize the broader network.

Potential advantages of opening the platform provider and sponsor roles notwithstanding, Akamai should consider the governance implications of such actions. Expanding governance has deep implications on control over IP and business strategy and must be approached with caution.
Historical Akamai Platform Model

Emerging Akamai Platform Model

Who Serves as Platform Provider:

- Mediating Users' Interactions!

One Firm

- Apple
- PlayStation
- Monster
- federal
- Enterprise
-............

Many Firms

- Linux
- Vista
- DVD
- UPC barcode

Akamai?

Figure 17 Akamai's Historical Platform Model

Figure 18 Akamai's Emerging Platform Model

Figure 19 Akamai should be aware of governance implications of adding providers and sponsors.
Chapter 5 – Platform Strategy Case Studies

Our original purpose in this thesis was to investigate Akamai’s revenue growth strategy, to understand the differences between growth through products and growth through platforms, and to provide insights useful for shaping Akamai’s growth strategy going forward.

Thus far, we have presented the current state of Akamai’s product lines and the channels available for bringing products to market. We discussed Akamai’s product-based revenue growth strategy, with focus on the role of innovation, acquisitions, and partnerships, and sales. We then discussed emerging revenue growth initiatives that leverage the platform-like characteristics of Akamai’s technology, such as opening the platform to new sponsors and providers.

We noted in our discussion of Akamai’s emerging growth strategy that senior management recognizes that growth to $5B will require new business logic. Akamai needs to change the way they engage their ecosystem in order to achieve broader influence and value capture. This observation is consistent with the message from management academics and business strategists that those firms who shape their technology evolution, product designs, and business relationships with the objective of growing an ecosystem can achieve market leadership far beyond what they would achieve as a supplier of products. The difference in objective, of growing a product market versus growing a platform ecosystem, is central to understanding the difference between product-based business strategy and platform-based business strategy.

Having established that Akamai appears to be shifting toward a platform strategy, how many we develop insights useful in shaping this strategy? One step on this path is to understand the mechanics of value capture in platform markets and to identify the ‘knobs’ by which managers can improve performance. We did this in section 2.6 where we defined vertical and horizontal strategies and described circumstance-based heuristics to guide actions. In Chapter 6, we will apply these heuristics to Akamai’s circumstances.
The next step is to identify strategies that have led to success in the past in order to establish a baseline for evaluating potential platform strategies for Akamai. We develop this baseline by studying strategies pursued by successful companies. In this way, we can identify strategic options, understand why these options were pursued, and perhaps discover reasons for Akamai to choose some options over others.

To develop a baseline of successful strategies, we follow Gawer and Cusumano’s platform leadership analysis of practices used by leading platform companies, namely Intel and Cisco. To simplify comparisons of these companies’ practices, we present each lever within individual sections and discuss each firm’s approach and circumstance in using these levers.

**Four Levers of Platform Leadership**

1. **Scope of the firm**: What to do inside the firm, and what to let external firms do.

2. **Product technology**: Make decisions regarding system architecture (degree of modularity), interfaces (degree of openness of the interfaces to the platform), and intellectual property (how much information about the platform and its interfaces to disclose to outside firms).

3. **Relationships with external complementors**: How collaborative versus competitive should relationships with complementors be? How will consensus be created? How will conflicts of interest be handled?

4. **Internal organization**: How to organize the firm to support the above three levers.

**5.1 Platform Lever 1 – Scope of the Firm**

Core to decisions on scope is the question of what will increase demand for the platform overall. If both demand and monetization can be increased by entering a complementary market then the firm may develop complements internally if it has the capabilities, acquire products and capabilities if the rationale is there, or partner with other firms if acquisition is too risky or costly. On the other hand, if the market is still immature, the firm may choose to prove out the market by entering or investing in early-stage entrants.

Platform owners need to be cautious about which markets they enter and what they bring to market. Platform companies are interdependent with an ecosystem that develops

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97 Ibid Chapter 3, pg 40.
complementary products and increases the platform’s value. If the platform owner competes too directly with complementors, they may drive complementors to exit the market or adopt a competing platform.

Intel and Cisco made very different assessments about the scope of their business. Intel focused on evolving its processor technology and market and builds relatively few complements. Cisco, on the other hand, focuses on delivering complete solutions and therefore has a broad product portfolio.

**Intel**

Intel chose to focus foremost on growing the market for their core product, the microprocessor, likely because the margin profile of a new generation of processors is predictably high. By focusing on developing markets for future generations and executing a technology roadmap for improving the processor over time, the processor business can remain sufficiently profitable.

Intel’s ‘Lever 1’ strategy is embodied in the way it defined its ‘jobs.’ Job 1 is to sell more microprocessors; other businesses are secondary to that. Intel pursued Job 1 through a diverse and sophisticated Lever 3 strategy of stimulating third-party innovation to create robust demand for evolving processor capabilities. On occasion, where promising applications were identified, but markets were undeveloped Intel would enter the market to stimulate demand and would later exit the market when complementors entered.

Intel also functioned as a traditional firm by entering profitable product-markets in pursuit of its own interests, sometimes hurting complementors in the process. Expanding scope in a way that injures complementors breaks trust and increases perception of risk that the platform owner will enter their markets. Gawer and Cusumano argue that platform leaders must be careful in expanding the scope of the business to ensure that the platform leader’s credibility remains strong.

**Cisco**

One of Cisco’s core principles is ‘customer first;’ a foundation which helps to explain its Lever 1 strategy. Since early in the 1990’s Cisco conceived of itself as a solutions company.
Through its history, Cisco worked to improve solution-level performance for its customers by providing products central to the complete solutions.

Cisco selected solution markets by aiming for 50% market share and #1 or #2 position. Markets were avoided where 20% share could not very quickly be achieved. The criteria for selecting product-markets includes testing whether a given feature has emerged across multiple industry or category vertical markets. Such market presence indicates broad demand.

After selecting a market, requirements were identified for developing products, services, and channels for those markets. Where possible, Cisco used internal capabilities to develop products, but where it could not become a market leader within 6 months using internal capabilities it would acquire companies and technologies to speed time to market. As a result, Cisco often chose not to build products in house but instead expanded through acquisitions.

5.2 Platform Lever 2 – Product technology

Platform architecture has a profound impact on the ability of external firms to innovate upon the platform. Modular designs help to reduce cost and complexity in development of complements. In addition, interfaces to the platform need to be open in order to allow outside parties to access platform functionality and build upon it. However, platform owners need to be cautious about how much access is provided. Providing too much access to core functionality risks giving competitors too much insight into core IP, whereas not being open enough stifles innovation.

Because of differences in the role of their core platforms and the nature of the systems in which they operate, Intel and Cisco have quite different Lever 2 strategies. Intel focused on taking leadership on building interfaces around its platform, whereas Cisco focused on broad interoperability through implementation of open network protocols.

Intel

Intel had a vision of a modular design of the personal computer with the processor driving continuous performance improvements and enabling ever more complex and intensive applications. To make headway with this vision, Intel continually evolves its core technology
driving to ever increasing levels of performance, but to unlock the potential of the processor component, Intel first had to drive architectural innovation in the design of the PC.

Intel initiated its strategy of building interfaces and standards to enable growth of complementary markets by leading development of the PCI interface. The PCI interface solved an architectural problem in the PC which throttled processor performance. By defining a new interface, Intel enabled complementary boards and chipsets to directly access processor power which greatly increased the value of the microprocessor and the PC platform more broadly.

This strategy was reinforced through definition of other, now ubiquitous interfaces, such as the AGP graphics port and the universal serial bus (USB). By creating these interfaces and making interface standards and design enablers freely available to complementors, Intel accelerated adoption of the interfaces and enabled its Lever 3 strategy of adding value to the PC platform by creating thriving markets for plug-and-play peripherals and application-specific devices.

Cisco

In developing Cisco's core technology, the IOS, was to create a 'glue' that could interconnect diverse networked components and applications. To create this glue, Cisco chose not to develop a proprietary standard but instead leveraged standard protocols to insure broadest interoperability. Essentially, this means that the core platform has little proprietary technology and so it cannot monetize the platform in the way that Intel does. Where Intel can sell its microprocessors at high margins, Cisco licenses IOS as part of a bundle. Consequently, core IP is perhaps less critical to Cisco than is their ability to sell a broad portfolio of products as complete bundled solutions.

5.3 Platform Lever 3 – Relationships with external complementors

The essence of platform leadership, arguably, is the ability to get external parties to grow platform value through innovation of complementary products and services. Platform leaders have to develop ways to collaborate with and influence external parties to grow the market that they serve. The platform leader, as owner of the technology at the core of the
market, must balance control and consensus in advancing the technology and must balance collaboration and competition in growing the market.

Intel and Cisco both worked to develop standards by which complementary products would interface with the core platform, but Intel takes a much more active role in growing the market than Cisco and for that reason has a more complex Lever 3 strategy.

**Intel**

To secure commitment of third-parties to develop complementary devices and peripherals, Intel established strategic interest groups (SIG) and took a low-key approach to gradually building market momentum. Gaining participation of influential third-party firms in defining and supporting new interface standards is a slow and careful process. Interface standards and protocols can have deep impact on a complementor’s technology roadmaps and product pipelines, such changes create significant uncertainty which takes time to resolve. Given the size and influence of players in adjacent layers in the ‘technology stack’ it is important for Intel to take a measured approach.

Essentially, Intel’s Lever 3 strategy of creating architectural interfaces is a horizontal platform strategy, where the platform sponsor role is opened for a limited time and just for the purposes of standardizing external interfaces. Intel found that it was important to enlist complementors who will lend credibility and attract other firms to the standard and to keep the number of SIG participants small, otherwise deliberations can become intractable. For software standards, gaining Microsoft’s commitment was essential. For hardware standards, IBM, HP, Compaq were frequently involved.

After SIG’s converged on a standard, Intel worked to accelerate momentum of adoption and to refine standards. They opened up the discussion within more public venues that Intel called Developer Forums and Implementer Forums. These forums provided Intel with input on technical specifications from a diverse base of engineers, which helped to ensure that standards enabled broad interoperability and was easy to interpret.

The next step in the standards development process was to validate the design. Intel sponsored ‘PlugFests’ to provide complementors and OEMs with an opportunity to test
compatibility with other firms' products. This provided a way to accelerate the prototyping process and reduce time to market for products that would use Intel's new standard interfaces.

After interface designs and technical standards were finalized Intel worked to actively stimulate innovation on complementary products. First, Intel developed enablers to speed technical development. The primary enablers were software development kits (SDKs), device development kits (DDK), and training programs that helped development engineers to use the kits. Providing technical enablers helped to reduce technical barriers to entry, but complementors also need market understanding and a vision of the future in order to develop forward looking strategies. Intel helped facilitate business planning by providing information about its product roadmaps, by sending engineers and marketers to share market knowledge, and also by making equity investments so that complementors could get the ball rolling.

Cisco

Because Cisco could never acquire all complementors and substitutes for the diverse and dynamic networking market, it worked to form numerous alliances and partnerships to scale its marketing and technical resources.

Cisco allied with manufacturers of complementary products, such as hubs, to create products that integrated well with Cisco routers. Like Intel, Cisco formed alliances with platform leaders adjacent to Cisco in the networking technology stack in order to develop cross-platform innovations such as networked videoconferencing. Cisco partnered with consultancies and integrated solutions vendors to implement custom networking solutions for large customers. Also like Intel and Microsoft, Cisco advanced its business agenda by influencing the development of technology standards within standards-setting alliances, particularly for networking protocols that enabled interoperability and growth of internet usage.

In addition to acquiring market-ready technologies, Cisco also invested in advanced technology companies before the technology was needed. Cisco's executives invested in startups and venture capital firms and so had information on emerging technologies and market applications.

To achieve high market shares, Cisco built a sizeable partner community. Cisco controls quality of partner services by defining tiers of expertise both in terms of technical breadth and
technical depth. Certification tiers reflect a partner's breadth of technology skills across certain technologies, whereas specialization tiers reflect the depth of a partner's skills in a particular technology or architecture.

For example, on the software side, Cisco constructed a software partner community for whom Cisco provides developer support including API's, SDK's, and technical collateral as well as a marketplace for selling validated products. To control quality and encourage advancement of skills, developer membership is tiered: Community Member, Registered Developer, Solution Developer, and Preferred Solution Developer.

5.4 Platform Lever 4 – Internal organization

To enable Lever 3 strategies for stimulating external innovation, platform leaders effectively develop organizational supports including organizational groups with explicit system-wide mandates and organizations that work to generate external momentum.

Intel

Intel's influence within their ecosystem came both from the ability to execute technically, making ever faster chips according to a well-defined roadmap, but also from their ability to establish relationships with other players both big and small.

To make their Level 3 strategy work, Intel created several internal organizations each with interdependent goals. Intel Architecture Lab played a central role in fostering external innovations via longer-term initiatives. IAL helped identify early-stage players in emerging markets, did ethnographic studies to learn about the customers' use of PCs and electronics, and also developed concepts for future complementary products.

Intel's Developer Relations Group worked to build relationships with external developers in order to "facilitate the development of leading edge, most compelling business or consumer content applications and services available for Intel-based PCs." The DRG worked to accelerate time to market of early stage applications with known market opportunity. The task of facilitating development of compelling applications helped to stimulate demand for new generations of processors which comprised the core of Intel's business. As such, the DRG's efforts directly support the business objectives of Intel's Microprocessor Product Group, which is responsible for the microprocessor business and technical roadmap.
Strong demand for future generations of processors is central to Intel’s continued market leadership. To build demand, Intel works to develop emerging markets for applications that consume a lot of processing power. Intel Capital, the venture arm of Intel, funds early-stage companies developing such applications. Intel’s investment strategy is to encourage competition in these emerging market applications by selecting a firm that will be a visible leader in creating a new technology or standard. In this way, Intel provides a competitive stimulus that drives interest in the technology or application.

**Cisco**

As Cisco aggressively acquired companies in its effort to provide complete solutions, Cisco wrestled with the problem of integration. Acquired products were placed within a business unit and developed from there. The challenge comes in coordinating solution-level development across multiple business units that are responsible for P&L and evolution at the product level. Cisco addressed this problem by creating an internal organization responsible for managing a solution-level development cycle.

**Summary**

Platform leaders grow proportional to their ability to build an ecosystem that adds value to their platform by contributing complementary offerings. This interdependency and lack of direct control requires formulation of business strategy and development of organizational capabilities beyond those required for success as a product or services company.

At the top level of the business strategy, Platform leaders have to define the extent of the offerings that they will provide in house and what opportunities will be made available to third-party complementors. Secondly, platform leaders must enable external innovation by providing access to platform functionality that complementors will use when building offerings. The extent of platform openness, however, must strike a balance between potential for external innovation and potential for value capture. Third, platform owners must take an active role in creating the relationships with external participants that will implement the Level 1 strategy. As the study of Intel shows, relationship building requires sharing risk, creating trust, sharing knowledge, and fostering competition. The initiatives taken to create productive relationships are long-term and focused on reciprocal benefit.
Chapter 6 – Analysis of Akamai’s Platform Growth Strategy

As Akamai pursues the benchmark of $5B yearly revenue, the company is evolving along many dimensions. Operationally, highly experienced and talented managers are being recruited to lead the company to growth. Key business processes, including product development and direct sales, are being reengineered for better quality at lower costs and shorter timelines. IT infrastructure and enabling tools are being designed for more to accelerate the pace of business and to improved visibility into business operations. Such broad-based initiatives are critical for putting in place the supporting infrastructure to support new go-to-market strategies and to scale day to day business activities.

As the enterprise market saturates, Akamai expects that rates of large contract acquisitions will decrease and mid-market account acquisitions will ramp up to compensate. Changing the target market necessitates changes in the design of Akamai’s channels to market. First, to sustain current growth rates through acquisitions of smaller deals, sales volumes have to increase. For the direct sales channel, this means closing deals more rapidly. IT-based sales tools and more standardized offerings will help increase deal velocity, but ultimately growth in the mid-market requires scale that direct sales cannot achieve. Instead, the majority of mid-market growth is expected to come through indirect channels, which can more effectively scale penetration.

For Akamai’s channel partner program to be successful, new go-to-market strategies and new sales and services processes were developed. To grow the partner network, Akamai needed foremost to define, market, and sell opportunities for other companies to profit from the resale or integration of Akamai’s network services. To develop this new channel, Channel Marketing and Channel Sales organizations were developed, who in turn defined the NetAlliance Partner program and began developing the network.

The new Channel organizations and their NetAlliance Partner Program were tasked with aggressively growing the business such that channel sales would account for 40% of revenue by 2016. To achieve the goal, the channel would have to be highly scalable, which meant minimal involvement of Akamai resources in partners’ business operations. ‘Channel Readiness’
initiatives were undertaken to develop content and training to enable partner effectiveness and autonomy in the sales, servicing, and support of Akamai products.

Beyond efforts to efficiently scale business sales and internal business processes, Akamai recognized a need to innovate faster. Companies in the internet economy have to keep up with the pace of innovation in the ecosystem to achieve and maintain leadership positions or else risk marginalization. In the words of senior management, Akamai needs to engage in ‘ecosystem plays’ to build the Akamai platform into as many use-cases as possible. This line of thinking has been emerging over the last few years and has crystallized in the realization that Akamai needs to develop new business strategy to guide the evolution of technology, product and system design, and business relationships. A new organization, the OPEN group, and the VP leading it are tasked with developing such a ‘Cloudification’ Strategy and coordinating the development of platform technology and interfaces to execute that strategy.

The OPEN group at Akamai will play a significant role in defining the future of Akamai’s business. In the remainder of this chapter we discuss issues that will shape definition of Akamai’s platform strategy and suggest a path to platform leadership.

6.2 Four Levers Analysis – Akamai Technologies

In Chapter 5, we learned of successful platform strategies of platform leaders like Intel and Cisco. We explored these strategies using Gawer and Cusumano’s ‘Four Levers’ framework and learned how these firms leveraged external innovation to drive adoption of their processor and network integration platforms. With these example strategies as reference, we apply the Four Levers framework to Akamai’s emerging Platform Strategy as of Q4 2012.

Platform Lever 1 – Scope of the Firm

At the core of Akamai’s offerings is a global network of servers located in the ‘last mile,’ nearest the user, hosting a proprietary platform that runs services for traffic processing, content storage, content assembly, internet route optimization, among others. This distributed infrastructure and proprietary IP represent a unique set of capabilities that enable enterprise-level performance and availability at global scale.

Early in Akamai’s history, the scope of the business centered on building content and application delivery capabilities for the broadest possible set of use-cases. As a result, Akamai’s
platform creates value for a relatively broad set of online markets foremost of which include Media and Entertainment, Commerce, High-Tech, and Enterprise.

As the volume of internet traffic increases exponentially and both CDN and internet transit prices drop, it is clear that the ‘delivery’ part of Akamai’s business is becoming commoditized.

To maintain premium pricing Akamai is adding new functionality on top of core storage, presentation, and delivery services. Adding valuable functionality required that Akamai make market-specific investments. Value-added for M&E includes complexity reduction through more complete and seamless content management workflows, such as through transcoding to multiple formats from a single source file and improving data tracking for user analytics.

For Commerce sites the focus is on performance and reduction of complexity. On the performance side, Akamai is branching out from the network and protocol layers to address inefficiencies in adjacent layers. For example, implementing Front-End Optimization which builds site presentations based on the users’ specific situation of use. This also helps to reduce complexity because previously, sites would have to present objects in formats and sizes optimized to the user’s device and connection which drove significant cost and complexity in creating and managing these multiple object versions.

Site and Application owners, by contrast, have specific problems to solve related to brining content and services from the point of creation to the point of consumption with as few intermediate steps as possible and with value-added visibility into user interactions to feed back into marketing and development. As Akamai pushes further back in the workflow to content creation and application development, is there opportunity for complementors? For example, would content creators value integrations between media editing software and the Akamai Media suite?

As Akamai moves forward, the focus on end-user experience will provide useful perspective from which to build a roadmap for future innovation. Akamai may find that new use-cases appear as performance improvements surpass application thresholds; just as new use-cases for Intel processors appear as processing power increases and processor size and power consumption falls.
Platform Lever 2 – Product technology

Akamai’s vision has been to make the internet work better and to do that, they created an overlay network on top of regional networks comprising the federated global internet. Not unlike Cisco’s strategy of enabling broad interoperability, Akamai has developed its network to support standard internet protocols and content formats.

Broad interoperability and open access mean that Akamai’s services are completely transparent to the end-user. However, from the perspective of the content creator and application developer the platform is tightly closed. Because Akamai’s proposition is enterprise-level performance, it has kept tight control over network configuration and has provided very little configuration access to its clients.

However, Akamai recognizes that enterprises are increasingly demanding programmatic interfaces to services in order to enable low-touch, low-cost consumption modalities. In response, Akamai is developing new interfaces to meet such needs. A key challenge for Akamai in this regard is to modularize the platform such that new interfaces can provide the customer with access to the desired configuration controls, and perhaps directly to certain network services, without creating risk to the platform and its users.

One approach to providing more open access has been through products such as Cloud Catalyst and the Aura suite, which enable partners to sell and provision Akamai services without direct Akamai involvement. By opening the platform to new providers and defining standardized offerings that require little configuration, Akamai’s services can be built into the provider’s offering as a well-defined module.

By defining Akamai services as a standalone, interoperable, open layer for web acceleration and security, Akamai has the potential to build itself into the cloud strategies of much bigger players such as HP, IBM, and Verizon Terramark which are emerging to compete with closed cloud stacks such as Microsoft Azure and Amazon AWS.

Platform Lever 3 – Relationships with external complementors

As a proprietary platform Akamai’s technology and product offerings were innovated through its own internal engineering capabilities, however Akamai also developed productive partnerships with influential technology organizations. Early in their history, Akamai and Apple formed an alliance for delivery of QuickTime streaming media. This partnership has endured to
this day and Akamai is now core to several of Apple’s internet-based services. IBM has also been a longstanding partner both in resale of Akamai products but also in development of complementary technologies such as the ESI markup language and EdgeComputing for WebSphere Java applications.

In addition to strategic alliances with large firms like Apple and IBM, Akamai partners with smaller technology firms where applications complement Akamai offerings, but whose businesses are too dissimilar to warrant acquisition. However, Akamai does acquire companies where it makes strategic sense, such as on the basis of reducing competition, extending current offerings, and entering adjacent markets.

As Gawer and Cusumano noted in their analysis of Intel, platform leaders can play multiple roles within their ecosystem and as part of Akamai’s ‘ecosystem play,’ they are finding new ways to engage with ecosystem partners. With the creation of the NetAlliance partnership program, Akamai is taking an active approach to building its platform into the offerings of other firms.

This approach is powerful because it lowers customer acquisition costs and delivers solid revenues and at the same time has potential to create direct network effects. Hypothetically, as more SaaS applications are ‘Akamaized’ the more user expectations of performance and availability increase, which in turn will drive more application developers to look for acceleration services such as those offered by Akamai. Moreover, the more online applications are capable of enterprise-level performance and reliability that Akamai delivers, the more companies will be enticed to take advantage of the advantages of cloud-based IT management models.

In addition to pursuing its own interest in maximizing profits and market share, Akamai may be in the position to drive cross-layer innovation in the same way Intel and Cisco did by investing in development of standards. In engaging in such ecosystem-enabling activities, Akamai needs to be mindful of striking the appropriate balance between profit seeking and stimulating growth at the ecosystem level.
Platform Lever 4 – Internal organization

Internally, Akamai is organized by business units that develop applications using network services provided at the platform level. This platform runs on network infrastructure which is administered by another organization. The business unit organizational structure was a relatively new institution at Akamai at the time of this writing and was seen as key to driving innovation targeted at Akamai’s key markets. The downside of this structure is ‘tragedy of the commons’ sort of phenomena where common infrastructure can suffer from uncoordinated decisions at the business unit level. For such reasons Akamai created a single organization – the OPEN group – to lead across business units the development and implementation of Akamai’s ‘Cloudification’ strategy, which will play a critical enabling role in Akamai’s larger ecosystem play.

The scope of Akamai’s Cloudification strategy is still emerging, but it will likely involve development of a programming interface layer that customers can use to configure services and may include development of service-layer interfaces to streamline development of products within business units.

As Akamai moves to play a broader role in enabling cloud strategies of larger companies, balancing cooperation and competition will take on new importance. To serve as a web acceleration and security layer across multiple competing firms, Akamai will have to act as a neutral and trusted party, providing equal access and equal rights to partner firms that compete against each other. Akamai might consider forming an internal organization without P&L responsibility and that will be responsible for maintaining trust and enforcing neutrality across these strategic alliances. This will help to ensure contractual obligations do not favor one partner over another, thereby shifting competitive balance and motivating partners to seek more favorable alternatives.
6.3 Platform Leadership Strategy – Coring vs. Tipping

Akamai has won and maintained a strong position as market leader in content delivery and web application acceleration, but they have not yet reached their potential in terms of ecosystem influence. Which technical and business actions should they consider to improve their long-term position?

Gawer and Cusumano’s platform and leadership strategies provide insights on practices that platform owners might use to establish and maintain leadership as a nexus of ecosystem innovation. The strategic options they offer are to either ‘core’ a market by creating a new platform market or by gaining momentum within an existing platform market and tipping it in favor of one’s platform.

Coring

Based on Gawer and Cusumano’s definitions, it appears that Akamai’s technology and business actions consistent with a ‘coring’ strategy and indeed Akamai can be viewed as the platform leader in the content delivery and application acceleration markets. Here we review these actions.

Technology Actions for Coring Strategy

- Solve an essential ‘system’ problem.
  
  In Chapter 3 we reviewed Akamai’s history and learned that Akamai was founded to solve a vexing problem with the architecture of the public internet which resulted in performance bottlenecks and poor scalability.

- Facilitate external companies’ provision of add-ons
  
  In Akamai’s case the add-ons or complementary offerings were provided by the content providers and application developers subscribing to Akamai’s network services.

- Keep intellectual property closed on the innards of your technology
  
  Akamai’s network was and is tightly closed in order to preserve network security and to protect proprietary IP from competitor networks.

- Maintain strong interdependencies between platform and complements
Once Akamai's customers are connected to the network, customers are relieved of significant costs associated with maintaining origin infrastructure. However, by offloading this infrastructure, Akamai's clients cannot simply disconnect without service disruptions.

**Business Actions for Coring Strategy**

- **Solve an essential business problem for many industry players**
  In addition to solving performance issues caused by the architecture of the internet, Akamai allowed companies to significantly reduce infrastructure costs by offloading to Akamai's network.

- **Create and preserve complementors' incentives to contribute and innovate**
  By providing an infrastructure capable of delivering performance at scale, customers were relieved of some technical details of implementation and could simply build more complex, richer sites without significant infrastructural investment.

- **Protect your main source of revenue and profit**
  By buying primary competitors, Akamai ensured that it could charge high prices due to its differentiated capabilities.

- **Maintain high switching costs to competing platforms**
  Switching costs to other platforms in some ways was a non-issue because no other company had the same global span as Akamai's network. For firms with more regional customer bases, this was less of a problem.

**Tipping**

As Akamai moves forward into its next stages of growth, it is bumping up on the cloud strategies of the internet's biggest players. In this market, Akamai's capabilities are less unique and more limited. For example, Microsoft's Azure cloud has much more expansive compute capabilities and application support and its development is subsidized by a huge corporation. Akamai cannot go head to head against such competition with a coring strategy. However, Gawer and Cusumano's tipping strategy does provide some insights.

**Technology Actions for Tipping Strategies**

- **Try to develop unique, compelling features that are hard to imitate and that attract users.**
Akamai is continually building out infrastructure for even broader global reach and is developing and acquiring technologies to maintain superiority in web-acceleration performance.

- Tip across markets: absorb and bundle technical features from adjacent markets.
  In addition to taking on additional technical features directly, Akamai can form alliances with capabilities that Akamai lacks and go to market against Azure, AWS, and Google as a cooperative technology stack. With this strategy, Akamai's unique capabilities provide a competitive differentiation.

Business Actions for Tipping Strategies
- Provide more incentives for complementors than your competitors do.
  The incentive for complementors is world class performance, but this can be supplemented with improved accessibility. This is part of the motivation for opening the platform with programming interfaces.

- Rally competitors to form a coalition
  In the race to build the enterprise cloud market, Akamai is taking definitive actions to build its services into the cloud strategies of major players, as evidenced by the recent announcement of alliances with AT&T and Orange.

- Consider pricing or subsidy mechanisms that attract users to the platform.
  At present, Akamai is focusing on providing technical differentiation of performance and security that the target enterprise market demands. Until competitors are able to compete on these fronts, subsidies may not be required.
6.4 Conclusion

Akamai is in a strong position to maintain a leadership position within its ‘layer’ of the web technology stack. However as cloud adoption accelerates, Akamai finds its legacy Go-to-Market model of consultative direct sales and professional services implementation is misaligned with the needs of Akamai’s target markets. To maintain a ‘market’ leadership position, Akamai needs to redefine its ‘ecosystem’ leadership role in terms of its technology, business relationships, and platform evolution.

As the market for online services explodes (Figure 20), Akamai needs to find a way to enable ‘complementors’ to connect to and innovate upon Akamai’s services with minimal friction. An efficient way to do this is to licensing the cloud service providers that will be hosting these new applications. The Cloud Catalyst product and NetAlliance partnership program are examples of the necessary technical and relationship enablers for activating new Akamai service providers. However, Akamai needs to think through the governance implications of these relationships. Akamai needs to balance coordination and cooperation in its relationships with these providers and it can do this through definition of an organization with a mandate to build trust and act as a neutral advocate of the interests of Akamai’s platform provider partners.

In addition to large-scale initiatives to scale cloud adoption, Akamai can take advantage of innovation within existing vertical markets by opening interfaces to Akamai services. For example, for the media and entertainment market Akamai has developed functionality that simplifies and accelerates content management workflows. To create additional value for the content manager, Akamai may consider opening services interfaces for its media workflow products. This could enable integration with applications and infrastructure used in earlier phases of content production to further streamline workflows without investment of Akamai engineering resources. The rationale here is to balance investment in functionality that increases revenue potential with investment that stimulates adoption.

The overall message from students of platform strategy is that growth as a platform company requires different priorities than does growth as a product company. Product companies prioritize investment in initiatives that will yield predictable returns. This means
identifying growth markets where the firm can offer high-margin products. Platform companies do this as well, but initiatives that stimulate market growth are higher priority. Monetization follows by enabling external market participants to profit by adopting the firm’s platform. Ultimately platform leaders are ecosystem enablers. By coordinating innovation through definition of interfaces and standards, by acting as a stimulator of ecosystem growth, and by building trust through fair dealing and adherence to a roadmap that predictably creates opportunity for ecosystem participants, platform leaders create a tide that lifts all boats. 

The spreadsheet associated with this figure contains details about this forecast.  

Figure 20 Forecast of cloud market growth.
Bibliography


