HD DVD, Blu-ray Disc and the future of home entertainment:

A strategic analysis

screendigest

Contents

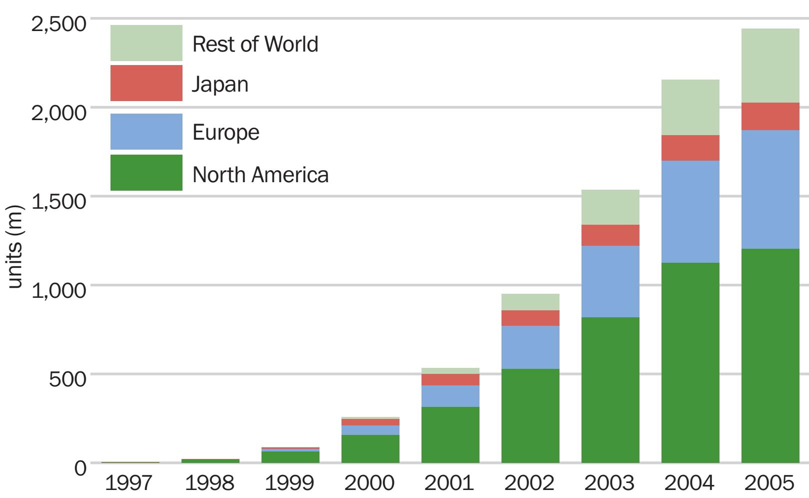
might be in the format battle. The software giant has also agreed to launch an add-on optional HD DVD drive for its Xbox 360 games console, due to be launched in the US in time for the Christmas selling season.

- Part of the Toshiba strategy for HD DVD is to bring Chinese and other second-tier manufacturers into the market far earlier in the technology life cycle than occurred with DVD. This might result in a steeper price reduction curve than for BD, although Sony has already indicated that it expects BD hardware pricing to reduce twice as fast as DVD did. In a bid to win early market share, Toshiba has adopted an aggressive pricing strategy from the outset. It is believed that, until the manufacturer can use less costly components in the design, Toshiba will be losing a significant sum on each player sold. However, this differential between the cost of components and the selling price is not likely to be any larger than that to be incurred by Sony on the BD-based PlayStation 3 (PS3) games console. The key difference between the two cases is that Sony's business model for PS3 is predicated on the ability to generate significant revenues from royalties on the sale of PS3 games whereas Toshiba can expect no comparable revenue stream. Although the Toshiba group has fairly 'deep pockets', there are limits to how long it will be able to sustain such investment – particularly as the company's audio-visual products division is currently loss-making.
- One of the keys to reducing the cost of both systems will be the speed at which semiconductor manufacturers integrate the required functionality into a single more cost-effective chip design. The availability of such chips – and a so-called 'reference design' that manufacturers can base their products on – will also be a critical factor in enabling second-tier manufacturers (including those from China) to enter the hi-def disc market.
- At the time of the launch of the first players from each camp, only a handful of titles were available for early adopters to buy. However, by July 2006 the number of available HD DVD titles had risen to 32, compared with 13 on BD, reflecting the later release of the latter hardware. Overall about 180 named titles had been slated for US release on each format, with a further 18 HD DVD titles announced (by France's Studio Canal) for European release. HD DVD was also ahead in terms of titles exclusive to the format – 95 compared with BD's 76 – despite the fact that BD had the support of seven studios to HD DVD's three. However, it is worth noting that none of the major studios have completely ruled out releasing titles on the other format.
- HD DVD hardware made its global debut in Japan when Toshiba launched its initial model at the end of March 2006. The first two HD DVD player models (from Toshiba) were launched into the US market a few weeks later in April 2006 priced at $500 and $700. Two months later on 25 June 2006 the first BD player model was introduced to the US market by Samsung with a $1,000 price tag. Although delayed, BD models from several other manufacturers are expected to be introduced during the second half of 2006. To start with, the lowest priced BD machine will be Sony's next generation games console, PlayStation 3 (PS3), now set for a global launch in November 2006. Two PS3 models will be offered, one at $500 and another at $600. Both will include BD drives and be capable of playing BD movies.
- Launch of players for either format in Europe is unlikely to happen before the fourth quarter of 2006.
- HD DVD and BD drives for computers – along with corresponding blank media – are becoming available and laptops with suitable drives for each format have also been announced, with Toshiba shipping its first HD DVD-equipped laptop to the US market in May 2006 priced at $3,000. Sony has also introduced a BD-equipped laptop at a $3,500 price point. However, in general terms, the availability of HD DVD drives to PC manufacturers is running ahead of corresponding supplies of BD drives. When the supply situation is sorted out, there is a strong argument to suggest that the PC industry will eventually veer towards the greater potential capacity of the BD format as a data storage solution. The counter argument is that the integration of HD DVD technology into the Microsoft Vista operation system will make that format an easier solution for PC users – and also importantly a potentially less costly item (in licensing terms) for PC manufacturers to include in their designs.. Whatever the relative merits of these arguments, there is no doubt that the

extremely limited interactive capabilities and a modest improvement in sound quality compared to VHS. Perhaps most important, none was able to win more than limited support from the Hollywood studios, who were only just starting to appreciate the importance of movies on VHS tape. It would take the advent of digital audio/video compression, starting with the MPEG-1 and then MPEG-2 standards, to create a viable technology base for a successful disc-based home video format.

The first digital format to be evaluated was Video CD (VCD), but the MPEG-1 compression used for VCD provided neither the picture quality nor the single-disc storage capacity the studios demanded for an average two-hour movie. Furthermore, it did not offer the anti-piracy protection considered essential by Hollywood. Despite these concerns, VCD was rapidly adopted for home video throughout much of Asia. By 2000 there was an installed base of 50m VCD players across the Asia Pacific region (although the format was never adopted in Japan) and local software needs were being enthusiastically met by local distributors and pirates. Faced with a de facto market, most studios began distributing their own titles on VCD and by 2002 studios and independents between them were selling around 400m legitimate VCD discs across Asia. However, the format was still not considered suitable for Western markets. Super Video CD, which was developed for the Chinese market, offered video quality approaching DVD, but the storage capacity was much less meaning that movies required multiple discs. The studios wanted an optical disc format that would hold a full-length movie without compromising the audio or video quality.

Figure 3.3: DVD Retail sales 1997-2005



Source: Screen Digest

Introduction of DVD

The solution was DVD, a new format based on MPEG-2 video compression, and multi-channel digital audio systems from Dolby and DTS. It was developed by the major Japanese and European consumer electronics companies and Time Warner. Before its launch, there were two proposals, MMCD from Philips and Sony, and SD developed primarily by Toshiba and Warner.

Following several weeks of frenzied negotiations and an 11th-hour summit in late 1995 between the two competing groups, they agreed to merge into a single format which essentially took all elements of Toshiba/Time Warner's SD format except the modulation coding scheme (EFM Plus), which was taken from Sony/Philips' MMCD proposal. The latter decision meant that the capacity of a single-sided single-layer disc was reduced from 5.0 GB in the SD proposal to 4.7 GB, but members of the SD Alliance agreed with the view of the computer industry (and IBM in particular) that EFM Plus was more robust than the system originally proposed by Toshiba. The compromise proposal made by Sony/Philips and accepted by the Toshiba group effectively reduced future patent revenue streams for the partnership of Sony and Philips, which had grossed \$500m from licensing their existing CD patents in 1995 alone, although the pair also held the patents for EFM modulation. Less than a year later, after some more months of wrangling over details such as copy protection, the first players went on sale in Japan.

A single layer DVD disc can hold up to 135 minutes of high quality PAL or NTSC video plus up to three surround sound audio channels, and multiple language soundtracks. DVD also offered a limited graphics capability for menus and subtitles plus navigation and interactivity. The features, some of which were rather hurriedly defined and developed, combined with a promotion and marketing campaign that united hardware manufacturers, content providers and the computer industry in an unprecedented way,

5 Protecting video content

Background

From the first days of consumer VCR sales in the mid-70s, the major Hollywood studios complained that consumers would use them to copy movies broadcast by TV and therefore unfairly depress their revenues. In November 1976, less than a year after Sony introduced its Betamax format VCRs in the US, Universal Studios as lead plaintiff on behalf of other studios sued in the US Federal District Court in an attempt to halt sales by claiming the devices infringed on copyrights held on broadcast television programming. The now-famous 'Betamax Case' held the entire home video industry's future in limbo until the US Supreme Court in January 1984 reversed an Appeals Court ruling in favour of the studios and cemented the legality of home video taping.

Ultimately, both sides won. Within two years of the ruling, VCR penetration had surpassed 50 per cent in the US and studio revenues from home video ultimately exceeded theatrical box office revenues. But the disputes over content protection and copying have outlasted the transition from analogue to digital media and continue to this day.

The Betamax court battle—and the aftermath -- was an object lesson for both sides—one that framed relations between them as they negotiated the details of the initial DVD format specifications. Consumer electronics manufacturers learned the value of bringing the studios into format discussions from the beginning, and the studios realised the wisdom of leveraging the value of their content libraries rather than petitioning the courts to win concessions from hardware manufacturers.

At the top of that target list of concessions was content protection, and in recent years the studios have won that battle more than they've lost.

In the late 1980s, a Silicon Valley technology startup, Macrovision Inc, developed a means to prevent consumers copying from prerecorded VHS to a blank VHS tape. This analogue system modified the video output from VCRs playing prerecorded tapes in such a way that would not affect the display on a TV, but would seriously distort images on copies made from the prerecorded tape. The studios quickly began applying Macrovision analogue copy protection to their preprecorded VHS releases and virtually all VHS VCR makers similarly built Macrovision copy protection circuitry into their VCRs.

The DVD Forum's specifications include Macrovision's Analogue Protection System (APS) copy protection for the analogue outputs of DVD players. Digital set-top box makers who distribute boxes in the US and many other international markets similarly include Macrovision protection for the analogue outputs on their devices. Macrovision's system, in fact, is the only copy protection technology ever written into US federal law—which, unlike home recording policy in EU countries, has in recent years taken an increasingly hard line on consumer

6 Supporting Blu-ray and HD DVD

In horse racing, backing the winner is crucial. Much the same can be said about BD and HD DVD as there is a lot of money at stake, particularly for the developers, who have invested a lot of money, time, effort – and corporate pride – in their chosen format. Content owners and hardware manufacturers need to choose the correct format to avoid throwing money away on the wrong one – and missing out on the revenue flowing from the winning format. Disc replicators similarly have to invest in equipment and they need to invest wisely. Finally consumers will be wary of investing in a format that does not have a future.

This chapter addresses the important issues in assessing which format might win including licensing, the reasons for success, the organisations promoting each format and the supporters in each of the industries.

Licensing

The developers of the winning format can gain, not only by selling products, but also from patent royalties on hardware and discs. In the 1960s when Philips launched the compact cassette, it achieved universal acceptance by offering it to the consumer electronics industry free of any license fee. But when Philips and Sony launched the compact disc they demanded license fees from all participants. This did not prevent the CD becoming the de facto format for music and set a precedent.

Since then Philips, for example, has earned billions of dollars from licensing its intellectual property, including patents on CDs and CD-ROMs. Philips has realised that licensing represents potentially a more important source of revenue than the hardware products that it has manufactured for decades. And Philips is not the only consumer electronics company for which licensing revenue can mean the difference between profit and loss from one year to the next.

By the early 1990s, Philips and its competitors realised that a new format was needed if CD's success with music was to be repeated for video. The home video market was too important for hardware manufacturers and the potential patent revenues could not be ignored. The result was the pre-DVD format war pitting Philips and Sony against Toshiba, Time Warner, Matsushita and others.

In fact, Toshiba and Time Warner had approached Philips and Sony in 1992 and proposed the joint development of a videodisc system. It is believed that Philips signed a Memorandum of Understanding to co-develop such a technology. However, in 1994 Philips and Sony came forward with a rival system called MMCD. There followed a protracted struggle with Philips/Sony seeking supporters for the MMCD format, while Toshiba/Time Warner did the same for the rival SD format. It was not until summer 1995 that a compromise agreement on a single DVD format was agreed and later that year the DVD Forum came into being to manage the progress of the system.