

## ***Product Launch in a Declining Environment: The Blu-ray Disc – Opportunities and Struggle***

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**Abstract:**

Increasingly ICT-based virtual products are challenging physical products and markets. Obsolescence has become a real effect for an augmented number of established industries due to the facilitation of access, consumption, and permanent, immediate availability, which dematerialised products provide. Once again, Schumpeter's Wind of Creative Destruction intensifies organisations' permanent struggle for survival (1950). This paper presents long-term research in the optical disc industry, which has presented the optical disc format of Blu-ray as its latest innovation. It is an example of how an established industry launches a new product for finding new opportunities, but fights desperately against market resistance. The degree of innovation, the Blu-ray represents, may not be sufficient in the overarching battle of the physical place versus the virtual space (Kotler et al. 2002, Lam. 2004, Lamont et al. 1993, Scardigli et al. 1988).

As the US market research institute In-Stat highlights, the optical disc market has declined for the 10<sup>th</sup> year in sequence (Kaufhold. 2010, IFPI. 2010). Sufficient evidence is available that the replication industry of optical discs may be confronted with an endgame scenario. The market climate may already be too hostile to support this industry's desire for a renewal of consumers' acceptance of the physical product, here the Blu-ray disc, and to create new market opportunities in the struggle against the industry's potential obsolescence (Harrigan et al. 1983).

Despite strong efforts of promotion and powerful market approaches, the Blu-ray disc could not find inroads to markets yet making this format sustainably successful. Evidence is that after a short period of time, Blu-ray discs' available manufacturing capacities outperform consumers' demand by >30%, consumer and replication prices fall sharply and many of the Home Entertainment's content providers have little or no use for this format being a commodity and based on mass production (dvd-intelligence. 2010a, Kaufhold. 2010, Killer-Korff. 2010).

Therefore, as research among the replication industry indicates, it presently seems more as though the Blu-ray format may not fulfil this industry's needs and, with reference to Abernathy et al.'s research, may not lead to the renewal of industrial dynamics in a declining marketplace (1983, 1984). Further explanation for reasons can be found in the theories of innovation based on Utterback's, Christensen's and Christensen et al.'s studies of disruptive and discontinuous innovation (1996, 2003, 2003, 2004).

Following the paper presented at the Sixteenth Annual South Dakota International Business Conference, this paper presents research about the Blu-ray format's market problems. The introduction of the Transilience Organisation Innovation Map provided a conceptual approach for the initial explanation of the underlying reasons (Oestreicher. 2009). Research among European replication firms since concludes for Blu-ray that innovation in technology alone is not sufficient, when innovation's second stream of market linkages is involved (Abernathy et al. 1983, 1984). The paper presents explanations, why the Blu-ray disc may not be sufficiently strong to support the replication industry in overcoming the odds impacting their strategic opportunities in a declining and eventually disruptive environment (Lamont et al. 1993, Yoo. 1992).

The research methods applied are grounded theory and case study (Goulding. 2002, Charmaz. 2009, Eisenhardt. 1989, Davies. 2006).

The overall intention of this long-term research is to contribute to a theory, which may also be relevant for other industries, like the publishing industry, whose struggle against dematerialisation of content is presently starting (Picard. 2003).

**Key Words:** Radical vs. marginal innovation, Ideal Final Result, endgame strategies, theories of innovation, Blu-ray,

## **Introduction**

The case of the Home Entertainment Industry is of particular interest, since being one of the early showdowns between physical place and virtual space. An established industry, which controlled markets, repertoire, distribution and artists for 100 years in a closed set of institutional mechanisms

going as far as pre-defining what consumers can see, hear and purchase is now radically challenged (Kusek et al. 2006, Anderson. 2007). The special interest of this case is threefold: 1), an established industry fights against obsolescence with means of marginal improvements against the radical forces of architectural innovation; 2), a similar situation has hit other industries, e.g. recently photography (with discontinuous outcome for analogue photography), before; 3), other industries may follow the paradigm rather soon, making these studies some type of a precedent case (Christensen et al. 2004, Anderson 2007, Kusek et al. 2006, Oestreicher. 2009).

The decision to develop a DVD, which could store significantly more data, arose from the growing availability of High Definition programmes being broadcast on television. At the time there was no way of recording these programmes, and Toshiba and Sony began a race to develop the technology that would allow an order of magnitude increase in data storage. Sabbagh reported that Sony has spent well over US\$3 billion to establish and secure Blu-ray as the high definition DVD standard in the marketplace, while the assumption about Toshiba's real loss exceeds one billion US\$ by far (2008). Two years after Sony's supporters were winning the battle against the Toshiba-lead HD DVD for the industry standard to be the HD format of choice – the race for the new dominant design of high definition discs – the proliferation of high-speed Internet access and the increasing availability of download services means that Blu-ray is now facing challenges that VHS and DVD never experienced when they were at the same stage of their lifecycles (Johnson et al. 2008a, Utterback. 1996).

It is the purpose of this paper to analyse the sustainability of Blu-ray's competitive position in the face of ICT-based virtual products, which are finding equal permanent improvement as, e.g., You Tube's high(er) definition clips show already. The paper will start by analysing the competitive environment and recent technological developments and the implications for product and industry life cycles (Porter. 1987). It will then explore the strategic options available and whether reinvention or end game strategies are the likely outcomes (Kim et al. 2005, Harrigan et al. 1983).

## **I. The High Definition Case**

### **1.) The Competitive Environment**

Blu-ray's success in winning a hard fought battle for the industry standard for the HD format should have signalled the beginning of a new era of growth and appropriation in the optical disc industry in 2008 (Grant. 2008). However, five years earlier, in 2003, Apple introduced the iPod with the iTunes store, revolutionizing portable entertainment, creating a new market and transforming the company.

According to Johnson et al. (2008a): `Apple did something far smarter than take a good technology and wrap it in a snazzy design. It took a good technology and wrapped it in a great business model. Apple's true innovation was to make downloading digital music easy and convenient. To do that, the company built a groundbreaking business model that combined hardware, software and service.' Johnson et al. also stated that: `Business model innovations have reshaped entire industries and redistributed billions of dollars of value' (2008a). Research in the United States also provides evidence reinforcing these trends, which have now extended to video as well as audio content: Nissen highlights that (2009):

- Web-to-TV is happening. The under 35 adult population has already adopted it. Over 40% of young adult households view Internet video on the TV at least once per month.
- Service providers and TV networks view online video as largely additive to pay-TV services.
- Consumers prefer on-demand video consumption, streaming content, and the web user experience.
- Once Web-to-TV video becomes simple and convenient, mass consumer adoption will follow quite rapidly.

However, In-Stat's research revealed even more worrying data relating to the broad range of devices being used to download content via the web. These were summarised by Nissen as follows (2009):

- Web-to-TV video content will use many devices and delivery mechanisms [concept of convergent technologies].
- Within 5 years, the number of US broadband households viewing Web-to-TV content will triple, growing from 8 million to 24 million.
- By 2013 nearly 6 million US broadband households will operate digital media adapters/Blu-ray devices in conjunction with online video streaming services.
- In 2013 4.2 million US broadband households will use gaming consoles to access online video streaming services. 10.7 million consoles will be used as Web-to-TV mediation devices.
- In 5 years, there will be 7.4 million US broadband households that use media centre PCs for streaming Web-to-TV content.
- By 2013 there will be 3.6 million US broadband households operating web-enabled HDTVs and 7.4 million HHs using web-enabled STBs/services.
- The number of Web-to-TV devices used in conjunction with streaming services will increase from 1.7M in 2008 to 22M by 2013.
- Total devices used for downloading Internet video content will grow from 8 million to 20 million over the forecast period.

Although Blu-ray media players have IP/network connectivity the proliferation of media devices with downloadable capabilities is very worrying for the industry. This is reinforced by the RIAA figures for music shipments (2009). It needs to be highlighted that these trends are apparent for other areas of the world, too.

In 2009 digital formats comprised a record 41 percent of total music shipments in the United States. This is an increase from 34 percent in 2008 and 25 percent in 2007. The total digital music market reached \$3.1 billion for 2009. Digital downloads continued double-digit growth in the past year reaching \$2.0 billion, 19 percent growth over the 2008 total of \$1.7 billion. Digital album growth continued to grow faster than single tracks and on a dollar basis comprised 38 percent of the download market. Overall shipments of recorded music in the United States fell 12 percent to \$7.7 billion. Growth in digital formats only partially offset a decline of 21 percent in physical formats. The decline in CD shipments accounted for virtually all the decline on the physical side. Music videos remained flat year-over-year (RIAA. 2009).

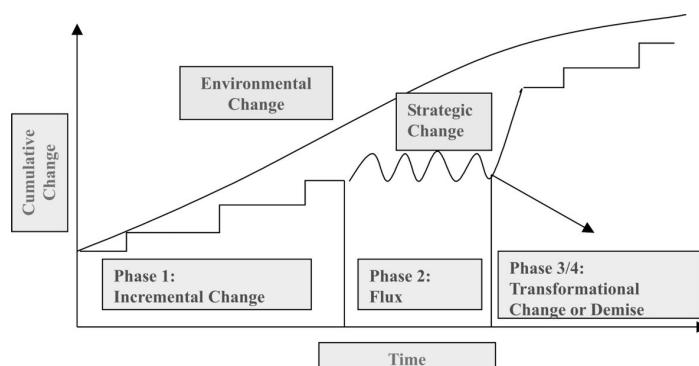
## **2.) Perception and Industry Paradigm**

The unique forces impacting upon the industry have raised a number of questions regarding the perceptions and industry paradigm shared by incumbent players in the Blu-ray marketplace. For example, how are the leading companies positioned to deal with the challenges ahead and what are their likely strategies? In 2009 and 2010, research undertaken among participants of the replication industry revealed a number of disturbing factors:

- A number of replication plants of physical sales have been offered for sale since their shareholders do not believe in the industry's future, which includes even major players.
- A good number of replication plants went out of business. Technicolor, the industry's # 1 player, was protected by chapter 11 and could regain its independence of activities only, since Warner Bros. decided to assign its manufacturing and physical distribution to them, leaving prior manufacturer and distributor Cinram, industry's # 2, in a situation of highest uncertainty, since there seems to be no replacement for this loss of business (dvd-intelligence. 2010b, Baress. 2010).
- Based on primary research (unpublished yet), other incumbents, like Media Plant, Sweden, DocData, The Netherlands, kdg-mediatech, Austria or Marcon and CDA, Germany, have started to turn away from the industry (Oestreicher. 2010).
- Warner Bros, EMI and a number of other industry participants have divested early, selling their replication factories, closed single plants or shut down manufacturing lines to reduce overcapacities and to reduce expected losses.

- The quantity-forecast on Blu-ray sales is poor considering that one replication line should be able to manufacture around 25k discs per day by full load. And, available capacities are far higher than market demand.
- A number of industry CEOs stated in personal interviews (conducted in spring 2010) that the industry's lifespan as a mass producer would not extend beyond another 3-5 years and that the Blu-ray disc will be the last physical format as mass product, despite the development of the holographic disc.

The further market developments will have to prove these statements, but it is suggested that a negative tendency, which is permanently underpinned by decreasing sales volumes, is apparent. Further attention deserves that stated timeframes are cohering with Nissen's study (2010).



Strategic drift would appear to have occurred due to a rapid change in the technological and competitive environment and the failure of the industry incumbents to respond with the development of new business models and strategies (Johnson. 2002). If this is the case, the question as to how far along the strategic drift model the industry has progressed is very important. E.g., is Blu-ray at Phase 1: incremental change,

Phase 2: Flux or Phase 3/4: transformational change or demise (see Figure).

In hyper-competitive Schumpeterian markets, where ICT-Based virtual products challenge physical products, any competitive advantage gained is transitory (D'Aveni. 1994). In the case of Blu-ray Phase 2 and Phase 3/4 of the strategic drift model could be imminent if action is not taken quickly. Based on the research findings above and recent music industry figures, endgame strategies for what could a declining industry may not be overly premature (Harrigan et al. 1983).

Leadership	Harvest or Divest Quickly
Harvest or Niche	Quick Sale

According to Harrigan et al. declining industries can be viewed as opportunities for endgame strategies (1983). Depending on how attractive an industry in decline is and on whether the business has competitive strengths in the remaining attractive market niches or segments, the four possible endgame strategies shown in the left graphic are recommended.

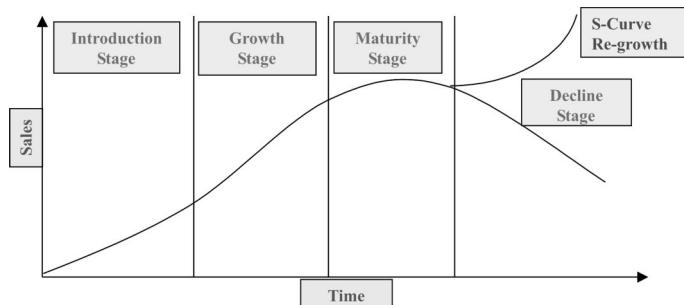
### 3.) Endgame Strategies Model

According to the ongoing primary research among industry incumbents, some would appear to be already pursuing both Quick Sale and Harvest strategies. For example, based on confidential information, EDC, like a number of others, may have chosen to respond to the unfavourable environment by seeking a quick sale in order to realize the greatest possible value from the permanently weakening competitive position of physical products. Other companies in the market would appear to be contemplating the pursuit of Harvesting strategies by returning value through the maximization of cash returns with little further investment. This is based on the assumption that the industry has only 3 to 5 years left before entering terminal decline.

Both the Quick Sale and Harvesting strategies are exit routes from an industry whereas Harrigan's remaining two strategies, Leadership and Niche, involve continued participation. A Leadership strategy will involve the achievement of market power in the remaining segments of the industry and controlling the process of decline in the businesses' favour (which requires some form of investment). The expectation is that as other competitors leave the industry so the profitability of the remaining firms improves.

Niche strategies depend on the existence of defensible market segments. In an endgame, the strategy requires a business to pull out of the broad market and concentrate on niches where it has relative strengths or where customer demand is likely to persist longer (or at higher levels) than in the rest of the industry.

However, Harrigan et al.'s Leadership and Niche strategies are difficult to implement due to the unique environmental factors impacting upon the industry (1983). E.g., the threats facing Blu-ray are from substitute ICT-based virtual products and new entrants to the industry. Moreover, Porter's Five Forces framework is very difficult to apply to the Blu-ray scenario because the industry and market boundaries have become irrelevant due to the advent of new technologies such as downloadable content via the Internet (Porter. 1998). Competitors are therefore entering Blu-ray's competitive domain from adjacent industries.



According to Kim et al., Divestment (Quick Sale) and Harvesting strategies are based on a 'structuralist' and 'environmental determinist' view of industry (2005). This is what the authors referred to as 'red ocean' strategies. However, if Blu-ray is to engineer an S-style growth curve to avoid moving into an industry decline phase (left-hand

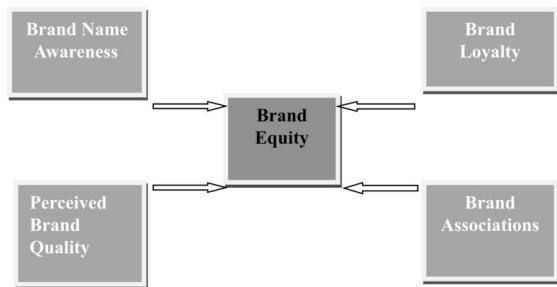
figure) then a 'reconstructionist' view or blue ocean strategy is required. This raises the question of how we actually define the industry and which industry must a leadership strategy be established in (and is that feasible) and/or which niche segments are now available due to the redrawing of the market boundaries. A simple answer would be that optical discs based on the Blu-ray standard are a market segment, habitat, within the overall entertainment industry and a number of niche segments can be exploited within this market dependent upon the positioning strategies of individual firms (Cassia et al. 2006).

In terms of adopting a leadership strategy and achieving market power in the Blu-ray sector using a blue ocean approach, leading market players need to promote the benefits of the Blu-ray brand to a much wider audience (Kim et al. 2005). Too few potential consumers are aware of the full range of actual and augmented features that Blu-ray can offer including its streaming/downloadable capabilities, 3D and UHD potential. Continued investment in the technology is also essential to ensure that it can match the benefits of broadband and broadcast technologies. Research by In-Stat revealed that consumers who used the Internet to obtain content could be broken down into three distinct segments consisting of (2009):

- 1) Power users (9%) who perform a wide variety of activities and applications on the Internet on a frequent basis. Social networking, Internet TV, downloading movies, etc.
- 2) Social Users (44%) who perform a limited set of activities and applications on the Internet on a frequent basis. Primarily social networking and short online videos.
- 3) Passive Users (47%) who perform very few Internet activities and applications, on a frequent basis. Primarily email, news, and web searches.

Power users may not be the wealthiest consumers but they influence the future buying behaviour of social users (who represent 66% of future US broadband households). Power users also access content on multiple screens (TV, PC, mobile); they are under 30, male and multi-taskers and they represent the largest social networks.

It is therefore critical that Blu-ray companies access and influence this target segment and build brand equity (right-hand graphic). For example, consumers have to recognize something about themselves in the



Blu-ray brand that they don't see elsewhere. The brand must have enough power so that consumers covet it and want to be a part of it, even if it's no longer the most convenient. Blu-ray and others in the high definition sector have so far only had to sell the category – the technology and the content – in order to grow but as the market matures this is not enough. Blu-ray needs to uncover the meanings and belief systems of its target audience and align its brand with them. A brand that says something about who the consumers are when they use the Blu-ray brand will ensure long-term success because then Blu-ray will have permission from target audiences to explore even more territories. For example, Apple customers are those who treasure simplicity and feel a little ahead of the curve. They "think different," as the Apple tagline says. Blu-ray will need to talk about itself and what it provides by peeling back the three layers of the product benefits 'onion' and understanding what is inside in terms of the wants and needs of the consumer. What are they really getting (Dibb et al. 2006)? What does the technology provide other than simple content i.e. excitement, a new experience, being in control or enjoying the fine things of life?

Power users not only influence other buyers of content but also play an important role in defining both current and future user needs. In order to overcome the problems of strategic drift (mentioned earlier), power-users should therefore be allowed to determine Blu-ray's future business model possibly based on a redefinition of the meaning of content ownership. By doing this a blue ocean strategy using a 'value pioneering' instead of a 'technology pioneering' approach could be adopted [i.e. reinvention through the introduction of a new set of rules] (Kim et al. 2005). For example, research by In-Stat revealed that power users had four primary requirements from audio and video content (Nissen. 2009):

- 1) Being able to make back-up copies.
- 2) Being able to use content on multiple devices.
- 3) Being able to re-use content.
- 4) Being able to be interactive with content i.e. sharing with family and friends (uploading and down-loading via social network sites).

Blu-ray media players are strongly positioned to meet these needs particularly due to the ability to record and store content for re-use and redistribution. However, this challenges the existing paradigm as to what constitutes legal ownership and the rights of the owner to share the content. P2P file sharing and piracy are also a serious problem and all recent tactics to prevent this occurring have failed.

A leadership position could therefore be taken by the industry in pioneering the introduction of a digital rights information management system. This would require the co-operation of other stakeholders. Blu-ray content owners should seek to provide an end-to-end solution for managing, marketing, purchase and distribution of digital audio and video content. For example, a Blu-ray customer would be granted digital ownership rights when downloading content, which could be tiered based on differing levels of use. Complete rights would include all four requirements listed above, namely: rights to download, rights to stream content; rights to produce back-up copies of content (including optical discs); rights to transfer content to other registered devices; rights to re-use the content and to distribute it to other users. Using an *a la carte* menu system, consumers could pick and choose the level of rights they wish to purchase based on differential prices. Pricing should also be set at competitive and affordable levels.

This approach would produce many benefits. First, it would help to monetise lost revenues suffered by the entertainment industry due to piracy. Second, it would increase integration between different technologies and platforms and thirdly it would lock customers and content providers into longer term relationships.

It would build increased brand loyalty and help to remove competition by creating co-operative technological relationships with erstwhile rivals. This is what Brandenberger et al. referred to as a Co-opetition Strategy combining competition and cooperation through a system of digital rights information management (1997).

## **II. Blu-ray DVD Decline – An Inevitable Surprise?**

With regard to the aforesaid, a decisive question has to be answered: In deciding to develop a high quality DVD system, did the industry set about solving the wrong problem? The further question is then, whether Blu-ray will be a next generation of a failed product? There are a number of very strong clues to suggest that the decline in the Blu-ray market is an “inevitable surprise”. These clues come already from using a series of simple innovation analysis techniques that can be used to help to define the right problem, and identify technology trends nevertheless effectively.

### **1.) The Ideal Final Result (IFR)**

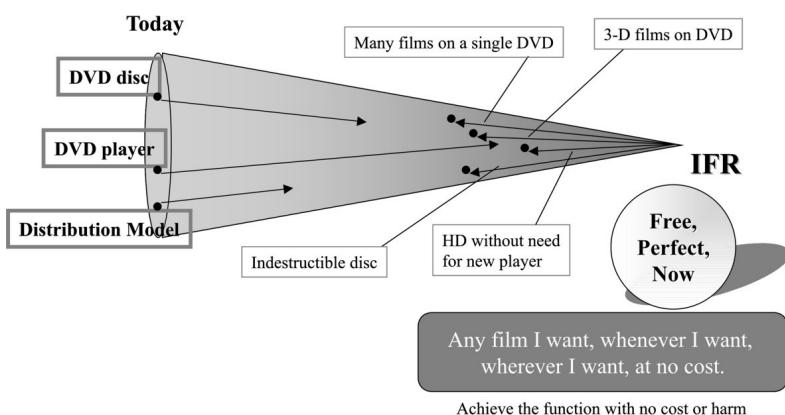
Altshuller postulated that products and services tend towards ideality over time. He defined ideality as the provision of all of the required benefits and none of the costs or harm (1996). Domb contributes that in terms of the value equation, the Ideal Final Result has all the benefits that the customer requires, and none of the harm caused by the original system (1998, 1997). A useful modern analogous phrase coined by Rodin is “Free, Perfect and Now”, which is complemented by Kelly’s thesis and argumentation of “follow the free” (1999, 1997).

The idea of pausing to consider what would be the perfect outcome for the consumer is an important one for a number of reasons:

- 1) The consumer will always abandon an existing solution in favour of a more ideal solution (for him/her).
- 2) It forces a consideration of what functions (“jobs-to-be-done” as described by Christensen et al., “outcomes” as described by Ullwick) need to be delivered. It also forces a consideration of what other means of delivering the function might exist (2004, 2005).
- 3) A consideration of the Ideal Final Result can be the basis of the introduction of a disruptive innovation.
- 4) The pace of technological change facilitates an ideal outcome increasingly often.

When thinking about where a disruptive innovation may come from, it is helpful to imagine what would be the ideal final result for the consumer (not the manufacturer, wholesaler or retailer). An ideal result for a film lover may be the opportunity to have any conceivable film available on demand, on any medium, with perfect quality and free of charge.

On the right is one example of how the Ideal Final Result may be described for the DVD industry. It needs to be noticed that the discs, the players, and the business models all make their own developmental steps towards ideality. This describes the concept of habitat, the Blu-ray is a dependent format in a system of interlinked technologies, which are developed by incumbents of different sectors of the Home Entertainment Industry, and, by consideration of the complete industry, do not necessarily follow the same organisational interests (Cassia et al. 2006). It is important to think about *how* the Ideal Final Result could be delivered to the customer. When this is done, it is suggested to be concluded by a company that:



- 1) The IFR can be delivered by certain developments of its own technology.
- 2) The IFR could be delivered by certain additions from outside to its own technology.
- 3) The IFR can be delivered by technology that it does not have.
- 4) The IFR cannot be delivered by any means that currently exists.

These are strategic considerations for a company, which can have an enormous impact on the future health of a company. IFR analysis highlights the potential for disruptive innovation to occur.

High Definition DVD and Blu-ray are certainly steps towards a more ideal solution for the customer. But when one focuses on the Ideal Final Result of, say, “any conceivable film, in perfect quality, on any medium, and free of charge”, it becomes apparent that Blu-ray falls far short of this ideal, and the industry needs to look to alternative technologies that could meet the need. As the above graphic shows, ways of distribution are involved simultaneously, which leads towards a major institutional dilemma. All resources, processes and values of the content owners are directed towards and focused on physical distribution. As the resources, process and values theory (RPV) tends to hold, innovative ways of organising products and services are embraced, when RPV favour the existing organisational structures and are difficult to master, when these are on stake (Christensen et al. 2004). The close collaboration between content owners, manufacturers of discs and players, etc. – all of their RPV are mainly based on the distribution of physical products – seek for strategies and products, which do not foster such innovation being against the status quo (established RPV), difficult to deal with, and do not support their existing business models. This may explain that consequently then, they tend to favour defensive strategies.

## 2.) Trends of Evolution

Altshuller's analysis (1996) of technical systems proposes that products progress towards ideality by moving stepwise along certain development paths. Altshuller identified 35 different trend paths, with each path containing 4 or 5 jumps. The following graphic presents the trend path dynamisation:



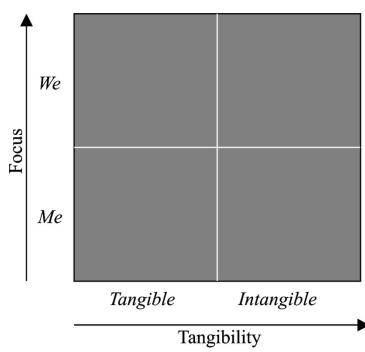
It is outside the scope of this paper to discuss these trends in detail. They are discussed fully by Mann (2002). However an important trend path is shown in the diagram above. The trend shows that structures evolve to move and permit users to become more mobile. Solid to liquid/gas to field are highly disruptive jumps when they happen. When functions move to a field-based delivery, this is often the death knell for non-field based delivery systems. The reason of this is that field-based functionality is close to ideal for the user and fields can add so many more functions. A clear example is the evolution of the camera, where development jumps progressed from single (immobile) photographic plates to (fully flexible) rolls of film, and ultimately a field-based image capture system (the digital camera) suggesting one explanation for the success of digital photography vs. the established analogue counterpart.



Each trend jump adds additional functionality for the user. Notably when the function of image capture becomes entirely digitally then there occurs an explosion of benefits and new functionalities for the user (in the case of the camera examples are zero cost image capture, instant image capture, vanishing small image capture devices, image enhancement and manipulation, image sharing, etc, etc). Important from the Sony and Toshiba strategic perspective is that a field-based delivery system (movie downloads) was already established before Blu-ray and HD DVD were launched. This fact and trend should have sounded alarm bells in the boardrooms of both companies, and is another clue that the decline will continue, despite heavy investments in the Blu-ray technology.

### 3.) Outcome Based Analysis

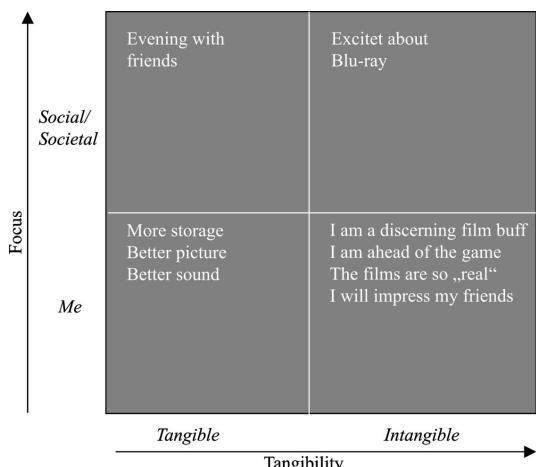
The main advantage that a Blu-ray disc has over a standard DVD is that it has an order of magnitude higher data storage capacity. The resulting benefit to the consumer is that higher quality video can be stored on a disc. To what extent is this outcome one that customers wish to have? Customers buy



solutions that allow them to achieve outcomes better than they can achieve currently [getting a “job done”] (Christensen et al. 2004). The left diagram allows these outcomes to be mapped. The template divides the world into four outcome quadrants, each focusing on tangible or intangible, individual or collective dimensions. The innovation of increased data storage is very much about trying to solve tangible level problems associated with the capture and consumption of films. However, buying decisions are almost always driven by intangibles, and the real reason for making a purchase is probably to be found in the top right hand corner of the left-hand template.

A consideration of the tangible and intangible benefits of Blu-ray can be compared to Internet downloads and/or cable services:

### 4. Outcome Based Assessment of Blu-ray

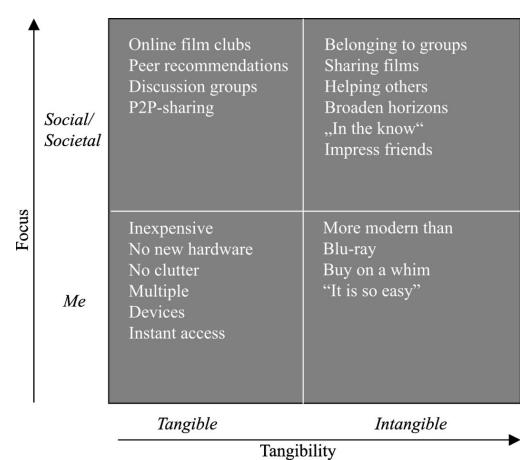


The left hand graphic suggests that the assessment for Blu-ray considers a contrast to download, which is divided in personal and more factual criteria. However it has to be assumed that the Internet will catch up with the disadvantages of lower quality and as well it needs to be stated that among the young generation, for those, who Prensky has suggested as digital natives, quality aspects are of less concern and as it can be observed in consumption patterns, watching a movie is frequently shared by watching it on a computer screen (2001). Furthermore, convergent technologies create increasingly opportunities to transfer films on TV-screens.

A further proposition is that the tangible Me quadrant involves further investments, as Blu-ray needs special screens, a different player and an audio investment, which sum up in substantial extra spending.

### 5. Outcome Based Assessment of Internet Downloads

The contrast between Blu-ray and download (right hand graphic) proposes significant differences with regard to access, mobility, immediate consumption and necessary investments. I.e., the Internet downloads offer significantly more intangible benefits than Blu-ray, and additionally, the tangible benefits such as instant access and no need to purchase new hardware are powerful and



play more nearly to the Ideal Final Result that the consumer is looking for.

## **6. Struggle for Survival**

There are many contributing factors that help explain the decline of the DVD. It is suggested, despite a number of other reasons for the decline, that in developing Blu-ray in the first place Sony has solved the wrong problem. Whilst many consumers will certainly appreciate the improved quality that Blu-ray offers, it is arguable that conventional DVD is good enough for most people, and Blu-ray does not satisfy unmet needs (Christensen. 2003, Christensen et al. 2004). Already simple innovation analysis tools clearly indicate that competitor technologies can deliver more ideal solutions to the customer than Blu-ray.

Unless Blu-ray can add new – intangible – functions to the consumption of films, then it will be replaced in the short term by Internet based solutions. How far away that future is will depend on how innovative it will appear in delighting the customer (e.g.):

- 3-D Films?
- Blu-ray systems that stimulate other senses in addition to sound and vision (touch, taste, smell)?
- Films where the ending is different every time it is watched?
- Films where the story develops differently, depending on who is watching it?
- A library of films on a single disc?
- Films in which the viewer can see him/herself present in the film as an extra?

## **III. The Case of Innovation by Technology and Market Linkages**

A conclusion via assessment by the arguments presented is suggesting that Blu-ray is the wrong solution, which does not sufficiently meet consumer requirements. This proposition supports the research of Christensen et al. expressed by the disruptive innovation theory. This theory tends to hold that incumbents flee upmarket, when attacked by disruptive technologies and face the problem to overshoot customer expectations (2004, Oestreicher. 2009). This attitude may find support in the resources, processes and value theory since the physical Blu-ray is a solution, which the industry considers as means for further exploitation of established ways of doing business. This way favours additionally the market and content control for institutional benefits, neglecting market linkages (Moyon.2006, Abernathy et al. 1983, 1984).

### **1.) The Dilemma Involved**

The overarching dilemma of the prior statement lies in its simplified perspective. It is not about one industry and it is not about Blu-ray alone. And additionally, it is much about consumers, their shifting behaviour and consumption patterns.

Blu-ray has its own logo and is considered as a brand offering its own set of features making it a valuable market proposition. But Blu-ray is not a unified product per se involving a huge number of different stakeholders. Blu-ray is first of all a technology, led by Sony and supporters. Next, Blu-ray is a medium transporting content being in possession of content owners and thirdly, Blu-ray is an optical disc manufactured most times by licensed replication plants. Finally, Blu-ray involves many other institutional stakeholders in the field of the additional devices, players, screens and loudspeakers, needed. Sony and its surrounding group have high interest in the success, since the license business is a steady return for its huge investments stated here earlier. Content owners have a vested interest, since they can sell either new content for a more expensive price to consumers offering a better margin than regular DVDs, whose profit pools have been destroyed. Manufacturers need urgently a replacement, since prior formats of other optical discs are in sharp decline. Further stakeholders of other industry sectors manufacturing players, screens, speakers and so on benefit from Blu-ray additionally. Kim et al.'s. blue and red ocean strategies having roots in their models of conventional and value innovation logic, suggested that this paradigm is part of the conventional logic and remains strongly in industry-given boundaries (2005, 1998). It is an institution-centred model.

A further supporting criteria for the aforesaid is the creation of the BD4C licensing group comprising four global players, Toshiba, Mitsubishi Electrics, Thomson Licensing and Warner Bros (dvd-intelligence. 2010c). (Surprisingly, Sony as a major Blu-ray stakeholder is not part of the founding group.) The categories offered for licenses provide evidence that Blu-ray licensing is a major issue for increased revenue streams. Contrasting the four founding members shows, as the categories for which license fees are requested, the variety of institutional interests across habitats, but in given industry boundaries. With regard to the model of Kim et al., little can be found, if anything, assisting to argue that value innovation logic takes place (1998). This argument raises further doubts about the sustainability of the Blu-ray developments in a context, where downloads are further increasing rapidly and Blu-ray struggles. Positive reports about the raise of Blu-ray demand need to be evaluated critically. Reports of shooting up by 167% in 2009 or 98% in Holland are meaning little, since a) demand is still far lower as replication capacities and b) such huge increase is based on very small figures making it easy to announce a positive development (dvd-intelligence. 2010d, 2010e, 2010f).

As Schulze-Garg and others stated in interviews, a further criterion is that a high number of content owners possess content, which cannot be used for high definition, since the source of content is not supporting the necessary quality, limiting the exploitation of the Blu-ray format even from within industry boundaries further and reducing its capabilities to become *the* mass product or future dominant design (2010). Another industry opposition arises consequently within replicators. As the conducted interviews proved, replication plants are aware that the vast majority of content owners do not own content, which provides the necessary prerequisites for a representation on a high definition format (2010).

Therefore replication factories are very reluctant in investing in adequate replication lines and specific glass mastering equipment. From a strategic perspective, this builds a second (inner-industrial) front against Blu-ray, limiting opportunities further and restricting the format's exploitation. A supporting statement is that manufacturers of replication lines have also stopped to invest in further developments of replication lines and, not to forget, that the financial performance of these manufacturers has declined due to a lack of demand for replication lines, including those for Blu-ray manufacturing. Hong Kong based Anwell Technologies, one of the latest entrants, joined the Blu-ray bandwagon recently announcing its own development of Blu-ray replication lines, but interestingly in its announcement Anwell uses the official low figures for Blu-ray as justification, e.g. household representation in the USA of just 19.4 millions by June 2010 (2010). But more important, Singulus AG, likely the most renowned replication line manufacturer, is a highlighting example, since having started to exit the replication industry by addressing new fields, like solar energy (Krause. 2010). This shift to solar energy, i.e. industry exit, is shared by the second acknowledged company M2 intensifying the scenario for a likely unhealthy Blu-ray future even more (2010, Harrigan et al. 1983).

I.e., a new young format (Blu-ray) with improvements was introduced, but in a market-related top-down hierarchy. Therefore, it is argued:

1. After an extremely short period of time, pressure on retail prices and manufacturing prices is high due to very slow market acceptance.
2. Many content owners do not possess Blu-ray compatible content, restricting the format's market opportunities as a mass product needed for a commodity medium.
3. Replication factories are reluctant to invest in the new technology due to high uncertainties with regard to achievable workload from their customers.
4. Manufacturers of replication lines are looking for new opportunities outside the Home Entertainment Industry

Generally, this is suggested as a further chain of arguments supporting immediately a next, refined chain for the hypothesis that Blu-ray is the wrong solution resulting now in a two-front battle:

1. A rather limited range of opportunities inside the industry itself, which suggests being in favour of the very few globally acting replicators (Technicolor, Cinram, Sony DADC and

- alike), since only they have real access to the so-called majors (Hollywood studios, music industry), those which have the content for high definition formats.
2. Such restrictions speak against a Blu-ray mass market in which pre-recorded content may replace the older standard DVD-format. I.e., the two fronts are as stated
    - a. in 1.), only opportunities in specific areas, which count nevertheless for a huge market share, since representing the major participants of both content owners and replicators/distributors by quantity of discs sold, but only a minority of the total amount of both content providers and replication plants;
    - b. the second front in which Blu-ray does not only fight against virtual downloads, but tries to cannibalise the existing DVD-business at the same time.

So far, all the argumentation is more concerned with technology. But innovation has its second stream of major importance, market linkages (Abernathy et al. 1983, 1984, Oestreicher. 2009). The deeper meaning is, the final point of consumption, the consumer, has little consideration in the institutional-centred model above. It is suggested that this model is 1) against d'Almeida's concept of the shift 'from an economy of transactions to an economy of relationships' and 2) furthers the old model of industry-controlled offers within given industrial boundaries (Moyon. 2006, Kim et al. 1998, Oestreicher et al. 2009).

It seems difficult to elaborate a scenario, which allows saying that Blu-ray fulfils the requirements for sustainability. A majority of research findings draws attention to obvious and severe underlying problems, and there is – a worst case scenario for all strategists – even a third front leading to the assumption of a next dilemma within which the various institutional stakeholders forgot to respect an (extended) understanding, consideration and application of transactions *and* emotions and tangible *and* intangible values, i.e. formulating a consumer-centred, instead of an organisation-centred strategy, since ...

## **2.) ... “consumers are doing it for themselves” (Antorini. 2009)**

A crucial aspect in the game that the industry plays by conserving and improving its prior status quo is the postmodern hyper-consumer. This pattern is suggested in this context as innovation's market linkages having high relationships with the concept of P2P. Another dilemma, being an odd one for the industry is – consumers are doing it for themselves – while the physical market decreases, in some areas like CD dramatically (from 2000 to 2009 = app. -70%, from 2008 to 2009 -20.5% alone), consumption increases (RIAA. 2008, 2009, Anderson. 2007, Kusek et al. 2006, Kusek. 2009). The Nielsen SoundScan 2009 provides, despite a few positive messages, even more evidence for the negative industrial trend (Smith. 2009). It is suggested that the real underlying aspect needing attention for answering the initially asked question, whether this industry has to prepare endgame strategies for its physical distribution and to a good extent of its market control, can be found here, since all the evidence tends to suggest that the industrial offers do not meet consumer expectations. Whether it is about CD or DVD or Blu-ray, whether about music, films or may be games, is proposed as being of secondary nature. By respecting the disruptive innovation theory, a further suggestion is that Blu-ray is not more than another industry's attempt to flee upmarket overshooting most customers' expectations, which are consequently not honouring the quality improvements by an adequate premium (Christensen et al. 2004, Oestreicher. 2009). This cause and effect logic may help understanding, why Blu-ray's profit pools are quickly disappearing, so short after its inauguration and, as expressed earlier in this paper, Blu-ray faces a rather hostile environment, which none of the prior formats experienced at the same point of its lifecycle. This again pleads for the assumption that the Home Entertainment Industry may have addressed the wrong solution: Marginal improvements against the radical forces of the probably architectural Internet solution of the virtual, dematerialised product download overshooting consumers' expectations.

Consumers, one suggestion of the P2P-concept, supported by the consumer culture theory, enjoy sharing experiences for which the ‘thing’ (the product) is a means to share social links (Rémy. 2009). Movies, music, games, the major content of the Home Entertainment Industry, are one of the favourite topics for such social interaction between consumers (Kusek et al. 2006, Anderson. 2007). This proposes that consumers enjoy content, want “to do it for themselves”, without institutional

restrictions and may therefore be prepared to exclude organisations (Antorini. 2009). This third front of rejection of industrial offers has its origin in the content, but affects other habitats, too, since the physical product may be considered as disadvantageous and restricting such social interaction and file sharing. This may help to explain the rapid increase of downloads and that consumers disregard legal aspects (IFPI. 2010). Assink defines disruptive technologies as the successful exploitation by radical new product, process, or concept that significantly transforms the demand and needs of an existing market or industry, disrupts its former key players and creates whole new business practices or markets with significant societal impact has significance for the key role ICT plays in the changing value chain of the Home Entertainment Industry (2006). One time more it is suggested that Blu-ray does not represent the right solution, since not concurring with the parameters of Assink's definition and not offering enough space for postmodern or hyper-consumers to do it for themselves, too.

### **3. Assessment by the Buyer Experience Cycle (Kim et al. 2005)**

Altshuller identified 35 different trend paths in the field of innovation, the IFR suggests the ideal result consumers are looking for (1996). Instant access, full mobility, immediate consumption on multiple devices and the criteria of P2P-sharing of experiences are suggested outperforming the higher quality of Blu-ray in the eyes of the mass of consumers. These consumer criteria correspond much to Kim et al's six utility levels for buyers, which can unlock extraordinary – 'blue ocean' – values (2005). Within this framework Blu-ray struggles again, as a short, qualitative, unstructured and non-representative research among German consumers undertaken by Oestreicher in 2007 provided evidence for two specific arguments 1.) the desire for buying only such content they desire and 2.), they do not want to support an industry (content owners) anymore for which they have little love marks (values of sympathy) since controlling what a consumer can see, hear and has to purchase. The first argument contributes to the discussion of this paper, while the second suggests that there may be a further field, outside the discussion of physical and virtual products, but probably influencing their viability nevertheless. The latter area needs further research to shed light on the extent and size of this influence, especially since Kusek et al. argue in the same direction (2006).

The outcome-based assessments above can be complemented by a Blu-ray-relevant selection of criteria in Kim et al's Buyer Experience Cycle (2005):

<b>Buyer Experience Cycle (Kim et al. 2005)</b>	<b>Download</b>	<b>Blu-Ray</b>
Purchase (finding, attractive place, accessibility, speed of purchase)	<ul style="list-style-type: none"> <li>- Easy finding by many download platforms and online retailers</li> <li>- Immediate access</li> <li>- More selection than in any shop</li> </ul>	<ul style="list-style-type: none"> <li>- Restricted finding due to shop space</li> <li>- Shops may be difficult to reach</li> <li>- Restricted product offer (not all content is available on/compatible with hi-def requirements)</li> <li>- Purchase can be timely extensive</li> </ul>
Delivery (time, easy to store product, easy access):	<ul style="list-style-type: none"> <li>- Download has immediate delivery</li> <li>- Allows to store thousands of tracks on a mini-device</li> <li>- Websites are always and easily accessible</li> </ul>	<ul style="list-style-type: none"> <li>- Time for shopping in city or delivery from online shops</li> <li>- Restricted storage space for discs at home</li> <li>- Access channels are sufficient (physical stores or online retailers)</li> </ul>
Use (Effectiveness of product features, overcharged with 'bells and whistles')	<ul style="list-style-type: none"> <li>- Very effective with regard to social links [the link is more important than the 'thing', as consumer culture theory sheds light on] (Rémy. 2009)</li> <li>- The charge is only for the exact purchase and not for pre-recorded unwanted tracks, extras and other gimmicks</li> </ul>	<ul style="list-style-type: none"> <li>- Pre-recorded content, which cannot be changed and forces to buy what the industry prescribes</li> <li>- Reduced ways of interaction in a P2P-environment</li> <li>- Quality and features overshoot likely most consumers' requirements, which do not want to pay the premium for such features</li> </ul>
Supplements (Other products and services to make the product work, if so, cost)	<ul style="list-style-type: none"> <li>- No further devices needed</li> <li>- No extra cost (see IFR)</li> </ul>	<ul style="list-style-type: none"> <li>- Player</li> <li>- HD-screen</li> <li>- 5:1 or higher speaker system</li> </ul>

for them, how much time do they take, how obtainable are they)		- Rather costly - But easy and quick to obtain
Maintenance (Requirement of external maintenance, maintain or upgrade the product, cost of maintenance)	- No general external maintenance - Upgrade by improved landlines and high-speed Internet connections - Upgrade by higher defined online files (e.g. You Tube) - No maintenance needed	- No general external maintenance - Potential of upgrade, e.g., exchange of player against recording player - Robust product, maintenance-free
Disposal (Waste and waste-related criteria)	- Digital files, no disposal	- By the quantity of discs, waste is an environmental issue, but of little consumer concern

The Buyer Experience Cycle is shaping a framework on a macro level, which can be complemented on the micro level by Vandermerwe's Customer Activity Cycle (CAC) detailing all activities needed to perform a job. As Oestreicher stated in the application of the CAC, any disc competes by 18 steps to listen to a disc-based track against just eight to listen to a download, a list, which does not respect the increased efforts of the purchasing process of a disc reducing the easiness of consumption of the physical product further (2009). This is of additional disadvantage for any physical product this industry has and may develop by applying conventional logic (Kim et al. 1998).

#### 4.) Summary

It is suggested to be short sighted and too simplified stating that the wrong solution is Blu-ray. The assumption being a centre in the further research is that any physical, pre-recorded medium is unlikely to meet today's market needs, which seem to be addressed better by the virtual offer with its versatility in both areas, technology and market linkages. The latter may even exclude the industry increasingly, fostering P2P behaviour, but as well c2c business models. Even the professional body IFPI suggested to its members to reflect about strategies of access, but as Christensen et al.'s and Utterback's studies suggest that incumbents wait until it is too late (2009, 2004, 1996). The arguments presented here, underpinned by the many official statistics available, nurture the assumption that it is already rather, if not already too late.

Therefore, the repetition of a majority of arguments presented is a conscious endeavour for this case to underpin that not regarding which framework is used or applied for an assessment, the outcome is at least similar and does not support Blu-ray, since its major characteristics as a commodity and mass product are not meeting the turbulent market place in a size and extent being important for industrial survival. The mere amount of these frameworks leading towards comparable results provides rather convincing evidence that this industry needs to reflect rapidly on far better solutions. Better solutions does not necessarily mean another new disc format, like the development of the holographic disc, which may result in a similar dilemma, since being part of the conventional logic. The holographic disc may face a similar fate as the digital VHS cassette, the prior desperate answer of the VHS duplication industry, which was heavily announced, but never released, since markets overruled the rules of the game quicker in favour of the DVD. The Ideal Final Result, unlocking extraordinary values may have to be found by value innovation logic reframing and reshaping the whole industry's boundaries, as far as they still exist (Kim et al. 2005).

Returning to the prior argument of habitat as explained by Cassia et al. creates a differentiated assumption for each industry sector (2006):

- Content owners: This habitat owns the necessary content, which is digitised. I.e., the format of transport is of little interest. This is suggested to count as long as the control over the content and its usage is protected. They are supposed to have a perception and branding problem, but this has little to do with Blu-ray (Kusek et al. 2006, Anderson. 2007). Their established physical distribution system is heavily challenged being a major source of revenues and the entire business model. Its likeliness to become obsolete is rather high.
- Disc manufacturers: This group is likely to go into an endgame scenario, since the attack of the radical ICT-based technology will not stop and each improvement the physical product made will be balanced by the Internet-offer. The timeframe of three to five years (as mass

product) is considered as being realistic. Harrigan et al.'s strategic endgame consideration of remaining pockets is probable and will allow a longer survival for some very few players (1983).

- It is suggested that a cascading effect will take place, since it is an imperfect distribution between those players having access to the group of majors of content owners with wider opportunities of Blu-ray and those, whose customer portfolio does not provide major Blu-ray compatible content.
- Other industrial sectors (players, loudspeakers, etc) will be affected, too, but consumption of any Home Entertainment software of which style ever needs screens and loudspeakers of one way or the other. Convergent technologies, e.g. bringing Web content to TV-screens may be supportive.
- Consumption patterns: These are expected to shift further away from institutional offers and favouring increasingly models in which consumers can do it for themselves (P2P), using the 'thing' for creating social links (Antorini. 2009, Rémy. 2009).

The big hope of 3-D offers will need further studies and evaluation. But, if the Home Entertainment Industry will try to make it a stand-alone offer, some form of panacea for its present dilemma, which will allow returning to the status quo, then it is likely to fail, as Blu-ray will likely not be more than a short episode. Again additional investment in special devices will be required. Again the social linkage among peers will be missing. On the other hand, it is assumed that 3-D solutions will again overshoot the majority of consumers' expectations, for who present solutions will likely be good enough [jobs-to-be-done theory] (Christensen et al. 2004).

For the time remaining an interesting correlation between the Harrigan et al. endgame model and Abernathy et al's resilience map may be of advantage. By totally different perspectives both address the quadrant niche (1983, 1983, 1984). Here, in this quadrant Blu-ray may find pockets, which – by a combination of both models (further research is suggested) – may offer interesting developments as suggested under chapter II. of this paper. It seems unlikely that these will easily address a mass market, but may find interest in special consumer segments. If this is the case, it may be much easier to achieve profitable business models, since these customers or consumers are interested in such solutions beyond commodities and are prepared to pay an extra price then.

## 5. The Ideal Final Result and Further Consequences

Blu-ray – this is dared to state – is the wrong solution, especially, but not only, since it is a) part of the conventional logic and not the value innovation logic, b) not developed as the IFR and c) a defence strategy for obtaining the status quo (Kim et al. 2005, 1998, Oliver. 1991). As Oestreicher argued before, Blue-ray addresses the wrong development and offers a number of disadvantages it shares with other product launches, which finds further evidence in the argumentation of this paper (2009). Christensen et al's and Utterback's studies underpin that fighting with marginal (product) improvements against radical technological forces produces the loser always on the side of marginal developments (2003, 2004, 1996). Abernathy et al. concluded in their studies that it is possible to revitalise a decreasing lifecycle, but this is not an easy endeavour and needs more than just simple quality improvements. Even harder in this scenario is that both forces of innovation, technology and market linkages have united and turned against the physical product (Abernathy et al. 1983, 1984).

Sun-Tzu has recommended that all forces have to be concentrated at the decisive point of the battle, but the proposition is that this decisive point are the market linkages, but the Home Entertainment Industry has obviously concentrated its forces at the point of the institution-centred status quo, being likely the wrong front, since secondary at best (2001). By application of the lessons of the Prussian general von Clausewitz this is less a strategic move, it is only a tactical manoeuvre at best, but to be successful it needs clear strategies for the development of sufficient counter-forces (2004). The IFR needs to be developed consumer-centric to meet a challenging environment and market demands (Johnson et al. 2008b).

A case study tends to develop a new theory (Charmaz. 2009, Goulding. 2002, Eisenhardt. 1989). This limited research around the Home Entertainment Industry and the Blu-ray disc cannot develop a new

theory. However a short view on next developments in a different market provides a next, but comparable dilemma, that of e-books vs. printed books. The new device Kindle is an apparent and next attack against the established physical book market. The threat of e-books is not new. Since quite a while e-books are available, but never took off the ground. This long-term and slow development meets again the results of Utterback's and Christensen et al's research (1996, 2004). Disruptive, discontinuous innovation tends to develop for a longer time without shaping major inroads to markets until suddenly a spark ignites the radical forces of the wind of creative destruction (Schumpeter. 1950). The arising and parallel questions with regard to the case here are:

- Will Kindle be the enabler for this discontinuous development, the igniting spark?
- Will the iPad become the destructive force – “more books than you can read” as its advertisement states?
- How will the habitat of the book market react?
- Will it follow the same pattern and flee upmarket with marginal improvements as the disruptive innovation theory explains (Christensen et al. 2004)?

This final suggestion wants to draw attention to the fact that it is not only about the Home Entertainment Industry and its marginal answer Blu-ray to radical forces, but that the wind of creative destruction will affect more and more industries – not to be forgotten, 3-D laser printers are a next threat to many more and totally different industries (Schumpeter. 1950, Anderson. 2007).

This case study is inductive, but following the argumentation it looks for ways to explain organisational behaviour beyond a single industry allowing us to understand the driving institutional forces.

## **Conclusion**

This paper has analysed the declining competitive position of Blu-ray technology in the light of new competitive threats from ICT-Based virtual products. There are now serious doubts regarding the sustainability of the industry, which is illustrated by the responses of existing companies within the sector. If an advanced phase of strategic drift is to be avoided and an irreversible decline in the industry lifecycle is to be averted, imminent strategic measures are required.

However, owing to the unique nature of the competitive threats red ocean strategies are likely to be inappropriate (Kim et al. 2005, 1998). However, the industry incumbents need to rapidly develop the brand equity of Blu-ray in the short-term in order to stave off further declines in market share. In the long-term, some form of blue ocean reinvention is likely needed and should include a radical review of the existing business model and the paradigm surrounding the definition of content ownership and the rights of consumers.

Once more it is summarised and suggested that the identified pattern is repeated: Incumbents tend to wait until it is too late, try to fight with marginal developments against radical forces, while fleeing up-market. This low-strategic approach had already failed in a good number of other industries before (Utterback. 1993, Christensen et al. 2004). Despite that the conclusion is that Blu-ray was the wrong solution, this assessment concerns the industry's effort to create another format enabling it to recreate market dynamics in the endeavour to re-establish its status quo. All the existing odds, from both ends of innovation, technology and market linkages, plead against a successful outcome. But there is another important fact of innovation, what was invented cannot be made un-invented, hence Blu-ray is an existing format having its advantages. Therefore, by a different perspective, Blu-ray may find a market and develop, but it is more likely to find its place in specific niches, where these advantages can be specifically exploited. Such strategies will likely have to be formulated meeting the requirements of Abernathy et al's quadrant of niche in the transilience map (1983, 1984, Oestreicher. 2009). This will mean a change of institutional strategies and even more to create real strategies as Johnson et al. have defined (2008b). Additionally, from a marketing view, the Blu-ray brand needs a much stronger strategy itself to position it in the mind map of relevant market segments (Aaker et al. 2002, Lindstrom. 2005).

In the present situation it might even be possible that Blu-ray may replace the standard DVD as the Home Entertainment Industry's dominant design, but the conviction, based on the assessments presented here, is that a) prices will have to be equal to those of standard DVDs and that strong support will be needed from, e.g., digital TV equalling the further consumer investment, e.g. in HD-screens, due to convergent technologies. But this will be unlikely equalling shifting market linkages and consumption patterns. Therefore, the assumption is that in this scenario Harrigan et al's niche quadrant will play its role making the endgame only smoother and with regard to the replication industry only for a part of its incumbents (1983).

Overall, the case of Blu-ray supports the researched paradigm that incumbents tend to be reactive, act by wrong assumptions and when it is too late.

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