Optimization and Visualization of Strategies for Platforms, Complements, and Services.

by

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SUBMITTED TO THE ALFRED P. SLOAN SCHOOL OF MANAGEMENT IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTERS OF SCIENCE

at the

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

June 2003

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Abstract

This thesis probes the causal elements of product platform strategies and the effects of platform strategy on a firm. Platform strategies may be driven by internal or external forces, and the lifecycle of a firm and of a platform strategy evolve over time in response to both the needs of the firm and the changes in the external environment. This external environment may consist of a "platform ecology," in which the platform strategies of firms affect one another. These effects may be positive, buoying revenues, or negative, eliminating markets and appropriating value.

The thesis assumes that a company whose strategy is to produce complements or services for another firm's platform may be said to have a platform strategy, and further assumes that a company with a modular platform strategy built primarily for its own internal use may also be said to have a platform strategy.

Finally, this thesis will demonstrate example visualization techniques that make the nature of such platform strategies more apparent. This thesis asks and tries to answer a few key questions:

- What comprises the elements of a platform strategy?
- What kinds of companies adopt these strategies?
- What circumstances drive adoption?
- What outcomes can be expected?
- What happens to such a strategy over time?

The thesis asserts and attempts to prove these hypotheses:

- Platform Strategies of one firm can influence those of many other firms, by direct effect on the other firms, or by simple economic benefit example.
- Return on Investment (ROI) is influenced by these strategies.
- Beyond ROI and thus Profit fluctuations, company survival, in an evolutionary Darwinian sense, may depend on these strategic choices.

Thesis Supervisor: Dr. Michael A. Cusumano
Title: Professor Sloan School of Management

Acknowledgements

My thanks go to everyone who motivated me and supported me throughout this process, especially my children, Celeste and Vivian. I did not see them very often during this challenging year at the MIT Sloan School, but they were never far from my mind and heart. While I was learning about frameworks, innovation, and modularity, Celeste, two years old, learned to walk and talk, and Vivian, age four, learned the rudiments of dance. On Sunday nights when I'd get ready to go away for a full week of school, Vivian would often get solemn and say "It will be ok daddy, I know you have to go to school. I'm going to school someday too."

To Professor Michael Cusumano, for supervising my thesis, and for authoring Microsoft Secrets and Platform Leadership. Those two books motivated me to choose this strategic direction, and have put me on a path that may change my career and my life.

To Dave Weber, Professor James Utterback, Jennifer Mapes, and Marc O'Mansky, who put a face of warmth and understanding on this incredibly intense academic program.

I also want to thank the following senior industry executives who lent hours of their time to providing data and insights for the case research presented in this thesis:

- Mr. John Schwarz, Chief Operating Officer and President, Symantec Corporation
- Mr. Marvin Keshner, Director, Printing Systems and Solutions for IPG CTO office, Hewlett Packard Corporation
- Mr. Jon Otterstatter, Chief Technology Officer of SPSS Incorporated
- Dr. Steve Chaput, Vice President of Strategy, SPSS Incorporated
- Mr. Leland Wilkinson, Vice President, SPSS Incorporated
- Mr. Rimas Buinevicius, Chairman of the Board and CEO, Sonic Foundry Corporation
- Mr. Robert Zitter, Senior Vice President of Technology Strategy, Home Box Office Incorporated

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Chapter 1: Introduction and Motivation

Introduction

The days of building a huge and successful business on unrelated, individual point products having no system relationship between them may be behind us. Rather, a best-in-class company produces products such that each product is part of a system, and each part of the system adds value to other parts. Because a well-designed system is of much greater utility and value to a customer than any one of its individual products, customers are motivated over time to buy more parts incrementally, and each such purchase causes the customer's perception of the value of his or her subsystem to increase. These "parts" may be other physical products, upgrades, complements, plug-ins, or more intangible value-adds, such as services, and even comprehensive warranties and responsive customer support services.[1]

These powerful systems provide real value for customers, and each reinforcing complement or service enhances the value of the other system parts. Platform strategies can lower costs, increase revenue, and increase penetration into new markets. Complements to platforms can add continuing value for the consumer and for the producer, as incremental complement purchases bring customers closer to the company and forge relationships that are likely to yield long-term, repeat business and loyalty. As is often said, "a rising tide raises all boats,"[2] and such a mutually beneficial outcome is characteristic of one type of well-designed platform strategy. Not all platform strategies are designed for this eventual win-win outcome, however, and this thesis will discuss some of the many variations on the platform strategy theme.

Many companies have implemented platform strategies, and have had highly visible, well-known successes. Such strategies are not always referred to as "platforms," but the implementation and results have been clearly those of a platform strategy. A platform strategy can be that of creating the platform itself, but there are variants wherein the strategy involves choosing to be the best possible complement to another's platform.

The automobile industry is perhaps the best known and most successful example of a platform strategy in the past century.[3] Automobile manufacturers have created vehicle platforms and stable interfaces between components (e.g., engines, transmissions, and wheels) and within components (e.g., carburetors and headers) that enable outsourcing and the addition of third-

party complements with minimal effort. These add-on industries are platforms, and their complementary interfaces have allowed the auto industry to create very profitable families of vehicles with targeted market segments and scalable options. The resulting consistent product portfolios allow for inter- and intra-product family customer loyalty, increase satisfaction, and encourage repeat purchase behavior.

Microsoft and Intel are modern-day exemplars of successful platform strategies. Looking at their successes, a platform may seem intuitive, or even obvious. However, most competitors fail to commit their organizations to such a course. Not every competitor has the influence or resources to follow the Microsoft or Intel roadmap, and they must choose other paths. Certain organizations find that they must make choices based on the knowledge that the platform effort will be supported by legacy revenues. Others have harder choices to make, including selling off business lines and significant financial re-engineering to support the platform effort that will take them into new markets and yield increased revenues and profits.

The thesis examines different platform approaches. In some cases, a platform strategy may push a firm to an untenable position, requiring a change of product direction or markets. In other cases, a firm can maintain a balance within the external platform ecosystem and use its strategy consistently over time. Companies choose variants of platform strategies for their own reasons, and have varying expectations. Is there a way to choose an optimal strategy, and to visualize it? This thesis explores this set of questions, leveraging historical and current research and looking at several case examples drawn from major players in the marketplace.

Motivations

The best products (at least in the software, hardware, or technology space) are built upon strategies that encompass the domains of products, platforms, services, and complements. These can be measured, visualized, and understood so that it is easier to understand whether a product embodies one of these winning combinations of success vectors.

This thesis proposes that while any of the singular platform approaches can add value to a product, that added value may not suffice to make the product the dominant one in the marketplace moving forward, and that truly dominant technologies are born of positive combinations of all of these approaches. This thesis is intended to examine the interactions between the firms participating in a platform ecosystem, and will touch upon how they can

influence each other over time. Finally, the thesis will provide a simple, organic, visual framework that describes these multiple platform attributes and shows their combined effects.

The perception of the value, and even the necessity, of platforms to enhance a firm's immediate and long term viability is a concept that arose as a result of the evolution of the marketplace in a general sense. Products have gotten better, less expensive, and more commodity-like in many respects. Customers' expectation is that over time they will get more features at the same price, thus implying a lower price per feature.[4,5] Producers of products need to implement a strategy that allows them to meet such expectations and still maintain timely delivery and long term profitable operations. It is the author's position that the evolution of complementary and service- and platform-oriented enhancements to dominant-design products may, in fact, be defensive innovations, and that appropriate use of services and complements can lengthen the effectiveness of these defensive-innovation improvements.

The thesis will look at improving the outcome of this survival-oriented, adaptive behavior and will question the assertion that a defensive innovation that yields a burst of performance is, by definition, a desperate effort of an S-Curve-limited-technology at the end of its useful life. The thesis will pose an alternative resolution, that the definition of the "end of the S-Curve" can be changed in significant ways, and that an S-Curve can be reinvigorated and reset by means of service, complement, and/or platform enhancements.

This thesis will incorporate the addition of services and complements as motivating forces that make the late-phase burst of improvement potentially more significant, outcome-changing, and useful in managing product growth from the Transitional to the Specific phases, positioning the use of platform families of products, services, complements, and upgrade/evolution strategies in order to maximally sustain overall dominance.

Assumptions and Definitions

- This thesis defines a "platform" as the totality of platform, complement, and service strategies, and that totality will be referred to as "platform strategies" for simplicity.
- This thesis assumes that a company whose strategy is to produce complements or services for another firm's platform may be said to have a platform strategy.
- The thesis further assumes that a company with a modular platform strategy built primarily for its own internal use may also be said to have a platform strategy.

- In this thesis, there are repeated references to “platform ecosystem.” In many respects, a platform ecosystem is somewhat synonymous with a “value chain,” when a value chain is defined as "a string of companies working together to satisfy market demands.”[6,7]

  However, in this thesis, the definition of a platform ecosystem has a focus on certain additional cross-participant feedback and mutual business interest implications, as described below. In the diagram below, a sample platform ecosystem is illustrated:

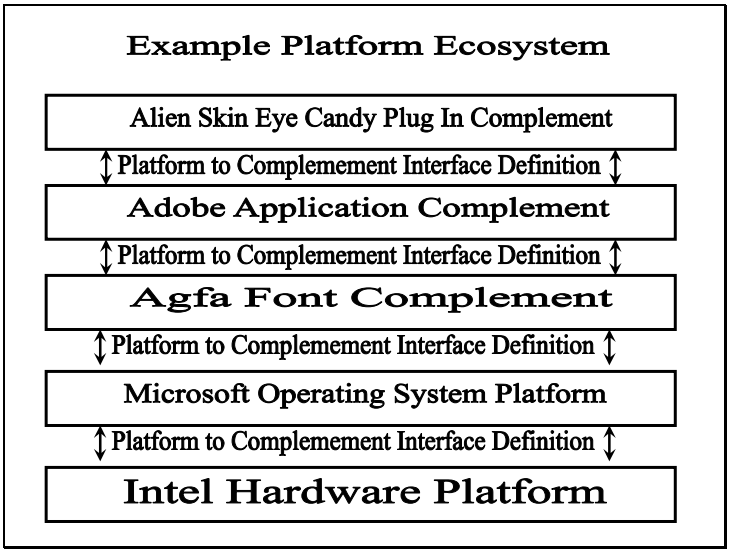

Figure 1: Platform Ecosystem for Adobe® Photoshop® on Wintel[8]

Figure 1 illustrates a platform ecosystem for Adobe® Photoshop® on a Wintel platform. The lower two layers are the Intel® and Microsoft® platforms, as discussed in great detail in the book Platform Leadership.[9] Atop those layers are the font-complements created and sold by firms like Agfa. They may be purchased by consumers and may be added to the “free” font complements offered by Microsoft. Microsoft has, over time, appropriated the value of certain font vendors by including “look alike” fonts at no charge in its operating system. Users would buy the Agfa fonts and install them into the operating system where all applications can access them. The layer above the fonts is the Adobe Photoshop application, also purchased by the customer and installed. The layer above that is the Alien Skin Corporation’s[10] Eye Candy plug-in, a complement specific to Photoshop that the user would buy and install into the operating system

and then tie directly into Photoshop itself with configuration information.

In the usage model for this ecosystem's outcome, the value for consumer is:

- A consumer wants a text string that is shiny and looks like rippled glass with fire on the edges for an advertising or other purpose,
- The consumer installs these complements.
- The consumer runs Photoshop.
- The consumer selects an Agfa font
- The consumer writes, "Hello"
- The consumer applies Eye Candy plug in.

The final output is as shown below:

Figure 2: Photoshop 5.0 Platform and Eye Candy 1.0 Complement treatment of the word "Hello," using the Agfa Monotype,[11]"Columbus" font.

The ecosystem described above, if left as-is, creates value for all participants, but is fragile; any change to the ecosystem platform or complements can disrupt the business models of the others. The list below indicates a few of the possible ways that this can happen:

- Microsoft includes a font much like "Columbus" (this has not happened yet).
- Photoshop includes a feature that does exactly what Eye Candy does (this happened in 1998 with Photoshop 5.5, and it disrupted Alien Skin's business significantly, forcing them to create new plug-in complements with new features in order to preserve their added value).

- Alien Skin abandons the Photoshop platform causing users to lose certain functionality over time, reducing innovation (this has not happened).

Thus, it is clear that such ecosystems are fragile and should not be modified without much thought for the effects on every player in them.

Strategy Questions

This thesis asks a few key questions:

- What comprises the elements of a platform strategy?
- What kinds of companies adopt these strategies?
- What circumstances drive adoption?
- What outcomes can be expected?
- What happens to such a strategy over time?

The thesis attempts to prove these assertions, or flesh out these hypotheses:

- Platform Strategies of one firm can influence those of many other firms, by direct effect on the other firms, or by simple economic benefit example.
- Return on Investment is influenced by these strategies.
- Beyond ROI and thus Profit fluctuations, company survival, in an evolutionary Darwinian sense, may depend on these strategic choices.

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[1] Such as warranty and service options offered by companies like Dell™; see http://support.dell.com/.
[2] Gawer, Anabelle and Michael A. Cusumano. Platform Leadership. Cambridge, MA: Harvard Business School Press, 2002.
[3] Cusumano, Michael A., and Kentaro Nobeoka. Thinking Beyond Lean: How Multi-Project Management Is Transforming Product Development at Toyota and Other Companies. Simon and Schuster, 2002.
[4] Stalk, George, and Carl W. Stern. Perspectives on Strategy from the Boston Consulting Group. John Wiley and Sons, 2002.
[5] Christensen, Clayton M., The Innovator's Dilemma. Harper Business Press, 1997.
[6] "Value chain." SearchCIO.com. <http://searchcio.techtarget.com/sDefinition/0,,sid19_gci509355,00.html>
[7] Fine, Charles H., Clockspeed: Winning Industry Control in the Age of Temporary Advantage. Perseus Books, 1998.
[8] Although this thesis does not delve very deeply into Adobe and does not cover it in a case, the author was the program manager for a number of Adobe applications an is very familiar with that ecosystem and the ramifications of change there, so this will serve as a succinct and instructive example that sets the stage for more detailed discussions of the actual case-target firms in the foregoing.
[9] Gawer and Cusumano, Platform Leadership.

[10] AlienSkin.com. <http://www.alienskin.com/>
[11] "Featured Designer: Robin Nicholas." Fonts.com.
<http://www.fonts.com/fontent/fontent_home.asp?nCo=AFMT&con=nicholas>

Chapter 2: Thesis Structure

Audience

This thesis targets management professionals, and those who study, teach, or have an interest in business, business strategy, or management at the graduate or postgraduate level. It may especially interest those who prefer information technology-related businesses. It is also intended to speak to those who track such industries and the firms within them, their economic status over time, their relationships to their customers, and the relationships between the firms themselves.

Structure of Thesis

- **Introduction.** Introduces the thesis, the assumptions underlying the thesis, and the strategic questions that will be addressed.
- **Structure and Methodology.** Describes audience, structure, and methodology.
- **Literature Review.** Discusses the range of literature that is used as a foundation for research in this thesis and that can be used for further information.
- **SPSS® Case Study.** Illustrates one firm's choice of a platform strategy to incrementally save costs and aggregate mixed offerings gained through corporate acquisitions into a flexible and responsive competitive platform.
- **HBO® Case Study.** Covers a somewhat unique approach to platforms, in which the complement to a platform may be content for that platform, and the content creator may in time evolve a platform of its own.
- **Sonic Foundry® Case Study.** Illustrates that some firms do not aggregate value from acquisitions as a primary growth method, but rather create value from within.
- **Hewlett-Packard (HP) Case Study.** Discusses HP's philosophy of being a best in class hybrid complement/platform and finding optimal value for their customers
- **Symantec™ Case Study.** Examines how a company is facing the challenge of Microsoft appropriating its value in a key market segment by responding aggressively and planning a strategy that may enable 10X growth despite the Microsoft challenge.
- **Microsoft® Case Study.** Discusses two components of Microsoft's platform strategy with divergent lessons: The XBox and the TCPA.

- **Visualizations.** Presents and explains models that can be used to provide a high-level analysis of a platform strategy.
- **Recommendations and Conclusions**
- **Bibliography**
- **Appendices**

Methodology

The data referred to throughout this thesis may be categorized into two classes:

Research via Publications

This document leverages Information about platforms, complements, and services, published in books, magazine articles, and web sites.

Financial and projected performance information about firms and industries was obtained as published in financially-oriented web sites, newspapers, and magazines. The availability and quality of financial data on firms varies based on the firm's public/private status and, if public, the stock market on which it is listed.

The author used the Google™ search engine to help locate obscure publications and web sites. Wherever possible, the data obtained was corroborated between multiple sources.

Research via Interviews

Interviews were conducted by phone and in person with individual senior managers and management teams of firms whose revenues range from $25M (Sonic Foundry) to $1.4B (Symantec). Non-disclosure agreements were signed where required, and the final written material has been approved for publication by the managers involved.

Name	Title	Firm	Comments
Mr. John Schwarz	Chief Operating Officer and President	Symantec Corporation	Mr. Schwarz participated in two telephone interviews of one hour each. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.
Mr. Marvin Keshner	Director, Printing Systems and Solution for IPG CTO office	Hewlett Packard Corporation	Mr. Keshner participated in three telephone interviews of one hour each. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.

Mr. Jon Otterstatter	Chief Technology Officer	SPSS Incorporated	Mr. Otterstatter participated in two telephone interviews of one hour each. He also participated in a 90-minute face to face meeting with the some of the SPSS management team reporting to him. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.
Dr. Steve Chaput	Vice President of Strategy	SPSS Incorporated	Dr. Chaput participated in two telephone interviews of one hour each. He also participated in a 90-minute face to face meeting with the some of his peers on the SPSS management team reporting to Mr. Otterstatter. Dr. Chaput provided numerous diagrams and supporting material in the form of Microsoft PowerPoint presentations. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.
Mr. Leland Wilkinson	Senior Vice President	SPSS Incorporated	Mr. Wilkinson participated in two telephone interviews of one hour each. He also participated in a 90-minute face to face meeting with the some of his peers on the SPSS management team under Mr. Otterstatter. Mr. Wilkinson also provided several 3D visualization diagrams which, although not directly used in this thesis, helped set a look and feel for the final diagrams created by the author. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.
Mr. Rimas Buinevicius	Chairman of the Board and CEO	Sonic Foundry Corporation	Mr. Buinevicius participated in two telephone interviews of one hour each. He also participated in a 90-minute face to face meeting and gave a tour of the firm, showing functional areas related to the platform discussion. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.
Mr. Robert Zitter	Senior Vice President of Technology Strategy	Home Box Office Incorporated	Mr. Zitter participated in two telephone interviews of one hour each. He and the author exchanged several rounds of clarifying e-mails, and he reviewed the final draft of the case on his firm.

Chapter 3: Historical and Prior Literature Perspectives

Introduction

The prior literature in this field includes clear exposition of breakthrough methodologies that increase product penetration by means of platform strategies. In Platform Leadership, Michael Cusumano describes one such platform strategy, in which platform control exists between major industry forces, wherein they choose the nature of the interfaces that support third party complements. Complements are not always physical goods, or even products, as explained in Cusumano's to-be-released The Software Business;[1] they may also be services. Finally, Professor James Utterback's 1994 work, Mastering the Dynamics of Innovation, explains that technologies are often repurposed and reborn as products unrelated to the original intent, leveraging a core technology platform into a diverse family of products that are neither direct competitors nor complements. Before exploring the literature that supports these platform strategies, it is important to review the literature that has helped define the best practices for the creation of useful, popular products themselves.

Competition and Innovation

In James M. Utterback's Mastering the Dynamics of Innovation, the author says that "…competitiveness is viewed as a systemic issue, rather than as a consequence of weakness or strength of one component or another."[2] This perspective can support multiple approaches to platform strategy. Utterback's work defines "defensive innovation" as the creation of significant improvements when threatened, paralleling in some ways Michael Porter's competitive-forces theories.[3] This thesis posits that that the evolution of complementary and service-oriented platform enhancements to dominant-design products may, in fact, be defensive innovations, and that appropriate use of services and complements can lengthen the effectiveness of these defensive-innovation improvements.

Professor Utterback describes the phases of a product's innovation life-cycle. First, there is a Fluid Phase in which the product is being defined and rapidly evolving. Then, there is a Transitional phase in which the product evolves to a level of production efficiency, and certain aspects of the product become institutionalized, bearing an increased switching cost over time. Finally, there is the Specific phase, in which the product has achieved design dominance and

stability. In Utterback's analysis, a product in the Specific phase, perhaps near the end of its viable life, may experience a burst of improvement when challenged. This improvement may temporarily extend the lifetime of the established product, but the new technology usually has significant potential to surpass the old, and, in time, overtakes it. The certainty of that outcome will be challenged by the theories and findings presented in this thesis.

Clayton M. Christensen's The Innovator's Dilemma provides an alternate understanding of the drivers of innovation. Christiansen cites the "value network" as a key driver of innovation.[4] A value network is "the context within which a firm identifies and responds to customers' needs, solves problems, procures input, reacts to competitors, and strives for profit."[5] This thesis will extend that concept to resemble Cusumano's platform discussions, and will link it to the strategic creation of a network of complementary technologies and offerings. For the purposes of this thesis, the source of complements is less important than that a value network is created and offers features and capabilities customers want.[6]

An example discussed in The Innovator's Dilemma is that of the 3.5-inch disk drive. Many companies were developing the 3.5-inch disk drive, but none saw a market for it.[7] Christiansen says, "… [the value network] simply did not coalesce – until customers needed [the 3.5-inch disks]." This is a clear example of a complementary technology being created prior to platform readiness. Such a supply-driven design approach can only work if there is clear leadership for a network effect of complements driving demand. Apparently, in that particular case, demand was not orchestrated very proactively or consciously, leaving Christiansen in the relatively simplistic position of reporting that the disruptive (in this case, 3.5-inch disk) technology got built, but nobody wanted to buy it.

Christiansen also unintentionally reinforces many of the values inherent in services when he says that "disruptive technologies are typically simpler, cheaper, and more reliable and convenient than established technologies."[8] This thesis explores disruption by means of increasing product value over time through, such as availability of complements and appropriate services. Services can be used to enhance reliability and convenience, and can be priced very inexpensively if desired.

In another Christiansen work, Exploring the Limits of the Technology S-Curve, Part 1: Component Technologies, he discusses using S-Curves prescriptively, to create intentional waves of product disruption and replacement, because, as he says, "That's where the money is!"[9]

Though he tries to position them in a prescriptive way, it is clear that even Christiansen himself sees some risks in using S-Curves as predictive tools. Richard Foster tried to do much the same thing in Innovation: The Attacker's Advantage, but it was equally unconvincing to the reader and to scholars who followed.[10] Most people now agree that one can only determine the end of an S-Curve in hindsight.

That said, Christiansen's discussion of prescriptive use of S-Curves can have an alternate (perhaps unintended) interpretation. In fact, it may be very similar to Intel's process as described by Cusumano's Platform Leadership. Intel engineered its own component obsolescence based on the expectation of performance-bar increases across a broad range of its complements. Christiansen notes that firms may respond in different ways depending on their strengths in terms of integration versus modularity;[11] he further observes that firms in the component space that switched late to new technologies matched product performance with the early attackers: there did not seem to be an early attack-advantage.[12] This indicates that component-modular, complementary product architectures, which are among those reviewed in this thesis, may be especially resilient and allow a firm to be nimble – even in a disruptive situation.

Edward B. Roberts's book, Innovation: Driving Product, Process, and Market Change, is a collection of articles from prominent innovation and technology development experts. In The Product Family and the Dynamics of Core Capability, James Utterback and Marc Meyer discuss the deliberate strategy of building products in families. Product families provide a good value proposition both for producers and for consumers, a concept not dissimilar from that forwarded in David Robertson and David Ulrich's article, Planning for Product Platforms, which discusses the specific benefits and challenges of platform planning, and explores the strategic differences between integration and modularity as platform approaches. Their concept of Differentiating Attributes (DAs) and Chunks (common components) provides a common language for platform planning, so that a company's marketing, design, and manufacturing functions can better cooperate through the stages of development.

Software Industry Insight

"Microsoft Secrets"

There has also been literature more directly related to primary focus of this paper, the software industry. Michael Cusumano's and Richard Selby's Microsoft Secrets is a useful

foundation for understanding other works, such as Platform Leadership, The Software Industry, and Opening the XBox, and it provides an insight into the development process at Microsoft, thereby illustrating how the various product organizations cooperate,[13,14,15] compete,[16] and differ in critical ways. It also illustrates that the application groups create complementary components and services, and the operating system groups make broadly useful platforms: their priorities and goals can be quite different at times.[17]

One particularly salient discussion in Microsoft Secrets is that of the intentionally scalable nature of the Windows operating system, and its applicability to a broad range of devices.[18] This is a harbinger of insights regarding the creation of platforms as a strategy. Microsoft's platform strategy is discussed in further detail in the sections on Platform Leadership and Opening the XBox.

The strategy described in Microsoft Secrets is quite useful to understanding the value of complements and services as reviewed in this thesis. These Platform-Family entities, shown in Table 1 (below), are neither competitors nor complements to each other,[19] but each has its own lucrative enabling array of complements and services, and they reinforce each other by power of branding and by economy of development and support scale for the shared core technology platform components:

Platform	Complements	Services
Windows XP in a Dell Laptop	Office XP, applications, USB Mouse and Keyboard, USB/Firewire/ISA disk and drive and docking accessories, cameras, audio equipment, handheld devices, and synchronizing hardware and software	Software Subscription, MSN, all commercial MS web services, other web and ISP services
Windows XP/DirectX in an XBOX	Controllers, Games, DVD Upgrade, connector kits, carrying cases, memory cards	Xbox Live, Xbox 3 year warranty, Xbox Magazine and game Subscription Service. Future Services likely include video/audio telephony.
Windows XP Media Center PC	DVD Movies, hardware upgrades, video hardware (projection, plasma, etc),audio hardware, wireless keyboard and mouse	TV Listing Services, Broadband, Cable TV, pay channels, upgrades, software subscriptions.
Future XP Handheld Device	Wireless cards, applications, carrying cases, batteries, chargers, cameras, microphones	Wireless Services, Telephony Services, content services, ISP services, warranty services

Table 1. Platform Families – examples.

"Platform Leadership"

This thesis explores the nested nature of enabling complementary innovation. For instance, to consider how PC systems are able to perform breakthrough innovation in consumer products using commodity, off-the-shelf complements (such as USB connected audio devices, for example) is to inferentially discuss a side effect of Intel's complement strategy,[20] defined more than a decade ago. Cusumano and Gawer's Platform Leadership covers this in great detail, discussing how advances like the PCI, AGP, USB, and Firewire1394 standards were established to continue Intel's planned-obsolescence of each generation of processor. The book also discusses technologies that have enabled entire industries, such as the audio and video digital workstation industry.[21] The combination of Microsoft's Direct X and Intel's PCI, AGP, and other bus initiatives provided has enabled today's PC systems to be game consoles, video editing workstations, and digital audio studio systems, displacing established competitors whose products were at least twice as expensive as a PC System. Gawer and Cusumano expose the strategy behind the PCI bus initiative:[22] PCI, an interconnect that is now taken for granted, was the first successful Intel standard, and led them to others, from AGP to USB. Each is today a commodity (e.g., video card, monitor, and motherboard), yet the total system may be integrated with complements from dozens of manufacturers, and services from others.

According to Gawer and Cusumano in Platform Leadership, Intel's complement strategy began with hardware standards like PCI and USB. Intel also worked with application developers to take advantage of features and capabilities, related to rendering and processing complex data, such as video and audio. During the 1990s, these efforts yielded increased richness of features and a corresponding need for faster CPU's and more memory. The proliferation of Intel-sponsored bus connectivity standards resulted in powerful complements—everything from CD-R drives to network cards—and PC Systems developed broad multimedia playback, recording, and editing capabilities.[23] As reflected in this example and in Gawer and Cusumano's book, the majority of these powerful complements were initially conceived in order to sell more processors or more operating system seats; such efforts have provided broad benefits to the consuming public in the form of products, complements, and services.

Winners and Losers

Tim Jackson's Inside Intel: How Andy Grove Built The World's Most Successful Chip Company discusses how Intel's Native Signal Processing (NSP) architecture—which could have reduced or eliminated performance latency in processing Audio and Video in the mid-1990s—was forced on complement co-creator Microsoft, in direct conflict with Microsoft's own software-based standards for the same function.[24] Microsoft eliminated the standard in 1996, and consequently delayed the entry of zero-latency video and audio support[25] by nearly four years. This was not a coordinated effort, or part of an intentional Intel-Microsoft strategy; rather, it was a conflict in which the victor was not best performer—as Darwinian theory would lead one to expect—but the party with the strongest ties (Microsoft) to the industry complement creators of the time (the PC manufacturers).

In the initial chapters of his latest, not yet published work, The Software Industry, Michael Cusumano goes beyond the complements-driven views presented in Platform Leadership and uses measures of Service content to differentiate between successful software offerings and those that are merely adequate. His discussion of product subscriptions[26] opens up the concept of a mature product vying for an extended life, possibly on a new type of S-Curve that does not end when expected. These strategies may appear to be "defensive innovation" as described by Utterback,[27] but they lack an actual external threat; they are a preemptive move by an industry player that is hyper-aware of the risks of complacency. Subscriptions and other service offerings bring suppliers and customers in closer contact and create a stronger mutual bond.

Cusumano's latest book states that is such initiatives generally "rely on networks of platform leaders, followers, and complementors in different forms,[28]" reinforcing a postulate that is borne out throughout this thesis.

"Opening the Xbox"

Dean Takahashi's Opening the XBox provides granular insight to the development of a controversial product, the XBox. This product was developed and driven by a team of engineers, rather than from above, and embodies the best of the complementary strategies, using commodity parts and leverage, combined with Microsoft expertise in operating systems and graphics software. Opening the XBox describes how the team faced significant pushback in

Microsoft's trial-by-fire culture. The XBox project was the brainchild of a Microsoft newcomer, Seamus Blackley, who decided that he could build the world's best game platform at Microsoft, using commodity components and enabling a platform and service opportunity that would define the home computing experience for most home users over time. This idea was not only anathema to Microsoft's traditional PC software mindset, but also resisted by other groups in the company, such as the Web TV group. Blackley was, however, able to seed the idea with other employees and bring it to fruition. Takahashi exposes the reader to the individuals involved and their motivations, and shows in some detail how an idea can grow and propagate in Microsoft at a grass-roots level.

In contrast to the deliberate and detailed planning at Intel described in Platform Leadership, Takahashi reveals that innovation and platform complement-strategy can begin at the bottom of the corporate ladder and be driven by a true entrepreneurial spirit. Also informative is Bill Gates's balance of a real support for Blackley's idea and team and the almost Darwinian leeway afforded to them to succeed or fail. The story of XBox will be one focus of the Microsoft case component later in this thesis because it embodies powerful complementary architectures and well defined service plays. Other Microsoft platforms in this space, such as Windows XP Media Center PC, will also be discussed, as they may provide more data on the power of different kinds of complements and services, and demonstrate the commodity nature of a very successful platform and the effect it has on the "complementary platform ecosystem." They too seem to be designed to embrace complements and services together as a means of success.

Hardware Complements Books

Loyd Case's Building the Ultimate Game PC and Anand Lal Shimpi's The Anand Tech Guide to PC Gaming Hardware provide detailed data on the composition of today's hottest high-performance systems. These books, and data gleaned from popular PC magazines and websites,[29] evaluate the top-performing hardware of a given period, and predict the next generation of performance leaders on a regular basis. These resources are tied into the development and product pipelines for the network of complementary products in that space. They also explore technologies developed to support the PC industry's network of value-adding peripheral and add on complements. These two books and dozens of multi-page articles from PC

Gamer show beyond dispute that the process of creating vast arrays of complements has far exceeded Intel's original goals, and does not exist solely—or even mostly—to enable Intel's growth. The process has grown a cooperative, competitive industry of its own, yielding generation after generation of increasingly modular, inexpensive, high-performance special-purpose hardware, and generations of product and service software and systems.[30]

Among the points raised in both these hardware complement books is the prevalence of just a handful of truly exceptional vendors in the high-end video card space. Despite the dozens of potential players, only two have been deemed exceptional with any regularity during the past 4 or 5 years: NVIDIA® and ATI Technologies Inc. These two players have learned better than most how to play the complementary hardware game, working with Microsoft and the game vendors on complement/ service offerings, such as regular and automatically uploaded driver updates, to optimize performance in an ongoing way.

The history of this lucrative complements and services business is described in great detail in Steven L. Kent's The Ultimate History of Video Games, as well as in Russel Demaria and John L. Wilson's High Score! The Illustrated History of Electronic Games. Note that the gaming industry has tried over the years to be among the first to develop a total strategy of complements (i.e., games, drivers, and hardware support) and services (i.e., subscriptions, network gaming community tools, upgrades on demand, and on-volatile player experience universes), and is just now reaching sufficient maturity and capability to make these offerings interesting to the average consumer.

Modularity

MIT Professor Charles Fine discusses the nature of value chains and the movement from integration to modularity in his book, Clockspeed: Winning Industry Control in the Age of Temporary Advantage. Fine's metaphors using fruit-flies and clock-speed complement many of the other readings that contributed to the thought behind this paper, and reinforce the idea that Intel and its aggressive branding and complement-creation strategy have changed the playing field—and the clockspeed—of so many other industries that it is highly unlikely Intel could have foreseen or planned it. Intel has accelerated the evolutionary process and in so doing, raised customer expectations as to what a "product" is, or should be.

As described in many of the cases later in this paper, platforms rely on modularity to satisfy the internal requirements of a firm. Modularity allows the firm to mix and match valued product subcomponent assets to create new variants of products. Similarly, modularity allows the products of multiple firms to be integrated into a new product or system, whether as a result of firm acquisition or of partnership. Modularity allows for layers of indirection that allow the modules to be designed independently of the underlying sub-platform. In Carliss Baldwin and Kim Clark's Design Rules: The Power of Modularity, the design hierarchy of interfaces that allows for this type of modularity is documented as follows:

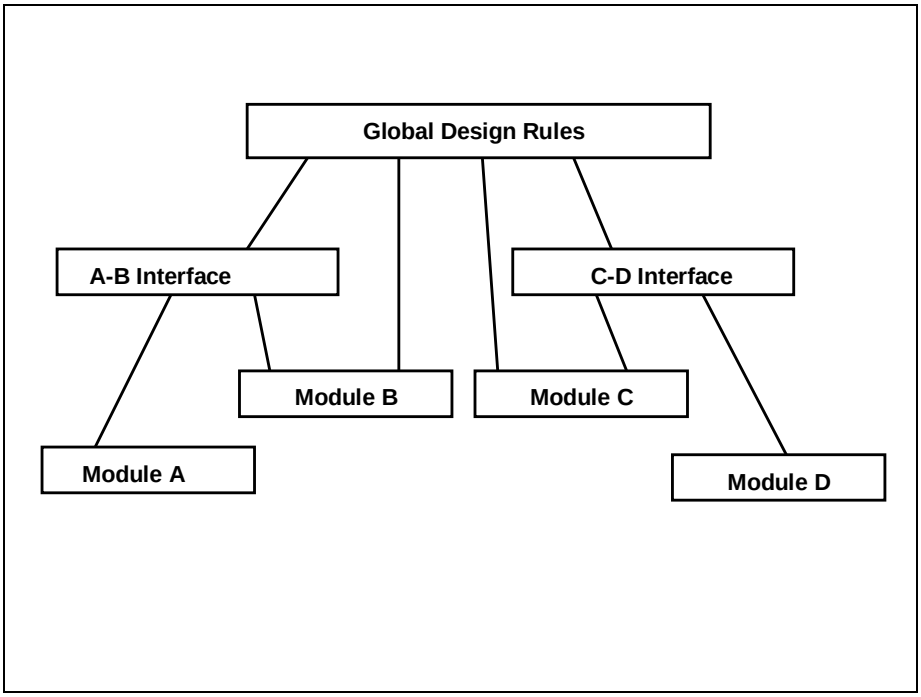

Figure 3. A design hierarchy with four hidden modules and three levels of interface visibility.[31]

Modular components can be "plugged into" the platform using the A-B Interface, and do not need to know about the interfaces for Module B, although the design rules do permit it. They can make full use of the value in Module A, however, without ever knowing the interfaces to Module A, and, in fact, they may not be made aware of them.

Given that a platform and the complements and services that populate it are assumed to be synonymous with a "system" as defined by Baldwin and Clark, modularity may be shown to greatly increase the inherent value of a system. Baldwin and Clark posit that "higher degrees of

modularity increase the value of a complex system."[32] This position is a baseline, and does not even take into account the additional value from the platform-complement synergies resulting from well-defined interfaces for modularity. This position has roots in mathematics of finance theory: Robert Merton's concept that "for any distribution of underlying value, a portfolio of options is more valuable than an option on a portfolio." [33] Similarly, the system that comprises a platform and its complements may be thought of as a "Modular Cluster" in the terminology of Baldwin and Clark. They state that "Individual modules will become the products of specific firms, and markets will arise at key interfaces established by the design. [34]"

In Carl Shapiro and Hal Varian's Information Rules, there is a related discussion of "Product Versioning,"[35] in which those authors suggest that there is significant added value in creating product versions with different features tailored to the needs of different customers. They suggest that value can be extracted maximally from each customer segment by accentuating the differences between segments. Modularity within a platform strategy creates the components that can, in turn, be recombined to create different versions of a product. As will be discussed in the SPSS case, such versions can, in fact, be built using configuration management skills, at almost no engineering expense.

Furthermore, Shapiro and Varian discuss the concept of "openness,"[36] in which they provide support for the concept of interfaces. Interfaces provide the plug-in points for modular complements to a platform architecture. To paraphrase their text in the language of complements, they state that a firm's reward equals the total value added to the platform ecosystem, multiplied by the firm's fractional share of the total industry. Shapiro and Varian go on to discuss the trade-off between openness and control, or between allowing a platform architecture to be open and share value among complements and choosing not to share the wealth and attempting to create

all of the complements and services for a firm's own platforms.[37] Figure 4 illustrates the trade-offs between an open complement standard in which many share the wealth to the benefit of all, and a closed proprietary standard where on firm captures all the revenue but fails to grow the market as well as multiple firms could have. The figure illustrates the optimal point between those two extremes wherein a firm can capture the most value.

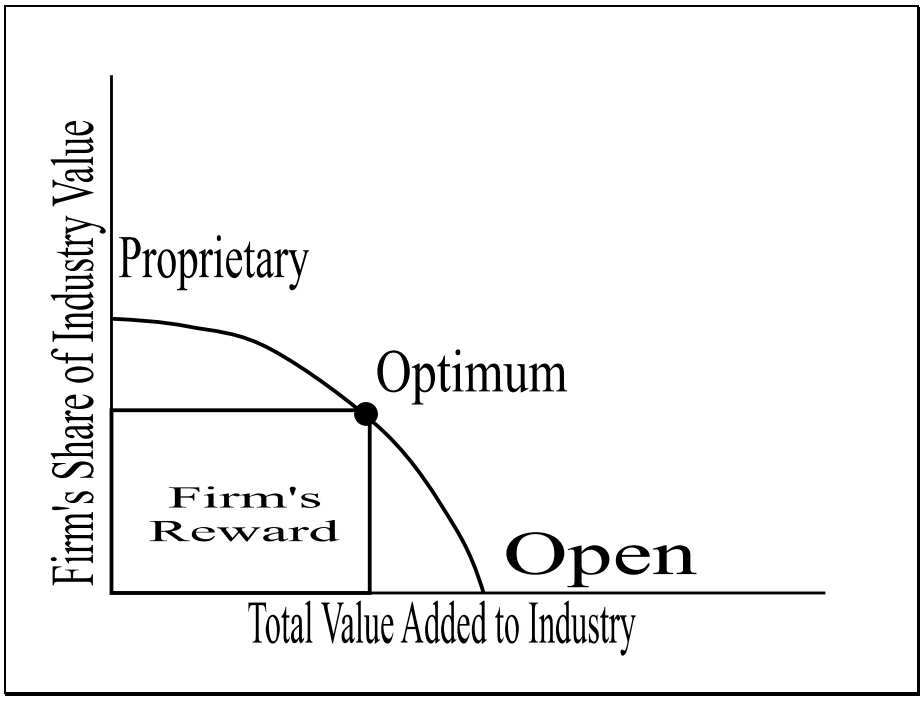

Figure 4: Total Value Added to Industry via Complements to a Platform, Open vs. Proprietary.[38]

These concepts that have been reviewed in this chapter are appropriate to platforms, and, in fact, each serves to reinforce the concept that platforms pervade most strategic thought, even when they are not referred to as platforms. These readings, and the others referenced in the bibliography and elsewhere in this thesis, represent many of the strategic thought leaders of the past twenty years, and provide a foundation upon which the rest of this thesis will build.

[1]Cusumano, Michael A., The Software Industry, ch. 1-3. (NY, NY: Free Press/Simon and Schuster, c. 2003 [not yet published]).

[2]Utterback, James M., Mastering the Dynamics of Innovation. Boston, MA: Harvard Business School Press, 1994: vxi.

[3] Porter, Michael E., Competitive Strategy, c. 1980;
Utterback, Mastering the Dynamics of Innovation.

[4]Christensen, The Innovator's Dilemma: 36.

[5] Christensen, The Innovator's Dilemma:32

[6]Christensen, The Innovator's Dilemma: 38,39: figs. 2.1 and 2.2.

[7]Christensen, The Innovator's Dilemma: 124

[8]Christensen, The Innovator's Dilemma: 221

[9]Christiansen, Clayton M., "Exploring the Limits of the Technology S Curve, Part 1: Component Technologies." Production and Operations Management, vol. 1, no. 4 (Fall 1992): 341.

[10]Discussion in various MIT Sloan school classes with faculty such as James Utterback, Jonathan Cummings, Ralph Katz, and with MIT Sloan Students William Shelton and Richard Willey.

[11]Christiansen, "Exploring the Limits of the Technology S Curve, Part 1: Component Technologies": 351.

[12]Christiansen, "Exploring the Limits of the Technology S Curve, Part 1: Component Technologies": 353

[13]Cusumano, Michael A., and Richard W. Selby. Microsoft Secrets. NY, NY: Simon and Shuster: 33.

[14]Cusumano and Selby, Microsoft Secrets: 168.

[15]Cusumano and Selby, Microsoft Secrets: 384.

[16]Cusumano and Selby, Microsoft Secrets: 52.

[17]This is discussed in more detail in the "Opening the XBox" section, which clarifies that Microsoft's product evolution is as much a result of an internally competitive environment as a master plan.

[18]Cusumano and Selby, Microsoft Secrets: 175.

[19]Except perhaps the handheld is a complement to the laptop, which shows the nested nature of such schemes, where each complement may contain its own recursive universe of complements and services.

[20]Gawer and Cusumano, Platform Leadership: 22.

[21]Also note that one key enabler of audio, video and games complements, DirectX, is detailed in Takahashi's "Opening the XBox."

[22]Gawer and Cusumano, Platform Leadership: 34.

[23] One side effect of these complementary strategies was a large number of systems capable of ripping and reproducing music, burning CD-R discs, and communicating at high speeds (all by virtue of these bus standards set by Intel) and this, together with the overall rise of the internet, and disruptive file sharing technologies, contributed to the disruption of the Music Industry's primary business model. While it is not a direct focus of this thesis, it is interesting to note that one industry's goal (sell more Intel hardware) incidentally enabled broad, inexpensive consumer copying of software, music and movie content.

[24]Jackson, Tim. Inside Intel: How Andy Grove Built the World's Most Successful Chip Company. NY, NY: Plume Books, 1997: 374.

[25]Executed via Direct X and certain DSP chipsets, and sold as complementary PCI or Firewire components.

[26]Cusumano, The Software Industry: ch. 2, p. 8.

[27]Utterback, Mastering the Dynamics of Innovation: the creation of significant improvements when threatened.

[28]Cusumano, The Software Industry: ch. 2, p. 35.

[29]PC Gamer Magazine, PC Magazine, ZDNet.com <www.zdnet.com>, C|Net <www.cnet.com>.

[30]For example, fee-based services like The Entertainment Network or TEN, Game Spy, Professional Gamer's League or PGL.

[31]Baldwin, Carliss Y. and Kim B. Clark. Design Rules: Vol. 1. The Power of Modularity. Cambridge, MA: The MIT Press: 76, fig. 3.5.

[32]Baldwin and Clark, Design Rules: Vol. 1. The Power of Modularity: 259.

[33]Baldwin and Clark, Design Rules: Vol. 1. The Power of Modularity: 259.

[34]Baldwin and Clark, Design Rules: Vol. 1. The Power of Modularity: 352.

[35]Shapiro, Carl, and Hal R. Varian. Information Rules: A Strategic Guide to the Network Economy. Boston, MA: Harvard Business School Press, 1999: 55.

[36]Shapiro and Varian, Information Rules: A Strategic Guide to the Network Economy: 198.

[37]To appropriate the full value of all other firms in that space; note this may play on later discussions of Microsoft's long term strategy in this thesis.

[38]Shapiro and Varian, Information Rules: A Strategic Guide to the Network Economy: 198.

Chapter 4: SPSS Incorporated Case

SPSS Inc. is growing global software firm providing a platform that transforms complex data into management insights and strategic information. SPSS products perform predictive analytics and other powerful data mining techniques.

SPSS technologies enable management to improve decision-making, getting a real-life, real-time perspective on a firm's financial path by learning from the past, understanding the present, and anticipating future problems and opportunities. Today, there are three SPSS product lines: data mining and analysis products, market research products, and scientific products.

Company History

SPSS was co-founded in 1968 as a firm offering the power of statistics to transform complex data into decision-making information by mathematics expert Dr. Norman Nie and his team. SPSS had the vision to drive business and government leadership decisions by providing insights into data trends. They quickly proved that data analysis is the heart of real business intelligence.

Since its founding, SPSS has grown steadily and has created new statistical tools and decision framework tools. SPSS was the first firm to offer high-end professional statistics capability for the Microsoft Windows operating system. SPSS has grown to provide a large array of complements for today's pervasive top-tier Customer Relationship Management (CRM) solutions, allowing today's leaders to understand insights hidden within huge and growing amounts of data that exist today, and will exist tomorrow.

As with many firms studied in this thesis, SPSS has grown and populated its platform of technologies through acquisition. Subsuming firms like Quantime Ltd., Integral Solutions Limited, Vento Software, Inc., and NetGenesis Corporation has fleshed out SPSS's portfolio and has provided it with the ability to rapidly acquire capabilities necessary to be competitive.

Since 1968, SPSS has grown into a global power in the space of providing top-tier analytical tools and solutions to organizations. The SPSS analytical platform enables organizations to manage today and thrive tomorrow, by understanding the past and present. The business payback from performing an intelligent analysis of the data flowing through an organization is proven, and can yield better decisions and a higher likelihood of success.

Leadership

Jack Noonan is the top manager at SPSS. He has served as President and Chief Executive Officer since 1992. Previously, Mr. Noonan was President and Chief Executive Officer of Microrim Corp., and prior to that, he served as Vice President of Candle Corporation, a developer of IBM® mainframe system software.

SPSS today retains a key member of the founding team, Dr. Norman Nie, in a leadership position. Dr. Nie designed SPSS's first product in 1967. He was Chief Executive Officer of SPSS from 1975 to 1991. Dr. Nie is today a professor at Stanford University and a professor emeritus in the Political Science Department at the University of Chicago. Dr. Nie received his Ph.D. from Stanford University.

Jon Otterstatter has been a key participant in this thesis case research. Mr. Otterstatter is SPSS's Executive Vice President and Chief Technology Officer. Mr. Otterstatter began his tenure as Chief Technology Officer for SPSS Inc in March, 2001. He owns the platform direction and strategy of SPSS, and, overall, he is responsible for all research, development, and support activities. Prior to SPSS, Mr. Otterstatter was the executive vice president for Technology and Services for ShowCase Corporation. There, he owned the research and development of Business Intelligence products for the IBM iSeries platform. Prior to that, Mr. Otterstatter had been employed by IBM as a senior development manager. Mr. Otterstatter has a BS degree in Computer Science from the University of Wisconsin, and an SM in the Management of Technology from the Massachusetts Institute of Technology.

Dr. Steve Chaput, the Vice President of Strategy for SPSS, reports to Mr. Otterstatter, and is the authority on platforms and the driver of SPSS's evolving platform strategy. Dr. Chaput contributed significantly to this thesis research in terms of both direct research and reference to third-party materials and frameworks. Dr. Chaput has a PhD in Systems Engineering and an MBA in Engineering Management from the University of Dallas. In addition to his duties at SPSS, he is Senior Faculty for the Project Management and Information Technology programs at Keller Graduate School of Management. In addition to significant corporate strategy and management experience at Motorola prior to SPSS, Dr. Chaput served in the United States Marine Corps and brings that sense of discipline to SPSS's day-to-day technology delivery operations.

Leland Wilkinson is Senior VP, SPSS Inc. and adjunct professor of statistics at Northwestern University. He wrote the SYSTAT® statistical package and founded SYSTAT Inc. in 1984. Wilkinson joined SPSS as part of a 1994 acquisition and now works on research and development of graphical applications for data mining and statistics. He is a fellow of the ASA and an associate editor of several statistical journals. In addition to published articles and the original SYSTAT computer program and manuals, Wilkinson is the author of The Grammar of Graphics and (with Grant Blank and Chris Gruber) Desktop Data Analysis with SYSTAT.

Product Direction

SPSS offers solutions and products that enable organizations to execute better decisions by having an accurate picture of the past and present, and thereby reasonably anticipating future trends. Most of SPSS's customers are corporations that use SPSS technology to measure and fine-tune their marketing and sales programs. SPSS has public sector customers as well, and the SPSS technologies are used in that sector to improve understanding between government agencies and their constituents. SPSS data mining can detect fraud and other non-compliance in both public and private sector applications. SPSS products are more than commercially and government oriented; they are also standard at colleges and universities throughout the world as tools for academic research and the teaching of data analysis techniques.

SPSS continues to grow by acquisition, and in December, 2001, it acquired statistical analysis firm NetGenesis Corp., followed by the February, 2002, acquisition of LexiQuest, Inc., a linguistics technology firm. As a result of these acquisitions atop its core platform, SPSS's technology offers a wide array of data access management capabilities. These may be stand-alone, or may be integrated as a complement to CRM systems, databases, and operational systems such as call-center software and sales force automation programs. This enables SPSS customers to make sense of data on a wide variety of computing platforms, including the generation of reports, graphs, and models.

SPSS is also well-positioned in the lucrative enterprise-services space, providing integrated services along with its products and solutions. This consultative business includes helping organizations to strategically develop plans to correctly align analytical efforts with strategic goals, delivering predictive frameworks and propagating the results of analyses.

SPSS CustomerCentric® is a CRM solution that applies analytical and data mining techniques to customer intelligence challenges. CustomerCentric uses automated scoring platform technologies and, thus, supports personalized customer interactions. It may also be applied to e-commerce and web business models, helping determine optimal site usage traffic patterns and identifying different visitor types.

SPSS also caters to the lower end of the market for analytical solutions. There are three classes of SPSS products:

- **Data Mining and Analysis Products.** The SPSS offerings for data mining/analysis are the SPSS or Clementine® products. In CRM applications, these products can segment customers by actions of record, such as the purchase of a product or the renewal of a contract. These technologies can to some degree predict customer's future behavior and the actions of prospects with similar profiles. They provide a broad range of statistical analysis methods, and Clementine also has analysis tools that support data mining applications in the smaller-scale desktop and distributed computing environments.
- **Market Research Products.** SPSS's market research products include the Quantime, In2itive, and Surveycraft product lines that provide comprehensive solutions for professionals in the market research industry. Quantime products have broad functionality; In2itive products offer powerful modern user interfaces; Surveycraft products may be localized for use in Asian markets. SPSS is working to combine the strengths of these product lines, in the MR Dimensions solution for market research professionals.
- **Scientific Products.** The SigmaPlot® and SYSTAT product lines are for data presentation and analysis. Scientists and engineers in various technical applications use these products.

SPSS also develops student releases of its SPSS Base and SYSTAT products, designed for classroom use with SPSS textbooks or other instructional materials. SPSS offers courses covering product operations and data analytical processes.

Competitors

SPSS competes with SAS®, IBM, HNC Corporation, NCR, Oracle®, Broadbase, E.piphany®, NetPerceptions®, Sawtooth Software, Computers for Marketing Corporation, and Pulse Train Technology. Because SPSS's internal platform efforts and its assimilation of acquired firms and technologies are the focus of this case study, the competitive landscape will not be discussed in fine detail. That said, it can be noted that it has a strong competitive position; in fact, "SPSS made the top 100 section of the Forbes 1999 list of the 200 best small companies, and is consistently one of the most profitable companies on NASDAQ."[50] One other item worthy of note is that SAS, an SPSS competitor, has announced that it is implementing a platform architecture, and it had done so many months before SPSS formally initiated its strategy. SAS is a much larger firm than SPSS, and it is not clear whether this size difference will yield an advantage or a disadvantage.

Strategic Choices

The SPSS case study is a study of the internal efforts of an acquisition-oriented firm to unify its products for customer satisfaction, revenue, and profit reasons. SPSS, grown by acquisition of complementary technologies and managed by technologists with a strong belief in platforms, is ideally positioned to develop a unified platform from its products. Senior managers, Mr. Otterstatter and Dr. Chaput, recognize this opportunity, and in late 2001, they began a company-wide platform coordination effort that spans the business and technical domains.

Strategy, Policy, and Influence

Dr. Chaput's theoretical and academic experience is reinforced by his hands-on experience in major platform efforts at Motorola; he understands the organizational issues involved in pushing such a strategy forward. In a March, 2003 interview, Dr. Chaput said, "This is not just a technology effort, it is a cultural shift, and each of the groups in the Influence Diagram is a factor in the adoption of a platform strategy." He also described how internal special interest groups can compete and disrupt a platform strategy, even if the CEO pushes for it and the competitive marketplace demands it. One part of a successful platform strategy is the establishment of policy across a firm in which the platform "rules" are agreed upon and disseminated. This case discusses the SPSS platform policy document that is a part of SMSS'

efforts, but a document is simply a document and does not guarantee success. Dr. Chaput believes that organizations that fail to understand the human side of this process will simply establish policy and fail to take the necessary influence steps. It is that human element that makes the SPSS platform discussion truly interesting, because it extends beyond technology and considers the people involved in the technology at all levels of the organization. In many cases, the technical and business merits of an idea are subordinated by the politics of influence.

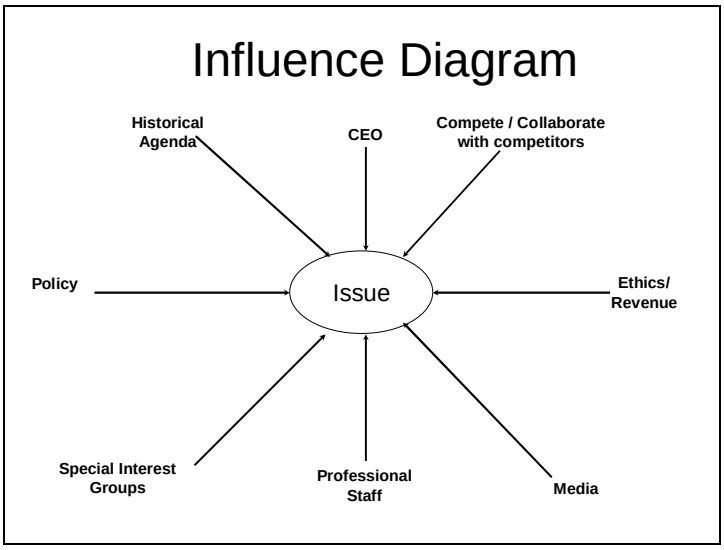

Figure 5: Influence Diagram showing the organizational effects that can influence propagation of a platform execution strategy within a firm.[51]

Within SPSS, despite almost two years of effort and measurable success, platforms are not yet policy. They are a special interest led by Mr. Otterstatter, Dr. Chaput, and people like Mr. Leland Wilkinson, Senior VP, SPSS, Inc. The broader professional staff at SPSS is not fully convinced of the concept that Mr. Otterstatter's team is pushing. The Influence Diagram (as shown in Figure 5) is still in play within SPSS; Mr. Otterstatter and his team know that once the process gets to the Ethics phase, it must be provably categorized as either a revenue generator or a cost saver. While a platform strategy can be either, it cannot initially be both. As the idea is being propagated, professional staff can gain support for it by referencing media, such as Cusumano's Platform Leadership or Lehnerd and Meyers's The Power of Product Platforms. At SPSS today, many people are being given book recommendations and are buying and reading the current state-of-the-art in platform books.

The SPSS Internal Platform Effort

The platform effort truly began in implementation with Lee Wilkinson and another technical professional staff member in 2002. This small effort, using only a handful of developers, part time, is having a large impact. By the end of 2003, 70% of all SPSS products will leverage common visualization complements. Tremendous cost savings—on the order of $1.75M per year—have already been realized; up to 15 developer redundancies have been eliminated through the platform efficiency of Visualization Sharing.

The SPSS experience so far has been that it can achieve a 20:1 increase in profitability for a given core component. The company also knows that not every component lends itself to that kind of return ratio, and that they must carefully choose components that have broad sharing appeal in order to make it worthwhile. Efforts to date have taken around eighteen months. Mr. Wilkinson strongly believes that formal modularity and component sharing is not the only way to gain platform efficiency in a broad organization like SPSS. The alternative method, "snippets of re-use," also works well for some components; this is not highly organized, nor is it actual code sharing; it is simply cross-team learning, as would occur if one team were to review a coding method of another team, perhaps in Java, and then adopt some of the algorithmic ideas as, such as C++, for another project.

According to Mr. Otterstatter, component-level re-use efficiency itself is not the compelling reason to undertake a modular platform effort. Rather, the value is in the internal synergies and cultural support for the cross-pollination that it generates within the company for larger scale reuse and sharing. The SPSS agenda is to build a platform for internal use on which to improve efficiency and quality with internal teams and partners, and with which to drive development toward lower costs and higher productivity, and toward the creation of a predictable product release schedule.

Internal Platform to Drive Competitiveness

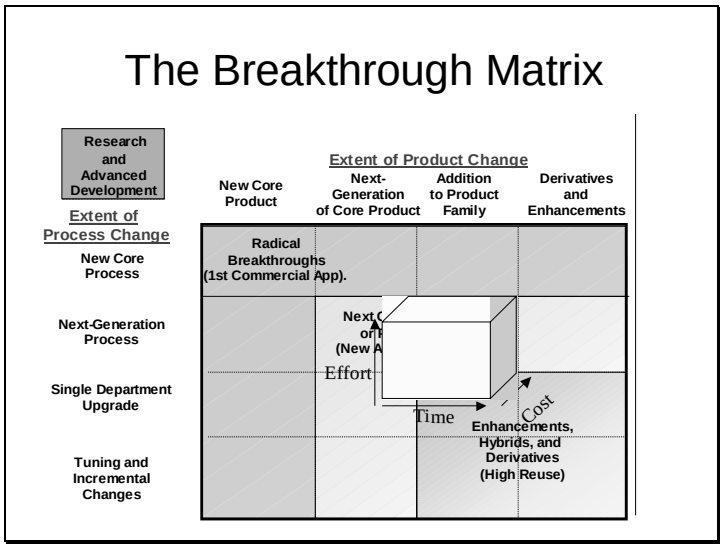

Figure 6: The Product Development Matrix, derived from the work of Wheelwright and Clark,[52] shows how a concept such as platform architecture can be migrated from R&D, toward mainstream and derivative productions. Courtesy of Dr. Steve Chaput, SPSS.

As a product moves forward in time, more and more features are desired and expected, and yet, in most cases, the product is expected to sell in larger quantities at a lower cost. As shown in Figure 6,[53] this can be accomplished by taking this process change from the upper left corner of the matrix to the lower right corner.

The experience curve[54] postulates that as an industry matures, there are no more than three or four players, and the dominant player typically has no more than four times the market share of the third place entrant in the market. The shake-out of the boom maps to this, as does the dramatic reduction in the first part of the last century in the number of car manufacturers. This dominance yields a commodities-like volume effect, such that as the markets expand, the model must expand. In a non-technical example, Dr. Chaput cites:

> "Five star restaurants have one experience set. Then they move to high end experience-replication, as did Wolfgang Puck. Higher volume, and lower price—the progression goes all the way down to the fast food model, as we see in Mc Donalds. Then, finally, the vending machine. The distribution channel tends to dictate the price point and also tends to require less staffing overall, and less skilled staffing."

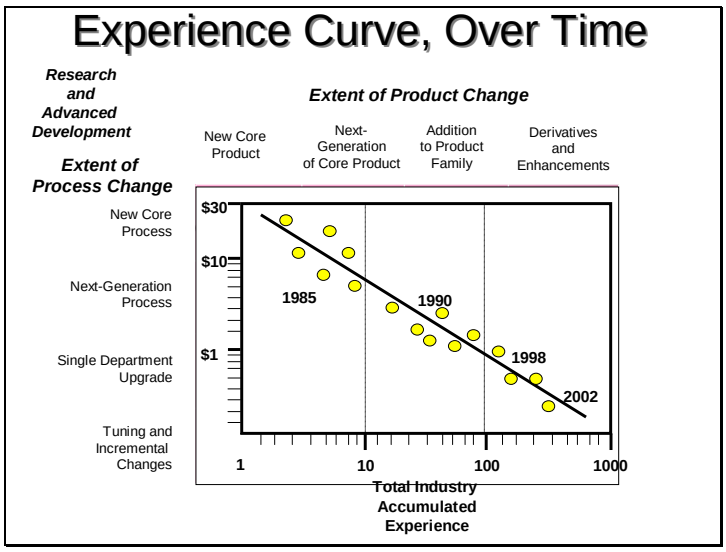

Figure 7: The Development Experience and Cost Curve, derived from the Boston Consulting Group's work and the work of Clayton Christiansen,[55] illustrates the increase in features and decrease in cost over time. Courtesy of Dr. Steve Chaput, SPSS.

If you overlay this experience curve concept from Figure 3 upon the product development matrix from Figure 6, the path between innovative prototype and consumer commodity becomes clear. It shows that the average price per feature drops over time, therefore more features are required at a given price point to be a desired product. The framework of the Experience Curve,[56] as illustrated in Figure 7, lends theoretical support to the goal of increasing features and decreasing cost per feature, and in turn validates the platform approach to creating, protecting, and enhancing value over time.

Elsewhere in this thesis, Symantec's COO states that he was "running faster and faster to stay in the same place." Dr. Chaput echoes that frustration, adding that "the platform strategy is the only strategy that allows me to add enough incremental features at this rate and at a low enough cost to be able to compete." According to Dr. Chaput, the firm would, of course, prefer not to lower the price per feature over time, but customers require it, and that becomes a large competitive issue. While Dr. Chaput regrets that the price per feature must drop over time, he explains that "you must cannibalize yourself so you don't get cannibalized by an outsider," and agrees that there are many parallels between that concept and the conclusions drawn by many from the work of Clayton Christiansen.[57] Thus, while the platform modularity work done so far has not yet fully pervaded SPSS, it has already resulted in changes in the way products are built.

One example of such changes is the education market: SPSS derives 15-20% of its revenue from educational variants of its products, and all of these products are derived from build-time variations of commercial products, and require no engineering changes to the code. They are simply re-built using different configuration information.[58] This software development discipline is known as configuration management, and is very similar to the processes of the aerospace industry and its optimizations around re-usable subassemblies. It is a rare skill in the software industry, and even rarer when implemented in a methodical way that drives the business as it does at SPSS.

Financial Trends

SPSS has shown steady increases in revenue, and seems virtually unaffected by the economic slump that has hit most high tech firms since 2000. Gross profits are up significantly this past year, firm investment in R&D is up.

Period Ending:	**Dec 31, 2002**	**Dec 31, 2001**	**Dec 31, 2000**
Total Revenue	**$209,300,000**	**$176,556,000**	**$186,114,000**
Cost of Revenue	$26,951,000	$19,835,000	$16,268,000
Gross Profit	$182,349,000	$156,721,000	$169,846,000
Operating Expenses			
Research and Development	$41,624,000	$32,305,000	$32,896,000
Selling General and Administrative Expenses	$146,222,000	$142,634,000	$129,119,000
Non-Recurring	$2,928,000	$10,139,000	N/A
Other Operating Expenses	$869,000	N/A	N/A
Operating Income	($9,294,000)	($28,357,000)	$7,831,000
Total Other Income and Expenses Net	$752,000	($821,000)	$3,418,000
Earnings Before Interest and Taxes	($8,542,000)	($29,178,000)	$11,249,000
Interest Expense	$1,082,000	$400,000	$1,100,000
Income Before Tax	($9,624,000)	($29,578,000)	$10,149,000
Income Tax Expense	($1,228,000)	($7,986,000)	$4,234,000
Equity Earnings or Loss Unconsolidated Subsidiary	N/A	N/A	N/A
Minority Interest	$497,000	$360,000	N/A
Net Income from Continuing Operations	($7,899,000)	($21,232,000)	$5,915,000

Figure 8: Financial Data. Source: http://finance.yahoo.com

The Discipline of Platform Production

As a part of the disciplined process supporting the platform effort, Dr. Chaput has driven SPSS to product release cycles framed around 13-week build-test-release cycles in which "Features are king," to quote Dr. Chaput. This is a continuous product renewal process that adds modular features, rather than implements a major architectural change. The 13-week development process is structured as follows:

- **Week 1.** The Requirements engagement team examines requirements, and makes marketing reprioritize the feature list based on six criteria:
    1) Has SPSS accepted a check? If so, delivery mandated.
    2) Does SPSS have a contract?
    3) Does SPSS have a Letter Of Intent that says customer will buy the product?
    4) Can it be proven this is a current customer's feature requirement?
    5) Can marketing justify the feature based on revenue?
    6) Is it an internally strategic feature for SPSS?

  Note: Product version press is release written during week one. It describes the feature set in the new release. This is an internal "charter" memorandum that is reviewed by marketing during week 10 to determine what is really in the release.
- **Week 3.** Prioritization of features is locked down. Priority drives decision making; even if a feature is 80% complete, the feature will be suspended from this release if its priority has dropped.
- **Week 7.** Release is promoted to performance and functional testing. If marketing agrees with the test results and likes the features, they can begin building the sales pipeline with the assurance that it will be available for sale in 6 weeks. The system test harness is also being tested at this point to ensure it is robust and to ensure the regression test suite works.
- **Week 10.** Completed features are tested. Incomplete features are dropped. Schedule is drives this process; if features are not ready, they will be pushed back to the next release.

- **Week 13.** The system architecture is reviewed to determine the extent of the new-feature impact. Feature impact may be visible or subtle. Engineers are poised to immediately fix any problems at this point.

Outside of this schedule discipline, unscheduled bug fixes maybe added based on the customer's revenue importance. As Dr. Chaput says, "My business model cannot break my partners business model…my business partner's process cannot be forced to change because of my policies."

Dr. Chaput's experiences at SPSS and Motorola have taught him that a large number internal people will ask to be involved in the platform team when a first determined to move a product to a platform, but that the team must, in fact, be very focused and inward looking. The top priority is that the team be able to generate a prioritized schedule and list, a process that can sabotage productivity if everyone tries to be part of it. According to Dr. Chaput and Mr. Wilkinson, the better choice for ensuring that development stays on a predictable schedule throughout the process of platform creation and execution is to carve off strategic parts and modularize them. Then, the firm can use those parts a bit at a time, easing into a platform without disrupting the flow of products and profits. Wilkinson believes that while it can be done one step at a time, the steps can also be overlapped across teams. It is Dr. Chaput's role at SPSS, in addition to looking ahead with a strategic focus, to manage the day-to-day integration of building and testing the product on a predictable cycle. SPSS is attacking this issue on two fronts:

- **Cost Reduction by means of Platform Elements.** The platform effort at SPSS has yielded hard data points that prove that the surgical replacement of redundant functions across acquired (or otherwise independently developed) products can reduce the development costs of those functions by between 5 and 20X. Costs associated with this work have been a fraction of the redundant overhead costs; two person-years worth of work, in one example, saved over 30 person-years worth of expense for each subsequent year.
- **Increased Revenue through Predictable Cycle Times Tied to Sales Initiatives.** Unrelated to savings described above, another aspect of SPSS's program of strategic

change was the institutionalization of predictable product update and release cycles. Such predictable release cycles have doubles revenues for other firms, and have supported subscription upgrade business models that produce annuities.[59] Typical uptake for these business models is 70% of all customers on the firm's mailing list can be encouraged to either upgrade once or subscribe to upgrade services.[60]

More on Policy

SPSS has committed to managing its internal influence forces, including the policy aspects. In addition to numerous hands-on platform modularity efforts and the rigorous platform build methodology run by Dr. Chaput, SPSS has assigned its policy effort to a senior technologist, Eric Richards. Previously, Mr. Richards was CTO of NetGenisys, a firm that SPSS acquired for its analytics expertise.

SPSS Inside

CTO Jon Otterstatter had the vision and scope to drive the platform effort. The ultimate goal of this effort is for all of the acquired products to be modular, and to share as much common code as possible. One goal is driving the SPSS value down to the firmware,[61] and to OEM the technology in a modular fashion to hardware vendors like Cisco Systems, which could encapsulate the value in their products and drive SPSS into new markets where its competitors cannot play. According to Mr. Richards:

> "Everything we build should be built for OEM market, and it just so happens that our applications will be the first shipping embodiment…ultimately, SPSS has a lot of great technical assets but there are too few technology people to sell to. How do we make this accessible to a marketing or other non-technical persons? How about instead of Intel INSIDE…SPSS INSIDE!"

SPSS is moving in new directions; its new product, Predictive Marketing, is the first case of an application built to target non-technical marketing users. Unfortunately, it is not built on the modular platform yet, but the modular platform is intended to make such products easier to make, opening new markets for SPSS. This new product allows marketing people to optimize marketing campaigns, and to identify people who are most likely to respond to marketing campaigns.

Mr. Richards is pleased with acceptance of the platform policy push so far. He estimates that there is 90% acceptance of it at a conceptual level. That said, SPSS's legacy products are among the strongest to push-back against the initiative, as they drive the most revenue, but Jon Otterstatter is firm in his resolve. SPSS's CFO, Edward Hamburg, is not going to support the concept unless it can be proven to drive revenue. Mr. Otterstatter has been clear that despite the support from the top, the platform approach will not be totalitarian, but will be driven by the dynamics of the Influence Diagram's group behavior theory over time to make the various groups feel ownership.

In Mr. Richards's opinion, the platform approach will yield a mix-and-match architecture, and that, in turn, will allow the creation of customized solutions from combinations of platform elements. SPSS will focus on establishing internal development policy-driven standards, and to have an SPSS presence on relevant external standards bodies to ensure that SPSS technologies can fit well as complements in the real world. SPSS technology is, after all, a discretionary complement to a variety of platforms, and must be able to easily plug into popular platforms.

Enabling Factors

SPSS is driven by a vision of platform modularity. This vision comes from the top of the organization. SPSS is customer oriented, and has a powerful process built around customer feature requirements.

One of the key elements of a successful strategy is knowing what to do and when to do it. SPSS has a disciplined process for change, and its philosophy is that the changes cannot break the core product, and the product must build, test, and ship every 13 weeks. The same discipline that guides the company in selecting the right bugs to fix and features to add over time will guide it in the propagation of platform change.

The company's highly-educated, platform-literate, and highly-motivated management team and workforce will follow Mr. Otterstatter's vision and deliver on the promise of platform development. They are following a conscious path, and have done the right planning and research. Under the detailed guidance of Mr. Otterstatter and Dr. Chaput, it is likely that the company will meet its incremental goals, obtain team buy-in, prove the value proposition, and enter new markets with new modular technologies.

Conclusions

The following elements comprise SPSS's platform strategy:

- Core competency in modular design
- Broad range of core technology in the analytics and visualization space
- Strong presence in its niche
- Platform expertise spanning a wide range of prior experience and educational venues
- Proven ability to acquire new technologies as needed and integrate them with the current product set
- Technologies that are respected and known to solve large problems
- Revenue- and customer requirements-driven model
- Disciplined and proven configuration management skills
- Rigorous quality testing processes
- New market opportunities for SPSS technology if easier to use and decoupled from the technical usage requirements
- OEM interest in bundling the technologies
- Grass-roots propagation of these strategies through SPSS with appropriate care
- Rigorous application of revenue or cost savings benefits to all phases of the platform conversion process

SPSS falls into the following categories of characteristics of companies that may adopt a platform strategy:

- Companies that are trying to grow beyond their current revenue levels, as is SPSS
- Companies that have reasonable niche credibility, as does SPSS, and that wish to be able to nimbly repurpose technologies to new markets
- Those that truly understand how flexible a modular platform can make them in a competitive landscape, as does SPSS
- Firms whose arch-competitors have announced platform strategies of their own, as SPSS's competitor SAS has done within the past half year

The following circumstances have driven the adoption of a platform strategy:

- SPSS was growing and acquiring firms at a fast pace and had absorbed some good technologies, but there was much technical redundancy in terms of product components, and much HR redundancy in terms of the staff.
- SPSS had brought in key management who recognized the growth opportunities and benefits inherent in a modular platform architecture.
- Dr. Chaput understands not only the technology aspects of platform adoption but the appropriate processes to ensure internal adoption in a fashion that yields buy-in.

SPSS has achieved or can expect the following outcomes:

- The SPSS platform strategy so far has provably lowered development costs and is expected to produce many more efficiencies.
- It is intended to open new markets and generate new revenue streams.
- It is intended to create new classes of partnerships—even OEM partnerships—that are not currently feasible.
- The IP and core technology developed by all the acquired firms will eventually be integrated as a whole with the overall SPSS platform and will sere to enhance the total platform value to the firm and to others.

The following happens to such a strategy over time:

- It evolves because once the platform has been created and the new markets have been entered, the firm becomes part of the larger platform ecology and may be affected by the strategies of the other firms in that market.
- Once the platform is achieved and enough features have been added, it will eventually destabilize, and there comes a time to re-architect and rebuild it.

The SPSS case provides different interpretations of the postulates of this thesis than have been seen in other case studies.

In terms of the influence of platform strategies on other firms, SPSS has not been directly influenced by the platform strategies of Microsoft, as most of the other firms in this thesis have been. It has been influenced, to a small degree, by the platform strategy announcement of its

largest competitor, SAS. SPSS is a complement to the platforms of others and, as such, is influenced by the database firms and their interfaces.

In terms of the platform strategies' influence on ROI, SPSS's platform efforts, to date, have yielded good internal return on engineering investment. There is an expectation of significant engineering savings on a continuing basis as more redundancy is eliminated. Savings in cost are an insufficient reason to make changes this pervasive; this thrust is far more focused on capturing new value in new markets with products built from modular platform components.

In terms of corporate survival, SPSS is shielded from danger, in some ways. SPSS is doing quite well and is consistently rated as one of the top earning firms on the NASDAQ, so its nascent platform strategy is not about an immediate threat. Mr. Otterstatter and Dr. Chaput are well-trained in the theory and recent historic evidence of disruption of firms who otherwise appear successful; very often they are profitable and leaders in their industry before their downfall. SPSS may be fine on paper and have a healthy revenue and cash flow, loyal customers and a great technology, but that does not protect it from disruption. Only self disruption and willingness to change as needed can protect a firm over time.

Overall, SPSS is in an ideal position to cause its own disruption, evolve its strategy to a full-blown platform implementation, and to grow its market significantly. It is well-run, has great technology, few real competitors whose technology is as well-reputed, and a running start at making the kind of change that can make a real difference. SPSS has a top-tier management team and are proactively moving to build a stronger future.

Some firms choose a platform strategy as a reaction to outside pressure; SPSS is acting on more purely strategic motivations: to build an extensible, flexible platform and achieve larger revenues by incrementally penetrating new markets.

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[50]Forbes.com. August, 2001. <http://www.forbes.com/>.

[51]Adapted from Wallace S. Sayre Model from The Brookings Institution and Dr. Steve Chaput.

[52]Wheelwright, Steven C. and Kim B. Clark. Leading Product Development: The Senior Manager's Guide to Creating and Shaping the Enterprise. NY, NY: The Free Press, 1995.

[53]Wheelwright and Clark, Leading Product Development: The Senior Manager's Guide to Creating and Shaping the Enterprise.

[54]Stalk and Stern, Perspectives on Strategy from the Boston Consulting Group; Christensen, The Innovator's Dilemma.

[55]Stalk and Stern, Perspectives on Strategy from the Boston Consulting Group; Christensen, The Innovator's Dilemma.

[56]Stalk and Stern, Perspectives on Strategy from the Boston Consulting Group; Christensen, The Innovator's Dilemma.

[57] Christensen, The Innovator's Dilemma.

[58]The process of "building" software usually refers to the following steps: i) get the source files from the revision control system, ii) compile and link them using the development toolset, iii) move them to a location where they are placed in the right directory structure to mimic the layout of a product kit, and iv) produce the product kit, optionally on physical media like CD-R.

[59]Sonic Foundry data

[60]Sonic Foundry data

[61]Much like John Schwarz's efforts to put Symantec value into appliances, thereby eliminating Microsoft's value appropriation.

Chapter 5: Home Box Office (HBO) Case Study

Overview

Founded in 1972 by New York City cable television entrepreneur Charles Dolan, Home Box Office (HBO) was shortly thereafter sold to TIME Incorporated. Originally established as a singular movie channel, the HBO service today offers many movie channels[62] that reinforce and complement each other. Home Box Office has incontrovertibly proven its dominance of the North American premium television market.[63] HBO has 38 million U.S. subscribers, 16 million international subscribers, and is growing in terms of the number of channels and volumes of high-revenue, highly rated, award-winning original programming it offers each year. By industry metrics, HBO has the highest viewer share rating for both daytime and prime time in North America. HBO (AOL Time Warner) also owns Cinemax®, the second-highest rated channel in this class. Always an adroit chooser of platform technologies to complement its content, HBO became a first-generation "interactive television" provider by launching a video-on-demand service in 2001.

Management

Discussions with Mr. Robert Zitter,[64] AOL Time Warner's Senior Vice President of Technology Operations, who is functionally the CTO of HBO, informed this case study. Mr. Zitter has been with HBO for since 1981, and has a great deal of insight into its past, present, and future.

HBO's functional CEO, Chris Albrecht, has a background in content and programming, and is responsible for the day-to-day management of the firm. The functional Chief Operating Officer, William Nelson, is Mr. Zitter's immediate manager. Mr. Nelson is responsible for technology direction, sales, marketing, and strategy.

Mr. Zitter's role within HBO is to find opportunities to leverage new platform technologies to enter or enhance markets with HBO's content and subscription service complements. He presents the opportunities to Mr. Eric Kessler, head of sales and marketing, and they then determine whether the ideas have traction in either the mainline businesses, or whether they may be appropriate for something new. HBO has historically had a tendency to assess the direction of technology and to identify appropriate nascent technology platforms. It

then executes a business assessment, and determines whether it makes business sense to be an early complement to those platforms.

HBO and Platforms

Decades of early-platform adoption experience that has taught HBO management that if they are the first to adopt a platform and complement it, the first mover advantage will be temporary, but may provide them with a branding advantage that sustains even after others enter. HBO's sustained, consistent leadership in the cable television movie channel space bears out the value of this perspective.

In the pure programming complement space, in which HBO's content serves as a complement to the programming delivery medium (the cable platform or satellite television platform). HBO knows it must evolve programming content and concepts constantly, because other firms copy its approach within a year or two. For example, HBO originated the concept of made-for-broadcast movies, which became a significant complement to the broadcast television platform. The value was fully appropriated by other firms within years, and HBO has abandoned this class of titles as a viable complementary product.

In its efforts to stay ahead of the curve, HBO has embraced many revolutionary platforms, and has been the first (or most significant) complementary vendor. In 1975, HBO was the first television network to use satellites as a platform to distribute complementary programming. The satellite move broke the "triopoly" of the three original broadcast television networks (NBC, ABC, and CBS); it found a way around the proprietary lock-out by that existed prior to 1975. HBO was able to have a national footprint and bring its new channel of programming to the consumer, enabling others to enter the satellite programming complements space and accelerating the competitiveness of the cable TV industry. In the true spirit of Platform Leadership, the new availability of bandwidth due to satellite platform benefited all content complements once HBO had shown the way.[65]

In 1986, HBO was the first to encrypt and scramble its satellite signal, much to the dismay of consumer programming pirates. This allowed HBO to create its own direct broadcast business selling its own programming, a complement, via an encrypted satellite signal, a platform. HBO's intent at that time was not to forestall piracy, although it achieved that effect.

HBO was trying to create competition for the cable operators, which had become a monopoly distributor no better than the broadcast channels.

HBO's encryption play in 1986 became a political issue for these customers relying on C-band[66] satellite dishes for access to programming. Many of these pioneering satellite platform customers had been accessing HBO's content without authorization, had purchased the dishes for just such access. When the signal was encrypted, consumers became outraged that their access to this complementary platform content had been disabled.

HBO felt the cable operators had monopolized its distribution channel, and felt that once it had established encrypted satellite distribution to bypass the cable firms in the new home satellite market, it would then soon face competition from other firms via the satellite market it had enabled by means of this encryption. HBO saw that its single-channel, premium complementary service was going to be overshadowed by these entries. It wanted to undertake a multiple-channel strategy, in which it could effectively provide complements to its own complements, maintaining customer loyalty targeting more specific demographics, such as Action, Romance, Comedy, et cetera.

HBO knew it would need to find a technology that would allow for multiple channels, a video compression of some kind. In 1992, HBO partnered with General Instrument, hardware platform creators, and Bill Schreiber[67] at the MIT Media Lab to apply digital compression technology and attain a 4:1 compression and be able to offer a revolutionary four channels in the same footprint as the original HBO channel, initially at the same price to consumers. HBO, therefore, became the first complementary content product to use the digital broadcast multiplexing platform. This platform change allowed HBO to broadcast its content with different channels, time-shifted, to allow for different viewing time selections. While the initiative was designed solely to stop the erosion of market share, over time it was found to increase viewership and customer loyalty. The scheduling was so extensively time-shifted and overlapping that it was said to be "near video on demand." Today, HBO delivers 16 channels in the footprint of what was once the original HBO analog channel.

The partnership with General Instrument offered more than just compression for its platform, however. The addressable set-top boxes allowed consumers to remotely add or drop services without an installer coming to the home. Pay per view was thus poised as a big next-generation player due to the nascent addressable nature of the boxes. In 2001, after six years of

cooperative R&D with the platform hardware and software creators,[68] HBO chose to deploy the first nationwide subscription video complement product in the "interactive television" video-on-demand (VOD) platform marketplace. HBO realized the VOD model would enable two things that fit with its core philosophy: greater choice and higher quality for the consumers.

Mr. Zitter knows that the commoditization of a popular product often leads to price competition, or even to competitors offering it for free. In 1994, Direct Broadcast channels saw HBO's digital multiplexing as a value-added differentiator; whereas cable TV had 4 HBO channels, the Direct TV platform wanted to offer 7 or 8 HBO complementary channels as a value add differentiator.

HBO's Present and Future

HBO takes a parallel approach to the challenge of the future. It wishes to extend the life of its current technology complements, and to continue its tradition of exploring new technologies that can open new markets and embrace new customers. HBO seeks to create new products with today's core competencies, new complements for current platforms, and/or enhanced complements.

HBO's strategic direction during the past few years has been focused on more original content creation. Its content is the ultimate complement to the platforms HBO inhabits, each strengthening the other. Content revenues were $3B in 2002, up from $2B in 1997. In general, HBO has embraced a strategy to increase its original programming over the last 6 or 7 years, more recently with a focus on series production, as a series' duration is more lucrative and can better leverage a marketing budget than a movie.

HBO is continuing to grow, gaining 1 million new subscribers per year over the past 5 years. HBO has a 27% penetration in cable and DTV households.

Strategic Choices and the Nature of HBO as a Platform Strategy Firm

HBO is a different kind of example of a platform strategy firm. This thesis has examined firms that dominate the development and strategy of a popular platform (Microsoft), that are being negatively affected by the platform decisions of Microsoft and have had to make adjustments (Symantec), that has benefited from the Microsoft platform initiative over the years and has used its own platform strategy as a means of changing direction (Sonic Foundry). HBO

is a firm that is usually a complement creator. In most cases, the complement is content, although HBO has also forged alliances that have driven additional technologies into the platform in order to provide new markets for its complementary content.

HBO has had a powerful influence on the platforms it has graced, and has, to a large extent, determined the fate of these platforms. According to Mr. Zitter, 90% of all people who signed up for cable television between 1980 and 1990 said they did so in order to obtain the HBO service. HBO has been a complement that was the primary reason to buy the platform, and a powerful complement firm that has chosen not to appropriate the value of its platform suppliers, but has actually enriched both the platform vendors and its competitive content creation firms by creating and augmenting these "alternative to NBC, ABC, and CBS" platform media.

Financial Trends

As the finances of HBO are inextricably linked to the finances of AOL Time Warner, the balance sheet summaries of AOL Time Warner will be shown here, but this case will rely on the direct information obtained from Mr. Zitter and reported above, with respect to certain HBO statistics.

Period Ending:	**Dec 31, 2002**	**Dec 31, 2001**	**Dec 31, 2000**
Total Revenue	**$40,961,000,000**	**$37,224,000,000**	**$7,703,000,000**
Cost Of Revenue	$24,315,000,000	$20,591,000,000	$3,874,000,000
Gross Profit	$16,646,000,000	$16,633,000,000	$3,829,000,000
Operating Expenses			
Research And Development	N/A	N/A	N/A
Selling General And Administrative Expenses	$9,916,000,000	$9,079,000,000	$1,902,000,000
Non Recurring	$45,873,000,000	$250,000,000	$10,000,000
Other Operating Expenses	$732,000,000	$7,186,000,000	$100,000,000
Operating Income	($39,875,000,000)	$118,000,000	$1,817,000,000
Total Other Income And Expenses Net	($2,498,000,000)	($3,374,000,000)	$122,000,000
Earnings Before Interest And Taxes	($42,651,000,000)	($3,210,000,000)	$1,939,000,000
Interest Expense	$1,783,000,000	$1,546,000,000	$55,000,000
Income Before Tax	($44,434,000,000)	($4,756,000,000)	$1,884,000,000
Income Tax Expense	$140,000,000	$139,000,000	$732,000,000
Equity Earnings Or Loss Unconsolidated Subsidiary	N/A	N/A	N/A
Minority Interest	($278,000,000)	$46,000,000	N/A
Net Income From Continuing Operations	($44,574,000,000)	($4,895,000,000)	$1,152,000,000

Nonrecurring Events			
Discontinued Operations	$113,000,000	($39,000,000)	N/A
Extraordinary Items	N/A	N/A	N/A
Effect Of Accounting Changes	($54,235,000,000)	N/A	N/A
Other Items	N/A	N/A	N/A
Net Income	**($98,696,000,000)**	**($4,934,000,000)**	**$1,152,000,000**
Preferred Stock And Other Adjustments	N/A	N/A	N/A
Net Income Applicable To Common Shares	**($98,696,000,000)**	**($4,934,000,000)**	**$1,152,000,000**

Figure 9: AOL Time Warner Financials. Source: http://finance.yahoo.com.

Enabling Factors

HBO has a culture and history that encourages innovation and technological risk taking, and a tradition that teaches HBO that it can influence industry platforms to support its complements in new markets, and can, at times, entice the platforms into new markets, making the markets themselves viable.

The different perspective on platform strategies provided by the HBO case provides additional answers to the questions posed at the outset of this thesis.

The following elements comprise HBO's platform strategy:

- The creation of compelling, original content as a platform complement
- The distribution of the content (complements) of others
- The exploration of new technology platforms to enhance current markets
- The exploration of new technology platforms to create new markets and business models

HBO reveals some characteristics of firms that adopt these strategies:

- Firms that are certain of their core competence in the creation of complements, and do not desire to be a part of the platform business.
- Firms that have a track record of success and continued revenue growth in the complement business.

- Firms that have sufficient influence over the platform market to get it to adapt to their complements and target markets as needed.

The following circumstances drive adoption of this strategy:

- Flattening or declining complement sales in an original market.

Success one or more times penetrating new markets and/or adapting to new platforms.

The following outcomes were achieved or are expected:

- Increased market share in existent markets.
- Penetration in new markets.
- Enhancement of the platform businesses of others.
- Enhancement of the complement business of others.
- Enhanced choice of content and delivery method for consumers.
- Disruption of the "big 3" television networks NBC, ABC, and CBS by the Cable TV firms.
- Disruption of the Cable firms by the satellite subscription TV firms.
- Disruption of the satellite TV firms by the video on demand business and the multiplicity of channels now available on cable.
- Potential disruption of the video rental business by HBO's video on demand business.

Over time, this kind of platform strategy:

- Must evolve in order to avoid market flattening and competitive dismantling of the initial lead in the market HBO usually has,
- Must be plugged into the new technology platform pipeline in order to take full advantage of the potential platforms of tomorrow, and
- Must always consider new markets and significant enhancements to old markets.

HBO also provides examples of the various ways the postulates of this thesis can be borne out. In terms of impact on the strategies of other firms, there are links between HBO and the platform strategies of networks, manufacturers and providers, but the link is a causal one in which HBO seems to take the leadership role more often than not. This appears to be an interesting exception

to the other cases, in which content firms (like software firms) have not typically been driving major change for platforms (such as the Microsoft OS) at will.

In terms of the strategy's influence on Return on Investment, the continual reinvention and reinvestment that HBO executes is risky and is costly, but has proven to be necessary. Those costs are also offset by its continued growth of viewer customer base and creation of new markets, combined with its significant leadership effect on the creation and enhancement of platforms by others. HBO's is a case of a sustainable, healthy model that benefits every other firm in the platform ecosystem.

Conclusions

HBO has a powerful platform strategy based on the creation of compelling content (the complement) and partnership with platform creators. HBO has never taken any financial interest in the platform firms, nor does it show a particular allegiance to any one firm or platform. Rather, it moves facilely from platform to platform as needed, bringing wealth and new markets to those who partner with HBO. Research yielded no evidence of any strategic appropriation of value from any platform vendor, or from any firm above or below HBO in its platform ecosystem. This has the earmarks of a sustainable, pure-complement strategy with firm-platform linkages.

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[62] The following channels are owned or partly owned by HBO globally: HBO, HBO2, HBO Signature, HBO Family, HBO Comedy, HBO Zone, HBO Latino, Cinemax, MoreMAX, ActionMAX, ThrillerMAX, WMAX, @MAX, 5StarMAX, OuterMAX, HBO Independent Productions, HBO Downtown Productions, Comedy Central, HBO Asia, HBO Brazil, HBO Czech, HBO Hungary, HBO India, HBO Korea, HBO Ole, HBO Poland, HBO Romania, A&E Mundo, E! Latin America, SET Latin America, WBTV Latin America, Latin America History Channel. AOL Time Warner <http://www.aoltw.com/companies/hbo_index.adp>

[63] AOL Time Warner <http://www.aoltw.com/companies/hbo_index.adp>

[64] Zitter, Robert. Telephone Interviews. January, 2003 and April, 2003.

[65] Gawer and Cusumano, Platform Leadership.

[66] GevekeTeknik. <http://www.geveketeknik.dk/produkter/marineudstyr/sattv.htm>

[67] Alvarez, Salvador, James Chen, David Lecumberri and Chen Pang Yeng. "HDTV: The Engineering History." MIT web site. 12/10/99 <http://web.mit.edu/6.933/www/HDTV.pdf>.

[68] Sources: <http://www.cs.tut.fi/tlt/stuff/vod/VoDOverview/vod.html> and Cole, Arthur. "Video-on-Demand: Fact or Fiction?" Communication Technology (June 1999), reprinted on CableToday.com <http://www.cabletoday.com/ct2/archives/0699/ct0699d.asp>.

Chapter 6: Sonic Foundry Case

Company History

Sonic Foundry was founded in 1991 by Monty R. Schmidt. Incorporated in 1994, it is today a leading provider of professional rich media solutions with revenues of $25M (+/- 1M) over the past three years and a staff of 200 employees (down from 400 two years ago). It has its headquarters and development offices in Madison, WI, and satellite offices Santa Monica, CA, Wexford, PA, and Toronto, Canada. The category "Professional Rich Media" includes products that create, aggregate, manipulate, and edit digital audio (e.g., sound, voice, music), digital video (e.g., movies, web clips, television), and digital media (e.g., CD-R&RW and DVD-R&RW/DVD+R&RW, and even Streaming Media on the wire).

Co-founders Curtis J. Palmer and Monty R. Schmidt entered the digital audio space with significant experience and expertise in low-level Microsoft Windows device driver technologies. Educated at the Oregon Institute of Technology, Mr. Palmer had been at Microsoft in the Multimedia Technologies group, where he worked on Windows operating system support for multimedia applications. Mr. Schmidt, who has a degree in Electrical Engineering from the University of Wisconsin, Madison, had founded the company 1991 as a one-person startup and architected the initial device driver and audio manipulation technologies.

Rimas P. Buinevicius joined Sonic Foundry in 1994 as General Manager and Director of Marketing, and in 1997 became Chairman of the Board and Chief Executive Officer. Mr. Buinevicius is a recognized figure in the rich media industry focused on the convergence of technology, digital media and entertainment. Mr. Buinevicius earned his MBA from the University of Chicago, an MA in Electrical Engineering from the University of Wisconsin, Madison, and a BA in Electrical Engineering from the Illinois Institute of Technology, Chicago.

Product Direction

Sonic Foundry has been a platform-development shop since very early in its history. The founding team formally entered the digital audio space in 1994 with significant experience and expertise in low level Microsoft Windows device driver technology, and built a firm that has led in performance and features and has been able to repeatedly leverage traditional core expertise to enter new spaces and gain market share and a technology thought-leadership position. Even in

those early days, the company chose a modular architecture as a preemptive strategy against a constantly expanding development workload. Modular platform development and architecture work was not immediately accepted by everyone, but in the end, it was widely believed to be worthwhile, as new product variants are usually made by simply configuring product "build" changes, not engineering changes.[69]

Historical Use of the Platform

First generation Sound Forge® products were designed around the SoundBlaster™ card's support for a specific file format, the .wav file recording and playback standard, developed by IBM and Microsoft in the early 1990s.[70] This is a good example of the nested nature of a platform ecosystem. The Intel hardware is a platform. The Microsoft operating system atop the Intel hardware is a platform. The SoundBlaster card, and its Windows driver, is a platform atop both of those, exposing interfaces for audio applications to use. The Windows .wav file recording and playback standard is a platform atop the SoundBlaster card's driver.

The figure below shows the design hierarchy of the Intel/Microsoft Windows sound card complement interface:

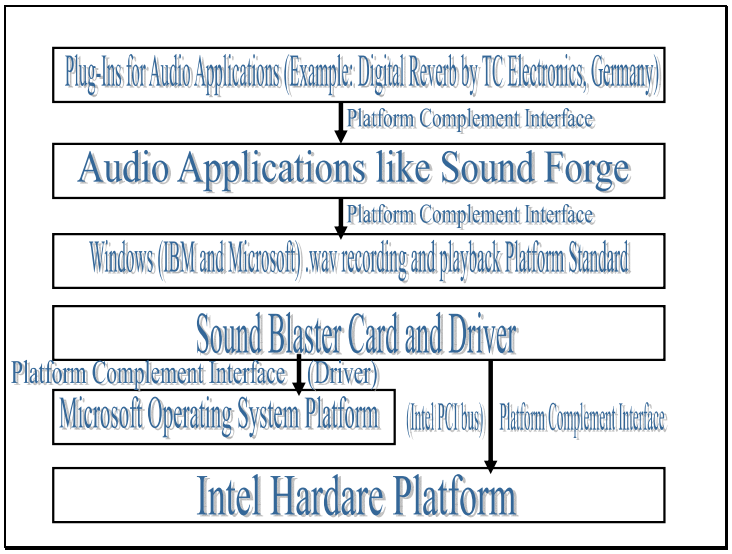

Figure 10: The layered/nested platform-within-a-platform nature of initial Windows Digital Audio ecosystem, circa 1996[71]

Note that the interface layer the sound card technology must "plug into" is a complex one, where the physical complement (the sound card itself) must be aware of and conform to the Intel PCI standard, but the driver for the sound card must be aware of and conform to (via the

Windows driver for the card, written by the Creative, Ltd. SoundBlaster team at their expense). This represents two levels of interface visibility that are required in order for a sound card to operate properly on this platform. This two layer interface, and associated expense supporting the hardware and software effort, usually make the device-complement products a lower margin business than application software products, which typically plug into the operating system interfaces at one level of visibility.[72]

This is a good example of the nested nature of a platform ecosystem. The Intel hardware is a platform. The Microsoft operating system atop the Intel hardware is a platform. The SoundBlaster card, and its Windows driver, is a platform atop both of those, exposing interfaces for audio applications to use. The windows .wav file recording and playback standard is a platform atop the SoundBlaster card's driver. This was of limited utility because it predated any of the more compact file formats, but even at this point Sonic Foundry had developed a technology of some excellence but positioned it in a very limited market. In 1996, the Sound Forge product was feature-adapted to support newcomer Real Networks'[73] streaming platform needs, and evolved into an industrial streaming audio production tool used by all content creators for Real Networks distribution. This co-complementary strategy had the expected benefit of extending Sound Forge's sales far beyond the .wav audio "musician's recording product" vertical niche that it had initially filled.

The company's platform evolved once again in 1996 when the Sonic Foundry team conjectured that serving the needs of the professional-consumer audio editing community and the professional-consumer video editing community made sense from demographic and industry technology use model standpoints. Once again, the company faced performance and capacity hurdles; even with all of Sonic Foundry's expertise applied to the software, systems of the day were incapable of rendering broadcast-quality digital video in real-time on the CPU, and had to use expensive third-party rendering cards in order to be even minimally useful. Sonic Foundry had the right insights as to the coming Digital Video market, but in this case they chose to wait for the hardware to catch up, rather than investing in hardware development to get to market faster.[74]

During the late 1990s, Sonic Foundry optimized its technology and focused on value-added video editing and manipulation feature development. It has taken nearly seven years to make the platform as competitive as it currently is, and consumer systems have only begun to be

able to use such tools reasonably since 2000. During this time, Sonic Foundry executed three complete code rewrites moving toward more common core architecture. This was a refinement of the platform approach they had always embraced, and it provided them with internal efficiencies. The company believes that this rewrite and platform consolidation effort has saved 50% to 70% of development costs, based on measures of increased product complexity and propagation of work across products with less effort. Simultaneously, the firm achieved a 2/3 reduction in development headcount in certain areas.

Sonic Foundry's traction and growth in the audio space, and more recently in the general media technology space, has been accomplished in part through the following chronological progression of audio products and video products, which represent a partial list of Sonic Foundry's historic offerings:

- Sound Forge
- ACID®
- VEGAS®

These products were built, to varying degrees, using platform technologies, and they share and leverage common features and common engineering work. In software firms willing to disclose that data, such cost sharing is known to reduce feature development costs by as many as ten times.[75] Sonic Foundry's own results indicate that it is possible to save as much as two-thirds of engineering expenses after implementing a modularity- and platform-based architecture.

Ongoing Platform Leverage

The company's value was built on the proposition that it could create effective audio-editing applications that could take full advantage of the relatively low-horsepower Intel hardware of the day. The founding team's expertise in low-level driver code and Intel assembly language device driver optimization initially allowed them to create audio-editing applications such as Sound Forge. Sound Forge had been popular initially because it was stable and performed reasonably well; shortly thereafter, its popularity grew with the addition of professional-grade feature, culminating recently with the addition of support for Dolby 5.1 mixing through the Direct X plug-in.

The Microsoft Direct X Standard, a feature of the Microsoft platform initiative, has allowed significant traction for Sonic Foundry's development effort, the realization of complex value-added functionality making features more portable between Sonic Foundry's products, and

even between versions of the Windows operating system. The benefit of this platform-enhancing strategy to Microsoft is discussed in Chapter 9. The benefit to Sonic Foundry is that it allows the sharing of common features between Sonic Foundry products, solidifying its platform-product line.

Similarly, Intel's platform strategy, as documented in Cusumano and Gawer's Platform Leadership, also has direct, positive effect on Sonic Foundry's product development success. In the early 1990s, audio manipulation was a very taxing computational task. Intel 80486 and the first-generation Pentium systems were barely adequate, and the advent of Intel's MMX™ platform strategy helped slightly but was abandoned and then surpassed by the Microsoft Direct X effort. Audio processing with value-added effects was such a challenge that most applications that attempted it were slow and unstable. Sonic Foundry was able to combine its development efforts and Windows device driver expertise with technical system performance optimization insights derived from Intel's technical evangelism, and managed to derive as much computing horsepower as the offered, allowing the Sonic Foundry team to add more features and focus on value-added work. The benefit to Sonic Foundry was leading application performance and the flexibility to add more CPU-intensive features; the benefit to Intel was increased audio application consumption of CPU cycles, prompting consumer upgrades[76] throughout the mid- to late-1990s.

In another example of a third-party firm's platform plans impacting the industry and benefiting a player, the de facto platform standard established by Creative's SoundBlaster PCI card, which plugs into the PCI slot backplane, a complement interface standardized by Intel and described in Cusumano's Platform Leadership,[77] provided a leverage point upon which Sonic Foundry could build. Sonic Foundry was able to add value by coding to the standard and achieving higher performance audio processing capabilities using the power of the card itself when its competition was using more purpose-built custom sound drivers. The founders were driver writers and they felt the market needed tools and applications, and thus Sound Forge was born.

Also note even another platform interaction between firms; the Sound Blaster board has flourished and benefited significantly from Intel's bus and add-in peripheral standards including PCI, USB, and the most recent 1394 Firewire standard. Sonic Foundry was able to leverage

these hardware beneficiary technologies and derive its own unique benefits from them in this way.

Customers and the Platform

In addition to its interdependence with third-parties and their platforms, Sonic Foundry's subscription, feature upgrade, and version upgrade strategies are another means of through which it leverages the platform.

- **Subscription services.** Such services take advantage of Sonic Foundry's platform architecture, such as the service through which a customer buys near-randomly selected offerings from its "Loop Library" collection (a set of titles that sell for approximately $50 each) that plug into the company's ACID product line as instrument samples which may be woven together into original, professionally-produced compositions.
- **Feature upgrades.** By creating variant platform versions of a product at one time, Sonic Foundry allows users who buy a less expensive product to upgrade at a discount to a more feature-rich version of the same product, lowering risk for consumers and a creating a powerful upgrade strategy without incurring additional engineering costs.
- **Version upgrade strategies.** These strategies reflect a combination of development disciplines that yield repeated product revision releases with both bugs fixes and added features, offered on a reasonably predictable and regular schedule, dictated by the sales and marketing channel to match certain strategic sales offerings, or driven by an engineering technology improvement, or a combination of the two.

In all of these strategies, Sonic Foundry uses and refines the customer list to optimize repeat purchases. Customers are solicited by mail and e-mail, and encouraged to pay marginally larger amounts for more function and more frequent updates.

The original development of Sound Forge was driven by customer requirements. The features and direction of Sonic Foundry products were derived from user feedback, and this process has continued to date. The process for gathering customer information and feedback as part of the planning and development phase of a product at Sonic Foundry involves the services

of a 50 person group of alpha testers, a select group of "lead users,"[78] reviewers, and formal written surveys. As a result of its evolution and continual addition of value and utility for the customer, Sound Forge remained a well-respected product throughout the 1990s, and came to be a dominant standard in the audio editor space. Sound Forge has no actual direct competitors in its niche and price range. Its closest competitor is Syntrillium Software's CoolEdit, at $399 with multi-track capability. The base Sound Forge product is $79, and allows fine-grained editing of a single stereo audio track, or more than one stereo track but still only one at any one time, but has no multi-track mix-down capability

In order to meet the needs of its evolving user community, new features must be added, and new products developed and released on a continuous basis. This process of continuous renewal on an 18-month cycle also serves the business interest of the subscription strategy and upgrade strategy that Sonic Foundry has cultivated.

These upgrade and subscription strategies have worked well for Sonic Foundry: its mailing list has 750,000 unique names, of which 59% are high-discretionary-income enthusiasts—not professionals. In this space, consumers of higher-end vertical products, such as VEGAS, have a staggering 50% upgrade rate. Overall, this marketing and sales approach yields a 40% revenue contribution annually, in 2003 estimated to be contribution of $10M of the total $25M projected;[79] these upgrade cycles have a big impact and can spike revenues. Maintaining them and making them more frequent and more predictable and controllable is a priority for Sonic Foundry. As a result, advances in development environments, such as those afforded by Microsoft's .net platform offering, is forcing Sonic Foundry to rethink its development process in an attempt to further increase efficiency and decrease cycle time.

Sonic Foundry Today

Sonic Foundry today has three separate operations: desktop software, services, and systems software.[80] Desktop software operations are managed by Sonic Foundry, Inc., and develop high-end professional and consumer software tools for the creation, editing, and publishing of digital multimedia. Services operations are run through Sonic Foundry Media Services, Inc. and International Image Services Corporation, doing business as Sonic Foundry Media Services. Services operations provide digitization, management and delivery solutions for various industries. Systems software operations are managed from Sonic Foundry Systems Group, doing business as Sonic Foundry Media Systems; they custom-develop automated rich-media applications and scalable solutions that allow industrial and private customers to deploy, manage, and distribute video content on IP-based networks.

Desktop Software

The company's desktop software operation represents the original product line of the company, and includes sophisticated software tools for the creation, editing, and publishing of digital multimedia such as audio and video. Production professionals use Sonic Foundry's Sound Forge, ACID and VEGAS Video tools for music creation and mastering, non-linear digital video editing, and streaming media development.[81] Sonic Foundry has organized its desktop software into three group categories: creation products, editing products, and delivery products.

As mentioned in this paper's literature, both the work of Baldwin and Clark[82] and that of Meyer and Lehnerd[83] describe the strategic power of platforms and modularity. These desktop products demonstrate those powers, sharing a modular platform architecture that allows for low-cost feature parity across a family of products. One example of this is how the widely-adopted audio looping and composing product, ACID, gained a product-genre-altering video preview feature from VEGAS during its second year as a product with minimal engineering investment. This allows ACID customers to write music and score video compositions, opening the market for that tool to a new customer segment and increasing the value for the tool for those who already own it and purchase a low cost upgrade. The products are themselves platforms and have their own complements in the forms of "Direct X Plug-Ins" and "Loops for ACID."

Sonic Foundry's Plug-in and Loop Library products serve as complements to its own platform architecture. The Direct X Plug-ins of other firms also complement Sonic Foundry's

product line, and it is not uncommon for a Sonic Foundry customer to use a plug-in such as the Antares Auto-Tune[84] plug-in with ACID.[85] "Loops for ACID" are a unique and profitable product, with only 15% of the revenue going to the artist, 5% in materials costs, and personnel expenses for no more than two Sonic Foundry employees at a loaded cost of $150K per year to manage the entire process. This product line alone brought in $3M in revenue in 2002 and represented 36% of the $8M total "ACID" related Sonic Foundry revenue for 2002.

Services

Sonic Foundry's service subsidiary provides digitization, management and delivery solutions for industrial customers. Long-term services that have proven themselves profitable are those of duplication, conversion, reformatting and encoding of television, film, and audio content for multiple delivery platforms. Sonic Foundry's earlier products laid a technical foundation that now supports its newer strategic direction toward products such as MediaWorks, a suite of media asset management tools. These tools provide the infrastructure for storage, management, and delivery of digital media content.

Sonic Foundry's traditional fulfillment services enable clients to meet the demands of distributing audio, video, and media content to global markets. This is a somewhat consultative business and does not offer the same volume scope or margins as the high-end software or systems market. Fulfillment includes a detailed, comprehensive assessment of the company's client's original content to determine its readiness for international distribution. Sonic Foundry's digital MediaWorks services include:

- MediaCenter, which provides online access to videotape libraries and orders,
- MediaCollective, a project management tool for internal and vendor/partner use,
- MediaQC, which enables online viewing of technical evaluation reports and impairments, and
- MediaTaxi, a technology for managing, distributing, accessing and storing advertising, sales, marketing and publicity materials.

Systems Software

The company's systems software business represents its future direction and market, and is discussed in some detail later in this chapter. This offering, formerly known as MediaSite,

provides customized development of automated rich-media applications and scalable solutions to customer firms that use the technology to deploy, manage, and distribute video content on IP-based networks.

Strategy Moving Forward

Financials and Corporate Goals

Sonic Foundry's financial performance reflected its growth as the company moved from a start-up to a successful firm in the mid 1990s, hiring a staff and purchasing a headquarters. Revenue began to flatten in the late 1990s, trended to flat in 2000, and then to declining slightly in 2001. Revenue increased slightly in 2002, primarily due to the beginnings of a financial reengineering tied to the company's evolving platform strategy, detailed in the pages ahead. Certainly, some of the financial pain was attributable to the stock market crash of 2000, in which its stock fell from a high of $98.50 per share in March, 2000, to $1 in December, 2000. It is currently holding steady at approximately $0.40 per share.[86] This drop in price was precipitated by the end-of-the-tech-bubble stock market crash in 2000. Despite the economic downturn, Sonic Foundry's expenditures and sales volumes have not been drastically affected overall; they remain relatively flat compared with the huge drop in stock values.[87]

Period Ending:	Sep 30, 2002	Sep 30, 2001	Sep 30, 2000
Total Revenue	**$26,156,000**	**$26,284,000**	**$27,378,000**
Cost Of Revenue	$10,585,000	$12,920,000	$10,670,000
Gross Profit	$15,571,000	$13,364,000	$16,708,000
Operating Expenses			
Research And Development	$7,231,000	$7,986,000	$7,868,000
Selling General And Administrative Expenses	$15,782,000	$21,707,000	$29,875,000
Non Recurring	N/A	$5,973,000	$1,000,000
Other Operating Expenses	N/A	$27,478,000	$14,300,000
Operating Income	($7,442,000)	($49,780,000)	($36,335,000)
Total Other Income And Expenses Net	($536,000)	$435,000	$2,031,000
Earnings Before Interest And Taxes	($7,978,000)	($49,345,000)	($34,304,000)
Interest Expense	$4,015,000	$515,000	$618,000
Income Before Tax	($11,993,000)	($49,860,000)	($34,922,000)
Income Tax Expense	$12,000	N/A	N/A
Equity Earnings Or Loss Unconsolidated Subsidiary	N/A	N/A	N/A
Minority Interest	N/A	N/A	N/A
Net Income From Continuing Operations	($12,005,000)	($49,860,000)	($34,922,000)
Nonrecurring Events			
Discontinued Operations	N/A	N/A	N/A
Extraordinary Items	N/A	N/A	N/A
Effect Of Accounting Changes	($44,732,000)	N/A	N/A
Other Items	N/A	N/A	N/A
Net Income	**($56,737,000)**	**($49,860,000)**	**($34,922,000)**
Preferred Stock And Other Adjustments	N/A	N/A	N/A
Net Income Applicable To Common Shares	**($56,737,000)**	**($49,860,000)**	**($34,922,000)**

Table 2: Sonic Foundry Financials for 2000, 2001, 2002.[88]

It became clear to Sonic Foundry's management team that their focus on the Non-Linear Editing environment was simply not going to yield the orders-of-magnitude growth necessary to sustain the firm. Rimas Buinevicius said,

> "Even being the number one software-based professional NLE product in the world was not going to change our numbers much, and the lower end consumer products were going nowhere."

It became clear to Mr. Buinevicius and his co-founder partners that something had to change. To begin with, moving forward, they felt that it was appropriate to narrow the focus of the desktop business. With an eye toward the future, they have altered the company's strategy to focus solely on the "Pro-Sumer" space.

Sonic Foundry's defines market segmentation[89] according to the following criteria:

Price Range	Category	Definition
$200 and less	"Consumer"	Not technically literate, low-end PC system.
$200-$1000	"Pro-Sumer"	Technical, high end consumer system, Professional features that run on a loaded Home PC system.
$1000 and up	"Professional"	Technical, large budget, discriminating. This customer charges money for their work, so they demand the best tools. In many cases money is no object and they have all or most of the competing media tools in a given domain, using each in specialized ways.

Table 3: Sonic Foundry's Criteria for Market Segmentation.

Sonic Foundry made a conscious decision in the late 1990's to map product variants from a given platform architecture to target specific market segments. For instance VEGAS Video, a $499 product in its top-shelf Pro-Sumer configuration, has a Consumer, stripped-down version called Video Factory that it sells for $79.

Sonic Foundry's modularity and platform architecture makes the cost of producing several consumer variants of a Pro-Sumer product relatively inexpensive, but Sonic Foundry is finding these consumer products do not help significantly in the total revenue picture and may be distracting from the lucrative middle end Pro-Sumer segment. For example, lower-end products

such as Factory may, in fact, be eroding the higher-end VEGAS sales, since the $79 product has most of the useful features of the upscale variant. There is apparently little upside potential in the consumer space, and so consumer products will be abandoned moving forward. Professional systems often require specialized hardware, such as multiple, expensive add-in cards or an entire dedicated system-box chassis, and are a smaller niche. The Professional space will also continue to be strategically de-emphasized moving forward, as the revenue available—and, more importantly, attainable against significant entrenched competition, such as Avid—is not sufficiently large to maintain focus on these products.

Strategic Choices

A lesson that can be gleaned from Sonic Foundry's experience may be that although platforms can make a product line flexible enough to inexpensively create variants, that may not always be the best strategic choice, and that a focused offering may be better for revenue and profit than a broader one.

Platform architecture has made Sonic Foundry's business itself modular, in that the company can adjust the breadth of its desktop product line with little impact to overall design or labor costs. This has allowed the company to modify its course as needed, first in 1996 with changes for compatibility with Real Networks, and then in 2003 in reducing the breadth of product on which to focus, and again in 2003 by allowing itself to package its desktop software division for sale. In April, 2003, Sonic Foundry publicly confirmed that it had received and was considering additional inquiries and terms sheets related to the sale of certain company assets, including the Desktop Products assets.

This proposed sale of parts of the company which had been the foundations of the product family since inception is a bold move by a management team that is very motivated to regain ground in climbing the revenue curve to attain great growth of potential revenues over the current mid-$20M range. Their motivation to make such a radical change is that the available NLE-oriented Desktop business and its associated product space is finite, known, and too small. Even with the company's newly applied focus on the Pro-Sumer segment and the abandonment of the Consumer space, Desktop is simply not a business worth pursuing for a firm that wishes to grow its revenues by 10X.

The process of gaining focus has made the desktop business a simpler thing to sell, as well. Any such sale of the business would necessarily have to leave Sonic Foundry with as much of its core audio and video technology as it needs for its ongoing services, and, more importantly, systems businesses. Sonic Foundry is pursuing its MediaSite business as a strategic next-step, and sees it as having the kind of revenue potential that the company is targeting.

Enabling Factors

MediaSite Live is a comprehensive solution that combines hardware, software and server technology in one integrated system that allows customers to readily capture, stream, deliver, and archive synchronized audio, video and other multimedia presentation collateral without expensive media production equipment and with greater flexibility, convenience, and speed than competitive products.

Learning from its own history, Sonic Foundry has decided not to wait for the hardware to catch up with its software, but has instead invested in the development of specialized hardware upon which they can run software technologies derived from Sonic Foundry's own, well-known, prior core competencies in audio and video manipulation, compression, and streaming. To this, they are adding a knowledge management layer that allows for intelligent access to each item of importance to the user, providing real additional value. The hardware approach also adds scalability in the present.

MediaSite Publisher is a product for creating accessible and searchable rich-media presentations by using meta-tagging tools to identify and extract audio, video, and other textural cues. The Company's system products are typically sold direct or through system integrators, and the Live product is incorporated within a third-party PC. The production of Sonic Foundry's system software products is generally limited to CD duplication and loading onto the third-party hardware, which it does internally.

The move to MediaSite is a concept not dissimilar to that from a few years ago that "content is king." In this case, however, management of content is the value proposition; the ease of delivery of a web browser, the accuracy and ease of navigation of a good search engine like Google, and the richness of the kind of media content Sonic Foundry knows how to manipulate and deliver. The application of this technology is broad: it can be applied to industrial and

educational contexts, and may perhaps become the underpinnings for a future information and communication infrastructure for consumers.

Note that in yet another example of third-party platform strategies impinging on Sonic Foundry's strategy, Intel is again evangelizing the CPU utilization-maximization of next-generation streaming media products. Intel is, in fact, funding work in this space to ensure that high-utilization products are in the pipeline and that they will be shipping in the near future. Intel needs high-cycle consumption applications like the one Sonic Foundry proposes to deliver in order to drive people to Intel system faster than the current 3Ghz Systems.

Conclusions

As has been mentioned at various points in this thesis, platform strategies have different value to different firms. They do not always guarantee success, but they can position a firm to recover more quickly from problems, and are almost always layers in a larger, meta-platform ecology. This ecology does not affect all third-party platform strategies equally. As can be seen in the Symantec case, Microsoft's platform strategy can sometimes undercut a third-party's strategy and remove or appropriate that firm's value. In the case of Sonic Foundry, Microsoft's and Intel's platform strategies benefited it and yielded opportunities for the creation of value.

What is clear and apparently consistent, based on current research and findings, is that platforms allow firms to evolve and adapt to their markets, to adjust their businesses or sell them a module at a time. Platforms do not always guarantee the right decisions or strategies, but they are almost always cost-effective, flexible, and, eventually, of value to the consumer of the product as well as the producer.

Sonic Foundry's case provides some answers to the strategic questions posed in the beginning of this thesis.

The elements that comprise Sonic Foundry's platform strategy include:

- Core competency in efficient media processing and manipulation code, packaged in a modular technical architecture
- A performance and function advantage at the driver level encapsulated in this architecture for re-use

- Use and efficient re-use of this core technology in a range of products, services and systems targeted at different markets
- A common user interface that is itself modular and can be used across product families
- Compatibility, awareness, and involvement in the platform architectures of others, ranging from Microsoft and Intel to Creative and other audio/video hardware firms

Sonic Foundry's experience shows the following types of companies adopt platform strategies:

- Companies that are small and just starting up as Sonic Foundry was in 1994.
- Companies trying to fill a market niche by becoming a complementary sub-platform to a major platform like the Microsoft/Intel platform of the PC market.

The circumstances that drove Sonic Foundry's adoption of a platform strategy include:

- Sonic Foundry was quite small in 1994 and needed to take advantage of the leverage that being a complement to the platforms of others provided.
- Sonic Foundry produced its own first generation platform technology in the mid 1990s, so to manage the workload of producing multiple products and multiple generations of products
- Current circumstances require Sonic Foundry to change target markets and focus its efforts, proving that a platform strategy is a solid option regardless of motivators.

Based on Sonic Foundry's experience, the following outcomes have been observed and can be expected:

- A platform strategy may lower costs over time; it did so for every company researched.
- Platforms will evolve and change, driven by the changes in other third-party platforms that make up the meta-platform ecosystem in which this platform resides.
- The evangelism and growth efforts of Microsoft and Intel provided a fertile ground for Sonic Foundry both yesterday and today. The underlying Operating System and Hardware platform's Moore's-law-fueled performance growth, combined with

interface platform enhancements like Direct X in the Operating System, gave Sonic Foundry the perfect environment to use its core expertise, and that stable-yet-evolving sub-platform allowed them to architect a modular platform of its own that could rise with the performance tide and create new markets.

Sonic Foundry exhibits the following evolution of such a strategy over time:

- It evolves because the environment around it is evolving; Sonic Foundry was quite motivated to keep pace with the Direct X interface addition and the other multimedia and driver performance enhancements offered by the Operating System and the underlying hardware.
- It evolves because a plateau is reached. Sonic Foundry hit a revenue plateau at around $25M per year, and much of that plateau was the flat desktop software space. The NLE market is limited.

The Sonic Foundry experience bears out the postulates of this thesis in the following ways. In terms of the influence of other players' strategies impacting Sonic Foundry's, it is clear that Microsoft's overwhelming presence and its dominance of a critical platform resource yielded a fertile environment for Sonic Foundry products. Sonic Foundry's products also took advantage of the Sound Blaster platform standard to provide new digital recording capabilities to consumers and to mid-level pro-sumer buyers. Finally, Sonic Foundry's platforms have themselves hosted a variety of complementary plug-in products whose presence adds considerable value to the entire system for the user.

In terms of the impact of platform strategies on a company's ROI, staffing efficiencies enabled by an investment in modularity and a useful platform architecture yielded good internal returns on engineering investment for Sonic Foundry, even during the recent downturn. This internal cost efficiency prevails despite the loss of value to investors in external markets. Also, Microsoft's platform support, combined with Intel platform subsidies, and pre-defined interface and media standards, have all provided a good working environment that has helped to lower expenses and offset development costs. While third-party platform strategy decisions can have a negative influence on a firm's ROI, the Sonic Foundry case illustrates a preponderance of positive platform effects.

The final postulate of this thesis is that, beyond ROI and profit fluctuations, company survival may depend on these strategic choices. Sonic Foundry has been carrying debt and losing much of its value in the assessment of public investors over the past three years. It must recover dramatically from its relatively flat earnings numbers in order to survive and return to the kinds of profits investors and the market demand.

Sonic Foundry has executed a platform strategy from its inception, and it has managed to be nimble and change directions while maintaining its core platform momentum. Sonic Foundry's experience is evidence that platform development works, even when other mistakes are made. **The platform architecture makes it possible for Sonic Foundry to withdraw from its unprofitable niche, to harvest some cash from selling off those niche products, and maintain its core platform technical momentum.**

It is very likely that had the stock market crash of 2000 not affected them so deeply, Sonic Foundry would not be in a position that forces it to sell off its desktop business in order to tackle the streaming media market. However, its current need is for the cash that the sale will provide in order to fund the reengineering of the firm for the next generation of streaming products. Divestiture of such major assets is not an easy proposition; those assets are metaphorical legacies as well as technical. However, the fact that its legacy products and core technology can be so easily partitioned and sold is evidence that a platform strategy creates flexibility for a company that faces circumstances beyond its control. After stalling at a long-term revenue plateau of around $25M that does not seem to have a further upside, Sonic Foundry is building a strategy to pursue a market with exponentially higher revenue potential.

Addendum

After the writing of this case, but before publication of this thesis, the following news became public.[90] The author has integrated it into the conclusions section as a proof point of execution along the stated Sonic Foundry platform plan.

> "Sony Pictures Digital has moved to enhance its Screenblast broadband entertainment venture by **acquiring the desktop software assets of Sonic Foundry** Inc., the company that helped develop core software for Screenblast. The companies valued the deal, announced Friday, at $18 million in cash plus the assumption of certain liabilities. Madison, Wis.-based **Sonic Foundry plans to remain in business as a media services and Internet presentation solutions company** after selling to Sony its audio and video software, including ACID, Sound Forge and VEGAS. Some of that software technology was integrated into Screenblast, initially an online community for filmmaking enthusiasts that later made its software tools available at retail. About 70 of Sonic Foundry's 190 employees are expected to be affected, though Sony said it expects to maintain the group in its home base of Madison. **Sony also plans to continue supporting the Sonic Foundry applications**."

This news event serves as a validation of the details presented in this case, including:

- Sonic Foundry intended to sell the desktop division and was able to do so without entangling its future work on the same core technology because of the modularity inherent in its platform system.
- Sony and Microsoft were both given an opportunity to buy the desktop division and either would have been an appropriate purchaser.
- The desktop tools survive, and will be maintained by Sony moving forward.
- Sonic Foundry is now free to pursue its disruptive change and deliver on its commitment to "remain in business as a media services and Internet presentation solutions company."[91]

This represents the exact outcome Mr. Buinevicius predicted and wanted.

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[69] The term "build" in the context of a software development organization typically refers to the act of initiating or running a script that executes on a system, extracting the product source files from source control, ensuring these are the right versions of the files, compiling and linking them using software development tools, and creating the final product executable. The function of that executable is determined by what components were included in the "build" and what parameters were set during the build.

[70]"Multimedia Programming Interface and Data Specifications 1.0, Resource Interchange File Format, Waveform Audio File Format (WAVE)," IBM Corporation and Microsoft Corporation. August, 1991. and "Multimedia Standards Update New Multimedia Data Types and Data Techniques." Microsoft. April 15, 1994, Revision: 3.0.

[71]Baldwin and Clark, Design Rules: 76, fig. 3.5.

[72]Baldwin and Clark, Design Rules: 76, fig. 3.5.

[73]Real.com. <www.real.com>

[74]Buinevicius, Rimas P. Personal Interview. Madison, WI, March 2003.
This would turn out to be one of Mr. Buinevicius' biggest regrets seven years later, although he simultaneously acknowledges that developing the horsepower in special purpose hardware at that time would have been perhaps too expensive for Sonic Foundry, and the product would have been quite expensive for the consumer, well outside his price range. The author's personal estimate is it would have been a $50,000 workstation product like the Avid systems of the same era.

[75]Information gathered in confidential discussion under NDA with another of the firms interviewed by Richard LeVine in Q1, 2003 in the preparation of this thesis, and by Richard LeVine's personal technical knowledge and observation of the Sonic Foundry product set.

[76]Gawer and Cusumano, Platform Leadership.

[77]Gawer and Cusumano, Platform Leadership.

[78]von Hippel, Eric. "Lead Users: A Source of Novel Product Concepts," Management Science 32, no. 7 (July 1986):791-805, and von Hippel, Eric. The Sources of Innovation. NY, NY: Oxford University Press, 1987.

[79]Buinevicius, Rimas P. Personal Interview. Protected under NDA.

[80]The corporate organizational structure data in the foregoing paragraphs was derived from multiple hours of case interview discussions with Rimas Buinevicius, Sonic Foundry CEO and Chairman. It was augmented with specific data found in the Sonic Foundry annual report, and on the Hoovers and Yahoo Finance websites.

[81]Windows Media format, Real Media Format, AVI format, MPEG 1 and 2 format, MJPG format

[82]Baldwin and Clark, Design Rules.

[83]Meyer, Marc H. and Lehnerd, Alvin P., The Power of Product Platforms: Building value and cost leadership. NY, NY: The Free Press, 1997.

[84]AntaresTech.com. <http://www.antarestech.com/>

[85]Note that the complementary function plug-in costs more than the platform product itself, in this case.

[86]Source: http://table.finance.yahoo.com/d?a=0&b=23&c=1997&d=3&e=26&f=2003&g=m&s=sofo

[87]In 2002 it was necessary for Sonic Foundry to reduce staff and overall Sales, General and Administrative expenses in order to eliminate a loss of profit and show some growth.

[88]Source: http://biz.yahoo.com/fin/l/s/sofo_ai.html

[89]Buinevicius, Rimas P. Personal Interview. Protected under NDA..

[90]Source: http://www.hollywoodreporter.com/hollywoodreporter/business/brief_display.jsp?vnu_content_id=1880530

[91]Source: http://www.hollywoodreporter.com/hollywoodreporter/business/brief_display.jsp?vnu_content_id=1880530

Chapter 7: Hewlett Packard Case Study

The Company[92]

Hewlett-Packard Company (HP) is a leading creator of technology solutions and services for consumers and for businesses. HP has a significant presence in nearly every country, and its products exist in every niche and genre. Products include IT infrastructure products, personal computing systems, remote access devices, consulting and enterprise services, and, of course, HP's industry-leading imaging and printing product line. HP has four global business segments:

- **Imaging and Printing.** Home and business imaging and printing devices, digital imaging and publishing systems, printing supplies, and consulting services.
- **Personal Systems Group.** Commercial PCs, consumer PCs, workstations, handheld computing devices, digital entertainment systems, calculators and accessories, software and services.
- **Enterprise Systems Group.** Business-critical servers, industry-standard servers, storage and software solutions; HP Services provides an integrated portfolio of IT services.
- **HP Financial Services.** Product and service solutions for financial services.

This case study focuses on the platform strategy of HP's Imaging and Printing business.[93]

The Imaging and Printing Segment

HP's imaging and printing products and devices include color and monochrome printers, all-in-one laser and inkjet devices, personal color copiers and faxes, wide-format printers, and large-format/large-volume digital presses. Digital imaging/publishing products and systems include scanners and digital photography products. Supplies, a lucrative annuity business in the printer space in general, has been raised to high art by HP, and today includes include laser and inkjet printer cartridges and other related printing media for nearly every printer they have made in the past twenty years. Additionally, enterprise-oriented consulting services are provided to customers to optimize the use of printing and imaging assets.

Competitors

Competitors include: Lexmark™ International Group Inc., Xerox® Corporation, Seiko Epson Corporation, Sony Corporation of America, and Canon USA, Inc.

The Printing Market

HP made its true entry into the printer market in the 1980s with inkjet and laser printers for use with the personal computer. While other firms were focusing on large, high margin, shared printers for the corporate workgroup, HP's delivered low-cost, high-quality inkjet printers that displaced virtually all competitors, both high-end, shared laser-printers (such as Digital Equipment Corporation's $45,000 PrintServer 40™ product[94]) and low-end, low-cost products like the popular dot-matrix printers of the late 1970s and early 1980s.

Launched in 1984, the HP LaserJet printer line went on to become HP's most successful single product line ever. During the 1980s, HP's printing products become synonymous with low-cost and high-quality, and were a household word. At the end of the 1980's, HP's revenue was nearly $12B, and it had 95,000 employees and a revenue-per-employee figure of $125K. HP continued to improve printer penetration through the 1990s, and introduced lower-cost, higher-quality thermal inkjet and personal laser printer technologies. It also continued to grow as a supplier of computing devices and increased the company's position as a major global player in the printing space.

HP had been an OEM of Adobe's PostScript language, a complement to the printer platform. As the HP printer market share grew, the company achieved such high volumes that its royalty payments to Adobe exceeded $40M per year. HP decided to stem this outflow of cash and bought Xionics, a company that competed with Adobe, for $20M in 1995. This allowed HP to reduce costs, and did not result in any customer satisfaction issues.

Because of this and other streamlining measures across the firm, HP was able to create a new class of sub-$100 commodity printers, "throw-away" products that were cheaper to replace than to repair, and an ink-cartridge and print head supply business that became the dominant industry model. At the close of the 1990s, the company had achieved yearly revenue of $42 B with only 84,400 employees, or revenue per employee number of almost $500K, a dramatic improvement over the prior decade.

Today, HP has acquired industry giant Compaq, which had acquired industry giant Digital Equipment Corporation in the mid 1990s. HP is focusing on new ventures and markets, penetrating the telecommunications, manufacturing and financial services industries. The HP value proposition of high-tech, low-cost, and the best total customer experience continues.

Financial Information

Since its founding in the 1950s, HP has consistently grown and increased its revenues. They thrived during the boom of the 1990s and became leaner, as mentioned above, while other firms were getting fat on staffing. The company has always maintained a focus on revenue and growth. The following financial figures from the past three years give a concise snapshot of the firm's internal state:

Period Ending:	**Oct 31, 2002**	**Oct 31, 2001**	**Oct 31, 2000**
Total Revenue	**$56,588,000,000**	**$45,226,000,000**	**$48,782,000,000**
Cost Of Revenue	$41,579,000,000	$33,474,000,000	$34,864,000,000
Gross Profit	$15,009,000,000	$11,752,000,000	$13,918,000,000
Operating Expenses			
Research And Development	$3,312,000,000	$2,670,000,000	$2,646,000,000
Selling General And Administrative Expenses	$9,033,000,000	$7,259,000,000	$7,383,000,000
Non Recurring	$3,274,000,000	$384,000,000	N/A
Other Operating Expenses	$402,000,000	N/A	N/A
Operating Income	($1,012,000,000)	$1,439,000,000	$3,889,000,000
Total Other Income And Expenses Net	($40,000,000)	($737,000,000)	$993,000,000
Earnings Before Interest And Taxes	($1,052,000,000)	$702,000,000	$4,882,000,000
Interest Expense	N/A	N/A	$257,000,000
Income Before Tax	($1,052,000,000)	$702,000,000	$4,625,000,000
Income Tax Expense	($129,000,000)	$78,000,000	$1,064,000,000
Equity Earnings Or Loss Unconsolidated Subsidiary	N/A	N/A	N/A
Minority Interest	N/A	N/A	N/A
Net Income From Continuing Operations	($923,000,000)	$624,000,000	$3,561,000,000

Nonrecurring Events			
Discontinued Operations	N/A	N/A	$136,000,000
Extraordinary Items	$20,000,000	$56,000,000	N/A
Effect Of Accounting Changes	N/A	($272,000,000)	N/A
Other Items	N/A	N/A	N/A
Net Income	**($903,000,000)**	**$408,000,000**	**$3,697,000,000**
Preferred Stock And Other Adjustments	N/A	N/A	N/A

Figure 11: Financial Revenue related data from http://finance.yahoo.com/

The numbers in Figure 2 reflect HP's good performance relative to its industry and sector for the past three years:

Valuation Ratios	Company	Industry	Sector	S&P 500
P/E Ratio (TTM)	NM	34.04	34.32	23.15
P/E High - Last 5 Yrs.	69.53	67.01	65.86	49.78
P/E Low - Last 5 Yrs.	16.68	16.41	19.07	16.37
Beta	1.59	1.57	1.91	1.00
Price to Sales (TTM)	0.73	1.46	4.59	3.14
Price to Book (MRQ)	1.39	2.59	4.64	4.39
Price to Tangible Book (MRQ)	3.06	4.04	5.83	7.26
Price to Cash Flow (TTM)	25.50	25.67	27.19	17.93
Price to Free Cash Flow (TTM)	31.12	31.13	24.66	28.55

Figure 12: Financial Profit/Earnings data from http://finance.yahoo.com/

Current HP Management

Carleton S. "Carly" Fiorina is the chairman and chief executive officer of HP. Her stated drive is to further accelerate HP's growth strategy by staying abreast of the changing technologies. Her commitment is to increase shareowner and current customer value. Neither of these goals diverges from the HP management tradition of growth and excellence. Ms. Fiorina was a strong leadership proponent of the HP merger with Compaq, and she drove it through the

board despite resistance from the heirs of both Mr. Hewlett and Mr. Packard and many members of the HP management team.

Prior to joining Hewlett Packard, Ms. Fiorina had been with AT&T, and then was a member of the senior leadership team at Lucent Technologies. At Lucent, Ms. Fiorina grew global revenue and drove the Lucent initial public offering. Ms. Fiorina's education includes a BA in Philosophy from Stanford University; an MBA from the University of Maryland; and a master of science degree from MIT's Sloan School's Sloan Fellows program.

On Platform Strategy

HP Research Overview

Hewlett Packard is a deliberate platform strategy organization. Marvin Keshner is the Director, Printing Systems and Solutions for IPG CTO Office, reporting directly to Frank Cloutier, the CTO for HP's Imaging and Printing Group. Mr. Keshner joined Hewlett Packard Laboratories in 1979. He holds an SB, SM, and PhD in Electrical Engineering and Computer Science—all from M.I.T. His areas of focus were: solid state physics, communications theory, medical electronics and analog circuit design. Mr. Keshner knows that HP is an organization that is successful that must still change in grow its successful. He has the responsibility for making HP's newer, "system-oriented" businesses even more successful.

His chosen strategy has to embrace Digital Photography, Commercial Publishing, and the Digital Press industry. HP is, in his words, an organization in transition from being a device organization to a system organization. HP has been around since before there were computers, and they have watched the progression of complexity, function, and value as it has unfolded in the PC space.

Example 1: The Thinnest Possible Layer Wins

In the early days of the PC, all product effort was focused on the lowest-level functions of the devices. Developers and customers accepted a lot of constraints in trying to extract the greatest performance from these devices. They were hard to install, difficult to troubleshoot, and the user had to deal with many system issues while setting them up and using them. Thus, it was many years before the system was mature enough for Microsoft to prioritize the creation of "nice to have" functionality, such as Windows and Plug and Play. Once the system had been

somewhat optimized for individual device performance, the development team could spare resource to tackle the complex functions of device recognition and automatic driver installation, marking the beginning of Microsoft's shift to a system view rather than a device view.

Mr. Keshner emphasizes that Hewlett-Packard's management team is concerned that the company's potential size and influence may inadvertently create a stranglehold on the Platform Ecosystem, killing external innovation and causing HP's internal rate of innovation to decrease. HP is strongly opposed to adopting the Microsoft-like strategy of controlling the platform to such an extent that it appropriates too much value from others.

Rather than controlling the entire platform ecosystem, Mr. Keshner clarifies, a well-managed firm would create the thinnest layer of connectivity and interface possible between the platform and the complement, with the least complexity. He cites an example of a new product that illustrates this new platform direction: the new HP photo printer directly accepts memory card formats from a range of cameras, regardless of manufacturer, and then prints a sheet of thumbnails automatically. The user selects desired prints on the thumbnail sheet, marking them with a pen or pencil, and feeds the thumbnail sheet back into the printer. The printer scans the sheet and prints the desired photos. There is no device compatibility, user interface issues, or partnership issues; the only interface layer is the interface to the memory card formats and standard file formats. The thinnest possible interface drives the solution.

This elegant and positive concept of pure functional simplicity is the opposite of Microsoft's behavioral concept of value appropriation and ever-growing layer complexity in the operating system. The simplicity and "thin layer" concept has a low development cost, and recognizes the lesson of the huge scale of complexity that today's product-systems can imply in a real world environment: nobody should do it all. Rather than defining complex layers for complements and using "interoperability" as a total control point over a platform ecosystem, HP wants to simply assist the interoperability process by being the point at which everyone in the ecosystem profits. This is good business sense and good engineering sense.

Example 2: The Platform Ecosystem of the Digital Press Industry

The Digital Press industry is vital to Marketing Communication (Marcom) organizations. The usage model has been evolving; customers might design a campaign that is a combination of various media, print, TV, and brochures. They all play together in time and to a target market

and demographic. The classic approach to the brochure requirements of such a campaign would have been to print 20,000 brochures and ship them to a Marcom stockroom at the customer site. The printing process would likely have been an offset press process, a technology far older than the computer industry itself. This would involve the handling and shipping of hundreds or thousands of pounds of printed paper, and there was often waste. The goals of such marketing efforts are different today: campaigns must be more specific, more targeted. Messages and printed matter are personalized to a person, or to a target market sub-segment.

The industry is creating a new system that changes the printing part of this value chain. The traditional, creative Marcom function focused on the message and making it "catchy" remains. From there, though, the process changes and requires the power of a CRM platform,[95] where a message can be made specific to the customer. The document is created in a customized and automated fashion from a template or family of templates; the text might change based on the content or the customer, and the physical layout might also change based on the variable content. Mr. Keshner provides the following example: "You are a current customer with a 3 year old Ford, and the CRM database knows it, so it shows you a new Ford."

Bi-complementary Platforms

Such an example offers to perspectives on a platform. For the printing firm, the CRM database is a complement to the HP printing platform. For the CRM vendor, the HP printing platform is, similarly, a complement to the CRM database. They're both right, and they both profit, as does the customer.

There is more to this than a printing platform, however. Like many of the other cases included in this thesis, HP is building out and emphasizing its Enterprise consulting function as a part of these platform/complement strategies. HP consulting does the detailed integration between a CRM database and the HP system. There are not standard interfaces that solve this problem, and HP does not want to establish them and force them on the market. HP is very careful not to subsume functions by developing too-restrictive, HP-beneficial interfaces in other systems. Mr. Keshner is very clear, saying "We won't do that. Microsoft does that whenever they can, but ultimately it damages the platform. The HP way is to create the thinnest possible, minimal, interfaces to enable the value added rather than restricting it."

That is not to imply that HP is in favor of a policy against the establishment of platform interfaces that add value for all the parties. There may be a push to standardize the highest level interface later in the evolution across the CRM databases, and HP will support that if it makes sense for all parties and adds value equally. For example, HP might define a publishing-system-to-Oracle-database-interface that supports the command "get me these relational forms."

A term that may best describe such a scenario is "bi-complementary," a case in which each platform owner is an equal partner and benefit equally. In the traditional platform leadership model, as posited by Annabel Gawer and Michael Cusumano,[96] Intel was the platform owner and created a symbiotic environment. It was symbiotic, but was quite asymmetrical, since Intel (and Microsoft) held all the power. Mr. Keshner likens that asymmetry to "a master-slave relationship," though he is also quick to point out that it is not solely a Microsoft and Intel strategy to dominate in this way. Other standards are sometimes created by small groups where one party has asymmetric power. HP has decided not to do this, as they believe that it is bad for business and represents poor value for the platform's customers in the long term.

HP has a model for creating such standards fairly. In the proposed HP peer-to-peer model, standards creation can be, in some sense, democratic. For example, if HP, SAP, and Oracle design an interface for CRM-based digital publishing, the licensing model might be free, or reasonable and nondiscriminatory. In any event, it probably cannot be restrictive, or people would fail to adopt or would clone the technology. The larger standards body would be composed of many companies, like Agfa and Adobe and others. Each of these peers can participate in the decision process, and can decide on the interfaces that affect them.

This poses a question, though, as to what control process stops the process from becoming a democratic churn in which decisions cannot get made in business time? One solution is to limit the size of each subgroup to three players to keep them lean and fast-moving. The three participants are chosen according to their domain expertise and closeness to the solution. Each player may see itself as the central player in their own web.

As shown in the diagram below, the Marcom brochure printing process is an example of a situation in which two platform creator firms each look at the other as a complement. This is very much an example of the type of symmetric platform complement relationship that typifies the HP strategy toward platforms.

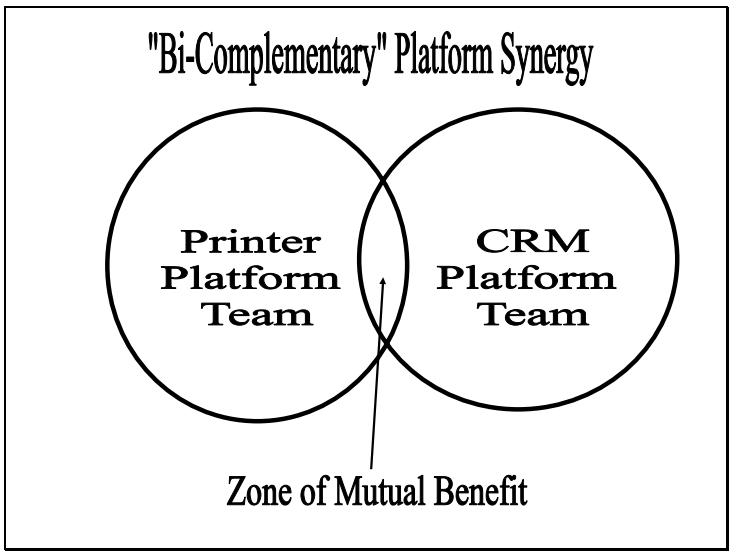

Figure 13: Bi-Complementary interaction between two firms

Influence vs. Control.

In this model, a company earns its customers by adding value, and if the company has enough value, it will have the customers and revenue and have Influence. Influence is, therefore, a volatile attribute tied proportionately to the value a company adds. Of course, a disadvantage of this approach is that no one participant has control. An advantage is that each company has the freedom to innovate quickly, because it has less investment in controlling the other parties. This approach espoused by HP leads to lean, manageable development of the platforms, because of the thin layers involved. HP's biggest worry is whether any such relationship can remain symmetric and stable; such that some player does not get so big that it becomes dominant. Mr. Keshner theorizes that perhaps the overlap shown in the Zone of Mutual Benefit can be sufficient motivation to all participants not to unbalance the relationship.

By contrast, Microsoft's involvement in the Trusted Computing Platform Alliance, or TCPA, which will be discussed in the Microsoft case, has resulted in a current design freeze on the next generation operating system, "Longhorn," even though that operating system is actually due to ship in 3 years. The complexity of the system and of the platform complement interfaces has caused Microsoft to freeze it now in order to be able to meet schedule. That much complexity hinders value to the platform ecosystem and ultimately throttles creativity and value.

The CD Story

The history of CD and DVD standards illustrates the two extremes of platform domination.

When Sony and Phillips collaborated to invent the Compact Disc standard, they were 5 to 10 years ahead of the industry. They owned all of the IP, and wrote the specification books. They evangelized the standard, and invited people to make players. They knew that they could not do it all themselves. They own the format, and they are the center of that ecosystem.

Twenty-five years later, the market is demanding an extension to the DVD format for HDTV. However, nobody in that platform ecosystem is as far ahead or has the power that Sony and Philips had 25 years ago. That may explain why there is currently no clear, writeable DVD standard and the competitive variants of DVD-R and DVD+R exist.

It is clear, then, that neither extreme is ultimately desirable; an extreme where a dominant player dictates the terms of cooperation, and the extreme where nobody can come to agreement are both destructive to the product's value.

Brief Lessons about Memory Stick

Sony's Memory Stick card is an example of another sub-optimal way to do this kind of platform creation. Sony, as a dominant player, defined the entire standard and asked for no industry input. Now, in trying to get people to adopt the memory stick complement standard, Sony has insisted on royalty rates that potential partners have universally found to be excessive. In addition, Sony has insisted upon maintaining total control of the standard. This lack of symmetry provides little incentive to cooperate or to adopt the standard, and as a result it has not been adopted by any non-Sony products to-date.

Industry analysts concur[97]:

> "Though blaming Memory Stick's less impressive sales figures on global economic woes appears to make sense, Yankee Group senior analyst Mike Goodman told NewsFactor Network that Sony's real problem is the product itself.[98]"

> “The major drawback for Sony's Memory Stick, said Goodman, is that consumers have demonstrated their preference for cross-platform products and, as a result, often shy away from anything with proprietary limitations. [99]”

> “Goodman went on to say that Sony is finding itself in a Catch 22 position. Though consumers seem more than willing to embrace the Memory Stick as a cross-platform device, Sony's competitors in both the technological and content sectors are against helping the company to strengthen its position. [100]”

Although no other firms had adopted the Memory stick format, in 2001 HP attempted to negotiate with Sony to include this format among the supported memory card formats, but Sony refused to moderate their control stance, according to HP’s Mr. Keshner. As a result, HP’s photo printer (as described above) does not accept the Memory Stick card format. Mr. Keshner relates that Sony refused to provide HP with any incentive in terms of margin reduction or other cost incentives, and negotiations broke down. According to Mr. Keshner, the lesson of Memory Stick is that if a firm has too much advantage, and there are other options, complement and platform creators will choose something else.

King for a Day

When asked, "What would you do if you had all the power and could define any platform you wished? What would be an ideal structure and power balance?," Mr. Keshner responded that he would:

- Create a platform.
- Make sure it is open enough to have a rate of innovation high enough to meet customer needs.
- Open all interfaces (for example, support all memory card formats).
- Provide interfaces for all complementary products to gain access to the core value.
- Create the value chain.
- Maintain the symmetric balance among players and jointly harvest the wealth.

Conclusions

HP's approach to platform development is idealistic and favors long-term value for the consumer and for the entire platform-complement ecosystem, rather than harvesting maximum gain for one player and making the system unstable in the long run.

As a platform creator, HP has experienced long-term success and has given attention to carefully maintaining its platform ecosystem. If one reviews HP's history in the printer space, for instance, there is no evidence of the company waiting until a complement provider or other partner had attained sufficient market size and subsuming that value.[101]

HP's case provides yet another set of insights to help this thesis answer questions posed at the outset.

The following elements comprise Hewlett-Packard's platform strategy:

- A conscious effort to attain a symmetric balance and find partners whose approach is similar
- A focus on small groups, triumvirates, that can move quickly and make decisions in business time
- An approach that breeds bi-complementary relationships and platform ecosystems
- Open standards

- Aversion to Microsoft-style tactics of dominance and control

HP reflects that the following kinds of companies can adopt symmetric strategies:

- Large firms that can afford a measured approach
- Firms with sufficient history to understand the benefits of symmetric balance
- Firms with products that fit the model of bi-complementary symmetry.

The following circumstances have driven adoption:

- A process of continual innovation and platform development
- A focus on a specific market and specific platform synergy partners
- A culture of innovation and fairness, where value for the customer is more important than pure corporate gain at the expense of the customer and the platform ecosystem

The following outcomes can be/were expected/achieved:

- This strategy should lead to the development of a mutually beneficial system consisting of the platforms of multiple firms.
- There should be profit for all participants.
- There should be considerable value for customers.
- Development tasks related to the platform interface should be small and simple, inexpensive, and not lengthy.
- Multiple complements should attach to the interfaces, they must be open, and there should be no exclusive interface deals or proprietary lockouts.

Over time, this strategy should:

- Be sustainable.
- Be profitable.
- Encourage the creation of other similar symmetric relationships.

HP also provides proof of the postulates.

In terms of impact on other members of the ecosystem, HP wish to have the smallest possible impact on other firms' platforms, and to have other firms' platforms have the smallest

possible impact on them. HP's strategy should be neutral to the strategies of other firms; even those that wish to add value by forming synergistic partnerships of platforms and complements will find they have little if any change to make to their own strategies in order to comply.

In terms of this strategy's impact on ROI, the HP strategy is a low overhead, low expense strategy. It can result in profits for all participants; as illustrated in the photo printer example above, everyone can win, especially the consumer.

Summary:

HP has an attitude unique among those firms studied in this thesis, and especially unique to such a powerful firm, an attitude that speaks of cooperation and symmetric partnership, trending toward long term stability and mutual gain for all participants. This does not mean that HP will not at times act aggressively (as it did in the Adobe PostScript decision) in order to protect its business interests, but it does imply HP has an inherent culture that discourages it from appropriating the value of a partner in its platform ecosystem for incremental gain. This has the potential to create long term stability in a given platform ecosystem.

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[92]Much of the firm's timeline and historic data was discovered using the simple links available at http://www.hp.com/ and http://www.hp.com/hpinfo/abouthp/histnfacts/

[93]This focus is primarily because each segment within HP follows its own strategic compass and it is wise to focus on one aspect of such a large entity. Further, the author of this thesis has over ten years experience in the digital imaging and printing space and knows HP well. And finally and most importantly, the primary HP research conduit for this thesis was through Mr. Marvin Keshner, Vice President of Strategy for Imaging and Printing reporting to the HP Chief Technologist's office.

[94]The author was an architect of this product for Digital Equipment Corporation. While a fine product, it could not compete with individual printers for a few hundred or a few thousand dollars each.

[95]Perhaps the Printing Platform requires the power of the CRM complement; this case makes clear that one person's platform is from a different viewpoint sometimes another person's complement.

[96]Gawer, and Cusumano, Platform Leadership.

[97] http://www.newsfactor.com/perl/story/8250.html#story-start "Sony Blames Economy for Memory Stick Shortfall"

[98] http://www.newsfactor.com/perl/story/8250.html#story-start "Sony Blames Economy for Memory Stick Shortfall"

[99] http://www.newsfactor.com/perl/story/8250.html#story-start "Sony Blames Economy for Memory Stick Shortfall"

[100] http://www.newsfactor.com/perl/story/8250.html#story-start "Sony Blames Economy for Memory Stick Shortfall"

[101]The Adobe story notwithstanding, as that is more an illustration of Adobe's stubborn refusal to lower their royalty rates and challenging a surefooted HP.

Chapter 8: Symantec Case Study

Symantec has a collection of products, many of which were originally designed as complements to the Microsoft Windows platform. By the assumptions defined in this thesis, a firm that chooses only to invest in complements to another's platform may be said to have a platform strategy, or to be participating in one. Symantec, however, is migrating those complements away from total Microsoft platform dependence and Microsoft consumer product purchase dependence in a number of ways, including creating its own underlying appliance hardware platform into which much of the standard Microsoft complement offerings (Anti-Virus, for instance) can be plugged after being modified to run on the new platform.[102] Symantec provides security software for content and networks, using software and appliance hardware. Symantec's appliance products provide routing and security solutions for consumers and industry. Symantec creates technology that performs server security, network gateway, and network client functions. It offers customers protection from viruses and network intruders. It offers firewall, remote management technologies, virtual private network, vulnerability, content, security services, and e-mail filtering. Symantec's scope today is global.

Company History

Symantec was the result of the 1984 acquisition by C&E Software of the Symantec Corporation. The combined business assumed the Symantec name.[103] The mission of the new company was to create and sell software tools, and to manage an entrepreneurial software publishing business, carving out a niche role in the market and avoiding the peril of direct competition with software giants Microsoft and Lotus. In 1985, Symantec released Q&A, a database and word processing package for the popular IBM personal computers. Symantec then addressed the publishing needs of smaller, entrepreneurial software houses and formed Turner Hall Publishing (THP), a Symantec division that publishes third-party software. In October 1985, Turner Hall introduced Note-I, a notation utility for Lotus 1-2-3, to much success.

Growth through Acquisition

Symantec's origin as the product of an acquisition foreshadowed a mode of operation that would serve it well as it looked to grow moving forward. In 1987, Symantec acquired three software companies: Breakthrough Software, Living Videotext, and THINK Technologies.

These acquisitions enabled the development of products like "Time Line,"[104] "Think Tank,"[105] "MORE,"[106] "Grandview,"[107] "THINK C,"[108] "THINK Pascal,"[109] and "InBox,"[110] used by many of the first-generation personal computer users. Symantec executed an initial public offering on June 23, 1989, and became publicly traded on the NASDAQ as SYMC.

Symantec extended its capabilities again in 1990, when it merged with Peter Norton Computing, Inc., the company that created "The Norton Utilities," a market leader in security and anti-virus technologies. This acquisition carried Symantec into the security and anti-virus space, which would prove to be among the firm's core strategic competencies moving forward.

Symantec had realized that it could complement its internal development programs through acquisition. Such tactics resulted in faster access to resources, products, and markets.[111] The table below lists the firms that Symantec acquired through such processes after 1989:[112]

Acquired Firm	Category	Date	Amount
Peter Norton Computing	Software Utilities	1990	$64M
Dynamic Microprocessor	Software Utilities	1991	$22M
Leonard Development	Productivity Applications	1991	$5M
Zortech Ltd.	Development Tools	1991	$14M
Certus International	Software Utilities	1992	$4M
MultiScope, Inc.	Development Tools	1992	$4M
Symantec (UK), Ltd.	Software Utilities	1992	$25M
Whitewater Group, Inc.	Development Tools	1992	$1M
Contact Software	Productivity Applications	1993	$42M
NetDistributor Pro	Software Utilities	1993	$0.8M
Fifth Generation Systems	Software Utilities	1993	$54M
Rapid Enterprises, Inc.	Development Tools	1993	$7.7M
Central Point Software	Software Utilities	1994	$57M
Intec Systems Corporation	Productivity Applications	1994	$1.8M
SLR Systems, Inc.	Development Tools	1994	$2.7M
Delrina Corporation	Communication Utilities	1996	$383M

Table 4. Acquisitions by Symantec, 1990-1996.[113]

Symantec continued to be acquisitive throughout the 1990s, often making multiple acquisitions in a given year. The company aggressively marketed these acquired products, many of them under the Norton name, as complements to the PC platform throughout the 1990s, and in late 1997 gained significant traction with utilities such as Norton CrashGuard, a complementary product that prevented systems from corrupting during the somewhat frequent crashes in the first

releases of Windows 95. Such success is one of many examples of an operating system's insufficiencies providing opportunities for complementary product providers to add value to a platform.

Symantec was able to again capture and then begin providing such additional value with its purchase of Binary Research Ltd. in June, 1998. With Binary Research came Ghost, the popular and respected program that provides fast and reliable system backups, even for large and complex configurations. Even before the acquisition, Ghost had been widely used in the IT community, to such an extent that the word "Ghost" had become a verb, with "to ghost a system" used frequently to mean to "safely back it up or to restore it from backup." Ghost was a powerful complement to the operating system platform in that it gave users total confidence in recovery from installation and upgrade problems, encouraging people to upgrade more frequently. It was also a complement to the Intel-compatible hardware, as a "Ghosted" system could be mass-restored on tens or hundreds of other systems. This ability to "mass-clone" vast numbers of systems and remote control the process on a network was a complement to and enabler of increased hardware platform sales to corporations for company-wide system deployments, and for system manufacturers who use this technology in the computer manufacture process to restore the standard system image on the shipping system.

In March 1999, Symantec acquired competitive rival Quarterdeck ($65M). It also focused more on new versions of Norton AntiVirus co-developed and co-marketed with IBM. The anti-virus engine at the heart of Norton AntiVirus had become a required operating system complement found on the majority of PC system platforms, and was itself a platform with its necessary complements, the updated virus recognition files. There became opportunities for complementary subscription services and subscriptions combined with site licenses for corporations. The corporate market had become quite attractive for Symantec, and there was much fear of virus activity in the corporate community in 1999.

Symantec Adds Enterprise Oriented Top Management

Symantec founder Gordon Eubanks left the company in April, 1999, and was replaced as CEO by John Thompson. Symantec's value has increased 500% under Mr. Thompson's leadership, and the product line has seen very high levels of penetration. Mr. Thompson has served as Chairman of the Board of Directors and Chief Executive Officer since April 1999 and

as President from April, 1999 to January, 2002. Mr. Thompson joined Symantec after 28 years at IBM Corporation. He holds an undergraduate degree in Business Administration from Florida A&M University and an SM in Management Science from MIT's Sloan School of Management.

In 2002, John Schwarz joined the management team as President and Chief Operating Officer. He has overseen Symantec's product development, incident response, sales, support, professional services and partner relationships. Before this position at Symantec, Mr. Schwarz served as President and CEO of Reciprocal Inc., which provided business-to-business secure e-commerce services. Before joining Reciprocal, Mr. Schwarz spent 25 years at IBM Corporation. Mr. Schwarz has a degree in Business Administration from the University of Toronto and a degree in Computer Science from the University of Manitoba.

Symantec Top Management Participation in This Thesis Research

Mr. Schwarz granted interview time as thesis research for this case, and much of his thoughts on competitive strategy and the realities of the market they serve with its platforms and platform-complements are represented in the strategic discussion in the following sections.

Symantec Today

Today's Symantec Corporation provides content security and network security software and appliance solutions. It is a provider of gateway, server security solutions and client technologies for virus protection, software and hardware firewall and virtual private network products, intrusion detection, e-mail filtering, vulnerability management tools, remote management technologies, Internet content, and security services. Symantec views its business in five operating segments: Enterprise Security, Enterprise Administration, Consumer Products, Services, and Other.

Symantec understands sales and sales logistics, and has a strong presence in the retail channel. It has long-term relationships with top-tier distributors and outlet firms. Symantec's large direct sales force expanded marketing efforts and cemented alliances with resellers and integrators that have large corporate or government account access. In accordance with Mr. Thompson's strategic emphasis on a corporate market dominance position for Symantec, the company has completed more than 6,000 corporate site licenses to date worldwide.

Symantec's gross revenue for the past four years has been on a significant upswing and was not halted by the stock market crash of 2000. During 2003, the nearly 5000-employee Symantec brought in $1.41 Billion in revenue. The table below shows the three year financial history from 200 through 2002:

Period Ending:	Mar 31, 2002	Mar 30, 2001	Mar 31, 2000
Total Revenue	**$1,071,438,000**	**$853,554,000**	**$745,725,000**
Cost Of Revenue	$194,610,000	$123,860,000	$121,073,000
Gross Profit	$876,828,000	$729,694,000	$624,652,000
Operating Expenses			
Research And Development	$163,979,000	$148,973,000	$112,725,000
Selling General And Administrative Expenses	$482,375,000	$394,705,000	$348,905,000
Non Recurring	$23,483,000	$3,664,000	$9,018,000
Other Operating Expenses	$198,950,000	$72,752,000	$18,801,000
Operating Income	$8,041,000	$109,600,000	$135,203,000
Total Other Income And Expenses Net	$46,626,000	$31,180,000	$122,110,000
Earnings Before Interest And Taxes	$54,667,000	$140,780,000	$257,313,000
Interest Expense	$9,169,000	N/A	$22,000
Income Before Tax	$45,498,000	$140,780,000	$257,291,000
Income Tax Expense	$73,649,000	$76,844,000	$87,143,000
Equity Earnings Or Loss Unconsolidated Subsidiary	N/A	N/A	N/A
Minority Interest	N/A	N/A	N/A
Net Income From Continuing Operations	($28,151,000)	$63,936,000	$170,148,000
Nonrecurring Events			
Discontinued Operations	N/A	N/A	N/A
Extraordinary Items	N/A	N/A	N/A
Effect Of Accounting Changes	N/A	N/A	N/A
Other Items	N/A	N/A	N/A
Net Income	**($28,151,000)**	**$63,936,000**	**$170,148,000**
Preferred Stock And Other Adjustments	N/A	N/A	N/A
Net Income Applicable To Common Shares	**($28,151,000)**	**$63,936,000**	**$170,148,000**

Table 5: Symantec's financial information from 2000 to 2002.[114]

Note Symantec's significant, increasing yearly expenses under "Other Operating Expenses" and "Nonrecurring," and its increasing and significant R&D expenditure, related to its strategic acquisitions and retooling as an appliance and enterprise focused firm.

Moving Forward, an Enterprise Focus

Symantec understands that it has to plan for change in response to the changing operating system market. As discussed later in this thesis, as that market changes and Microsoft continues to appropriate much of the value created by complement providers like Symantec, there may be no further complementary access to the system for products like Norton's Virus Detection "engine." That levels the playing field to some degree, posing the question: can the redesigned playing field—where Norton creates only the AntiVirus pattern files and anyone can start a business that competes—provide the same kind of return on investment that Symantec's investors have come to expect?

Today, Symantec is successfully leveraging revenue from the Norton family of consumer security software to help fuel its future enterprise products and services strategy. The company has put increasing revenue goal emphasis on professional services, such as security assessment, corporate consulting, and security management outsourcing services.

Product Direction

The company's value was initially built on the proposition that it could deliver high quality applications and software development tools to the consumers of Personal Computing platforms. Over time, this evolved to a system utilities and security offering for consumers. A natural progression of enterprise users buying these consumer tools drew Symantec into the enterprise, a position that evolved to a lucrative enterprise-focused offering built around site licensing and subscription services for every Personal Computer "seat" in the enterprise. Consumers remain important, of course, as they now purchase products derived from the module's enterprise platforms.

Meanwhile, other strategic decisions have been made that impact product direction. In 2001, Symantec divested itself of its web access management product line, after having divested the venerable Visual Café and ACT! product lines at the end of 1999. These product lines had comprised much of Symantec's revenue stream prior to their disposition. These divestitures were

made in order to help Symantec focus its efforts and resources on the Internet security business and other future-looking markets. The company has been reaching for higher and more sustainable markets, and has gone "down" the ecosystem to the firmware level, incorporating its traditional value in the silicon in Symantec-branded network appliance devices. It is also heading "up" the ecosystem to a position of security consulting and customized enterprise services.

Symantec's recent product direction includes: Appliance Security, Intrusion Detection, Enterprise Products, Consumer Products, Subscription Services for Security Platform Complements, and Enterprise Oriented Security Services.[115]

- **Appliance Security.** Enhanced appliances that combine many of Symantec's value added core technologies in a hardware appliance format that is sufficiently safe from Microsoft's strategy of value assimilation at this time. This product, Symantec Gateway Security, is a firewall, anti-virus, Internet content filtering, intrusion detection and VPN appliance.[116] It competes directly with the offerings of Netgear, Cisco, and the dominant low-end player, LinkSys,[117] distancing Symantec from being a complement to the ever-expanding Microsoft Operating System and moving it toward being a necessary security complement in the broadband-enabled corporate and consumer worlds. Note that while Microsoft may not appropriate this new market itself, it is appropriable by the network-endpoint platform interests of the broadband providers, and their network hardware competitors.
- **Intrusion Detection.** Symantec's Intrusion Detection products include IntruderAlert[118] and NetProwler.[119] Its Vulnerability Management products include Enterprise Security Manager[120] and NetRecon.[121]
- **Enterprise Products.** Symantec's Enterprise segment offers products descended from the tools that made up the consumer desktop product family. These enterprise bundles can optimize management tasks in its customers' IT departments[122] today.

Product	Capability
pcAnywhere	Fast and flexible point-to-point remote computing via Internet, serial, local area network, integrated service digital network, digital subscriber line, cable modems and infrared.
Ghost	A tool for personal computer deployment, recovery, cloning and migration. Ghost reduces expense in a centralized IT context by streamlining software configurations.

Table 6: Two of Symantec's most popular products, both acquired along with their parent firms during the mid 1990's. These products were popular before the acquisition, and Symantec retained the original product names, as they did for the entire Norton line of products as well.

- **Consumer Products.** Symantec's Consumer Products migrate these corporate security and system platform complement functions down-market to consumer-level customers. The organizational direction of this segment is to keep consumers and their information secure.
- **Subscription Services for Security Platform Complements.** Complementary component subscription services may protect market share and generate a long-term revenue stream. Such services are highly profitable for the company, and they provide an ancillary service of keeping the customer list constantly refreshed. With the automated subscription service, "LiveUpdate," in both the enterprise and consumer spaces, customers of all segments leverage the creation of the rule-based virus and intrusion detection pattern files. This subscription-based feature creates a dependence upon updates, and drives repeated subscription to content updates. The venerable Norton AntiVirus continues to be a major component of the market positioning of Symantec. It scans and cleans the system in the background while the user works and when the system is idle. For "Live Update" subscribers, virus definitions are automatically refreshed and downloaded.
- **Enterprise Oriented Security Services.** Symantec offers a wide array of services to complement the security oriented product platform. These include consulting that incorporates Symantec's technology expertise, security expertise, and worldwide resources. Additional Symantec Consulting Services perform comprehensive security assessments and strategic secure planning.

Strategic Choices

John Schwarz, President and COO of Symantec Corporation, is both worried and optimistic about the future. He and his boss, John Thompson, are veterans of IBM and came to Symantec with the mission of moving it from a $1B company to a $10B company. Both know that growing the revenue beyond $1B will put Symantec squarely on Microsoft's radar, and the firm has already had some of its value appropriated by Microsoft in the Windows Utilities space. Called "The Johns" by their executive team, the two have complementary responsibilities for their shared mission: John Thompson takes the longer view of an Enterprise-focused strategy, while John Schwarz must deliver on the vision through internal re-engineering, strategic planning, and a solid acquisition strategy.

John Schwarz inherited a platform portfolio too closely coupled as a complement with Microsoft's Windows, and even more so with the underlying Intel platform. It was clear that such a position would result in the underlying Microsoft and Intel platforms' appropriation and consumption of much of Symantec's traditional value over time. A good example of such cannibalization of Symantec's utilities and security space has been the sublimation of utilities such as the Disk Defragmenting tools that were once good revenue products; that product has now long been a "free feature" of the operating system. Similarly, there was a real market need for products like Norton CrashGuard when an operating system (Windows 95 and 98, for instance) would crash once a day under load; current Windows XP systems stay running for days or weeks without crashing, eliminating the CrashGuard market by default. The revenue lost by Symantec when this cannibalization occurs is not necessarily captured in entirety by Microsoft, but that may be acceptable to Microsoft.

Note that such appropriation has a price: Microsoft assumes responsibility for the function appropriated and, thus, incurs cost. Over time, continued appropriation could result in changes to Microsoft's ROI model that negatively affect it. These forces are discussed in further detail in the Microsoft case, Chapter 9.

Gravity

Mr. Schwarz speaks of a "Force of Gravity" within the technology platform ecosystem, one in which value sublimates to the level beneath the level at which it is created.

Mr. Schwarz is referring to a cycle of change that has been occurring throughout the industry. Even in the Graphic Arts space, far from Symantec's products, seemingly benign applications like Adobe's popular Photoshop application regularly cannibalize the feature value of their plug-in vendors, and, over time, negatively alter the plug-in vendor's ROI. In the case of Photoshop, the third-party plug-in Eye Candy[123] was devalued when a version of Photoshop shipped with the same function, obviating the plug-in as well as the Alien Skin business model.

As shown in Figure 14 (below), a time exists when a plug-in has a symbiotic relationship with the application platform.

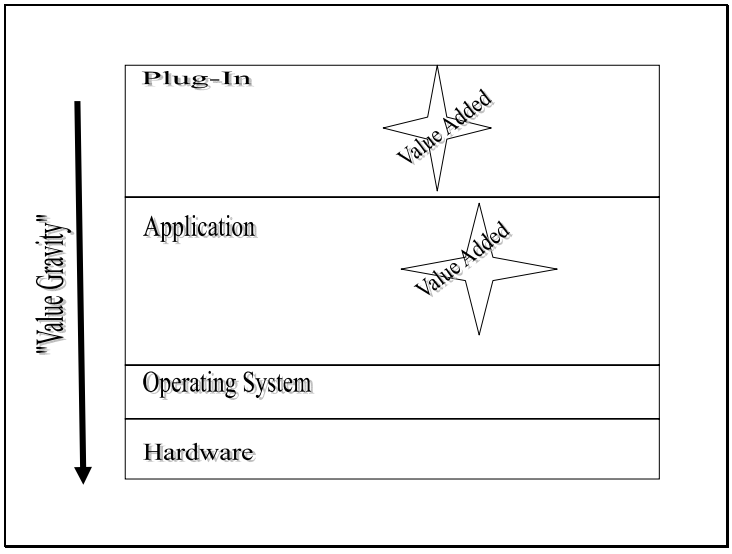

Figure 14: Value Created in Application Layer and in Complement Layer above Applications

However, Figure 15 (below) illustrates how that can change as the application subsumes the value:

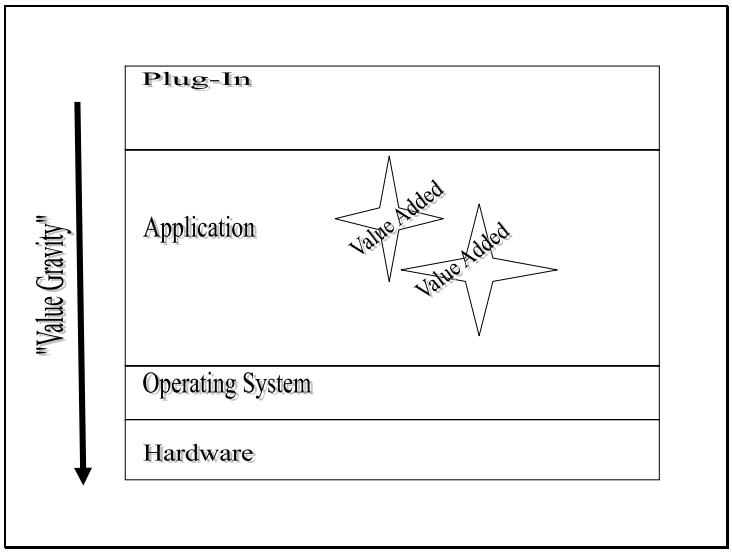

Figure 15: Application Platform Subsumes Value above It

In this case, the application platform has subsumed more of the value of the plug-in and has gotten "fatter;" the plug-in complement layer gets correspondingly thinner. The expansion of the application level implies a higher cost of development work in the application platform; as it subsumes the value, it also assumes the responsibility for the work. If price of the application platform remains constant or does not change much, the assumption of the work can result in a worsening ROI over time. Although the platform is getting more value, it is also getting "fat" and there is a price to be paid. It is assumed that a wider stratum in the diagram indicates a larger value opportunity and a larger development cost for the product, perhaps yielding more work on a longer timeline. The implications of this will be discussed later in this case, and in the Microsoft case, as an overaggressive platform strategy may put the firm in danger of expending unplanned effort to its meet commitments, and/or creating delays of the product, and/or disappointing customers by over-reaching and under-delivering.

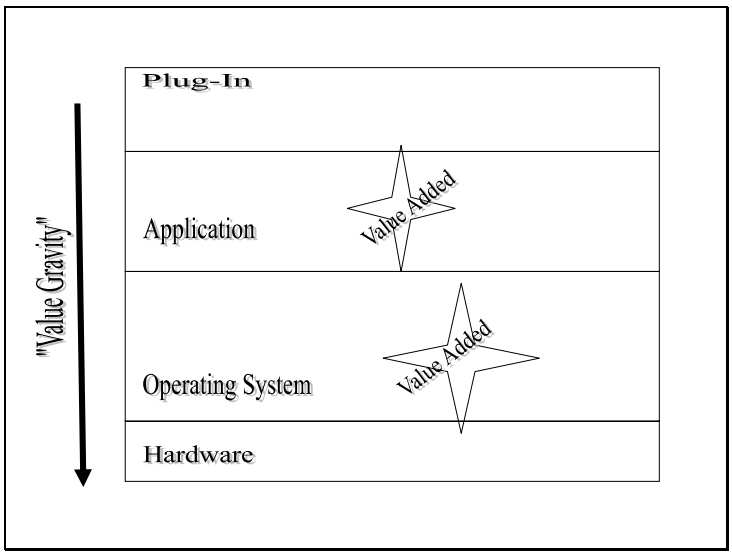

Figure 16: The Operating System subsumes value formerly owned by the application layer. Examples include disk defragmentation utilities, in the past, and anti-virus engines in the future (2005-2006) with Windows Longhorn and Palladium releases.

This concept of Gravity implies a constant sedimentation of ideas and value shifting to lower and lower layers of the meta-architecture. In a layered platform view, this means value shifts to lower-level infrastructure platforms.

Thus, software value follows the law of gravity, sinking lower and lower in the stack until much of it finally ends up as commodity hardware, in the silicon. As the software gets more generalized and better understood, it gets pushed into the firmware in the engineering stack. The ultimate limits of this settling is that some layers need to be changed more often than one would prefer to change firmware, however even that can be addressed as the bottom layer of hardware and firmware become populated with faster and faster flash memory components that can be automatically and ubiquitously upgraded.

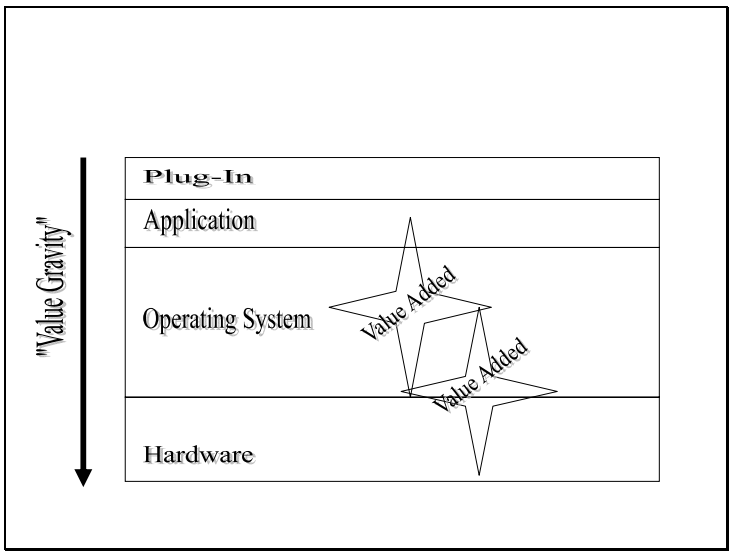

Figure 17: Hardware/Firmware and Operating System platforms have captured all the value previously in the upper platforms. It is now necessary to innovate at the application and plug-in platform/complement levels in order to survive.

Mr. Schwarz believes that the best way to battle this constant erosion is to continue to move up the value stack, closer to the end user, innovating new concepts and adjusting to platform changes rather than just accepting the entropy and deterioration of value as preordained. This requires continued innovation, and, over time, new ideas and value concepts may get harder to find and be more expensive to produce. The ROI for the very thin layer may then also be skewed negatively through this process.

Impact of Longhorn

Symantec, under Thompson's and Schwarz's leadership, knows that the migration of value from one platform generation to the next carries the risk of forcing the firm to execute strategic abandonment of certain markets. One such potential example is the Microsoft operating release of Longhorn, scheduled for late 2004 or early 2005. Initially scheduled to be a minor upgrade to Windows XP, Longhorn became a much larger release when Microsoft decided to make it a "major" upgrade, including a new security architecture called Palladium. Palladium is believed to include security and utility functions that directly overlap or compete with Symantec's catalogue, such as the purported anti-virus engine included "free" with the operating system release that will offer interfaces for anyone to provide anti-virus data files.

If you view Symantec's current anti-virus offering to be a platform (the engine) and its other offerings complements (the rules files that are sold by subscription), then the inclusion of Palladium will mean that Symantec could no longer sell the engine platform, but will still be able to sell the complements to that platform. This may not be an entirely negative interim outcome, as Symantec will also no longer be responsible for the maintenance of the engine and can focus on the value-added detection data files and associated high-margin subscription complement strategies focusing on enterprise and consumer customers.

In contrast, Microsoft's platform direction in the Longhorn release poses more risk to its complement-creators. By locking down the lower-level access to the chipset in Palladium, it is very possible that only Microsoft-certified code will be able to execute at Ring 0 and have full access to system resources. This restriction was supposed to be in place with the release of Windows XP, but the traditional methods of accessing the hardware and attaining Ring 0, the highest level of driver privilege, continue to work under XP and are still employed by many companies. Microsoft considers them "hacks," but they are the foundation for many firms' lowest-level architectures.

Longhorn's release may antiquate the practice of writing assembly language that runs below the operating system and touches the Intel and Intel-bus-connected hardware directly without using Microsoft's interfaces as the intermediary. Thus, entire industries that create complementary development tools for the Wintel platform, such as the debugger business or the emulator/virtual PC business, may vanish or be seriously damaged. If this occurs, it could raise the attention of the anti-trust watchdogs."[124]

Palladium, Microsoft's security effort, may in fact meet its goal and provide secure media and content for a time, if only because the development tools a hacker would need to crack it do not run under it. This sea-change will be of significant platform interest, as some entity will have to make system debugger tools and in-circuit emulators (ICEs) that work in order for the platform to be developed. But in a model where the lowest level code, and all the intermediate value is added by Microsoft in conjunction with Intel, only Microsoft might need such tools. That could obviate the utilities and tools of Symantec and of many other vendors, either by making it more expensive to develop the products, and/or by making certain kinds of code impossible to write without Microsoft's explicit permission and involvement.

Symantec faces at least two issues in the near- and mid-term future. First, Microsoft and Intel may begin to subsume and include in the price of their platforms value-added functions that have always been Symantec's core competencies, eliminating much of Symantec's market. Second, certain coding techniques related to low-level, hardware specific access and low-level operating system architectural function are likely to be made illegal in Longhorn, requiring an encrypted privileged authentication transaction between the CPU and the Operating System that a third party application will not be privy to. Vetted device driver engineering methods will simply no longer work; the system will refuse to run them.

These two challenges are the high priorities for Symantec's enhanced focus on the Enterprise. To meet the first challenge, Symantec has retained its core competency focus on security software and device drive oriented code that performs such functions, exactly as it did for years on the consumer side. Offered at the Enterprise level, this is a business model that may retain customers even when the value of the anti-virus engine vanishes, as this thesis assumes it does, in 2005. Such a model preserves the most profitable component, the subscription service, and leverages consumer loyalty, which is stronger at the enterprise level than at the consumer level. Focusing on the enterprise to build loyalty and volume in the time between now and Longhorn's release is a solid strategy for Symantec.

Another component of Symantec's approach to the future is its move into the appliance business. Symantec has, as discussed earlier, combined its core technologies in a hardware appliance that may be safe from Microsoft's value assimilation strategy. The move follows Mr. Schwarz's concept of value "migrating to silicon," and does so in way in which Symantec is able to capture all the value of the firmware and bypass Microsoft and Intel in the evolutionary value chain.

An appliance may present an inherent security proposition that could forestall Microsoft absorbing this space with its consumer and workstation operating system's feature-adds. Firmware may be considered reliable, of course, but it may also be incorruptible in ways that a PC running Windows cannot be. A security appliance is an unlikely target for external subversion, as there is little to modify. By moving this code to firmware, Symantec bypasses Microsoft's role in the gravity-evolution, shortcutting the functional path through the operating system and retaining the revenues. Regardless of form factor, these appliances can capture value at a commodity hardware level below the operating system and avoid sublimation by Microsoft.

That said, Symantec continues to face plenty of competition from other good firms in the appliance space.

Enabling Factors

One factor that enables Symantec to adapt and grow is its management's attitude about "gravity." In Microsoft Secrets, Cusumano and Selby called this "blurring."[125] Many other academics and business strategists call it "appropriation of value."[126] Symantec's awareness of those forces will help Symantec maintain a role in the value chain and to capture the value of its technology investment. The Enterprise strategy delays the impact of the operating system layer absorption of some of its traditional value; the appliance strategy allows Symantec to migrate its value to silicon and bypass Microsoft's value-capture strategy entirely, potentially with positive effects for the long-term.

Symantec is well-positioned to execute on these strategies; its technology and domain expertise is unquestionable; its cash reserves and earnings projections are favorable, and the company continues to have a "buy" rating in all of the financial markets, as it has for much of the last decade.

Conclusions

Platform strategies have different value to different firms. The key components that comprise Symantec's platform strategy are technical, attitudinal and organizational. Symantec brings to bear its core competencies in security technologies and in efficient low-level coding techniques and platform modularity that allows its core technology components to be firmware targeted and used as building blocks in an appliance system. Moreover, its strategy is driven by the awareness of an impending need to change, as evidenced by the formative influence of Symantec's awareness of Longhorn and its implications years in advance of their advent, and its desire to grow by orders of magnitude, which fosters creative drive and decreases the risks of complacency. Symantec is also willing to acquire firms to rapidly attain the expertise and intellectual property required to move into a strategic space, and has significant experience acquiring and absorbing firms and technologies, as well as an agile Mergers and Acquisitions organization with an industry-leading documented diligence, scrubbing, and acquisition process.[127]

Symantec possesses many of the attributes that this thesis posits support a successful Acquisition and Rapid Growth strategy. Symantec is cash-rich, and can afford to acquire firms without accruing debt in the process. Symantec also has a clear vision of its target market and deep technical skills, so it can acquire the right firms and avoid expensive mistakes. It also has a strong emphasis on its internal M&A organization, so it is better able make acquisitions without undermining the value of an incoming adoptee company. Finally, Symantec possesses the knowledge that it must change rapidly and significantly, and wants to change and grow in significant ways.

Symantec's strategy of adopting an Enterprise orientation and depending less on the consumer products is also well-suited to its corporate characteristics. Companies, like Symantec, that have top management that understands the long-term value of the Enterprise market and the value of offering an IBM-like suite of software, hardware, services, and consulting services in their area of core competence are well-positioned to launch and implement on an Enterprise-oriented strategy. Moreover, Symantec has a clear value-added competency and a platform built around it, and so can move it rapidly to a different target market. This is not much different than the Sonic Foundry move to the Streaming Media space; taking the core capabilities of an experienced and profitable team and refocusing them on a market that needs quite similar technology underpinnings but offers a rate of return orders of magnitude larger than the Consumer or Desktop Products market.

The adoption of these strategies have been driven, in part, by Symantec's crossing of the $1B revenue threshold. Like other companies in that revenue range, it is now apparently visible to Microsoft. While smaller firms, such as Sonic Foundry, whose $25M earnings are not large enough to tempt Microsoft, still find that they can gain benefit from Microsoft's platform strategies, $1B+ firms often find strategic announcements from Microsoft nibble away at their businesses[128] and have to plan to mitigate the damage.

Based on the assumptions of this thesis, a strategy such as Symantec's, based on complementing a pervasive platform and filling its functional gaps, can offer lucrative returns. It can be assumed that Symantec always understood that many of its revenue opportunities were based on Microsoft's oversights and deficiencies, and that, as these were remedied, opportunities would change and new challenges arise. Frequent change has been and continues to be necessary, but the model of acquisition and integration of new technologies into the platform of

tools, utilities, and services, has supported and created a culture of successful, repeated change and resiliency.

Over time, a platform strategy such as Symantec's evolves because the underlying platform evolves; all the layers of this platform ecology respond to each other's changes and evolve together. Those that fail to see the change lose dominance and wither, or are absorbed by the dominant players.

Both the Symantec and Sonic Foundry cases show how two skilled players have kept their core technologies sharp and have reapplied them to a changed target, focusing on new revenue models. Both cases reflect a focus on enterprise and corporate sales as an order of magnitude boost above the revenues of the consumer space, a shrewd decision since consumer-oriented technologies can still be easily and inexpensively derived from enterprise offerings of modular platform build strategies.

Symantec's particular position supports this thesis's postulate that the platform strategies of one firm can influence those of many other firms, by direct effect on the other firms, or by simple economic benefit example. In particular, Microsoft has been appropriating much of Symantec's traditional value over time, forcing Symantec to change its focus and invent new value at the same time. Value has been being pulled from Symantec's platform into the layers below it, which may have indirectly made the appliance and firmware business appealing to Symantec. It is unclear whether it would have chosen pursue this strategy a decade earlier; the environment had to be sufficient to force them to make radical changes and view the firmware space as an opportunity. While the shift to hardware requires fairly radical operational, cultural, and strategic shifts for a software firm, the shift satisfies John Schwarz's criterion: it capitalized on the understanding that the true value might settle to the silicon anyway, and the desire to be the firm that profits from it, rather than losing it as it leaks through the platform "floor" of the operating system.

The second postulate that is supported by Symantec's history is that these strategies influence Return on Investment. For many years, Symantec yielded good internal return on engineering investment for many years. Once Microsoft began to compete with Symantec on system utilities—around the release of Windows 98—the undermining of value in that market became apparent. Rather than trying to merely sustain any one position, Symantec management

continues to push the envelope on growth in new markets while simultaneously stabilizing its complementary position atop the Windows platform.

The final postulate borne out by Symantec's story is that company survival may depend on these strategic choices. Symantec is well-positioned: it is literally a household name and has a solid cash position. However, the Symantec's management team must continue to be diligent: Clayton Christiansen's[129] work clearly shows that cash-rich giants can fall and be replaced by competition if they fail to change their process and disrupt themselves by inventing a new business or technology or both. To mitigate such risks, Thompson, Schwarz and their management team have found a way to self-disrupt the business model and refocus it without abandoning the company's core expertise, and to not only preserve the legacy core technology modules, but refit them to the new platform and business model.

Based on all of the attributes discussed above, Symantec is uniquely positioned to face the challenge posed by its shifting environment. The solutions outlined above can help to sustain the company's platform, but do not by any means represent a comprehensive solution to the platform challenge it faces in this ecosystem. Symantec's OS platform dependency problem remains, and that could fatally erode that component of its value even in the lucrative enterprise space. The appliance direction is an interesting and disruptive strategy for a software firm, and represents an ultimate lowest-level firmware platform strategy with a nearly un-appropriable value proposition, in which Symantec can retain the value of its anti-virus engine IP and other Symantec platform IP that would otherwise be subsumed by Microsoft.

Despite all the factors in Symantec's favor, these two strategies alone are probably not sufficient for long-term growth of the scale that Thompson and Schwarz envision. The two have aggressive goals for Symantec, including growing revenue perhaps 10X beyond than 2003's $1.4B in revenue. The current operating system platform hurdle—driven in large part by Microsoft and Intel—is a significant challenge. Symantec needs to develop additional strategic platform directions to help it move into spaces where it is able to only break free of Wintel platform dependence, but can also achieve exponentially improved revenue and value in areas that are difficult or impossible for Microsoft's platform to appropriate. Still, though, Symantec's Strategic and Acquisition teams are tightly coupled to the marketplace, and to the pulse of Symantec's senior management goals, and are gearing up to make a success of this challenge.

Based on its history, attributes and insight into what the market demands, Symantec is positioned achieve these goals.

Addendum

After the writing of this case, but before publication of this thesis, the following news became public.[130] The author has integrated it into the conclusions section as a proof point of their commitment to the described Symantec enterprise-focus platform plan.

> "**Symantec Drops Norton Utilities:** Symantec has quietly stopped shipping the stand-alone version of its venerable Norton Utilities product, choosing instead to offer the software only as part of its SystemWorks suite. [131]"

This represents a move away from lower cost, unbundled or less-bundled standalone consumer utilities, and towards larger integrated suite solutions, such that the value to the customer is broader than just a single utility. A single utility has value which can be appropriated by the platform creator at any time. A suite represents a broader system value, more difficult to appropriate in total, and represents a more diversified strategy. The broader range of included functions in a suite may also cause enterprise customers, who initially only desire a subset of the integrated suite, to buy the entire suite, perhaps for each seat in their firm. This can increase Symantec revenue, and can secondarily introduce large numbers of corporate users to new tools they would otherwise not have the opportunity to experience.

This decision to drop the venerable Norton Utilities product line represents a willingness to disrupt their legacy products as needed. This sort of strategic bravery is required to maintain future competitive advantage, and assure continued innovation and future consumer value.

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[102] Shwarz, Jon. Telephone interview. April 2003.
[103] Symantec Company Overview. <http://www.telesystems.co.uk/company/symantec.htm>
[104] A popular project management tool for the IBM Personal Computer.
[105] The predecessor to "MORE,", a first-generation presentation-graphics software program for the Macintosh.
[106] The first-generation presentation-graphics software program for the Macintosh.
[107] An information management software program for the IBM Personal Computer.
[108] Programming language development environment for the Macintosh.
[109] Programming language development environment for the Macintosh.
[110] A first-generation, shrink-wrapped electronic mail system that was sold to Sun Microsystems in 1988.
[111] Blackburn, Kozinski, and Murphy. "Symantec Corporation: Acquiring Entrepreneurial Companies." Graduate School of Business, Stanford University, 2001.

[112]Blackburn, Kozinski, and Murphy. "Symantec Corporation… ."
[113] Symantec's acquisition pace during the early 1990s was slowed in 1995 due to a $40M loss on the firm Delrina.
[114] Source: <http://finance.yahoo.com>
[115]Source:
<http://yahoo.multexinvestor.com/MGI/signdevt.asp?target=%2Fstocks%2Fcompanyinformation%2Fsigndevt&Ticker=SYMC>
[116]Source:
<http://yahoo.multexinvestor.com/MGI/signdevt.asp?target=%2Fstocks%2Fcompanyinformation%2Fsigndevt&Ticker=SYMC>
[117]Acquired by Cisco 2003)
[118]A host-based, real-time intrusion detection system that detects security breaches and automatically responds according to pre-established security policies
[119]Complements existing security counter measures by offering dynamic network intrusion detection that transparently examines network traffic.
[120]Automates the discovery of security vulnerabilities.
[121]Network vulnerability assessment product with progressive scanning technology.
[122]Norton.com. <http://www.norton.com>
[123]Created by the firm Alien Skin
[124]This is the opinion of Professor Cusumano and the author.
[125]Cusumano, Microsoft Secrets.
[126]Professor Fiona Murray. Technology and Entrepreneurial Strategy. Course, 15.290, MIT Sloan School, Fall 2002.
[127]Blackburn, Kozinski, and Murphy. "Symantec Corporation… ."
[128]An example from another firm that supports this is that Microsoft announced X-Docs, which stands a chance of eroding fully 1/3 of Adobe System's $1.2B yearly revenue in just a few years. Adobe is a beneficiary of a Microsoft platform deficiency (inability to control document access, modification, and distribution) and a platform interface that inadvertently originally made Acrobat possible (the print driver interface). By coming up with a document control initiative in the form of X-Docs, Microsoft closed off a source of opportunity that Adobe had to some degree taken for granted.
[129]Christensen, The Innovator's Dilemma.

[130] Source: http://www.pcworld.com/news/article/0,aid,110598,00.asp "Symantec drops Norton Utilities"
[131] Source: http://www.pcworld.com/news/article/0,aid,110598,00.asp "Symantec drops Norton Utilities"

Chapter 9: Microsoft Case Study

The Company

Founded in 1975 by Bill Gates and Paul Allen, Microsoft is one of the largest and most profitable technology companies in the world, with revenues of $28.3B and over 50,000 employees as of year end 2002. It has a global platform strategy with a significant presence in 78 countries and regions.

With its roots as an operating system and programming language tools firm, it quickly dominated that space while also becoming a dominant application software firm. Today, Microsoft Corporation creates a wide range of software products for a nearly every type of computing device, sells branded hardware, and offers many types of services. The company's software products include:

- Scalable operating systems for servers, personal computers (PCs), and intelligent devices
- Server applications for client/server environments
- Information worker productivity applications
- Business solutions applications and software development tools

In mid-2001, Microsoft launched the XBox, its next-generation video game system and service offering. Microsoft's other online efforts include the MSN Internet products, services, and alliances. During fiscal year 2002, Microsoft had four operating segments:

- Desktop and Enterprise Software and Services
- Consumer Software
- Services and Devices
- Consumer Commerce Investments

Several of the books used as research for this thesis offer specific insights into the details of Microsoft's broad history and its future. Relevant books include: Michael Cusumano and Richard Selby's Microsoft Secrets,[132] Annabel Gawer and Michael Cusumano's Platform Leadership,[133], and Dean Takahashi's Opening the XBox.[134]. This chapter assumes that the

reader is with the general history of Microsoft, and will focus, instead, on the platform and industry implications of two recent Microsoft efforts: the XBox and the Secure Computing Initiative.

Management

The core of Microsoft's current strategy and direction is jointly driven by the vision of the firm's top two executives, William Gates and Steven Ballmer.

William Gates

William (Bill) H. Gates is chairman and chief software architect of Microsoft Corporation. A lifelong computer enthusiast, Mr. Gates left Harvard University during his junior year to devote his energies to the formal launch of Microsoft with Paul Allen. Mr. Allen left Microsoft in 1982 to pursue other interests.[135]

From 1982 to 1998, Mr. Gates' singular vision drove Microsoft. In July 1998, he promoted Steve Ballmer to President, giving him day-to-day responsibility for running the firm. He named Mr. Ballmer CEO in January, 2000, giving him full managerial responsibility for the company. Mr. Gates retains a great deal of influence over the direction of the firm.

Steve Ballmer

Steve Ballmer is Chief Executive Officer of Microsoft; his passion for the work and solid leadership skills have set the tone for Microsoft's direction for all of its largest revenue years to date (see Financials, below).

Mr. Ballmer graduated from Harvard University with a bachelor's degree in mathematics and economics, and holds a graduate degree from the Stanford University Graduate School of Business. Mr. Ballmer has headed the Operations, Operating Systems Development, and Sales and Support divisions of Microsoft.

Other Members of the Top Management Team[136]

- **John Connors**, CFO, Senior Vice President
- **Craig Mundie**, Senior Vice President, CTO, Advanced Strategies and Policy
- **David Vaskevitch**, Senior Vice President, CTO, Business Platform

Current Corporate Statistics

Microsoft's worldwide headcount and revenue growth for the past 10 fiscal years are summarized in Table 7:[137]

Fiscal Year Ending	Head-count	Net Revenue (US$)	% Growth	Net Income (US$)	% Growth
6/30/1993	14,430	$3.79B	36%	$953M	35%
6/30/1994	15,017	$4.71B	25%	$1.15B	20%
6/30/1995	17,801	$6.08B	29%	$1.45B	27%
6/30/1996	20,561	$9.05B	49%	$2.20B	51%
6/30/1997	22,232	$11.94B	32%	$3.45B	57%
6/30/1998	27,055	$15.26B	28%	$4.49B	30%
6/30/1999	31,575	$19.75B	29%	$7.79B	73%
6/30/2000	39,170	$22.96B	16%	$9.42B	21%
6/30/2001	48,030	$25.30B	10%	$7.35B	-22%
6/30/2002	50,621	$28.37B	12%	$7.83B	6%

Table 7: The relationship between Microsoft's headcount and revenue for the years 1993 through 2002[138]

Microsoft's Internal Demographics[139] are shown in the table below:

Current Employment Headcount
(as of July 26, 2002)

Worldwide:	0,621
USA:	4,598
Puget Sound (Washington State):	5,235
Reported Gender Breakout (USA)	
Male	25,549
Female	9,042
Reported Age Breakout (USA)	
Under 20	5
20-29	8,912
30-39	17,419
40+	8,262

Average Reported Age (USA)
34.7 years
Functional Breakout (Worldwide)

Research & Development	21,037
Sales & Support	23,569
Operations	6,015

Table 8: Microsoft's worldwide employee demographics, broken down by age and gender, as of mid 2002[140]

Financial Summary

Microsoft Corporation creates many products, including:

- Scalable Operating Systems
- Server Applications
- Worker Productivity Applications
- Software Development Tools

For the nine months ended 3/31/03, revenues rose 14% to $24.12B. Net income rose 28% to $8.07B. According to Microsoft,[141] 2002 revenues reflect increased XBox sales and the launch of new products. Earnings also reflect higher net investment income:[142]

Period Ending:	Jun 30, 2002	Jun 30, 2001	Jun 30, 2000
Total Revenue	$28,365,000,000	$25,296,000,000	$22,956,000,000
Cost Of Revenue	$5,191,000,000	$3,455,000,000	$3,002,000,000
Gross Profit	$23,174,000,000	$21,841,000,000	$19,954,000,000
Operating Expenses			
Research And Development	$4,307,000,000	$4,379,000,000	$3,775,000,000
Selling General And Administrative Expenses	$6,957,000,000	$5,742,000,000	$5,242,000,000
Non Recurring	N/A	N/A	N/A
Other Operating Expenses	N/A	N/A	N/A
Operating Income	$11,910,000,000	$11,720,000,000	$10,937,000,000
Total Other Income and Expenses Net	($397,000,000)	($195,000,000)	$3,338,000,000
Earnings Before Interest and Taxes	$11,513,000,000	$11,525,000,000	$14,275,000,000
Interest Expense	N/A	N/A	N/A
Income Before Tax	$11,513,000,000	$11,525,000,000	$14,275,000,000
Income Tax Expense	$3,684,000,000	$3,804,000,000	$4,854,000,000

Equity Earnings or Loss Unconsolidated Subsidiary	N/A	N/A	N/A
Minority Interest	N/A	N/A	N/A
Net Income from Continuing Operations	$7,829,000,000	$7,721,000,000	$9,421,000,000
Nonrecurring Events			
Discontinued Operations	N/A	N/A	N/A
Extraordinary Items	N/A	N/A	N/A
Effect of Accounting Changes	N/A	($375,000,000)	N/A
Other Items	N/A	N/A	N/A
Net Income	$7,829,000,000	$7,346,000,000	$9,421,000,000
Preferred Stock and Other Adjustments	N/A	N/A	N/A
Net Income Applicable to Common Shares	$7,829,000,000	$7,346,000,000	$9,421,000,000

Table 9: Microsoft's summary financial information for the years 2000 through 2002[143]

History[144]

The following table, available on Microsoft's own website, provides a synopsis of Microsoft's early and middle history:[145]

1975:	Microsoft founded
January 1, 1979:	Microsoft moves from Albuquerque, New Mexico to Bellevue, Washington
June 25, 1981:	Microsoft incorporates
August 12, 1981:	IBM introduces its personal computer with Microsoft's 16-bit operating system, MS-DOS 1.0
February 26, 1986:	Microsoft moves to corporate campus in Redmond, Washington
March 13, 1986:	Microsoft stock goes public
August 1, 1989:	Microsoft introduces earliest version of Office suite of productivity applications
May 22, 1990:	Microsoft launches Windows 3.0
August 24, 1995:	Microsoft launches Windows 95
December 7, 1995:	Bill Gates outlines Microsoft's commitment to supporting and enhancing the Internet. MSNBC launched as a Microsoft Media channel.
June 25, 1998:	Microsoft launches Windows 98
February 17, 2000:	Microsoft launches Windows 2000
June 22, 2000:	Bill Gates and Steve Ballmer outline Microsoft's .NET strategy for Web services
May 31, 2001:	XBox Launch, Microsoft launches Office XP
October 25, 2001:	Microsoft launches Windows XP
January 15, 2002:	Bill Gates outlines Microsoft's commitment to Trustworthy Computing

Table 10: Selected critical events in Microsoft's history, 1975 through 2002[146]

These events on the timetable above help set the stage for understanding Microsoft's current offerings and future direction, and provide data-points showing the firm's strategy progression from a simple firm to a ubiquitous force.

Product Direction

Microsoft's pursuit of a platform strategy is observable even in the self-descriptions publicly available on its web site:

> "…Microsoft's development of a revolutionary Microsoft .NET platform for desktop personal computers, servers, non-PC devices and the Internet. Microsoft's goal is to provide the platform to enable a seamless experience across different computing devices, software services and data sources, putting a unified face on a wide variety of digital interactions."[147]

> "Although Microsoft will provide some important customer services, the company's success will depend on thousands of new and current partners creating innovative customer solutions on the platform." [148]

> "…..Microsoft must be part of a community of partners, each providing a special focus and added value."[149]

That third quotation describes how the Microsoft .NET platform will shift the application software market to a service market, making the platform interface between the product and the customer equivalent to "an instance of a service." The following would be a clear but extreme example of this: a customer would not buy the word processing application, Word, but an instance of usage of a word processing service, Word. This shift alters the dynamics of the complements market because consumers will not own an actual instance of the service platform itself, but a "service instantiation," potentially making it challenging to integrate an instance of a complement. A non-technical example of such a challenge would be that of a customer using a car wash: a customer would drive his or her car through the car wash, but does not own the car wash; he or she has no interest in buying a supply of a complement, Soap. Translated to the software application, the user does not own the software application, and therefore has no interest in buying a plug-in for it.

Microsoft's goal of enabling a seamless experience across devices, services, and types of data makes the customer's interaction with the platform ubiquitous, and may serve to appropriate some or all of the unique value of any of the device classes used to access this "seamless experience." The platform strategy may drive a commodity effect through all those device

classes; this "unified face"[150] may yield brand awareness and value perception for the Microsoft platform, and not for the end-user devices or the complements to those devices that will allow the consumer to have enhanced access to the platform.

Although Microsoft will define the platform, its stated position is that "the company's success will depend on thousands of new and current partners creating innovative customer solutions on the platform,"[151] which may be translated to "innovative complements to the platform." While this public statement is fundamentally true, other cases in this thesis (most notably that of Symantec) reveal that Microsoft can choose to change the rules and appropriate the value of a complementary supplier at any time. Moreover, it tends to do so when a supplier attains a sufficient revenue share to make it an interesting target.[152] The public position that Microsoft "must be part of a community of partners, each providing a special focus and added value"[153] may be marketing hype; its historic actions do not support that as a core value principal.

This chapter will discuss two current (2003), major Microsoft product directions:

- **The XBox Gaming and Entertainment Platform.** Microsoft chose to harness the power of the broad range of platform/complement synergies it had fostered over the years, and to apply them to the gaming and entertainment market. While Microsoft has had a long and growing presence in the computer gaming space, it is the newest player in the console gaming arena.
- **The Trusted Computing Platform.**[154] The Trusted Computing Platform Alliance, or TCPA, was formed by Compaq, HP, IBM, Intel, and Microsoft. For years, each of the five companies has been working on improving the trust available within the PC. They came to an important conclusion: the level, or amount, of trust they were able to deliver to their customers, and upon which a great deal of the information revolution depended, needed to be increased, and security solutions for PCs needed to be easy to deploy, use, and manage. An open alliance was formed to create a computing platform for the next century that would provide for improved trust in the PC platform.[155] The platform created by this alliance will have significant side effects for firms that make low-level tools (such as the anti-virus products from Symantec[156] and debugging tools from NuMega[157]).

Strategic Choices

Unlike other cases, which included the interview research methodology discussed in Chapter 2, this case was prepared solely using the literature, publication, and web research methodologies. Unlike any of the other firms contacted during the research phase of this thesis, including Symantec and HP, Microsoft was unwilling to allow the author to access key Microsoft management strategists. Therefore, all of the strategic cues are derived and discerned from public data using corroboration, source credibility, and the author's industry/technology insights.

The XBox

While the initial focus of this case study had been to understand the Platform thinking behind the XBox and Microsoft's penetration of the market for PC-Games and Game-Console-Platform Games. Through the process of research, however, the focus has shifted to a study of the battle for the living room. This chapter asserts that the winners of this battle will become household icons, and that—beyond game consoles—the platform and its producer may become parts of a modular computing and entertainment nerve center of the home of tomorrow, disrupting the current, dedicated PC paradigm in the home and, eventually, the office.

The losers will become irrelevant. The initial beachhead is the modern game console market, which expects and requires a computer/appliance device with networking capabilities. These computing appliance devices pioneer the future integration of all of the information, communication, and entertainment technology capabilities in a customer's home. Everything may eventually become a module, a complement to some future[158] home entertainment, computing, and communications platform. Certainly, even the land-line telephone could be threatened by this significant network entry-point. Even today, Microsoft's XBox Live network has already rolled out such communication capabilities in the voice domain.[159]

Microsoft intentionally designed Windows to be scalable, and from very early on had decided upon making it "a platform compatible with a broad range of complementary devices."[160] It is those complementary devices that have enabled Microsoft to break into the games console market today.

The exceptional graphics performance of today's PC systems is in many ways a direct result of Intel's complement strategy,[161] defined more than a decade ago. As Cusumano and

Gawer discuss in Platform Leadership, advances such as the PCI, AGP, USB, and Firewire1394 standards were established to continue Intel's planned-obsolescence of each generation of processor. Intel worked with the creators of complementary hardware and software to teach them how to engineer their components to leverage every bit of power from the Intel platform, leading to continually increasing CPU horsepower requirements over time and forcing consumer upgrades.

Takahashi's Opening the XBox discusses a key enabler of audio, video, and games complements: Microsoft's DirectX. The combination of Microsoft's Direct X and Intel's PCI, AGP, and other bus initiatives created the opportunity for today's PC systems to be game consoles, video editing workstations, and digital audio studio systems, displacing established competitors whose products were two or more times expensive than a PC system.

Each such component (the video card, the monitor, the motherboard) is now a commodity, yet the total system may be integrated with complements from dozens of manufacturers, and services from others. This is the very platform-complement ecosystem strength that allowed Microsoft to enter the game console market and go from a non-entity to top-tier contender in that space during the first six months of its first generation product.[162]

Some Gaming History:

The very first games were literally experiments, written by computer enthusiasts. Simple, early games gained popularity and fostered adoption of the very early consoles, such as the Atari. Whether the original "Pong," or the intermediate text-based fantasy games, or modern three-dimensional, realistic games, one key value element of a game is its "game engine." The modern engine is the software system that renders and simulates a 3D virtual environment in both visual and audio. The engine must process a broad range of tasks, including the simulation of real-world, physics-related tasks, are processed during the simulation. It takes years for a game development crew to complete an engine platform. The first engines were monolithic and non-modular within the games. Each game and engine was written from scratch, by each game company, adding expense, lengthened game schedules, and reliability issues to each game.

Hardware limitations, such as processing speed and storage limitations for data, limited the realism and functionality of the games. Modern game systems have hardware that supports much higher resolutions, frame-rates and depth of effects than the early games. A comparison of

the image and sound capabilities in terms of bandwidth of early and modern games may be of interest:

1990	2002
Size: 320x240 Color Depth: 256 colors Frame rate: 12-18 Frames Per Second Video Card Memory Expectation: 2MB	Size: 1600 x 1200 Color Depth: Millions of colors Frame rate: 100+ Frames Per Second Video Card Memory Expectation: 128MB

Table 11: A comparison of high performance PC video card specifications from 1990 and 2002, illustrating the vast improvement in performance and capability during that period.

The pioneer of multidimensional gaming, Id, began distributing the source code to Doom in 1992, and a community of developers grew up around it, creating and distributing modifications to it. This practice—the distribution of the source code and licensing any modifications for free if they were not used for profit—built a grassroots community and created an almost viral propagation of the games. Games that included network (multiple protocols) and dial-up, multi-player capabilities were introduced late in 1997, and anyone could run a server on any home computer. There was no official "service" initially, but, later, many services for providing servers and lists of active gamers to other gamers arose, some free, some paid. All of the paid ones failed; the free ones flourished and continue to drive the industry's expectations in terms of cutting edge-games. Source code was also made available with each release, under the licensing terms of free for no-profit use, and negotiated licensing with its business development team for profit-oriented use of the engine technology.

Throughout this evolution of the games industry, modularity has increased at both the hardware and software levels. Dedicated graphics cards with 3D processors and many hardware features can now populate Intel's AGP standard slot as complements to this market and model. Originally developed by id's John Carmack as a proof of concept for portability of the Quake engine, this engine licensing model became the standard-bearer for 3D hardware acceleration on PC computers, single-handedly launching the now-defunct graphics hardware and software giant 3Dfx.

Performance and Moore's Law[163]

The Microsoft/Intel platform performance in the arena of graphics has been astounding. As shown below, the rate of improvement has supported more and more realistic and compelling

games environments, and created such a high level of consumer expectation that the entire console market was left behind for nearly a decade as the PC platform raced ahead. This was good for the development of modular technologies, but may not suffice to lead the next decade, thus the dual thrust of advanced consoles, such as Microsoft's XBox, and media-friendly PC systems, such as Microsoft's Windows Media PC system.

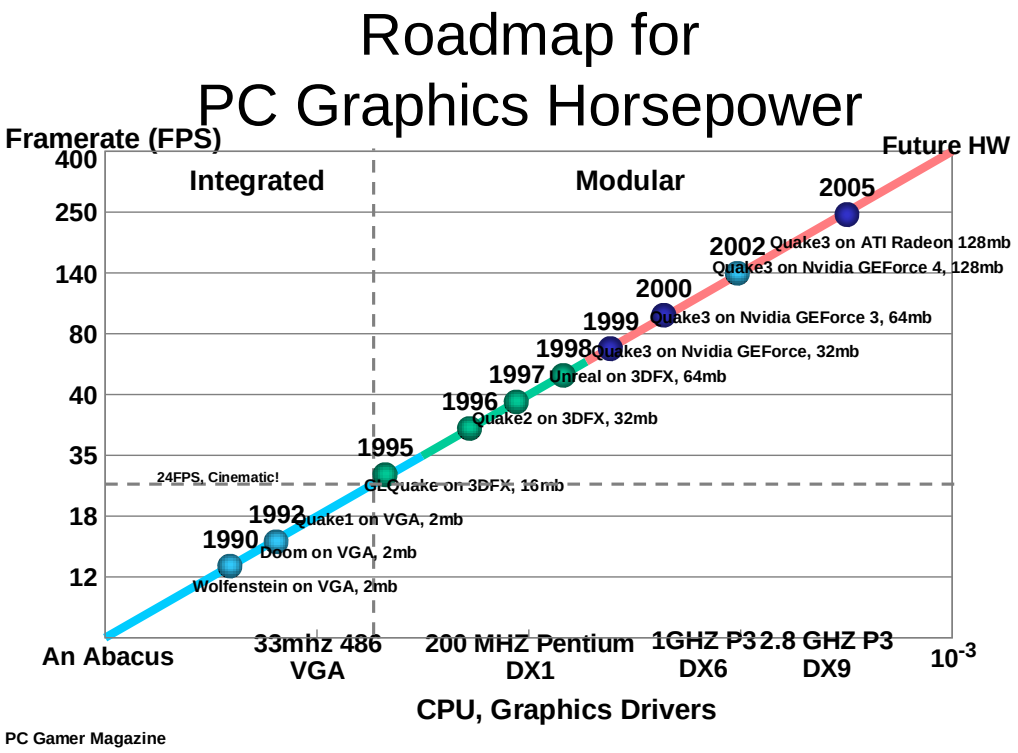

Figure 18: Moore's Law as applied to PC Graphics Card performance[164] over time.

As mentioned above, console games could not keep up with the performance of PC platform-complement game engines and graphics cards in the early 1990s. Consoles maintained a toehold in homes as the choice of younger gamers who did not have the degree of technical skill necessary for keeping up with the fast changing PC technology, or even managing a network connected PC system in order to play a networked game. Some games, such as Doom, were ported to popular consoles, and networks were created to support console-to-console gaming. However, consoles are static while PC games are patched and modified frequently, so they would fall out of synchronization in terms of design and stop working together. PCs are also experiencing faster and faster performance, and so had significant advantage in terms of game-play. These two worlds had not yet become capable of merging; the living room was the home of the console and the computer was elsewhere. PC systems were more powerful in terms

of function, but far less accessible to the general user. This was the case until very recently, and thus unfolds the current battle for the living room.

Modularity

Using Charlie Fine's framework of integration versus modularity to understand the maturity of the Wintel platform, the table below illustrates the market evolution of modularity across these products[165]:

Integrated:	**Modular:**
Early Consoles	XBox on Wintel Platform
Early Games	Quake, Unreal on Wintel Platform
TiVo (Linux on Motorola Platform)[166]	PVR Card in PC on Wintel Platform
TV and DVD player	Media Center PC on Wintel Platform

Table 12: Integration versus Modularity, as exemplified by the game industry

The drivers behind the degree of effective modularity are primarily Microsoft and Intel. As detailed in Gawer and Cusumano's Platform Leadership, these plans for modularity and complements were not focused on this market, per se, but rather on increasing product platform economies and increasing product adoption. They were well-suited to the game and entertainment industry, and Wintel saw opportunity as the trends toward increasing performance and flexibility became clear in the 1990s. Intel set the bus and slot standards for peripherals and cards. PCI, AGP, USB, and, now, Firewire, have made it possible to add functions to a standard PC system to make it into almost any kind of computing entertainment device. Volumes and business models for this market dictate affordable components. Intel and Microsoft, strategic evangelists for higher utilization applications, have seeded the market, encouraging developers to push the envelope and create faster/better/cheaper generations of products.

The single most powerful agent of modular success may well be Microsoft's Direct X. The process through which this happens is as follows: Microsoft decides that a new feature with intense computational requirements is needed. It exports an interface to this feature through Direct X, and simultaneously encourages next-generation developers to use the feature and vendors of cards to support it in hardware. Thus, if a consumer's card does not have the feature when the product ships, the feature will be provided in software, but will run slowly. Quickly,

customers buy the card that runs fastest. Thus, card vendors that do not implement what Microsoft suggests will be the "slow card" company, and will lose.

The Game Console Industry and Microsoft's Entry:

Overall, it becomes clear that the move from integration to modularity and toward a future of Meta-Integration of modular components has had tremendous impact on the gaming industry and the types of products expected and offered.

The game console industry is a lucrative space, and Microsoft targeted it, believing that although the three gaming consoles (Microsoft, Sony, and Nintendo®) are not in any way compatible, most consumers are not locked in since switching costs are relatively low—less than $200, in most cases. The modern computer gaming market is fast moving and fickle; since 1990 this market has never seen any one company remain the market leader for more than 5 years.[167] In short, buyers in this space are strong; they decide quantity, quality, and price, and have not yet (in 30 years of electronic gaming market data collection) demonstrated loyalty to any particular brand over time.[168]

Console Competition[169]

Although it exerts the dominant force in the PC industry, Microsoft is an underdog in the gaming industry. On the hardware side, it has two formidable forces to reckon with: Sony and Nintendo. Nintendo has chosen to target the 8-18 year old segment and is less of a threat, since Microsoft has chosen to target Sony's market, the15-28 year old segment, effectively establishing Sony as its main competition. Sony has a lot of factors in its favor: it is extremely experienced in the consumer electronics industry; it has an established base of over 20 million PS2 units and has over 120 game titles with 2000 more in development; its agility is clearly visible in its quick response to the XBox's built-in hard disk and networking capability.

This thesis posits that Microsoft has an inherent advantage over Sony and Nintendo, in that the vast array of hardware and software complements for the PC market can become XBox complements and may be built into the product. Sony and Nintendo, following a more vertical approach, are developing purpose-built graphics components. Sony, for example, is in a much-publicized partnership with Toshiba,[170] building a next generation PlayStation[SM] graphics chip. This may result in Microsoft having a slight advantage in the hardware performance.

Microsoft's longer term strategy is that the XBox will be a one-stop broadband appliance, and that Microsoft will transform itself into an omnipresent data provider.

> "There are a lot of people with the view that the XBox will be a Trojan horse into the home," said Cynthia Brumfield, president of Broadband Intelligence. "Once you get it into the home, you have a base from which to deliver a whole host of telecom services. [Microsoft] wants to be the ubiquitous provider of data services."[171]
>
> "Sony's ISP deals don't approach the breadth of Microsoft's partnering program, which includes DSL deals with all the Bell companies, agreements with cable partners AT&T Broadband and Charter Communications, and broadband deals with international service providers. [172]"

Sony was initially unprepared for this market attack in June, 2001, but today it is already competitive in its own network implementation. Sony has launched a PlayStation-centric ISP in Japan, and has also partnered with RealNetworks, Macromedia, and AOL Time Warner.[173]. Microsoft, however, has a stake in the Comcast-AT&T cable network—currently the largest US cable network, DSL deals with all of the Bell companies, and an agreement with Charter Communications, another cable company.

Substitutes[174]

Currently, the most competitive substitute for the console market is the PC gaming market. This has a high market penetration, numerous software titles are available, and has surpassed the performance and quality of even the fastest console by multiples. For example, XBox, the highest quality console in this respect, is around 40 Frames per Second at 640x480, the default NTSC resolution, for $199. A $500 PC system (any $400 PC from HP, Dell, or Gateway) with a $60 NVidia GeForce 364MB graphics card could exceed that performance by 20%. A high-end PC system would offer performance on the order of 150-200 Frames per Second at 1600x1200.

PC Systems are now approaching competitive price parity with consoles as the commoditization and pricing of their many shared components brings them closer in cost to build. Consoles, being purpose-built devices, will probably always have cost advantages over PC Systems. Today, a console may cost $199 and a PC $500. This thesis posits that prices of each will continue to drop and converge as the shared components become even more commoditized, more functional, and face further price/feature reductions.

Threat of new entrants[175]

Currently, Sony and Microsoft have each chosen to price their consoles as "loss leaders." Each is a well-established brand, and each has large cash reserves with which to fight this battle. Sony has $6B,[176] Microsoft has $24B,[177] and, according to Dean Takahashi,[178] the XBox team has approval from Mr. Gates, Mr. Ballmer, and the Microsoft board to spend up to $8B in order to dominate the market.

Both firms can afford to resort to predatory pricing. The industry itself is capital intensive and exhibits large economies of scale. This is a high-tech product that requires a large and continuous R&D budget. The market is highly dependant on penetration levels, and to achieve this, the new entrant needs a large marketing budget; Microsoft's marketing budget is approximately $400 million per year.[179]

The likelihood of a new entrant displacing these leaders is unlikely under these circumstances. Or at least unpredictable; Clayton Christensen[180] would probably assert that a new entrant is exactly the type of firm that would unseat Microsoft and Sony.

Wintel Platform Complement Interfaces Supported the Coming of the XBox

Tim Jackson's Inside Intel: How Andy Grove Built The World's Most Successful Chip Company discusses how Intel's Native Signal Processing (NSP) architecture—which could have reduced or eliminated performance latency in processing audio and video in the mid-1990s—was forced on co-complement-creator Microsoft, in direct conflict with its software-based standards for the same function.[181]

Microsoft subverted the standard in 1996, and so delayed the entry of Zero-latency video and audio support—executed via Direct X and certain DSP chipsets, sold as complementary PCI or Fire wire components—by nearly four years. This was not a coordinated effort, but a conflict whose outcome was that Microsoft, with the strongest ties to the industry complement creators of the time, the PC manufacturers, won out.

Enabling Factors for XBox Success

Microsoft is positioned as the controlling force in its complementary value chain, and can benefit from the R&D of its complement providers, and maintain a lead fueled by the Moore's Law commodity performance in the PC industry.

The Value Chain for the XBox

Content creators—whether small shops, such as id software or giants such as Microsoft—can adopt strategies that give them influence on the chain of complements that are the value network of the industry. The game engine evolution of id drove huge graphics cards companies. It also co-drove the Direct X and Open GL graphics standards that have defined the industry since. The value chain for this market is a complex one because of the interrelationships of the "gears" of the system and the broad array of complements and services that are coordinated around the value chain. Many of the coordinating entities are independent and acting out of self interest.

Interactive Game and Media Computing Platform Value Chain

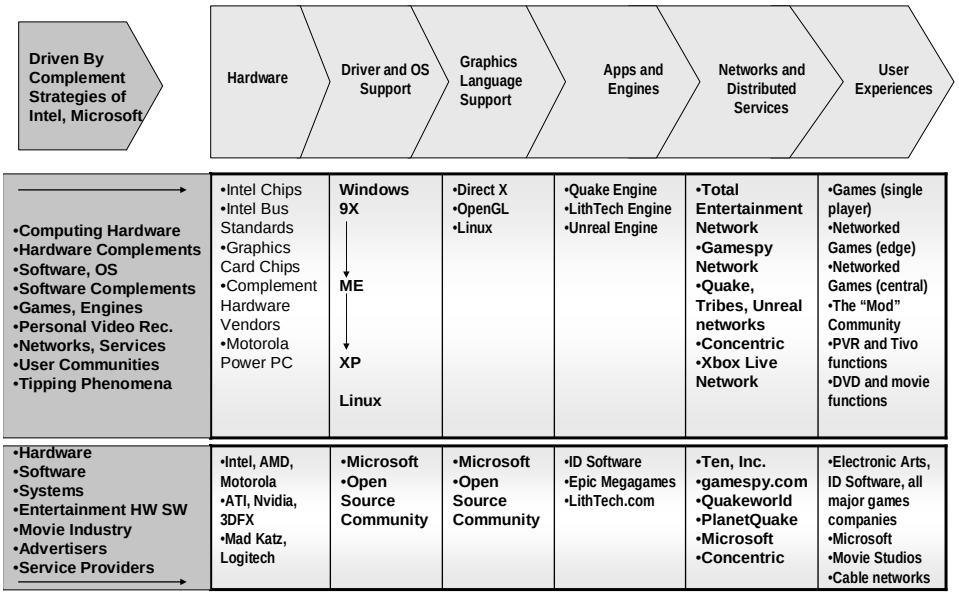

Figure 19: Interactive Media Platform Value Chain[182]

Note that in the above diagram, the modification, or "Mod," community and the open-source-like nature of id's engines and games[183] take a role equal to Microsoft in influence upon the graphics and quality of game play across the value chain.

Platform impact is strong in terms of competition. In the set-top space, there are a number of competitors, and the whole set-top versus PC competition adds yet another dimension of the competitive landscape. For example, Windows Media Center PC and Microsoft's own

WebTV competes OpenTV, a provider of digital television software. OpenTV is installed in more than 12 million digital set-top boxes today, according to C|Net. Microsoft also competes in the television area with San Jose's Liberate, which has a software platform for delivering Internet-enhanced content and applications to information appliances, such as television set-top boxes and game consoles.

Microsoft Platform initiatives in this space especially recently have been strong, especially in the XP Media Center PC platform. They have positioned major supply and value chain partners in interesting ways as they enter this space. Quantex, manufacturer of laptops and towers for all major providers, is making the XBox hardware for Microsoft. Quantex has licensed HP to create a consumer system using Media Center PC components, moving HP up into the living room. And, they have also licensed high-end gaming PC vendor Alienware® to create an "Ultimate" media center PC system.

Microsoft is bringing competitors and suppliers together to insert as many Microsoft-powered complements into the living room as possible, as quickly as possible. This is intended to present a large challenge to Sony, who has decided to play by different rules. Sony could (and may) choose to enter the Media Center PC space with its own Vaio® line of Microsoft-inside products, and probably would excel there, but for now, Sony is not taking that step away from its own gaming platform penetration strategy.

Displacement

Incumbents displaced by the Microsoft and Sony competition include not only television and entertainment appliances, but may also include dedicated computing devices, and phone and cable services. Displacement may occur more deeply than that, however. This innovation can disrupt entertainment formats entirely. There is a school of thought that believes that the under-25 video game generation may have different long-term expectations from entertainment, and that this could change the complexion of commercial entertainment significantly.

This dominant design shift is a concept in which the boxes that make up an entertainment system are not standalone islands, but rather interconnected, sharing resources and attributes. This, in turn, leads to discussions of the capability to use game-like constructs to interact with the content—regardless of its source.

The Trusted Computing Platform (TCPA)

The Trusted Computing Platform Alliance, or TCPA, has members that represent some of the most powerful firms in the computer industry. It was formed by Compaq, HP, IBM, Intel and Microsoft. The primary thrust of this deliberately planned platform effort is to lock down content on the platform, and to thwart today's ubiquitous, previously-unavoidable digital piracy. This effort is not intended to, nor able to, stop piracy of analog streams (video, audio).

TCPA is likely to be a very good method of securing data and content in the digital domain so that users cannot copy digital data (such as copying a CD and converting it to MP3 format) without permission of the owner.

TCPA Effects on the Platform Ecosystem

The platform created by this alliance will have significant side effects for firms that make low-level tools. End users, and perhaps certain firms (and hackers), may not be able to obtain low-level debugging tools that they would otherwise use to figure out ways of stealing the secured content on the TCPA.

The core of the TCPA is cooperation between the hardware and software at a level of security that will prohibit unauthorized outside entities from doing anything meaningful with the processor or the system's memory. The TCPA platform would be threatened—even irrelevant—if technical users could debug on it with tools like NuMega's SoftICE, as they currently do Windows XP.

Authorized TCPA partners will need access to tools that allow for development. Others, whether hackers or firms without access to TCPA-enabled tools, will simply not be able to directly access low-level functions of the system, and will have to pass through the controlling, higher-level Microsoft Interfaces that will have to be provided. Writers of Device Driver code will likely have to code to higher-level Microsoft interfaces, and will be disallowed the option of executing assembly language routines in a highly-privileged mode of execution on the processor. Hackers, a sub-community with significant initiative,[184] may eventually craft their own tools to penetrate TCPA and diminish its value. The closest precedent to measure how long it may take them is the Macrovision SafeDisk history, which took the global hacker community[185] six months to crack. The TCPA may take longer, perhaps 18-24 months,[186] but is likely be breached. The hackers will have to write their own In Circuit Emulator, or steal and modify SoftICE if and when it becomes TCPA-compliant.

There is an incidental effect on firms like Symantec, as discussed in that case study, in that Microsoft subsumes and appropriates some of their value. For example, in the anti-virus space, Microsoft and the TCPA platform are obviating Symantec's Norton Anti Virus engine, its longest-standing revenue platform.[187] The diagram below illustrates how the operating system subsumes the value of the application:

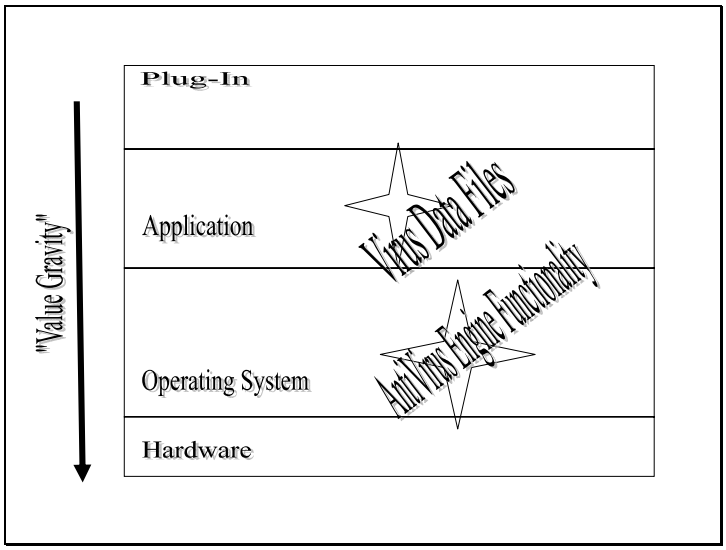

Figure 20: TCPA Operating System subsumes value formerly owned by Application Layer anti-virus engines like Symantec's Norton Anti-Virus.

Note that the operating system has appropriated value, in this case by subsuming the anti-virus engine's value through more product feature development work. This implies a higher cost of engineering for the operating system, and either more developers or more time required for each subsequent release to maintain the new features. This thesis posits that in this instance, Microsoft is subsuming perhaps too much value. This damages other key participants in the PC platform ecosystem, and may, in time, do significant damage to Microsoft's ROI model as well.

Conclusions

Platform strategies within a firm may result in different behaviors and outcomes in dealing with different external markets.

Microsoft XBox Platform Strategy:

In the case of the Microsoft XBox platform strategy, Microsoft has cultivated and nurtured an ecosystem of third-party suppliers like Creative (SoundBlaster), NVidia (GeForce

Video Card), and Madkatz (Game Controllers). It is harvesting its investment by incorporating many of these category complements into its requirements for a game console solution; it is benefiting its complement creators with added volumes and added component sales profits, and, as the saying goes, "A rising tide raises all boats."[188]

Sony dos not have this pool of complement resources from which to draw, and so is expending large amounts of cash with partners to develop the elements of an entirely purpose-built vertical technology supply chain. Even in a worst-case scenario, Sony cannot lose entirely: if Windows platforms prevail, Sony could conceivably make Media Center PCs, as HP is, or even license XBox technology for its own Intel/PC product line.

Microsoft-driven TCPA

In the case of the Microsoft-driven Trusted Computing Platform Alliance, the technology and platform shift by Microsoft potentially benefits its complementary content creators on the digital content creation side and on the application software side, but may do serious damage to complement creators in the system utilities and security markets, such as Symantec. Microsoft and TCPA may possibly damage the business models of an entire class of software firms, including debugger firms, anti-virus firms, and PC emulator and virtual PC firms. This may have negative effects on several classes of users, including technical users/legitimate software developers, software firms that cannot get the TCPA compliant tools, and hackers.

Microsoft may be making a mistake by taking on so much responsibility and "functional thickness"[189] in its platform layer. Microsoft may have a non-obvious strategy to turn this direction into a winning one, but this thesis case leads the author to the conclusion that Microsoft might be wise to avoid continual bloating of its future operating system releases with appropriated complementary functions and extra features, as this will erode ROI metrics, increase labor costs, and make the future product delivery schedule unpredictable.

Lessons from the Microsoft Case Study

The following elements comprise Microsoft's platform strategy:

- Cultivation of a network of supporting complements to its platform strategy

- Appropriation/consumption of some complement creators or entire complement markets as needed
- Creation of platforms in alliance with selected major industry players, driving these alliances toward a position that favors Microsoft's interests

Microsoft reflects the following characteristics of companies that adopt platform strategies:

- The most powerful industry leading firms can do this; Microsoft is the most financially successful executor of such strategies today.
- Not all firms choose this method; some prefer the more ad-hoc complementary marketplace of the firms whose businesses are based on truly open standards based technologies. Hewlett Packard's printer division, a firm within a firm, has taken this more cooperative complement position, even as the other Hewlett Packard hand participates in the TCPA

The following outcomes can be observed or expected:

- In the case of the PC Game market and the XBox, platform dominance and platform growth along with complement providers at a scale relative to the firm's size and earning potential.
- For the operating system platform, platform dominance and platform growth at the expense of the firms in the market who are the system utilities and security complement providers.

Over time, these strategies may result in the following outcomes:

- The XBox can be sustained, not only because by funding, but because it depends, in large part, on the efforts of the entire PC Game industry value chain.
- In the case of the TCPA, this strategy may result in an operating system that is:
  - Less profitable to sell, due to higher development expenses, or more expensive for customers if the price is raised to maintain profits;
  - More expensive to produce in terms of features, labor, time, and developers;
  - Later to market because of features, labor, and time;

- Less stable for device driver-intensive tasks, due to the operating system interposing itself at that level for security purposes; and
- Limited in total effectiveness; as it will very likely be hacked and subverted after some amount of time.

Regarding the ways in which Microsoft does or does not provide support for the postulates of this thesis, the following can be considered: Every one of Microsoft's major initiatives, like XBox and TCPA, influence dozens of firms—some of them nearly the size of Microsoft. Microsoft's decisions can define the entire platform market single-handedly. Third parties can take effective action, but it has to be dramatic, like Symantec's move to the appliance and firmware space. It cannot be simple price and feature competition in the compromised market category.

In terms of these strategies' impact on ROI, the Microsoft cases imply that more features added to the operating system can mean more engineering work, more time expended, higher labor costs, more system complexity, and more required testing. All of these factors drive higher costs, requiring a raise in price or a significant increase in volume to make up the lost profits. Furthermore, more complexity shortens the overall life of architecture; it cannot be made arbitrarily complex and at some point needs to be replaced.

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[132]Cusumano and Selby, Microsoft Secrets.
[133]Gawer and Cusumano, Platform Leadership.
[134]Takahashi, Opening The XBox.
[135]"Pursue other interests" is usually euphemism to indicate that a member of the management team had a difference of opinion over firm direction with the other leaders, and had to leave as a result. Mr. Allen has, in fact, pursued many diverse interests, worked with and founded a number of ventures, and been quite philanthropic..
[136]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp#dates>
[137]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp#dates>
[138]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp#dates>
[139] Microsoft.com.<http://www.microsoft.com/presspass/inside_ms.asp#dates>
[140]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp#dates>
[141]Source: http://finance.yahoo.com/.
[142]Source: http://finance.yahoo.com/.
[143]Source: http://finance.yahoo.com/.
[144]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp>
[145]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp>
[146]Microsoft.com. <http://www.microsoft.com/presspass/inside_ms.asp>
[147]"Steve Ballmer's biography." Microsoft.com.<http://www.microsoft.com/>.
[148]"Steve Ballmer's biography." Microsoft.com.<http://www.microsoft.com/>.
[149]"Steve Ballmer's biography." Microsoft.com.<http://www.microsoft.com/>.
[150]"Steve Ballmer's biography." Microsoft.com.<http://www.microsoft.com/>.

[151]"Steve Ballmer's biography." Microsoft.com.<http://www.microsoft.com/>.
[152]In the cases of both Symantec, discussed in this thesis, and Adobe, not discussed in this thesis, Microsoft began taking aim at appropriating the revenue from the firms within a year or two of the firm's crossing the $1B revenue mark.
[153]"Steve Ballmer's biography." Microsoft.com.<http://www.microsoft.com/>.
[154]Some components of this code-named Longhorn and Palladium, as discussed in the Symantec case.
[155]Trusted Computing.org. <http://www.trustedcomputing.org/tcpaasp4/index.asp>
[156]Supported by data in this case's Symantec chapter, and directly from http://www.symantec.com/
[157]Source: http://www.compuware.com/products/numega/index.htm.
Tools like ICE in-circuit-emulators, and debuggers, require low level access to the Intel hardware and the virtual memory management interactions between the operating system and the hardware. That is exactly the class of access the Trusted Computing model cannot allow, or the private nature of the system would be completely violated. Content could be pulled from memory and stolen, copied, as is done today.
[158]Many firms and organizations share a vision of the home (and eventually the office and the rest of the world) sharing computing and entertainment resources ubiquitously and having modular devices that perform functions or add value; MIT's own Media Lab is just one such example: http://www.pcmag.com/article2/0,4149,417135,00.asp,
[159]Voice over IP, bundled with the "Live" game service subscription.
[160]Cusumano and Selby, Microsoft Secrets, 175.
[161]Gawer and Cusumano, Platform Leadership, 22.
[162]BBC <http://news.bbc.co.uk/1/hi/entertainment/new_media/1976825.stm>, Microsoft.com <http://www.microsoft.com/presspass/press/2002/may02/05-08XboxPricingMomentumPR.asp>,
[163] Moore, Gordon E., "Cramming more components onto integrated circuits," Fairchild Corporation, 1965.
[164]ServerWorld Magazine. <http://www.serverworldmagazine.com/hpchronicle/2000/07/select.shtml>
[165]Fine, Clockspeed: Winning Industry Control in the Age of Temporary Advantage.
[166]Note the position of TiVo under "Integrated." TiVo is indeed a computer based appliance, but it has been so integrated into the form factor of standard appliances that it offers little modular utility; it is not a platform, as it has no external interfaces for any complements to plug into. It is in many ways a wonderful device but is as much "an unconnected island" as the VCR is, and cannot play in the Meta-Integrated living room as the XBox and Windows Media center PC can. TiVo is a very effective implementation of a computer appliance, running Linux on a Power PC processor, showing that not all entrants are Microsoft/Intel based. TiVo competes with Microsoft's WebTV but does not have nearly as many subscribers. TiVo, despite early market entry, only has order of magnitude 100,000 subscribers. WebTV now has about 1.1 million subscribers.
[167] Kent, The Ultimate History of Video Games, 320.
[168]Kent, The Ultimate History of Video Games, 352
[169]Porter, Michael E., Competitive Strategy. NY, NY: The Free Press, 1980.
[170]InfoWorld.com. <http://www.infoworld.com/article/03/04/21/HNsonytoshiba_1.html?platforms>
[171]TelephonyOnline.com. <http://telephonyonline.com/ar/telecom_microsofts_xbox_broadband/>
[172]TelephonyOnline.com. <http://telephonyonline.com/ar/telecom_microsofts_xbox_broadband/>
[173]TelephonyOnline.com. <http://telephonyonline.com/ar/telecom_microsofts_xbox_broadband/>
[174]Porter, Competitive Strategy.
[175]Porter, Competitive Strategy.
[176]Source: http://finance.yahoo.com/
[177]Source: http://finance.yahoo.com/
[178]Takahashi, Opening The XBox.
[179] http://finance.yahoo.com/
[180]Christensen, The Innovator's Dilemma.
[181]Jackson, Inside Intel: How Andy Grove Built the World's Most Successful Chip Company, 374.
[182]Derived from MIT Professor Charles Fine's Technology Roadmap Course teachings, handouts, and his book, Clockspeed.
[183]Complex licensing which allows anyone to do anything with them for no profit, but imposes strict royalties for profit.

[184]Source: http://www.fravia.de/ and http://www.gamecopyworld.com. Both provide good entry links into the web domain of the hacker community, a web community whose web presence is totally legal, hosted in European countries like Germany and Russia where this type of distribution of content and recipes for stealing content is not illegal.

[185] An informal group of hackers and piracy minded individuals who communicate by means of websites, chat rooms, and tools like ICQ and AOL Instant Messenger.

[186] The author is an experienced digital security architect and anti-hacker, with a good understanding of the hacker community and its history.

[187] The engine is a platform. The complements to this engine platform are the pattern recognition scanning files that Symantec sells on a single instance or subscription basis.

[188] Gawer and Cusumano, Platform Leadership.

[189] Referring to the diagrams in this case and the Symantec case which show the appropriating layer getting thicker while the layer that lost the value gets thinner.

Chapter 10. Visualizations

Overview

To this point, this has discussed the characteristics and merits of some permutations of platform strategies within platform ecosystems. The author has also developed a simple visualization model for projecting the impact of platform, complement, and service strategies ("platform strategies") on a firm's present and future economic position.

Rather than a detailed mathematical exposition of the financial nuances of a strategy, this method instead serves as a verification of a strategy's trajectory in whatever parametric dimensions matter the most to the viewer. This model is intended to be simple and provide a rapid "rule of thumb" visualization model for the outcomes of proposed and extant platform strategies. The images used to depict the model were created for this thesis using the modeling technologies embodied in modeling clay, wire, and photography.[190]

The visualization is expressed in a typical 3D grid environment with three axes. These axes may, in time, be used to represent any meaningful platform metric, but for consistency in this explanatory visualization chapter, the three axis labels will be chosen as follows:

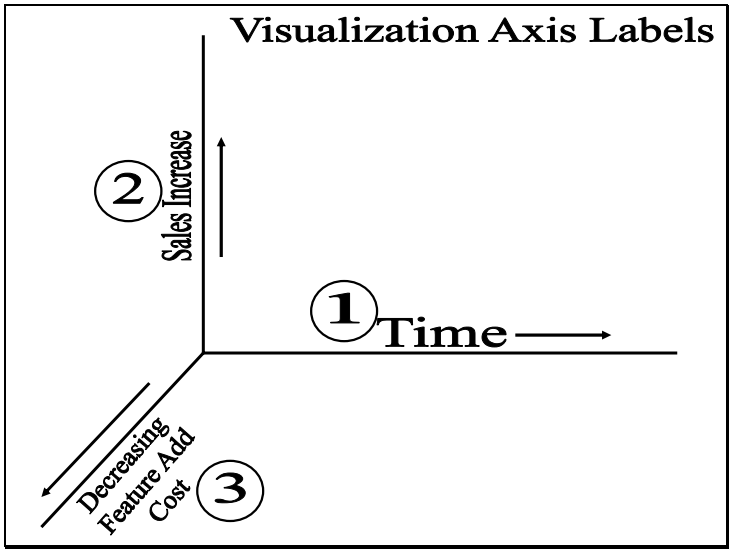

Figure 21: Visualization Axis Label Choices

1. **Time.** Represents the passage of time from the first shipment of product to either the end of the product's life, or to date.
2. **Sales.** This axis may be used to represent any meaningful, consistent value for sales—units sold, revenue, or profit. Simple metrics, such as "revenue" or "total units sold," may be better choices since they are fairly straightforward. Note that using a complex metric such as profit may be confusing because it integrates the costs.
3. **Feature Cost.** As raised in this thesis's discussion of the Experience Curve, Christiansen's work, and the SPSS case, one success factor has been to add features that add value to customers throughout the life of a platform. The corollary success factor is using platform modularity to support the decreasing cost per feature, as it is not sustainable to continue to add features without increasing efficiency. While feature cost can increase or decrease independent of platform strategy's influence, reduction of per-feature-added costs, commensurate increase in profitability, and increased customer satisfaction is often a platform strategy goal.

Cost per feature is chosen here simply as an example metric. This axis (or any of the axes) may instead represent other parameters, as long as the use is consistent across cases. Such parameters could include:

- Number of derivative products built from the core platform technology
- Total number of unique customers currently using the product
- Geographic penetration of the product
- Market penetration of the product
- Number of repeat customers
- Any valid business metric related to product sales or corporate health

It is recommended that the axes be set up such that the desired directions result in the graphic moving up and away from the corner, and widening as it progresses, in order to maintain the "thriving growth" correlation to desired attributes.

Permutations of the Platform Strategy and its Visualization

In addition to the three axes, the visualization method relies on the rate of size change of the shapes. The WIDTH of the shape is driven by the number of complements/services[191] associated with the platform. This can be more or less granular, representing either the total number of complements, only those made by the platform firm itself, or only those complements made by other firms. Figure 22 (below) illustrates a simple instance of a platform whose values for the three axes are moving in the platform-strategy-desired direction, that is, more units sold with a lower cost per feature over time, and whose complements are also increasing:

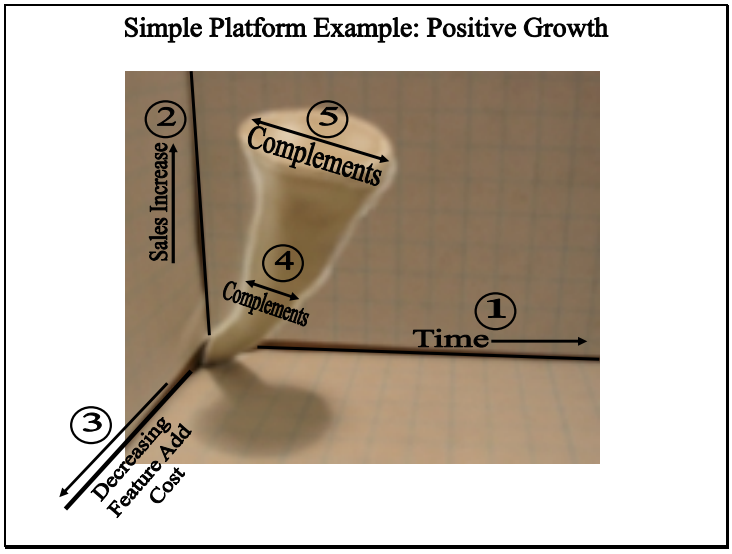

Figure 22: Sample Visualization of one platform instance with positive growth and complement attributes.

In the sample visualization, the labels have the following meaning:

1. **Time.** Passage of time from the launch of the product to present.
2. **Sales.** Magnitude increase of sales since the launch of the product. In this example, sales have increased over time.
3. **Feature Cost.** Decreasing cost of adding new features over time. In this case, the platform has achieved a decreasing rate of feature cost over time.
4. **Complements.** Number of complements at an early time in the product lifecycle. In this case, the product showed a moderate increase in complements (both internal and third party) since launch.

5. **Complements.** The number of complements at a later time in the product lifecycle. In this case, the product has shown a much larger increase in complements since the time referenced in [4] above.

The example above shows a platform that has achieved its initial goals and is growing. The visualization model is organic in appearance; if we look at the same image without distraction of the text labels, as in the figure below, we can see that it looks very much like a thriving organism or plant:

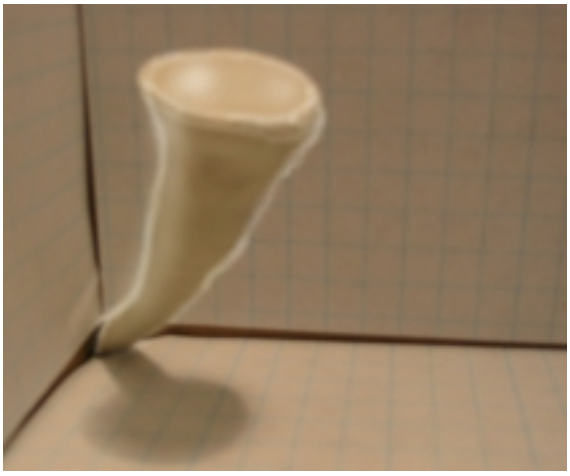

Figure 23: Platform Example without labels; note the organic shape.

Figure 23 should serve as a reference point: for the purposes of this visualization discussion, the above shape—a funnel or tornado shape—represents an optimal shape in the context of the axes and funnel-width definitions as specified above. It illustrates one instance of a product, based on a platform technology, whose sales are increasing, whose cost per feature is decreasing, and whose complements[192] are increasing in number.

To anchor this visualization in a real-world, specific-platform-product example, we can consider the product above to be the first release of Adobe's Photoshop product in the mid 1990s.[193] The increasing width represents the complements that began to emerge as the platform gained popularity. Those complements included plug-in software, pen and tablet input devices, digitizing input devices, and scanners.

With that foundation, an additional component can be added to the visualization: the representation of product upgrades and new version releases. To build on the above example, Figure 4 (below) can illustrate the next sequential release of Adobe's Photoshop product:

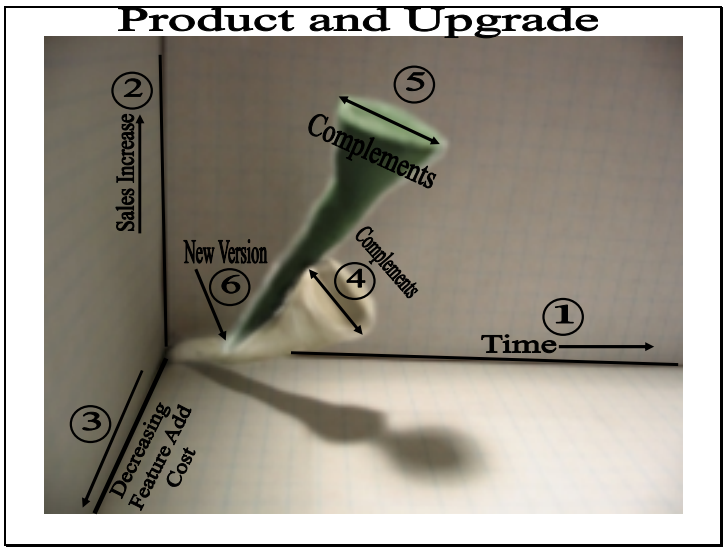

Figure 24: Product Upgrade Visualization

This figure represents a product (Adobe Photoshop 1.0) and the next sequential product upgrade (Adobe Photoshop 2.0). The labels in Figure 4 have the following meanings:

1. **Time.** Passage of time from the launch of the product to present.
2. **Sales.** Magnitude increase of sales since the launch of the product. In this example, sales have increased over time for both the first version and the second version.
3. **Feature Cost.** Decreasing cost of adding new features over time. In this example, the platform has achieved a decreasing rate of feature cost over time for both the first version and the second version.
4. **Complements.** Number of complements available for the first version of the product.
5. **Complements.** Number of complements available for the second version of the product.
6. **New Version.** Point in time at which Version 2.0 is released. Note that Version 1.0 continues to sell and continues to grow in terms of complements; this is typical of software products in which version usage overlaps and adoption of a new release is gradual across a population of users over time.

The examples thus far have been entirely positive: visualizations of a product whose platform strategy goals were resulting in increased sales, lower costs, and wider complement adoption. This model must also have the ability to represent scenarios that are not entirely positive, since real-world product strategy decisions sometimes do not result in success. Figure 25 illustrates a product with increasing sales but less than optimal results in other dimensions:

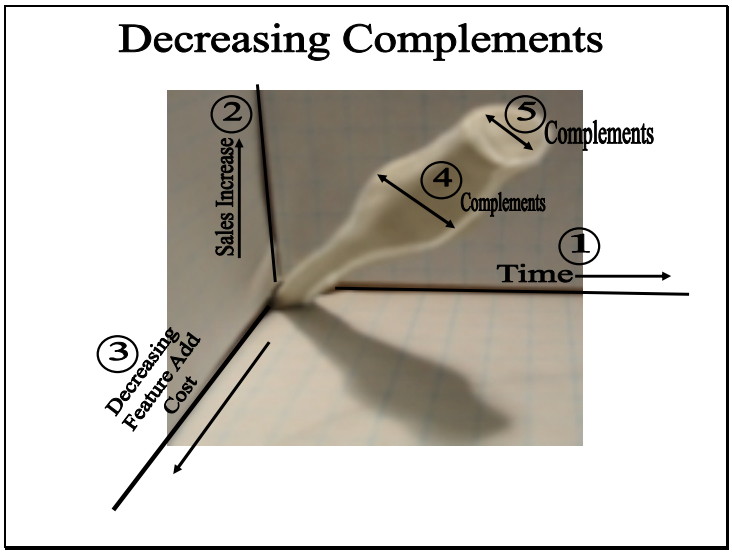

Figure 25: Decreasing Complements: Sales volumes are still increasing but something in the Platform Ecosystem is non-optimal as the number of third party complements are decreasing over time.

In this example, the firm made a strategic decision that resulted in a Platform Ecosystem impact that reduced the number of third party complements. A real-world example of such a decision is Apple and the Mac OS decision in 1998 to drop licensing support for Macintosh "clone" hardware, requiring customers to buy all hardware directly from Apple.[194] Based on that premise, the labels in Figure 5 have the following meanings:

1. **Time.** Passage of time from the launch of the Operating System product to present.
2. **Sales.** Magnitude increase of sales since the launch of the operating system. In this example, sales have increased over time.
3. **Feature Cost.** The decreasing cost of adding new features over time. In this example, the platform has achieved a decreasing rate of feature cost over time.
4. **Complements.** Number of complements at a mid-life time in the product lifecycle. In this case, in 1997, the Mac OS 8 release showed a significant bulge in complements,[195] primarily due to clone hardware sales.

5. **Complements.** Number of complements at a later time in the product lifecycle. In this case, the product has showed a **decrease** in the number of third-party complements since 1998, when Apple disallowed clone system hardware and required customers to buy all hardware and all systems directly from Apple.

Note that the appearance of the visualization is less robust, it is "thriving" less and the narrowing of the end is much like the stem of a houseplant that has been deprived of water for a long period of time. This organic appearance of somewhat "ill health" should be a warning, as it may indicate worse things to come if not remedied. The Apple scenario did not yield a downward spiral or loss of sales over time; Apple's marketing and new product development over subsequent years kept its sales volumes from plummeting. However, Apple also did not continue to grow in terms of hardware penetration, as they had been in 1996 and 1997.

While the example above illustrates a moderate problem, this visualization framework is capable of illustrating much more dire situations. In a case in which a product had achieved a loss in the number of complements, and the situation was not remedied, the effects might eventually become visible in reduced sales volumes of the product. Such a result is shown in Figure 26 (below):

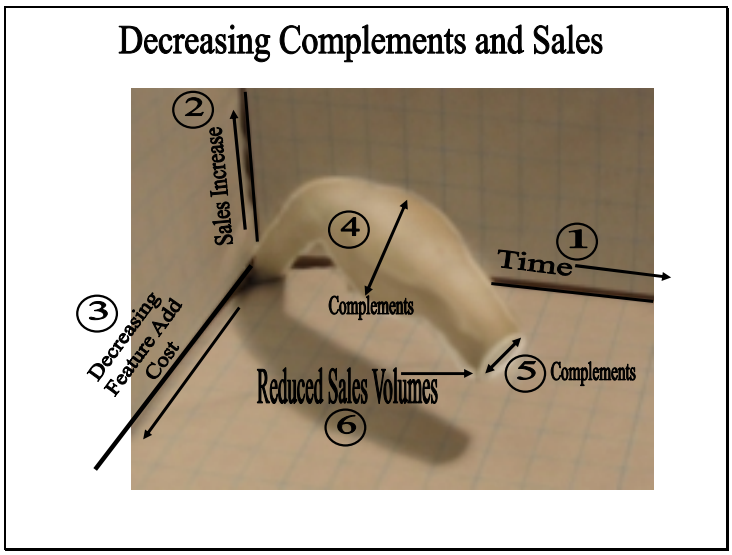

Figure 26: Decreasing Complements and a Decrease in Sales. Very unfit appearance to the organic visualization, even at a glance.

In the figure above, the labels have the following meaning:

1. **Time.** Passage of time from the launch of the product to present.

2. **Sales.** Magnitude increase of sales since the launch of the product. In the case, , sales have increased and then decreased over time.
3. **Feature Cost.** Decreasing cost of adding new features over time. In this example, the platform has achieved a decreasing rate of feature cost over time.
4. **Complements.** Number of complements at a mid-life time in the product lifecycle. This figure shows a large number of complements at this point in time.
5. **Complements.** Number of complements at a later time in the product lifecycle. In this case, the product has shown a decrease in the number of complements since [4] above.
6. **Reduced Sales Volumes.** Over the life of the product, the sales volumes increased and decreased. It is not clear whether this is attributable to the loss of complements over time, or if the complements were lost because of the sales decrease, or neither.

This particular case reflects that it may not be possible to know why certain events occur using this high level visualization. That does not diminish the value of the visualization, but represents a known limitation.

Based on mechanics of the visualization developed in this chapter, it is possible to look at a relatively complex rendering of a product family across multiple product generations over time, and to very quickly determine that product family's health at a high level. Such a determination is a rapid, high-level assessment method divorced from causality, but it does provide a good sense of whether the overall history and direction is healthy and positive. The figure below represents such a multi-generational example:

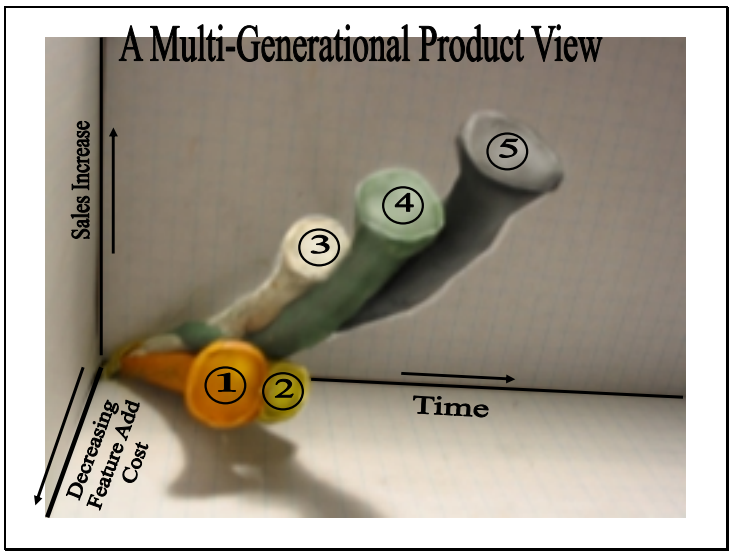

Figure 27: A Multi-Generational View of a hypothetical product line.

In this multigenerational example, it is obvious that this is a thriving product family, whose sales volumes have increased over time, whose subsequent product generations have continued this increase trend, and whose cost-per-feature is decreasing over time. A more detailed examination reveals the following:

1. The first generation product did well in terms of per-feature cost reduction as the platform was established. It also developed many complements.
2. The second generation product did not sell well, and experienced a reduction in complements. Many users kept using the first generation product and did not switch.
3. The third generation product was a great success in terms of volume and complement increases.
4. The fourth generation product was a similar success, but the cost per feature began to increase slightly.
5. The fifth generation product continued the trend of the fourth. This resulted in more sales and more complements. but a continued increase in development costs.

One can conclude from this quick analytical snapshot that the company is earning increasing revenue, but also experiencing increased costs and possibly a reduction of profits. This does not mean the firm is doomed—the visual signs all point to good health—but this may

mean the firm needs to consider a platform re-architecture to regain control over growing development costs.

Summary

This visualization method is simple, and limited. It provides an intuitive view of the state of growth and health of a product line, a multi-generation product family, or may be used to depict a firm's entire product line. It is not a rigorous analytical tool, but may serve as a useful high-level status indicator on a CEO's "Executive Dashboard."[196]

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[190]There had been an attempt to use a computer rendering engine such as the SPSS Incorporated visualization engine, but the required shapes and spatial relationships were beyond the capabilities of that engine, according to Leland Wilkinson, the architect of the engine and author of "The Grammar of Graphics". Certain solids rendering programs, such as those used for CAD product design and virtual world rendering would have had the capability to render the shapes, but the author elected to use simpler techniques so as not to let the TOOL get in the way of expressing the visual elements of the CONCEPT. The end result of this effort is pictures that represent the visual images the author had imagined originally; these photos, however, have certain visual flaws associated with the real world; rough edges on the models, wrinkles in the backing graph paper, approximate positioning, and other flaws.

[191]For simplicity, all complements and complementary services will be called "complements."

[192]The indication of a thriving platform ecosystem composed of multiple cooperating firms, or of one very large and powerful firm providing all-encompassing support for its own platform, or both.

[193] Although this thesis does not delve very deeply into Adobe and does not cover it in a case, the author was the program manager for a number of Adobe applications and is intimately aware of the history of the firm's flagship products. For more information, see http://www.adobe.com/.

[194] Despite the increased penetration in the market due to clone sales (see below) Apple dismantled those relationships in order to protect their hardware revenues. This reversed a trend toward a market penetration rate that would have, if it continued, been a far more significant threat to Microsoft than Apple has been before or since. From: http://www.tidbits.com/tb-issues/TidBITS-369.html#lnk2

Mac OS Clone Sales -- Dataquest recently released updated personal computer market share numbers that showed Apple's licensing of the Mac OS provided noticeable increase in the overall Mac OS market share for 1996. Apple Computer's share of the personal computer market was 6.7 percent in 1996, good for fifth place, but adding the Mac OS clones into the mix raises the numbers to 7.8 percent, or fourth place. In addition, Computer Intelligence just released numbers showing that the Mac OS market share in the U.S. dealer channel grew from 8 percent in Nov-96 to 11 percent in Jan-97, again, due primarily to Mac OS clone sales.

[195] Despite the increased penetration in the market due to clone sales (see below) Apple dismantled those relationships in order to protect their hardware revenues. This reversed a trend toward a market penetration rate that would have, if it continued, been a far more significant threat to Microsoft than Apple has been before or since. From: http://www.tidbits.com/tb-issues/TidBITS-369.html#lnk2 **Mac OS Clone Sales** -- Dataquest recently released updated personal computer market share numbers that showed Apple's licensing of the Mac OS provided noticeable increase in the overall Mac OS market share for 1996. Apple Computer's share of the personal computer market was 6.7 percent in 1996, good for fifth place, but adding the Mac OS clones into the mix raises the numbers to 7.8 percent, or fourth place. In addition, Computer Intelligence just released numbers showing that the Mac OS market share in the U.S. dealer channel grew from 8 percent in Nov-96 to 11 percent in Jan-97, again, due primarily to Mac OS clone sales.

[196]Source: http://www.iexecutivedashboard.com/.

Chapter 11. Conclusions:

Platform strategies often provide good return on investment and allow a firm to be more responsive to customers, and more nimble with regard to changing markets. They are, in general, a good thing and can lead to the creation of sustainable businesses. Platform strategies do not guarantee success, but they can enable it. Platform strategies come in many different shapes and sizes; while several different firms and their strategies have been explored in this thesis, the cases comprise only a sample and do not represent the full spectrum of possible platform strategies.

Nevertheless, the examples presented in this thesis demonstrate that there is more than one way to succeed using a platform strategy, and that within a platform ecosystem, the combinational strategies of all the players have a significant impact on the overall viability of the system represented by the combinations of platforms, complements, and services. It is, in fact, these combinations, and the interrelationships between the players, that can make or break a platform strategy. No one firm can, or should, do it all, even if they have the scope to attempt it.

Platforms in General:

Platforms, complements, and services, when used as part of a coordinated strategy, can lower costs, increase product scope and flexibility, and can breed multiple generations of profitable products. Platform development processes allow a firm to add features that add value for customers, and to partner with other firms to build systems and aggregate products that have added value.

Platforms offer interfaces to other components (other platforms, complements, or services) that allow the components to plug in. These interfaces, and how they are developed, can often be a determining characteristic of platform strategies. Open interfaces, defined by an unbounded community of participants, can result in a platform, but that platform is often less focused and, therefore, less likely to breed a successful business strategy. Closed interfaces, defined by a single firm, are not very useful to anyone but that firm. If they are published, they may attract complements, depending on the size of the firm and the size of the market represented by the platform. Ultimately, such an asymmetric balance of power between the platform and the complement creators can lead to the platform appropriating the value of the complements. Platforms created by a focused group of firms, each with an equal interest in the

success of the platform and a mutual benefit to be gained, can result in good value for all concerned.

Platforms are not themselves a guarantee of success. They can, however, provide a firm with traction for repeated success in multiple product generations, in multiple product families, and aimed at moving market targets—usually at a much lower cost than those of a stand-alone product with "monolithic" development over time.

Platform Ecosystems in General:

Platform ecosystems represent product markets and the firms that serve them. A group of firms whose platform-based products or services complement each other may be said to represent an ecosystem. Any firm whose product or service is useful on another firm's platform may be said to be a participant in a platform strategy.

The members of these ecosystems are interdependent; excessive greed or aggressive business practices by one party, especially one dominant in an asymmetric scenario, can cause other participants in such an ecosystem to lose their value contribution to the ecosystem entirely. Such interdependence is dangerous and must be treated carefully; if one participant appropriates the value of others, it may profit in the short term, but the ecosystem could be damaged so severely over time by this behavior that all of the participants will eventually lose.

About SPSS

SPSS has had a deliberate inward focus. SPSS has been built by acquisition, and has had to integrate a large and disparate set of acquired products repeatedly over time. Its platform discipline is quite deliberate and organized with almost military precision.

SPSS's orientation is driven by intelligence, and may even be said to be pure, in the academic sense. Its management team has done all of the relevant platform readings that any strategy professor in a top-tier MBA school would recommend, and they can quote chapter and verse from most of them. SPSS's production discipline, based on a firm belief in configuration management, automation, and build/test methodology, has created an admirable process. Platform strategy has allowed SPSS to gradually and steadily build a $100M+ business, and to develop a core expertise encapsulated in its platform, which may be repurposed as the firm desires.

It is not only an inward focus that drives SPSS; its platform ecosystem consists of database firms and knowledge management firms, and it has crafted symmetric partnerships with all the major players such that members of the ecosystem are bi-complementary. SPSS holds a balanced view of its ecosystem, and there is little or no value appropriation occurring. It is a sustainable, positive environment.

About HBO

HBO is a complement firm, rather than a platform firm, per se. HBO has significant power in an industry where the platforms evolve and change every five to ten years. HBO operates based power from added value, a concept shared in many ways by Hewlett Packard. HBO's content is tremendous value added, and its commitment to innovation is continuous.

As a complement firm, one might expect HBO to be a follower, but that company has taken a consistent leadership approach, defining new technologies to be delivered by others, and then creating new markets to be shared with others. HBO believes in openness of standards, non-exclusivity in terms of use of technology, and overall taking a non-dominant position based on power. It has found that sharing the platform actually brings it more success than locking others out because platform sharing makes the overall offering very compelling to customers. HBO is another case subject firm that emphasizes the predominance of customer value.

About Sonic Foundry

Sonic Foundry exemplifies a solid platform development strategy. Arguably, this strategic orientation was a primary factor in the founding of the firm as a Windows complement creator. Further, despite the fact that the firm never reached its $100M+ revenue goals using this strategy, the strategy did keep the company profitable. Modular platform development also provided Sonic Foundry with the strategic flexibility to plan the sale of key corporate assets, its desktop software products, the sale of which occurred on April 3, 2003, enabling Sonic Foundry to retain its core technology modularity. The firm is now engaging in its plan to create a streaming media business, using the cash from the sale of the assets and the modular platform assets retained.

Platform strategy did not make Sonic Foundry extremely wealthy, but it did provide over a decade of profits and excellent technology, and as well as an opportunity to restart the process

over again. Sonic Foundry has benefited as a participant in Microsoft's platform ecosystem, and has not run afoul of Microsoft's value appropriation methods. Platforms have served the firm well, and the firm will continue in its next incarnation to operate as a firm whose strategy is platform-based.

About HP

Hewlett Packard has been a potent force in the computer industry for decades—decades longer than any of the other firms discussed in this thesis. For HP, platform strategy is a natural fit, an intelligent way to build product families and maintain relevance and profit over time.

HP's platform approach is one of symmetric balance, sustainable growth, and development processes. It has the power to be a dominant force in its platform ecosystem—to rule that system as Microsoft does its—but HP has consciously chosen not to do so. It feels it is unwise and destructive to create an asymmetric platform ecosystem. HP believes that such a system damages or eliminates innovation. It is deliberate about the process of setting up alliances and standards with appropriate partners, based on a balanced view of the desired outcome. It strives for the thinnest possible layer of platform complement connectivity, and believes that the partner with the highest value, rather than the greatest size, deserves control based solely on that value.

HP views platform strategies based on open standards for symmetric mutual benefit as the lifeblood of its future businesses, and as the fuel for continued innovation that adds value for consumers.

About Symantec

Symantec shares some of the attributes of SPSS, in that it is, to a large degree, an acquisition-based firm, and some of the attributes of Sonic Foundry, in that it is a member of the Microsoft/Intel Platform Ecosystem for much of its traditional revenue.

Symantec is following a multi-part path. On one front, it is trying to break away from dependence on that ecosystem, especially since Microsoft has begun to appropriate much of the value it had. On another front, it is establishing higher value by working the enterprise market and repurposing its platforms. On a third front, Symantec is establishing an appliance business where it appropriates its own value to prevent Microsoft and Intel from doing so.

Platform strategy has enabled Symantec to do all of these things, remaining profitable and growing significantly every year. Rather than fighting for survival against the Microsoft appropriation of its value, the firm is moving toward multiplicative growth.

Platform strategies have enabled Symantec to exist, grow, mature, and thrive.

About Microsoft

Microsoft is a giant among platform firms, and, as such, must tread carefully. As a giant firm, it provides more than one example, and the two covered in this thesis are, to some degree, contradictory. Microsoft's public position is very similar to HP's stance of honoring the value of its partners and the creation of symmetric Platform Ecosystems. Its practical behavior has been different in some regards. It seems that when a partner firm in a platform ecosystem develops significant revenue (on the order of hundreds of millions of dollars), Microsoft may choose to focus on that partner and appropriate its value.

The XBox does not illustrate that acquisitive, appropriative mode of operation, but rather features Microsoft as an underdog entrant into a market where the established players include Sony, a giant firm the equal to Microsoft in many ways, and its superior in others. Microsoft has leveraged its PC platform ecosystem commodity capabilities into this game console market, and it has provided Microsoft with an almost instantaneous presence and a significant technology advantage that Sony may spend years and billions trying to equal or surpass.

The Trusted Computing example, on the other hand, details a different aspect of Microsoft's platform approach. This security initiative, proposed to control piracy, has the side-effect of Microsoft's appropriation of significant percentages of the value from firms like Symantec along the way. This appropriation, of course, does not transfer value to Microsoft directly; its appropriation of several hundred million dollars in value from Symantec does not equate to the same amount arriving at Microsoft.

However, there is a deeper problem presented by this value appropriation: it results in much more work for the appropriator, Microsoft, in this case. Each function absorbed is another function that must be maintained, improved, and innovated upon. This increases costs, and—as is shown in the SPSS case and in the visualization chapter—the goal of a platform is to be able to add features for less and less cost, not to increase the cost of features over time. Should an increasing cost trend continue, the appropriation of value from other firms could eat into

Microsoft's expected rate of return and alter its business model. Simply put, it is probably unwise in the long term to adopt a platform strategy that creates thicker and thicker layers and increases development costs.

Aggregate Conclusions:

To understand the platform strategies of firms is to understand its cultures, its corporate soul and mode of operation. Each firm has a different way of doing business and different goals, and it is reflected in its strategy.

Platform strategies are, in the end, determined to be effective or not because of aggregated factors related to the strategy itself, its execution, the environment, and the strategies of other firms. No one of these items is a sole determinant; rather, their joint effect is to some extent multiplicative and interlinked. The platform ecosystem itself may be as important to the success of the strategy as is the firm's internal execution.

The interdependence issues in a platform ecosystem may be controlled by a firm's conscious choices with regard to ecosystem participants and the firm's behavior. Greed regarding value appropriation from other firms in the ecosystem may not be a good idea, regardless of the immediate appearance of gain; it is believed to break the cycle of innovation and can cause increased labor and expense for the appropriating party.

The Microsoft control-based model looks appealing upon first glance, but most firms cannot adopt it because it requires the firm be in nearly total control of the platform ecosystem. Most firms simply lack the finances, clout, and market impact to cause this to happen. Even Microsoft may find, in time, that it is unwise to follow this path indefinitely.

Of all the approaches discussed in this thesis, the HP posited approach of conscientious platform creation, using lean open standards, by groups of firms with a symmetric balance of influence, offers significant appeal in that can yield true sustainability. Above all else, the information presented in this thesis reflects that "change is the order of the day" in most platform ecosystems.

A truly sustainable platform structure is the best possible outcome. In order to be sustainable, it must be one in which every participant profits, and in which the consumer sees added value benefits in an ongoing, growth-oriented cycle of innovation.

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