IIPS

Globalization and
Japan's Science and Technology Strategy

19 – 20 November 2007

Tokyo

Session 2
Monday, 19 November 2007

Strategies for Platform-Leader Wannabes

Annabelle Gawer
Imperial College London

Strategies for Platform-Leader Wannabes

26 August 2007

Annabelle Gawer and Michael A. Cusumano

I.   Introduction

In recent years, many high-technology industries, ranging from "smart" cell phones to video game consoles, have become platform battlegrounds. These markets require distinctive competitive strategies because the products are parts of systems that combine core components with complements usually made by a variety of firms. If a leader emerges and complementors work together, they can form an "ecosystem" of innovation that can greatly increase the value of their innovations as more users adopt the platform and its complements. The problem is that companies often fail to turn their products into industry platforms.

Our previous research focused on understanding the levers or strategic mechanisms that existing platform leaders use to maintain their positions (see About the Research). In this article, we focus on the special problems of firms that want to *become* platform leaders – we call them *platform-leader wannabes*. We have seen many hopeful companies fail because their platform strategy was too narrowly focused (either on technology, or on business). We argue that companies must be able to tackle both the technology and business sides of platform leadership otherwise their efforts are doomed to fail. The technological challenges come under what we previously labeled as Lever 2 – designing the right architecture, the right interfaces/connectors, and disclosing intellectual property selectively, in order to facilitate third-parties' provision of complements. The business challenges include what we discussed as parts of Levers 1, 3, and 4 – making key complements yourself or introducing incentives for third-party firms to create the complementary innovations necessary to build market momentum and defeat competing platforms.

Our strategic recommendations consist of two basic approaches (see Table 1). One strategy, which we call "coring," tackles the problem of how to create a new platform where one has not existed before. The second strategy, which we call "tipping," tackles the problem of how to win platform wars by building market momentum.[1]

2. The Platform vs. Product Strategy Choice

First, we need to clarify the difference between a *product* and an *industry platform*, and how this misunderstanding can lead to strategic mistakes. Put simply, a product is largely proprietary and under one firm's control, whereas an industry platform is a foundation technology or service that is essential for a broader interdependent ecosystem of firms. The platform requires complementary innovations to be useful, and vice-versa. An industry platform, therefore, is no longer under the full control of the originator, even though it may contain certain proprietary elements.

Managers sometimes underestimate the importance of deciding early on between pursuing a product or a platform strategy. This decision matters because the industry conditions and choices that favor a platform business differ from those that favor a product business -- leading to conflicting incentives between owners of industry platforms and firms that assemble proprietary products. In particular, owners of industry platforms benefit from lots of innovation in complementary products as well as from competition at the overall system level which would bring its price down. Just as

Microsoft benefits from the competition between products firms Dell and Hewlett-Packard, they, in contrast, benefit when customers perceive their products as unique, and therefore do not want cut-throat competition at the product or system level in which they compete. They would rather see Microsoft face tough competition on computer operating systems in order to be able to bargain better prices for the OS they will load on the PCs they sell. So platform firms and product firms generally want to see different industry configurations.

Table 1: Strategic Options for Platform-Leader Wannabes

	Technology	**Business**
Coring How to create a new platform where none existed before	▪ Solve an essential "system" problem ▪ Facilitate external firms' provision of add-ons, e.g., through provision of open IP on connectors ▪ Keep IP closed on the innards of your technology	▪ Create and preserve complementors' incentives to contribute and innovate, e.g., by subsidizing them and reducing their risks ▪ Protect your main source of revenue and profit
Tipping How to win platform wars by building market momentum	▪ Tip across markets: absorb and bundle technical features from an adjacent market	▪ Provide more incentives for complementors than your competitors ▪ Rally competitors to form a coalition

Failure to decide early between product or platform strategy can result in dangerous states of strategic confusion (such as in the case of Palm with the PDA, which we shall discuss later). Achieving platform status requires specific decisions that govern technology evolution, product and system design, and business relationships within the ecosystem – different decisions from when pursuing a product strategy. Another common mistake is that managers can simply overlook the platform potential of their products, such as in the well-known examples of Apple's Macintosh or Sony's Betamax video recorder – both excellent products that could have but failed to become industry platforms. Apple may be making the same mistake with the new iPhone by limiting its initial diffusion to only selected telecommunications providers.

But, while the benefits of becoming a platform seem clear, we do not believe that "every product can become a platform".[2] To have *platform potential*, and for the promoting firm to succeed in platform leadership, we found that a product (or a technology or service) must satisfy two pre-requisite conditions:

(1) It should perform at least one essential function within what can be described as a "system of use," or solve an essential technological problem for many actors in the industry.

(2) It should be easy to connect to or to build-upon to expand the system of use as well as to allow new, even unintended end-uses.

It is possible to test for these conditions. For the first, we can evaluate whether the overall system could function without the particular product or technology. If the system cannot operate, then the product does indeed perform an essential function. For example, the Windows operating system and the Intel microprocessor are both essential platform components of the original IBM and IBM-compatible personal computer. For the second condition, the challenge is to test whether a product or a technology is easy to connect to or to build-upon. A way to do this is to see whether external firms have indeed succeeded in developing complementary and interoperable products, or have at least started to do so. Without fulfilling these two conditions, the strategic game of platforms cannot begin. But they are far from sufficient to *win* the platform game.

3. Coring: How to Create a New Industry Platform

Coring is the set of activities a firm can use to identify or design an element (it can be a technology, a product or a service) and make this fundamental to a technological system as well as to a market. From a functional or technological point of view, an element or a component of a system is "core" when it resolves technical problems affecting a large proportion of other parts of the system (this simply reflects our previous pre-requisite Condition 1). Our research also suggests that coming up with platform-like technologies is easier than coming up with business strategies that encourage partners and customers to adopt a particular technology. We also noted that platforms open the overall system to new usage possibilities (this simply reflects our previous pre-requisite Condition 2).

These different uses are essential to the growth of the installed base, but one question arises: who will develop these new uses? The platform-leader wannabe may have some application skills and its engineers can certainly design a good platform solely by focusing on product architecture and interfaces. But a thriving ecosystem will rely on lots of externally-created innovation. So how can platform-leader wannabes successfully encourage other firms to join their ecosystem – and develop the essential complementary applications? That is one of the two essential business aspects of coring: It requires that the platform leader create economic incentives for ecosystem members to invest in creating complementary innovations, and to keep at it over time. Last but not least, platform-leader wannabes need to protect, just as any innovator firm should, their ability to profit financially from their innovations. The balancing act – protecting one's sources of profit while enabling complementors to make an adequate profit and protect their proprietary knowledge – is perhaps the greatest challenge to platform leadership. There is no simple framework on how to do this, but looking at successful and unsuccessful firms can provide ideas on what to do and what not to do.

a. Examples of Successful Coring

4

We know of many cases of coring or attempts at coring in practice. Google is a particularly well-known and clear example of successful coring in internet search technology and establishing the underlying business model for itself and complementors. Qualcomm in wireless technology has done very well in coring from a technology standpoint, though the business side of its ecosystem shows some signs of instability. In contrast, General Motors with its OnStar mobile communications technology and EMC with data storage software are failed attempts at coring, primarily from the business side. The digital home is an example of coring in process for a potentially enormous but still ill-defined platform market.

i.   Google in Internet Search

Google, founded in 1998, started off as a simple search engine company and went on to establish its proprietary search technology as a foundation for navigating the Internet. Let's see whether Google satisfied the two conditions of platform potential: (1) performs at least one essential function within the system, (2) easy to connect to or to build-upon, in part to allow different end-uses.

First, since the Internet quickly became an un-chartered universe of information, Google brilliantly solved an essential technical problem – how to find anything in the maze of the Internet, with millions of web sites, documents, and other content online. Google's search function provided an essential function to use the Internet. Second, Google distributed its technology to web site developers and users as an embedded toolbar, making it easy to connect to and to develop upon. It also allowed different uses (such as combining search with different kinds of information or graphics) due to the inherently versatile nature of Internet search.

But where Google really won the platform leadership battle for Internet search was on the business side. Google solved a fundamental problem, which was that in the early years there was a lot of confusion in the industry about just how to make money on the Internet. Google found a way to link focused advertising to user searches. Ads appear only along with specific searches, so users should have some interest in the advertisers. Google's advertising fees also seem low or modest relative to their effectiveness and ultimately are based on what the advertisers choose to pay. In effect, Google revolutionized the advertising business by re-architecting the relationships between advertisers and Internet users. Today, Google's market value is $145 billion, eight times that of the largest advertising agencies such as WPP. Of course, Google had competition. In the mid-1990s, Digital Equipment created a powerful search engine tool for the Internet, AltaVista; several other firms created equally powerful search engines, such as Inktomi and Yahoo!. But these and other competitors did not offer targeted ads or prices based on bidding and effectiveness. We therefore contend that Google's competitors failed in the business aspect of market coring.

Google continues to extend and promote what has become the basic Internet usage platform. In June 2007, Google held its first developers' conference with 1000 programmers in attendance and another 5,000 at 10 other locations around the world. The agenda included presentations on Google's Application Programming Interfaces (APIs) to enable developers to embed Google applications such as search, maps, calendars on

websites, or to develop custom search engines. Google also presented APIs for the Web 2.0 social networking site YouTube, which it purchased in 2006. Google has increased the amount of free online software it provides, ranging from e-mail to word processing, and is expanding its ambitions. Google's goal today is to provide to millions of users advertising-supported online software, moving from being a complementary platform to Microsoft, to become a direct competitor. Google even has indicated that it will provide free wireless internet access in some locations.

ii. Qualcomm with Wireless Technology

Qualcomm provides an example of coring that, in terms of profitability, has been wildly successful in recent years. Founded in 1985, Qualcomm started out designing communications technology for satellites and military applications and went on to establish its proprietary wireless communications technology as a platform for the cellular phone industry.[3] However, the company also has been threatened by growing opposition among powerful third parties within its ecosystem.

One major issue is that, unlike Google, Qualcomm may not have permitted its partners and customers to make enough profit. But another issue is that wireless technology is evolving relatively fast. In any market where there is a rapid pace of technological change, we think it is much more difficult to establish and maintain a position of platform leadership because new competitors appear and customers can switch with each new technology generation. At the same time, in rapidly evolving markets, platform leader wannabes must make special efforts to create strong economic incentives for their partners and customers to continue using and investing in the common technology and applications to help the platform evolve. But let's see whether Qualcomm satisfied our two pre-requisite conditions for platform leadership potential. Then we shall return to how Qualcomm is faring on the business side of coring.

First, Qualcomm solved a basic technical problem of the late 1980s and early 1990s of incompatible and inefficient wireless cell phone technologies. This problem affected negatively other industry players such as telecom operators and handset manufacturers. Qualcomm invented the CDMA (Code Division Multiple Access) technology, which breaks phone calls into small bits and then reassembles them much like the Internet does with data packets. Key industry players such as AT&T (later Lucent) and Motorola soon considered CDMA as the most efficient technology for cell phones and licensed the technology. We conclude that Qualcomm met the first condition for platform potential.

Second, Qualcomm specifically invested in chipset designs embedding its technology to facilitate third-parties' adoption, and made CDMA widely available for licensing. The chipsets were compact integrated circuits which had physical connectors that made it easy to plug them inside cell phone handsets – and Qualcomm licensing of its intellectual property made it easy for operators to use CDMA protocols. This strategy enabled dozens of companies to include Qualcomm technology in most "2G" (second-generation) and many 3G cell phones as well as in hundreds of other wireless devices. Qualcomm therefore passed the second pre-requisite condition for platform potential.

On the business side, Qualcomm has a more checkered performance. In its business model, an important source of revenue is from licensing its intellectual property. Qualcomm therefore filed thousands of patents and challenged regularly and aggressively, in court, any potential violators. Third parties may not have appreciated this litigious approach. But, since Qualcomm owned approximately 80 percent of the patents for CDMA and CDMA2000 technology, for many years, customers had little choice. Also, Qualcomm lessened some of the conflicts with third parties in the late 1990s, such as by selling its cell phone handset business, which had competed with its own handset-maker customers such as Nokia, Ericsson, and Motorola.

In fiscal 2006, Qualcomm reported an astounding net income of $2.5 billion on sales of $7.5 billion, selling both chipsets as well as licensing its patents. However, as the technology and market continues to evolve, we can see Qualcomm's position weakening. European companies led by Nokia as well as companies sponsored by the Chinese government have been developing or exploring alternatives to Qualcomm patents to avoid paying high license fees. In 2007, Qualcomm only owned 20 percent of the patents for the newer WCDMA standard, popular in Europe. Nokia also has gone to court to challenge Qualcomm's high licensing fees. Qualcomm might have avoided this situation in the cell phone market by investing more of its profits in R&D for the next-generation technology as well as making more aggressive efforts to work with, not against, customers such as Nokia. Qualcomm is also trying to diversify. It is attempting the same coring strategy for mobile broadband connectivity on laptops, with 70 models embedding Qualcomm chipsets as of May 2007.[4]

We think that the fast pace of technological evolution in the cell phone industry and degree of opposition within the ecosystem will make it difficult for Qualcomm to maintain its position and profit margins. Still, it may well be able to establish a strong business in wireless technology for other mobile devices. But Qualcomm probably needs to change its philosophy and pay much more attention to the business side of coring. It could make its technology cheaper to license. It could also work more cooperatively with partners and customers to prepare better for generation changes in the technology and to encourage the development of complementary innovations.

b. **Examples of Failed Coring**

i. **GM OnStar in Automotive Telematics**

In 1995, General Motors started an effort towards launching a new industry platform, OnStar, with the goal to give wireless capabilities to the automobile for navigation systems, directions, notification of accidents, remote diagnostics, maintenance reminders, internet connectivity, remote opening of locked vehicles, and other services. GM established OnStar as a wholly owned subsidiary in collaboration with its EDS and Hughes Electronics divisions. The technology platform consists of hardware, software, and service agreements with a wireless provider.

Initially, GM managed to get various automakers (Toyota/Lexus, Honda, Audi/Volkswagen, and Subaru) to adopt the OnStar platform. Gradually, however, other automakers concluded that these capabilities and, in particular, the information on the

customer that OnStar generated about driving habits, was too valuable to let a competing company control. Consequently, these firms decided to build or buy competing systems and stopped licensing OnStar.

In our analysis, GM had not found a way to position its new technology as an essential part of a neutral industry platform. It might have spun off OnStar as an independent company. Or GM might have done what Intel is famous for: creating the equivalent of a "Chinese wall" around its architecture labs, the core microprocessor business, and various chipset businesses that compete with Intel customers. We think GM failed at the business aspect of coring, though OnStar remains an attractive service platform for GM customers and, with internal transfer payments, generates a profit for the automaker.[5]

ii. EMC in data storage

EMC, a market leader in data storage technology founded in 1979, launched a strategy in the early 2000s that aimed to establish its hardware and software technology, known as Wide Sky, as a new industry-wide platform. Wide Sky was a middleware software layer that made it possible to integrate and manage third-party hardware. By doing so, it solved an important technical industry problem that affected all IT customers: the efficient management of a growing assortment of heterogeneous information systems, which store more and more mission-critical data. Like GM, we can say that EMC succeeded in the technological aspect of coring, but failed at the business side.

EMC was unable to convince its competitors – principally IBM, Hewlett-Packard, Hitachi, and Sun Microsystems – to adopt Wide Sky. Non-EMC customers were also reluctant to adopt a proprietary standard. Perhaps EMC should simply have given away its technology for free or spun it off into an independent, neutral entity, making every effort possible to get the input and cooperation of key industry players. If a common platform for data storage benefited the storage market, EMC could have benefited more than competitors because it had the largest market share. In any case, EMC's competitors decided to establish their own open-standards platform controlled by a newly formed organization, the SNIA (Storage Networking Industry Association). The number of firms and users supporting this open technology eventually forced EMC to abandon its platform-leadership effort and adopt the SNIA standards.[6]

Adoption of the consortium's SMI (Storage Management Initiative) specification (SMI-S) is on the rise since it has received the formal backing of most of the storage industry firms. However, this standard has not yet fulfilled the promise of enabling centralized management of heterogeneous systems. This coalition of firms has therefore succeeded at the business aspect of coring, but failed at reaching a technical solution that effectively solves the industry's main technological problem. The functionality provided by this industry coalition still lags the functionality that EMC could have provided. This situation still leaves the possibility for EMC to reassert itself as a potential platform leader, but it would probably have to work through the consortium and make more of its technology open and perhaps even free or nearly free.

c. An Example of Coring in Process

i. The Digital Home (Intel, Microsoft, and others)

The digital home represents a market where many technology vendors are ready to proceed but there are few customers and related technology and business sides have not yet come together to define a coherent platform and ecosystem. The goal since the mid-1990s for the digital home has been to connect entertainment devices (e.g., television, stereos and music players) and appliances (e.g. heating or air conditioning systems, refrigerators) with a home computer network. To further this vision, several companies in 1999 formed a group called the Internet Home Alliance, bringing together Sears, Panasonic (Matsushita), General Motors, Intel, and Cisco to deal with the various challenges, such as wiring homes with high-bandwidth Internet service or making wireless functionality available.[7]

While at least some consumers should want their digital systems to communicate with each other and with a PC, demand for such a platform has progressed extremely slowly. We think this is a coring problem because no company has managed to insert the necessary technologies into all the relevant products or to create the business incentives to motivate industry players to converge on a common technology. The two firms that ultimately took control of the PC platform are once more vying for platform leadership in the digital home market, though it is not clear that either will succeed without lots of help.

On the software side, Microsoft, in 2002, launched its Windows Media Center software, which enables Windows to perform some of the necessary digital home functions. Microsoft continues to evolve the Windows software, though usage of the Media Center software is minuscule. Slow adoption on the Windows side has allowed Apple, Hewlett Packard, Sony, and other firms to enter this market segment with their own software and hardware combinations. On the hardware side, Intel, in 2003, launched a new digital home business division and began marketing a bundle of microprocessors intended to be the core chips in new home PCs and perhaps other devices. As it did with the personal computer, Intel put in place a series of initiatives to encourage the adoption of its microprocessors and networking standards among customers, partners, and software developers interested in home applications. Also in 2003, Intel co-founded the Digital Living Network Alliance to promote interoperable common standards for audio and video within a home network. This group, whose board of directors now consists of representatives from Intel as well as Microsoft, Sony, Phillips, Hewlett Packard, Matsushita-Panasonic, and Nokia, has grown to over 130 members.

Our assessment is that this market will require many years for a platform and a leader to emerge. On the technology side, there are too many diverse products involved, and connectivity adds cost. Moreover, the communications protocols and wireless technologies keep evolving and there is no common standard followed by appliance producers around the world. Business-wise, the major challenges include how to justify the additional cost of adding technology and features that few users demand. There are also issues such as digital rights management for audio and video content. Another challenge is the different product replacement cycles: Customers buy new computer hardware and software or multimedia content much more frequently than they replace

their heating and air conditioning systems or buy new durable goods like refrigerators and television sets, which can last a couple of decades.

So, although Microsoft, Intel, Apple, Sony, and many other firms already produce the key components necessary to create a digital home platform, the business drivers are not there and the digital home remains more an idea than a market. This diverse market may require a different type of platform leader and a different approach to coring. For example, the digital home might require coordination through a governmental or industry organization that can identify the relevant technical standards and technologies, encourage the development of interoperable as well as complementary products and services, and use this consensus to promote both the technology and the business sides of the platform. In fact, we can already see signs of this happening. A large non-profit industry coalition for home builders, the Continental Automated Buildings Association, has taken over the Internet Home Alliance and continues working on the long-term platform goals. Key directors of this organization include executives not only from builders such as Tridel and Leviton but also from technology companies such as Bell Canada, Honeywell, Hewlett Packard, Microsoft, AT&T, Invensys, Cisco, Siemens, Panasonic, Whirlpool, and Trane.[8]

4. Tipping: How to Win Platform Battles by Building Market Momentum

We call "tipping" the set of activities or strategic moves that wannabes can use to shape platform market dynamics and win a platform war when at least two platform candidates compete. These moves cover sales, marketing, product development, and coalition building. As with coring, successful tipping requires actions taken from both the technology and the business sides of the platform. First, though, we need to show how some key ideas discussed by other authors in another context can apply to tipping. We also have two specific suggestions for successful strategies, namely *tipping across markets* and *building coalitions*, as well as comments on some potential mistakes managers can make.

First, we need to recognize that many platform battles involve competition among technical standards and incompatible technologies (e.g. VHS vs. Beta, Windows vs. Macintosh, CDMA vs. GSM, or Toshiba's HD-DVD vs. Sony's Blu-ray standard for high-definition media storage). In these cases, as other authors have discussed, companies should try to gain control over an installed base, broadly license their intellectual property, and do other things to facilitate partner investments in complementary innovation.[9] They should also invest in building brand equity as well as manufacturing, distribution, or service capabilities to signal support of the platform. For example, Matsushita publicized its large investment in mass production facilities as an argument to convince developers of videotapes to adopt the VHS standard, which had been developed at its much smaller Japan Victor (JVC) subsidiary. Intel, when trying to convince motherboard makers to adopt their new interface for connecting peripheral devices (PCI), committed to develop it themselves in large numbers. All these approaches are helpful to master the business side of tipping.

Second, we need to recognize that pricing is another useful strategic weapon in platform battles, but it is more complex to use than in simpler product markets. We do find helpful the idea that platforms can be understood as "double-sided" markets, and that it may be necessary for platform leaders and wannabes to subsidize one side of the market (for example, software application developers) in order to bring on the other, paying, side (for example, software end users).[10] But we do not see any clear frameworks that tell mangers how much to subsidize one side of the market over the other. Moreover, the price that maximizes profits for a standalone "hit" product may not encourage a global ecosystem of complementors or make much difference if new and better platform generations appear. For example, Qualcomm clearly emerged as the leader in 2G wireless technology, but its high royalty and licensing fees have encouraged powerful non-U.S. complementors (like Nokia) and governments (like China) to seek alternatives.

At the opposite extreme, trying to stimulate demand through low or zero pricing for all or part of a platform system can destroy the business model for complementors. As we wrote in Platform Leadership, Intel made this mistake when it tried to enter the PC video-conferencing market with a line of products that competed with higher end systems made by PictureTel and other companies. Customers suddenly stopped paying for expensive video conference equipment and services, forcing these companies out of existence and probably delaying the adoption of the PC as a device for video communications. Software product companies that have to compete with free open source products of comparable functionality have faced a similar problem: Low- or zero-priced products can destroy the incentives to innovate for companies in those markets, although, in software, some firms have survived by selling services and advertising.

But there is another way to do tipping that we found quite powerful: we call this tipping *across* markets. This is when wannabes *cross over* the boundary of their existing market to absorb technical features from an adjacent market and *bundle* them to extend their platform. Such bundling across markets involves both technology (as it changes the design of a product) and business (as it involved pricing of the combined product). Tipping across markets seems particularly important in the context of technological convergence, which is pervasive among computers, telecommunications equipment, and digital appliances. Firms who tip across markets by bundling new features can leverage existing market power, technology, or reputations to help them move into adjacent markets.

Another novel tipping behavior we have observed is when competitors or users band together in a coalition, as a defense mechanism, to fight entry by a platform leader wannabe. This can be seen not only in the EMC storage example but also in cellular telephony with Nokia ganging up with competitors to back up the Symbian operating system to build a viable alternative to Microsoft's mobile operating system. Japanese, European, and Chinese telecommunications equipment producers and service providers have also worked together to oppose Qualcomm's monopoly in CDMA technology. As we later discuss, Linux users and service providers have worked together to limit the positions of Unix as well as Windows in the server operating system market.

Our research also suggests that companies can encounter specific obstacles and make common mistakes when attempting to help a market tip. Of course, established platform

leaders with monopoly power in one market, such as Microsoft, Intel, Cisco, and Qualcomm, must take care not to violate anti-trust laws. In addition, however, problems sometimes occur because tipping strategies dependent on narrow technical standards are effective only as long as platform boundaries remain relatively fixed and predictable. This is because companies that dominate in one market may fail to maintain their positions when converging technologies create opportunities to extend other platforms. For example, Palm once dominated the hand-held computer market with its PDA product but this is now giving way to smart phones. Another problem can occur when opening a platform's inner workings too much to encourage the supply of complementary innovations. Too much openness can expose the firm to imitation. IBM made this mistake when it asked Microsoft and Intel to provide key components of its PC platform and did not contractually retain rights to the operating system or the microprocessor design.

We think that Linux (for web server operating systems but not for the desktop) and Internet Explorer (for web browsers) are particularly good examples of different but successful tipping strategies. Netscape (with its browser) and Palm (with its PDA) are well-known cases of failure. There are several emerging markets where tipping has yet to occur, though video game consoles is useful to demonstrate the variety possible in tipping strategies and the difficulty of declaring a winner in large markets that can sustain differentiated or niche products.

a. Examples of Successful Market Tipping

i. Web operating systems (Linux vs. Unix and Windows)

Linux provides an excellent example of tipping through the power of a large, and still growing, coalition of service provider firms as well as users. This operating system was introduced first in 1991 by the Finnish graduate student Linux Torvalds, based largely on the Unix design, and evolved through a formal and informal community of open source programmers and users around the world. The interface and installation requirements continue to limit its popularity among average consumers, resulting in an ongoing shortage of everyday desktop applications, compared to Microsoft Windows, the dominant software platform for the PC. Nonetheless, Linux has managed to become the fastest growing operating system used in the back-office, particularly for web servers.

From about 20 percent of the installed base for server software in 2005, Linux grew to about 50 percent of the market by 2006 (compared to only about 3 percent of the desktop operating system market).[11] In contrast, Unix (whose main distributor is Sun Microsystems) remains expensive and requires more costly proprietary hardware. Windows server from Microsoft is still cheaper than Unix but is more expensive than a nominally free product. Intel also adapted its microprocessors to run Linux and this reduced hardware costs. Even Microsoft in 2007 signed an agreement with Novell to make sure that Windows interoperates with Linux in the future.

Several factors contributed to the success of Linux for back-office applications – suggesting that price alone does guarantee a market will tip.[12] Linux offered not only a seemingly low cost of ownership (the price is nominally zero, though service and training

can be expensive) but also very high quality at least for skilled IT professionals. By itself, an operating system is of very limited utility. But the open source community made sure that Linux worked exceptionally well with what we can consider the "killer" application for web masters -- the free and open source Apache web server. Still, we believe that Linux would not have become widely accepted as an enterprise software platform without the decision of numerous powerful companies, led by IBM and Hewlett Packard, to provide support services for Linux as well as to bundle it with their popular hardware servers and other software products. The legitimacy that IBM in particular gave to Linux helped startups such as Red Hat survive as service providers for Linux users, and made it more comfortable for major enterprise application vendors such as SAP and Oracle to make their products work with Linux.

ii. Internet Browsers (Internet Explorer vs. Netscape Navigator)

We have already mentioned the case of Internet browsers but here we would like to highlight Microsoft's tipping strategy. As discussed elsewhere,[13] Netscape introduced the first mass-market browser in 1994 and dominated the market for several years. Microsoft designed its own browser, Internet Explorer, and bundled this "for free" with Windows from 1995. As hundreds of millions of new PCs shipped with Internet Explorer over the next several years, and as Microsoft steadily improved its browser technology, Netscape's browser dropped from around an 80 percent market share to a negligible presence. In this case, we also have the problem of whether the browser is a separate product from the operating system and how a company with a monopoly in one market has to treat the second product. By bundling a product for free that competitors offered for sale (and sometimes for free as well), Microsoft violated antitrust law because it had such a dominant share in operating systems. What is worse is that Microsoft pressured PC manufacturers and service providers not to bundle Navigator.

Apart from the antitrust story, however, we can still learn from Microsoft's strategy. One dominant platform can be a powerful distribution mechanism for a company that wants to enter other platform markets — if there are ways to bundle the technologies or do other things, such as use the same distribution channels or create unique complementarities across the different products. Windows would have served these functions for Internet Explorer even if Microsoft had avoided antitrust problems such as by offering Windows with and without the browser at different prices and not pressured PC manufacturers to avoid the competing product. We are especially confident in this judgment because Microsoft had much greater resources to continue investing in browser R&D and Netscape management made a series of strategic and technical errors, as we discuss next.

b. Examples of Failed Market Tipping

i. Netscape

How might Netscape have maintained its early lead and prevented the market from tipping toward Microsoft? For one thing, Netscape managers misunderstood how to keep a market from tipping in a different direction. Once a comparable product is free, competitors have little choice but to reduce their prices to a similar level and find other

ways to make money, such as through services or advertising. Netscape made the mistake of continuing to charge customers such as Dell and AOL as well as corporate users for the Navigator browser even after Microsoft began bundling a competitive browser for free. Netscape was also late to see that it could generate enormous advertising revenues from its highly popular website.

But perhaps Netscape's greatest mistake was to challenge Microsoft too directly and present the browser as an alternative computing platform before it had enough of a user base and ecosystem of complementors (web site designers, web application developers, and Internet service providers as well as PC assemblers who were licensing Navigator) to sustain its position.[14] Navigator initially was a wonderful complementary application to Windows and might have remained so, at least for several more years. Netscape had million users by 1995-1996, but there were hundreds of millions of PC users out there who had yet to move to the Internet. We do not think it unreasonable that Netscape managers should have thought more carefully about the potential size of the market and how their early lead could quickly erode with a competitor such as Microsoft, which shipped hundreds of millions of copies of Windows each year.

ii.   Palm with Handheld Computers

Palm involves a case of failure due to its strategic ambiguity – whether to be a product company or a platform company. After a resounding success in 1996-1999 as the pioneer of personal digital assistants (PDAs) with the Palm Pilot, Palm tried to do two things at once: establish its Palm device as the preeminent PDA product while promoting the Palm OS as an industry platform that it could license to PDA competitors. Platform leaders generally have difficulty encouraging complementors if they do not establish a position of neutrality.

Palm also has suffered from convergence – the PDA market is quickly being absorbed by the "smart phone" market. Palm did end up splitting its operations into two companies in 2003, creating palmOne for the PDA devices and PalmSource for the OS, but this was too late for the market. PalmSource became increasingly dependent on palmOne as its main customer. In 2005 it was sold to a Japanese-based software company, Access, and gave up the Palm name. Today there is less confusion between Palm as product and Palm as platform, but other platform technologies have much more market share in this space. Access continues to market the Palm OS with limited success.

c.   An Example of Tipping in Progress

i.   Videogames (Sony, Nintendo, Microsoft)

The videogame console market reflects the different kinds of tipping strategies possible for platform leader wannabes and the difficulty of choosing a winner where such degrees of differentiation in strategies and products is possible. The ecosystem generated $12.5 billion in sales in 2006, including games and consoles.[15] We have intense competition among three platforms. Every five or six years, new generations of consoles appear with different features or qualities, triggering a new series of investments and competition. Although some games run on all the different consoles as well as personal

computers, the game consoles represent very distinct platforms and different platform strategies.

Microsoft, the newest player in consoles, has approached games much as it has the PC market. It has tried to rally the largest possible number of developers. It has developed a highly modular software architecture based on Windows and has eagerly disseminated Windows-like programming tools to facilitate game development. [16] Microsoft is also strong in online gaming and has designed its X-box console to work seamlessly with PCs. So far, however, Microsoft loses money on each console and hopes eventually to make a profit on software.

Nintendo, the loser in the last round of console wars, is selling the cheapest product while developing in-house or through a tightly controlled network of developers a smaller number of games but potentially bigger hits. Its consoles share a lot of technology with previous generations, making new games cheaper to develop. In this last round, Nintendo also surprised the industry with a clever innovation combining hardware and software that changes the player's experience: a wireless remote control for its new Wii console. This new technology allows for a more intuitive gaming and has attracted new users interested in exercising and sports such as golf and boxing. As of mid-2007, the Wii was outselling competitors by a large margin.[17] This suggests that this is not an easy platform market to dominate. The loser in one round can win the next with the right features and complementary innovations.

Sony, which won the last round with a 70% market share for PlayStation 2, has focused on the high end and "hard core" players. Its latest console, PlayStation 3 (PS3), is the most expensive. One problem, though, is that Sony seems tied to its historical roots as a great product company with little understanding of how to turn products into industry platforms (we have in mind Sony products such as the Betamx VCR, the Walkman, and, more recently, its Blu-ray DVD players). Not surprisingly, Sony has been slow to market with its latest console (because it adopts so many state-of-the-art technologies) and slow to help game developers (though it has tried to change recently).[18]

Some platform markets are sufficiently competitive while also having enough room for differentiation and niche strategies that a winner may never emerge. Videogame consoles may fit this case. None of the competitors seems vastly superior and each has strengths. However, if PC manufacturers add more specialized capabilities for gaming, then we expect Microsoft to have an advantage. It may be able to tip across platforms by modifying Windows, appealing to the enormous network of Windows programmers, and using its software tools expertise to encourage more game developers to support Windows and X-box.

5. Final Thoughts

One issue that has surfaced in our discussions with managers is whether small or medium-sized firms can truly become platform leaders, or do you have to be a large firm like Microsoft or Cisco? We believe that coring is an option possible for small and large firms alike because technology and architectural leadership do not directly depend on the size of the firm. Qualcomm, for example, was little more than a startup company when it

introduced its technology for wireless devices. Japan Victor and even Microsoft and Intel were small firms when they first became platform leaders. And Linux was the product, at least initially, of a lone graduate student working in a remote corner of Europe. At the same time, though, smaller firms are likely to have a harder time tipping markets on their own and generally will need to establish ecosystem partnerships or coalitions of providers and users – as JVC, Microsoft, Intel, and Linux have done.

In general, success as a platform leader wannabe requires a compelling vision of the future as well as the ability to create a vibrant ecosystem by evangelizing a business model that works for the leader and potential partners. It can sometimes be hard to convince others to follow a particular vision of the future, for example, when an industry is undergoing transition and its contours are ill-defined, or when technology is evolving too rapidly. But these are the very conditions when platform leaders can stand out – precisely because they are so badly needed.

About the Research

Over the past decade, we have investigated dozens of companies that have attempted to formulate and implement platform strategies. These firms operated in a variety of industries, including computing, telecommunications, electronic appliances, semiconductors, enterprise software, data storage, automobiles, web portals, and electronic payment systems. The major firms we have studied include Intel, Microsoft, Cisco, Palm, NTT DoCoMo and NTT Data. We have also worked closely or exchanged ideas with firms such ranging from SAP and Nokia to eBay, Boeing, and Siemens Automation. In our research, we have interviewed hundreds of managers and engineers, and complemented the interviews with analysis of firms' archival records and company and industry data. The first stage of our study aimed at uncovering the drivers of success at established platform leaders. The results of that work were published in SMR (2002) as well as in our book Platform Leadership (HBS Press, 2002).

The focus of our previous work was on how Intel, Microsoft, Cisco and other firms had been able to drive industry innovation and sustain positions of platform leadership. We identified four "levers" or mechanisms through which successful platform leaders were able to "architect" or influence external innovation. The first lever was *firm scope:* the choice of what activities to perform in-house vs. what to leave to other firms. This decision is about whether the platform leader should make at least some of its own complements in-house. The second lever was *technology design and intellectual property:* what functionality or features to include in the platform, whether the platform should be modular, and to what degree the platform interfaces should be open to outside complementors and at what price. The third lever covered *external relationships with complementors:* the process by which the platform leader manages complementors and encourages them to contribute to a vibrant ecosystem. The fourth lever was *internal organization:* how and to what extent platform leaders should use their organizational structure and internal processes to give assurances to external complementors that they are genuinely working for the overall good of the ecosystem. This last lever often requires the platform leader to create a neutral group inside the company, with no direct profit-and-loss responsibility, as well as a Chinese Wall between the platform developers and other groups that are potentially competing with their own complementary products or services. Taken together, the Four Levers offer a template for sustaining a position of platform leadership.

This article presents findings from the second stage of our research. We are now focusing on drivers of success at firms that wish to become platform leaders in new or established markets.

Endnotes

[1] Since we published our work on platform leadership in 2002, a number of students at MIT and elsewhere have inspired us to continue this research and, in particular, to go beyond the 4 levers and investigate market or business factors that help platform-leader wannabes succeed. In particular, we would like to thank Ray Fung for his 2006 master's thesis, "Networking Vendor Strategy and Competition and Their Impact on Enterprise Network Design and Implementation" (MIT System Design and Management Program) and Makoto Ishii for his 2006 master's thesis, "A Strategic Method to Establish Sustainable Platform Businesses for Next-Generation Home-Network Environments" (MIT Sloan Fellows Program).

[2] We thus disagree with J. Sviokla, and A. Paoni, "Every Product's a Platform," Harvard Business Review, October 2005.

[3] This discussion of Qualcomm is based primarily on D. Yoffie, P. Yin, and L.Kind, "Qualcomm, Inc. 2004," Harvard Business School Case #N1-705-401 (January 25, 2005). See also "Qualcomm Business Model: A Formula for Innovation and Choice", http://www.qualcomm.com/about/pdf/QCOM_Business_Model_0307.pdf

[4] Source: Qualcomm Annual Report 2006

[5] This description of OnStar benefited from public information as well as an informal discussion with the president of OnStar, Chet Huber, at the MIT Sloan School on April 4, 2007.

[6] See J. Saghbini, "Standards in the Data Storage Industry: Emergence, Sustainability, and the Battle for Platform Leadership," MIT System Design and Management Master's Thesis, June 2005.

[7] See http://www.caba.org/iha/iha-list.html and P.Thurrott, "Internet Home Alliance Integrates Its Way into US Homes," Connected Home Magazine, November 7, 2001, http://www.connectedhomemag.com/Articles/Print.cfm?ArticleID=23133&Path=Networking

[8] See http://www.caba.org/aboutus/index.html

[9] See C. Shapiro and H. Varian, "Information Rules" (Boston: Harvard Business School Press, 1998).

[10] A good summary of this research can be found in T. Eisenmann, G. Parker, and M. Van Alstyne, "Strategies for Two-Sided Markets", Harvard Business Review, October 2006.

[11] DM Review, "Industry Research: Linux vs. Windows – Is the Gap Narrowing?" http://www.dmreview.com/article_sub.cfm?articleId=1030321 May 24, 2005; and Wikipedia, "Comparison of Windows and Linux" www.wikipedia.com (accessed May 29, 2007).

[12] See, for example, G. Moody, "Rebel Code: Inside Linux and the Open Source Revolution" (Perseus, 2001) as well as our treatment of Linux in A. Gawer and M. Cusumano, "Platform Leadership: How Intel, Microsoft, and Cisco Drive Industry Innovation" (Boston: Harvard Business School Press, 2002).

[13] M. Cusumano and D. Yoffie, "Competing on Internet Time: Lessons from Netscape and Its Battle with Microsoft" (New York: Free Press, 1998).

[14] Cusumano and Yoffie.

[15] "Console Wars – Video Games," The Economist, 24 March 2007.

[16] M. Adkisson, V. Costan, Y. Khan, D. Kim, and L. Popov, "The 7th Console War", MIT Sloan School, Software Business Class (15.358) Group Project, December 2006.

[17] "Wii Fans Give Nintendo a Boost," Boston Globe, May 29, 2007, p. C4.

[18] "Console Wars – Video Games," The Economist, op. cit.