

**BETAMAX REVISITED:
A CONTEXTUAL VIEW OF THE BATTLE FOR THE HOME VCR MARKET**

Xavier Olleros
Université du Québec à Montréal

Abstract

This paper argues that the management literature offers too narrow a view of the classic battle for supremacy in the home VCR market. As a result, that literature has failed to incorporate some valuable insights and lessons from that battle. In this paper we leverage several detailed historical accounts to offer a more contextual reading of the VCR battle and to criticize the established literature about dominant product platforms. Our conclusions highlight the self-organizing nature of open technological architectures and the role of the institutional context in creating the conditions for architectural battles.

Introduction

For more than 20 years now, Sony has been the choice of professionals in the field of video production all over the world. The Sony Betacam video camera, the top-of-the-line camera used by thousands of professionals, has a virtual monopoly throughout the world. Sony has a near-monopoly also in the complementary machine - professional videocassette recorders (VCRs) used in TV studios and audiovisual workshops. Sony has a firm grip as well on the market for home camcorders. Not only does Sony's brand have a very high market share, but also, all other makers of 8mm camcorders use slight variations of Sony's technology.

One would think that with this kind of domination of the professional market and of the market for home video cameras, Sony should be doing very well in the market for home VCRs. As we all know, however, this is far from being the case. Sony's home VCR system – the Betamax – did have a world monopoly for about 18 months, back in the mid 70s, but then VHS arrived and, within a few years, Betamax disappeared from the market without leaving a trace. Since November 1988, Sony has had to play second fiddle in the home VCR market, as one of many suppliers battling for market share in the market for VHS machines.

The battle for the home VCR market has marked a watershed in our understanding of competition in high technology markets. The rapid and surprising demise of the Betamax format, back in the early 80s, alerted us to the fact that architectural competition tends to

be very different from brand-level competition. Even so, the reader might wonder about the need and pertinence of a paper about Betamax in the year 2003. Hasn't everything that needs to be said about this case already been said, or written, dozens of times?

The main aim of this paper is precisely to show that there is a disconnection between the analyses of the VCR battle offered by management theorists and the detailed historical accounts. I will argue, in fact, that most of what has been presented about Betamax in the management literature misses the most interesting part of the story – one that doesn't fit well the standard theory about dominant product platforms.

The analysis of the VCR story offered by management theorists is too focused on trying to explain why VHS won the battle for market supremacy. By so doing, they have tended to overlook the more interesting question of why the loser, Betamax, had to disappear. As a result, they have missed a number of insights that could enrich considerably our understanding of architectural competition. Some have been captured by the economic literature on network externalities. Others must be found in the detailed historical accounts of the VCR battle.

The paper is structured in four sections. The first section reviews the received theory about dominant product platforms. The second section presents the managerial perspective on the VCR battle. The third section delves into the historical record in order to present a richer, more contextual view of the VCR battle. The final section highlights some important facts about the context of the VCR battle which seem to contradict the received theory of dominant product platforms.

The theory of dominant product platforms

In recent years, a new synthetic view of industry evolution has emerged. Whereas the old paradigm was centered on the dynamics of individual products, the new one highlights the numerous complementarities and interdependencies at the level of product platforms, product families and larger systems (Meyer, 1997; Baldwin and Clark, 2000; Gawer and Cusumano, 2002; Iansiti and Levien, 2002; Chesbrough, 2003). This new synthesis dovetails well with the systemic nature of many high technology industries. It helps us to better understand the interactions between component-level choices and system-wide dynamics, as well as between firm-level choices and industry-wide

dynamics. It should also help firms to develop a more holistic appreciation of competitive dynamics, one which will guide them in their search for an optimal balance between systemic openness and proprietary control.

If there's a drawback to the new synthesis it is its strong engineer-driven thrust. It offers a top-down view of industry dynamics which, I will argue here, is too stylized and simplistic. According to this view, the systems integrator defines the product architecture and particular patterns of specialization and competition follow therefrom. Thus for example, a closed platform will lead to a particular industry dynamic, a centralized open platform will lead to another, and a decentralized open platform to yet another. The more or less explicit message from this literature is not only that systems integrators are in control of the whole process, but also that within systems integrators, engineers are the ones making the key decisions that will cause adaptive ripples throughout an entire "business ecology" (Iansiti and Levien, 2002).

Systems integrators are bound to be important players in any battle of platforms, but I will argue here that it is a mistake to consider integrators as the necessary key players, as if their central position automatically invested them with the power to orchestrate the evolution of a platform and the concerted efforts of every other firm in a given business ecology. In reality, the emergence of complex systems often is a messy, surprising affair, neither foreseen nor controlled by systems integrators. The VCR story will serve us well to illustrate our argument.

The managerial perspective on the VCR battle

The battle for the home VCR market is widely considered the archetype of commercial contests between incompatible architectures. Figure 1 shows the distribution of market shares in the crucial market – the US market - in the late 70s and early 80s. On the right, the overall sales curve for that market.

The story is well known¹. In April 1975, Sony launched the Betamax system, the first successful videocassette recorder targeted at the home market. In September 1976, Matsushita and its subsidiary JVC launched a competing system, VHS. With

¹ For more information on this classic battle for market dominance, see Fox, 1983; Lardner, 1987; Cusumano, Mylonadis and Rosenbloom, 1992.

considerable help from RCA, in only three months, VHS succeeded in capturing 30% of the American market. By 1978, VHS had caught up with Betamax. Beyond that point it took the market leadership, first in the U.S. and then abroad. In November 1988, Sony itself started making and distributing VHS machines. Since then, VHS's world monopoly of the home VCR market has been largely uncontested. Only recently is it being challenged by a totally different technology – the laser-based DVD.

It is worthwhile emphasizing that the battle for the home VCR market was essentially over by 1980. All throughout the 80s, Sony spent millions trying to reverse the trend toward a VHS monopoly. But it was all in vain. It was much too late to do anything about the matter. JVC and Matsushita didn't need to move a finger to take VHS from 60% of the US market to 100% of the world market. The market did it for them.

In trying to understand this unusual market outcome, it is important to realize that there are two very different questions here that need answering. First, we need to explain how VHS managed to beat Betamax, despite its late arrival with a technology that was only comparable to Sony's. And secondly, we need to explain why Betamax disappeared completely from the market. Many brands, and even technological platforms (think of the Apple Macintosh), manage rather well with 5, 10 or 20 % of a market. Why couldn't Betamax survive with 40% of the VCR market, from 1980 on?

The literature identifies three factors that supposedly explain the demise of Betamax:

1. A faulty product design. Sony shortchanged the potential of the Betamax system by launching it with only a one-hour tape. By the time Sony launched a two-hour Betamax, Matsushita was ready to bring out a four-hour VHS machine. And by the time Sony countered with a five-hour Betamax, Matsushita was ready to launch an eight-hour VHS.

2. A myopic business model. Betamax was conceived as a closed system and Sony was slow in building up a strong coalition of manufacturers and wholesalers in support of Betamax.

3. Strong network effects (complementarity effects), arising from the emergence and increasing importance of video film rental stores.

As a general rule, management theorists tend to emphasize the importance of the first two factors, whereas economists tend to emphasize the third. As it happens, the first two factors have everything to do with Betamax losing the battle for the VCR but nothing to

do with Betamax disappearing from the market. The differences in tape length and in the strength of the coalition behind each format help us to explain VHS' rise from 0 to 60% of the US market, but not its further rise to absolute world monopoly. A more contextual reading of the VCR battle makes clear that it is the third factor alone – network externalities - which explains VHS' world monopoly and Betamax's disappearing act.

A contextual reading of the VCR battle

The VCR industry has known two very different product architectures and two equally different market dynamics. As a rough approximation, we can date the transition period around the year 1980. Figure 2 tries to capture in a graphic way this transformation, at the same time that it highlights the two different sets of elements that explain VHS' world monopoly: the moves and countermoves of the two rival platforms, on the one hand, and the strong network effects unleashed by the success of video film rental stores, on the other.

Before 1980, the VCR was a closed system, a machine meant for one of two uses: either the recording of TV programs for later viewing, or the viewing of home-made videos. For the first use, only a compatible TV set was necessary. Obviously, all VCRs were compatible with the local TV system, so this was never a problem. For the second use, a compatible video camera was necessary. This wasn't a problem either, as all VCR manufacturers were able to supply a complete system - camera and VCR. Had things stayed in this state, therefore, every system integrator would have always been able to offer a complete system to potential buyers. As a result, even marginal market positions would have been sustainable. Sony could have survived with 10 or 20% of the world market. It certainly would have survived and thrived with 40% of the world market, and perhaps even mount a counterattack. In such a market, the war between VHS and Betamax (and perhaps Philips and others) would have never ended. The market would have had minimal inertia. It would have remained always strictly meritocratic – that is, proportionally shared and contestable.

After 1980 (and especially after 1984), the VCR became a totally open system. Why? Because a brand-new application for the VCR – the viewing of rented videofilms - became increasingly dominant. Suddenly, each user felt the imperative need to make a

choice of machine in line with that of its nearest video club. As more and more video clubs chose VHS over Betamax, so did new buyers of VCRs. Increasingly, the loser in the market battle became unable to support its platform, since it could no longer offer a complete system. “The market” had turned its back on any platform that was not the bestselling platform. Thus, after 1980, the VCR market was quickly transformed into a winner-take-all market, that is, a market with only two possible long-term equilibria: one monopoly or the other. Hence, at a critical branching point, coinciding with the US market’s takeoff, a quick and final battle was waged. Beyond that point, the trend towards a monopoly for the best-selling option became increasingly self-reinforcing and irreversible.

Notice that two very different kinds of network effects drove two complementary standardization bandwagons. A strictly local effect caused VCR users to align themselves with the choice made by the nearest video club. At the same time, a global effect caused all video clubs to align themselves with the world’s bestselling platform. Clearly, the latter effect was by far the most decisive of the two.

Now, why did all the video clubs across the world decide, in a matter of a few months, to abandon Betamax and service only videofilms for VHS machines? This global bandwagon was primarily triggered by the fact that video rentals awakened a huge demand for an ever wider menu of videofilms. A film generally has a very short usage cycle. Once viewed, a film will not be viewed again all that often, even if it is of considerable quality. This fact, combined with the possibility of renting rather than buying videofilms led to an exponential growth in the demand for a wide range of videofilms (Roehl and Varian, 2000). Most Hollywood studios, although initially slow in recognizing the profit potential of the new technology, and in particular that of the rental market, soon were all too happy to provide a growing and varied supply of videofilms, both old and new.

Around 1981, in the midst of this exponential growth of both supply and demand of videofilms, most video clubs, generally very poorly financed, were faced with the prospect of a liquidity crisis and a stark choice - either to drastically limit their stock of videofilms in both formats, or to drop one format and stock only films in the other. A significant minority of US video clubs proceeded to abandon Betamax, simply because at

the time VHS was already the best-selling format. By thus sending a clear signal not only to other video clubs and to VCR manufacturers, but also to the Hollywood majors and to scores of potential new clients who were about to buy their first VCR, this choice triggered the fateful, snowballing bandwagon that gave VHS a world monopoly (Lardner, 1987). From that point on, VHS's market dominance became not only irreversible but also self-reinforcing. Soon, the eventual disappearance of Betamax became inevitable. In this bandwagon dynamic, indirect network externalities (that is, complementarity effects) played a key role. The more people bought VHS machines, the more video clubs and VCR manufacturers and distributors sided with the VHS camp, and vice versa. Both polarizing bandwagons, the local and the global, fed on each other.

The lessons yet to be learned from the VCR battle

The management literature, with its exclusive focus on explaining who won or lost the battle for the VCR market, offers too narrow a view of such an event. In the preceding paragraphs we have focused instead on explaining why the losing platform disappeared completely from the market. This effort yields a richer, more contextual view of the event, one which highlights the network effects that caused a winner-take-all dynamic to take hold of the market. In turn, this emphasis on network effects and industry-wide transformation has led us to pay a great deal of attention to a group of agents which the management literature considers only secondary, but which have played a central role in the VCR story - the video clubs.

This line of analysis suggests some interesting theoretical implications to be drawn from the VCR story. Three related points, in particular, stand out.

1. The power of decentralized emergent processes

The analyses of the VCR story offered by management theorists tend to fit a simplistic top-down view of industry dynamics. As told by these authors, the VCR story stars Sony, Matsushita and JVC. If other firms are mentioned at all, they are invariably other major systems integrators, like RCA and Philips. True, some authors in this stream are careful to mention the impact of video clubs, but their role is seen as secondary. Other possible influences are rarely mentioned. Moreover, in this narrative, engineers are placed front and center, for good or ill. Thus, for example, faulty architectural designs -

too short a tape and too close a platform - are seen as the critical cause of the Betamax fiasco.

Detailed historical accounts of the VCR battle reveal a very different story, centered on the disconnected but complementary efforts of numerous independent firms, most of them very small. Matsushita and its partners, with their superior design and business model, did beat Betamax, but it was the video clubs - thousands of family-run rental stores, all over the world - who managed to drive the VCR market away from a conventional dynamic of contestable, proportional market sharing and into a winner-take-all dynamic.

The systems integrators – whether winners or losers – had neither control nor foreknowledge of the dynamics of the VCR market. They were as surprised as anybody else by the transformation of the market into a winner-take-all contest and a world monopoly. Many authors have pointed out that Sony didn't see the transformation coming. This much is obvious. But it is equally obvious from the detailed records that Matsushita didn't see it coming either. Had they known, they would have never dared to come into the market 18 months behind Sony, with a barely comparable technology. Indeed, in the end, coming in second played to Matsushita's advantage. Since they were coming from behind, they felt compelled to do better than Sony: longer tape, stronger team, etc. Hoping for a decent and sustainable market share, they stumbled into a world monopoly that they hadn't foreseen or even desired.

2. The power of the weakest link

The video clubs, not the systems integrators, are at the center of the story told by historians. Furthermore, the historical accounts show that video clubs played such a crucial role in defining the dynamics of the entire sector not because they were tightly knit, powerful and well organized, but rather because they were extremely fragmented, poorly financed and quite disorganized. The conventional, market-sharing, competitive dynamic broke down because this weakest link in the system couldn't sustain it.

Simply put, the small and poorly financed video clubs could not afford to keep supporting two different formats of the same films and had little to gain from doing so. As the number of titles to stock ballooned, American videofilm clubs were forced to choose between drastically reducing the inflow of new titles, or letting go of one of the

competing formats. Around 1980, an important minority of video clubs started let go of Betamax, by then already the second seller, and those few decisions triggered the snowball dynamic. By so doing, they passed a clear signal not only to potential buyers of new machines, but also to systems manufacturers and wholesalers, as well as to videoclubs still undecided. The overall bandwagon soon became unstoppable.

3.The limited power of engineers

Historical accounts of the VCR battle show very clearly that systems are not shaped only by engineers. They are shaped as well by entrepreneurs in small and large firms (Andre Blay, George Atkinson, ... Steven Roberts). And they are shaped by legislators and the courts of law, among other institutional forces. A crucial factor in the VCR story, one that influenced very directly and immediately this market's evolution throughout the world was the 1984 US Supreme Court decision – by the narrowest of margins – to legalize the rental of videotapes. The rental market, was critical in triggering the competitive dynamic that made the survival of Betamax impossible. Instead of indirect and global, in a sale-only market, network externalities would have been strictly direct and local and a world monopoly would not have taken place.