

Strategies for Tomorrow's “Winners-Take-Some” Digital Goods Markets

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Abstract

Most business managers are familiar with "Winner-Take-All" markets where information technology products that have essential complements, such as hardware and software, or players and media, tend to "tip" toward a single standard, typically owned by a single dominant firm. Winner-Take-All markets have been common in technology industries, with examples including VHS over Betamax, Blu-Ray over HD-DVD and Microsoft's Windows and Office software over a variety of competitors.

However, changes in the development and delivery of digital goods may portend a different, "Winners-Take-Some" outcome that will demand new thinking and strategies on the part of business executives. In single-winner outcomes managers were encouraged to subsidize early adopters and later rely on powerful network effects to drive the market to "tip." These markets had a tendency to keep customers "locked-in" until the next major shift in technology platforms occurred.

However, as information increasingly moves to digital transmission formats, the possibility of digital conversion between formats increasingly allows multiple winners to co-exist. Examples of such markets include hardware devices such as flash memory cards, where currently multiple formats coexist, and a variety of digital audio, video, and image formats that allow conversion across an array of standards.

In these markets managers will be required to unlearn some prior strategies, and will have new opportunities for growth. As the cost of conversion falls in markets with strong complementary goods relationships and relatively homogeneous consumers, quality and product features will start to replace lock-in as the most important product attributes. Firms will benefit from coordinating with other firms by cross-licensing to increase total market size. Consumers will more aggressively adopt new technologies as the risk of being 'stranded' on the wrong technology declines. Overall we expect to see more rapid technology innovation and more entrants. In addition, incremental change will be possible as lower compatibility barriers reduce the dependence on a limited number of discontinuous technology changes during infrequent platform change periods.

In this environment managers will need to develop greater skills in coordinating with former competitors in order to be part of the larger market 'pie.' They will need to carefully consider whether making significant investments in early customer subsidies still makes sense as the potential 'jackpot' payoff from winning the entire market is reduced. At the same time the risk of entering these new markets will be lower, rewarding managers who can quickly develop compatible products and services. Consumers too, will benefit overall from faster technological change, greater product variety and lower risks of choosing the 'wrong' technology.

The “Winner-Takes-All” Era

Most managers (and consumers) understand the key patterns from the prior decades’ “standards wars.”¹ At first, two or more similar, but incompatible, information technologies are introduced to address similar market needs. Incompatibilities between the technology platforms mean that users of one platform can’t enjoy the benefits derived from the other platform in terms of additional users to communicate with or content to consume.

Managers of both platforms, realizing the strong network effects associated with initial adoption, start a “standards war” given their expectation that only one firm will win and thus that firms have to compete *for* the market before they compete *in* the market. This result is common in markets with networks of complementary goods (e.g., software for hardware, media for players, games for video game consoles, etc.), where the market desires a single, dominant platform, and consumers prefer to adopt the leading platform and may even withhold purchases until the dominant platform emerges.

In order to win the standards war vendors may engage in competitive behaviors such as subsidizing early adopters to increase network size and to offset the lack of network benefits to early adopters, thereby causing the market to ‘tip’ to their platform. Once tipping occurs, the winning firm can extract economic rents from its dominant position in the market and future generation technologies need to offer significant improvements to overcome the network advantages of the incumbent platform. Examples of these sorts of standards wars include VHS over Betamax, DVD over Divx, Blu-ray over HD-DVD, and the XM-Sirius satellite merger.²

These examples have a number of characteristics in common: The competing technologies are effectively substitutes; the competitors’ formats are incompatible, and complements (media, software, content) are critical for consumer value; and finally, and most importantly, the technologies are not easily converted from one standard to another due to factors including the time and effort involved in conversion, quality degradation inherent to conversion, technological restrictions or limitations, and/or digital rights management restrictions.

The Emerging “Winners-Take-Some” Marketplace

However, managers should note that this established pattern of strategic interaction might become less relevant in the context of digital standards, where cheap and perfect conversion from one format to another is possible. In this setting our research suggests that managers are more likely to face a “Winners-Take-Some” outcome where multiple different standards can co-exist side-by-side.

Examples of this new competitive environment are appearing in a variety of contexts. For example, while the content-platform characteristic of flash memory cards and card converters may look similar to competition in VHS and Betamax, flash memory cards have not seen a strong “Winner-Take-All” outcome where one dominant standard emerges. Instead, as shown in Figure 1, the flash memory card market has multiple formats (Compact Flash, Memory Stick, Secure Digital, Smart Media, xD Picture, MultiMedia Card) with no obvious trend toward market consolidation. Similar situations can be seen in digital media formats for audio (e.g., .wav, aac, MP3, WMA, FLAC, Apple Lossless), images (e.g., .jpg, .tif, .bmp, .gif), video (e.g., .wmv, .mpg, .avi, .flv, .mov), and file compression (e.g., WinZip, winrar, arj).

¹ The notion of markets “tipping” to a single standard has been popularized by Gladwell, M. *The Tipping Point: How Little Things Can Make a Big Difference*, Back Bay Books, 2000. Advice to managers on how to succeed in such markets is summarized in Eisenmann, T., G. Parker, M. W. Van Alstyne. “Strategies for Two-Sided Markets” *Harvard Business Review*, October, 2006, 1-10.

² For historical background see Cusumano, M.A., Y. Mylonadis, and R.S. Rosenbloom. “Strategic Maneuvering and Mass-Market Dynamics: The Triumph of VHS Over Beta. *Business History Review*, Spring 1992. Dranove, D., and N. Gandal, “The DVD vs. DIVX Standard War: Empirical Evidence of Network Effects and Preannouncement Effects.” *Journal of Economics and Management Strategy*, 12: 363-386 (2003), and sidebar.

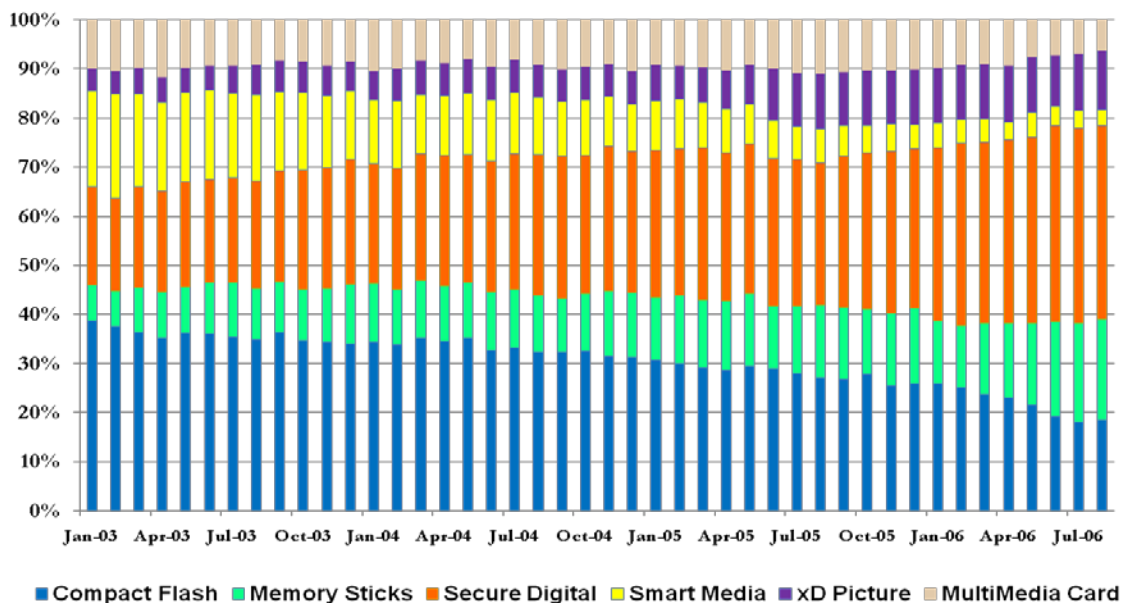


Figure 1: Flash Memory Card Market Share (January 2003 – August 2006)

(Liu, C., C. Kemerer, S. Slaughter, M. Smith. "Standards Competition in the Presence of Digital Conversion Technology: An Empirical Analysis of the Flash Memory Card Market" Revised 2010. Data source: NPD Group.)

We believe there are several factors driving this change. First, in a digital environment, a large number of essentially equivalent designs are possible, making it more likely to see an increased variety of independently-produced formats. In contrast, in an analog environment, natural laws tend to limit design space.

However, this only suggests how multiple standards come into existence, not why they survive. One critical factor enabling the co-existence of competing digital standards is the presence of digital converters — either hardware- or platform-based. For example, hardware-based flash memory converters allow users of one standard to easily read their content into other devices through the universal USB interface. For digital conversion, computers can serve as flexible universal converters, allowing, for example, video editors on a Macintosh platform to easily convert WMA audio files created on Windows PCs to an iTunes-compatible AAC format with little discernable loss in signal quality.

In contrast, analog media “readers” were typically fixed in hardware and relatively inflexible. Conversion between two incompatible standards in this context was slow and led to significant signal loss — for example, conversion from vinyl record albums to analog tape. Likewise, providing the ability to play two incompatible formats (e.g., VHS and Betamax videotapes) nearly doubled the hardware cost.

Sidebar: Digital Winner-Take-All standards: Blu-ray vs. HD-DVD and XM and Sirius:

But wait, aren’t Blu-ray discs digital? And isn’t satellite radio a digital signal? Why do these markets have a single winner?

Blu-ray / HD-DVD: It is important to note that, while Blu-ray content is digital, it is encoded onto a fixed medium that is not easily converted between standards because of intellectual property (IP) protections. Moreover, differences in the lasers used to encode Blu-ray and HD-DVD content mean that “dual players” would cost nearly

twice as much as a single player (similar to a dual VHS/Betamax player). As a consequence, the Blu-ray vs. HD-DVD “standards war” had a single winner, like Beta-VHS.

XM and Sirius: XM and Sirius were established by the FCC as separate licenses to promote competition. However, bidding for content and subsidization of early adopters threatened to bankrupt both sides. Their recent merger was the solution to the failed regulatory-enforcement of multi-vendor competition. However, a converter, in the form of a dual receiver, would still be required to receive both signals.

The Digital Products Delivery Chain

A model is helpful to observe similarities among what otherwise might be seen as disparate products. Figure 2 highlights three essential elements in the digital products delivery chain:

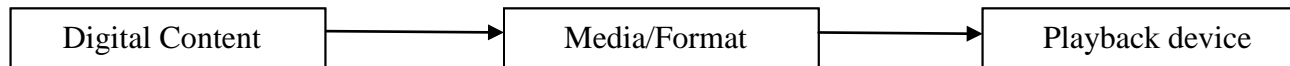


Figure 2: Digital Products Delivery Chain

This delivery chain starts with Digital Content. These information goods represent anything that can be encoded digitally, including data, images, music, and video. Producers of information goods need to decide how they deliver their goods, represented as the second step in the delivery chain, Media/Format. In an analog era, goods were delivered in fixed media, such as videocassette tapes or vinyl records. The first move toward full digitalization was digital media, such as audio CDs or video DVDs. Currently digital goods are increasingly delivered as a stream of bits following a standard format, such as multiple audio (e.g., .wav, aac, MP3, WMA, FLAC, Apple Lossless), image (e.g., .jpg, .tif, .bmp, .gif), and video formats (e.g., .wmv, .mpg, .avi, .flv, .mov). Formats can be seen as “containers” that fulfill the role previously filled by fixed media.

Finally, the end consumer needs a Playback device, or reader, to allow consumption of the information good. Previously these were single purpose devices such as VCRs or CD players, and this model persists today in, for example, Amazon’s Kindle. Increasingly, however, general-purpose devices serve the playback role for multiple media types. For example, electronic books may be read on a single-purpose eBook reader or on a multipurpose device like Apple’s iPad.

Future Standards Wars

How might these trends evolve in the future? In analyzing this question it first seems likely that media quality will continue to be an important attribute for consumer adoption decisions. Second, the cost of digital conversion will continue to fall, given the prevalence of general purpose computers and the increasing reliance on media consumption through software-based devices and the Internet (e.g. Google Docs and other cloud-based services). It also seems likely that important technology markets will continue to have strong complementary goods relationships due to lower compatibility barriers. As a result, we expect that consumers will increasingly value product features over mere platform compatibility and that design features and functionality will become key dimensions of competition (see, for example, Apple’s recent success with the iPhone and iPad).³

³ For more on the relationship between Apple’s successes at marketing devices in this environment see Cusumano, M. “The Puzzle of Apple”, *Communication of the ACM*, September 2008, 51:9, 22-24.

If these predictions hold we expect to see an environment where firms benefit from coordinating with other firms through cross-licensing agreements to increase their total effective market size.⁴ In response, consumers will be more aggressive about early adoption of technologies since the risk of being ‘stranded’ on the wrong technology is reduced. This should lead to a larger and more competitive market, more rapid technology innovation, and potentially more entrants in standards- and platform-based markets. Finally, we expect to see more incremental technological changes relative to prior analog markets because there will be fewer installed base barriers of the kind that might cause discontinuous, step-function technology changes during platform change windows (for example, the change from analog tapes to Compact Disks, from floppy drives to CD-ROMs and the attendant rush to upgrade to the latest media format).

From Here to There

Figure 3, the Digital Markets Evolution Diamond, outlines three potential paths that might be taken in the evolution from “Winner-Take-All” to “Winners-Take-Some” markets. The simplest, most direct path would be from 1 to 3 where products move directly to a digital format, e.g., from analog TV signals to digital TV signals. However, such a direct evolution may turn out to be a special case scenario. Perhaps more likely are two “detours” to the same end result. In the first of these (the left-hand path from 1 to 2a to 3), the market evolves by going through a transition stage through fixed media. Products move to a digital future in two steps, the first being a “digitally-based” transitional form, e.g., the movement from analog vinyl records to digital CDs, and then a second step, e.g. from digital CDs to pure digital downloads or the transition from analog video tapes through digital DVDs to digital downloads. (See SIDEBAR “Netflix – a missing link”).

SIDEBAR: Netflix – a missing link

Netflix, Inc. is a subscription service that began by providing a “DVD rental by mail” service, and has since begun offering streaming content over the Internet. According to recent data, Netflix has 15 million subscribers, and on an average day mail about two million DVDs. Netflix represents a classic transition path through fixed media: while it may ultimately provide only a direct digital download service, it began life by offering an alternative to making a trip to the video store.

Sources: http://online.wsj.com/quotes/key_facts.html?mod=2_0470&symbol=NFLX&news-symbol=NFLX and www.Netflix.com.

A second “detour” on the evolution to Stage 3 is the right-hand path in Figure 2 from 1 to 2b to 3. In this path the first step for the product is a set of multiple digital formats that vendors protect with traditional intellectual property protections (e.g., patents and copyrights) while still imposing a “Winner-Take-All” outcome supporting their technology. In Stage 1 analog formats typically provided rational explanations for single, Winner-Take-All outcomes, such as the physical incompatibility between VHS and Betamax tapes. Similarly, the installed base of software may have created disincentives for multi-formats due to learning costs, and incentives for “Winner-Take-All” outcomes through network effects stemming from platform creation and the benefit of a large number of complementary products. In Stage 2b vendors attempt to replicate such “Winner-Take-All” outcomes by creating proprietary digital formats protected through intellectual property controls (see Sidebar below on Apple iTunes Digital Right Management).

⁴ See Liu, C., E. Gal-Or, C. Kemerer, and M. Smith, “Compatibility and Proprietary Standards: The Impact of Conversion Technologies in IT-Markets with Network Effects”, *Information Systems Research*, March 2011.

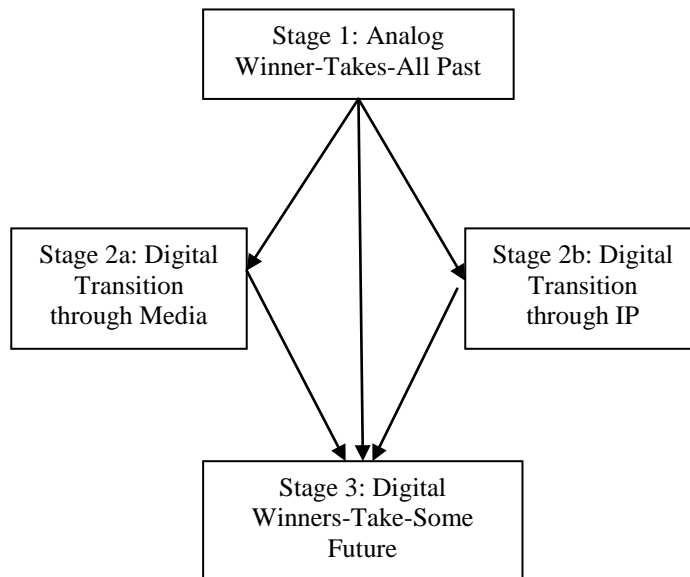


Figure 3: The Digital Markets Evolution Diamond

SIDEBAR: Apple iTunes Digital Rights Management

One example of a stage 2b intermediate migration is the migration of digital music from Apple's iTunes Digital Rights Management (DRM) to DRM-free downloads. As noted above, while inter-standards conversion is easy for most digital goods, products with DRM typically cannot be converted between formats. The record industry's mandated use of Apple-controlled DRM may have created a virtuous cycle for Apple where customers who purchased content on the iTunes store were tied into using iPod media devices, and out of convenience, most iPod users used the iTunes store to purchase music. This may have contributed to the early market dominance of the iTunes music store and the resulting market power that Apple was able to exercise over music labels in pricing and marketing negotiations⁵.

However, such approaches may be short-lived, as the ease and quality of digital conversion makes it difficult to create advantages for proprietary formats (e.g., Sony's unsuccessful attempt to establish its Memory Stick format as the dominant flash memory standard), and users' abilities to defeat proprietary schemes to create constrained environments (e.g. the so-called "jail-breaking" of Apple iPhones, defeat of copy protection schemes)⁶.

Moreover, in Winner-Take-All markets, firms sought to establish their format as a dominant standard, and protect it from being copied. Sometimes this took the form of not licensing their innovations to other firms, so as to retain sole manufacturing rights, like Sony with the Betamax and Apple with the Macintosh operating system. As these products could maintain higher margins, they tended to command only niche markets. Therefore, firms moved to partnerships with other firms to co-produce devices or their complementary goods, but still with the goal of establishing a single standard. Sony successfully teamed with Philips in the Netherlands to produce the audio CD standard, and a variety of video game console manufacturers have contracted with video game software producers to create entertainment systems that often (although not always) produced generational "Winner-Take-All" results

⁵ See, for example, this article in the New York Times:

<http://www.nytimes.com/2009/01/07/technology/companies/07apple.html><http://www.nytimes.com/2009/01/07/technology/companies/07apple.html>

⁶ Cleary, Patrick J., "The Apple Cat and the Fanboy Mouse: Unlocking the Apple iPhone", *North Carolina Journal Of Law & Technology*, 9:2, Spring 2008.

in video games. However, there have been a wide variety of failures with this approach as well – Sony, in particular, has created or backed a variety of unsuccessful efforts to standardize devices (see Sidebar “Sony-lessons learned, lessons missed”).

SIDEBAR: Sony – lessons learned, lessons missed

Sony has been extremely successful in the consumer electronics market, having had a number of huge commercial successes including the Walkman cassette player, the audio CD standard (joint with Philips), and the Playstation video game system. However, less visible than these clear ‘home runs’ have been a number of product attempts that have been relatively unsuccessful. Beyond the Betamax, which, despite losing the standards war, went on to have success as a commercial videotape standard, a wide variety of other Sony products failed to establish themselves in the marketplace. According to author Steve Knopper, these include the Minidisc audio format, the PressPlay music store, the MusicClip (an SDMI-compliant digital music player based on the ATRAC DRM-protected standard), the Connect music store (also ATRAC-based) and the eXtended Copy Protection (XCP) placed on music CDs via a software rootkit.

Knopper, S., *Appetite for Self-Destruction: The Spectacular Crash of the Record Industry in the Digital Age*. Free Press, (2009).

But, we may be starting to see an alternative strategy emerging. In flash memory, instead of attempting to promote a proprietary single standard, as Sony did with Memory Stick, SanDisk sells a variety of flash memory formats. Likewise, Amazon provides converters allowing its users to read its Kindle-DRM-protected titles on both Kindle devices and other portable devices, including iPads and iPhones. More recent versions of Microsoft’s Office productivity suite allow the user to save the output in non-Microsoft formats (e.g., PDF) and has made the file format standard more accessible through XML., e.g. Microsoft Word 2007 permits the user to save their document as a .PDF file.

This may be the first wave of a new strategy where platform rights holders will choose to allow conversion in many cases. In the context of digital products, a new equilibrium can emerge with firms agreeing to provide converters at a sufficiently low price to all consumers. In this approach both the incumbent firm and potential new entrants are better off since the possibility of conversion between formats provides a number of benefits: it helps both existing and new products get adopted as consumers need not wait on the sidelines for fear of being stranded by choosing the wrong standard; it reduces the need for price competition and subsidies to attempt to create a single winning standard; and, finally, it may even generate revenue through the sale of devices or software that perform the conversion. In addition, users may benefit from being part of a larger network and generally having more opportunities to consume the new product.

Our own research in the market for flash memory has discovered that a wide variety of formats co-exist in a Winners-Take-Some outcome, rather than the traditional Winner-Take-All result seen in VHS over Betamax.⁷ We find that the existing network effects in flash memory usage are moderated by the adoption of digital converters. Specifically, the availability of digital converters provides a measurable reduction in the price premium of leading flash card formats relative to that of formats with lower market shares. These market dynamics imply that the provision of conversion technology increases new entrants’ ability to survive the standards competition, as converters tend to neutralize the impact of network effects. Further analysis shows that market concentration in the flash memory market decreases as converters become more widely available, which implies that the adoption of converters fosters a more competitive market.

⁷ See Liu, C., C. Kemerer, S. Slaughter, M. Smith. Revised 2010. “Standards Competition in the Presence of Digital Conversion Technology: An Empirical Analysis of the Flash Memory Card Market”.

Based on this history there are a variety of new and emerging products that may fit this model. For example, as of this writing there is a tremendous competition in the eBook market between Amazon's Kindle, Sony's eBook reader, Apple's iPad solution, Barnes and Noble's Nook, and others. Given the digital nature of the content, it seems probable that a Winners-Take-Some result will emerge with the ability to convert electronic book content between formats.

Caveat Manager – some possible exceptions to this evolution

Of course, predicting the future is a tricky business. While we expect to see the “Winner-Take-All” phenomena replaced by the “Winners-Take-Some” phenomena in many digital goods markets subject to increased digitalization, we expect that exceptions will also emerge. What signs should a manager look for to know that the market they are interested in is not going to proceed to a Winners-Take-Some outcome? We imagine three such conditions. First, especially early on, traditional market power may still prevail — big vendors with deep pockets and strong distribution links in the marketplace may choose to follow the old rules and survive for a period of time. Eventually, though, as more examples of “Winners-Take-Some” outcomes emerge, fewer firms will elect to take this risk. In addition, firms that elect to try to follow the traditional path will be subject to increasing governmental anti-trust oversight, as has been the case with a variety of information technology firms, including Microsoft, Intel, and Google.

A second exception may occur when a few collaborators in a consortium emerge to share in the returns (appropriability), but keep out others so as to keep sharing to a minimum. This is another market power exception, but with an oligopoly instead of a monopoly outcome. These are likely to be an initial transition point for market leaders who increasingly perceive the risks in the going-it-alone strategy.

Finally, we may still see “Winner-Take-All” outcomes when governments choose to dictate or otherwise greatly reward this outcome. In some circumstances this may be appropriate, as when there are significant social and private costs of non-standardization (e.g., HDTV, telecommunication standards, etc.) and the scale makes conversion a relatively expensive option. However, other circumstances will see less benign government intervention as, for example, when government regulators, either under the influence of organizations with market power or through a ‘fighting the last war’ analysis of Winner-Take-All markets, or both, create regulations that favor single winners. Managers would be well-advised to closely monitor emerging government policies in this regard.

Looking forward

In conclusion, we see the movement towards greater digitization to bring about an overall better marketplace for both vendors and consumers. It should be a future marked by faster technology innovation, fewer consumer ‘deadweight’ losses due to technological stranding, more product choices, fewer vendor risks, and more interoperability. Managers need to be prepared to seize the opportunities in this world, and not fight the last war.