

A HISTORICAL EXAMINATION OF
**DISRUPTIVE INNOVATION MANAGEMENT IN THE
GLOBAL MEDIA & ENTERTAINMENT INDUSTRY**

by

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Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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Synopsis

“The goal of university research is the creation, dissemination, and preservation of knowledge.”

– *Steven E. Hyman, Provost of Harvard University 2001–2011*

The Department of Trade and Industry recently identified the media and entertainment industry as a strategic sector in South Africa because of its growing contribution to economic development through both local and foreign investments, export opportunities and job creation potential, as well as the significant spill-over possibilities in industries like tourism and retail usually associated with emergent industries. However, deficient research and development has been identified as one of the notable constraints to ensuring sustainability and competitiveness of local cultural industries, in which annual expenditure currently amounts to R100 billion.

This emergent nature of South Africa’s cultural industries, their strategic importance as part of South Africa’s growth path as dictated by the government and the current dearth of academic literature concerning entertainment technology innovations instigated a three-tiered research objective: First, to determine whether this industry is a legitimate subject for engineering management study by examining its technology-foundation; second, to examine the impact which technological change has historically had on the industry, building on theories by Meza (2007) and Burgelman and Grove (2007); and thirdly, to provide an analysis of the global trend of contention and convergence between content creators and technology companies. Integrating these objectives into one deliverable, the ultimate aim of this study is to establish a synthesised knowledge base on the media and entertainment industry for the Department of Industrial Engineering with specific emphasis on the intersection between technological innovation and business model innovation.

A hybrid multiple-case study research approach is utilised to answer eight research questions which contribute to this research goal. Four notable insights gained from answering these are (1) entertainment companies have historically reacted to technological change in a very particular manner, reducible to a four-phase process: *invention*, *ascension*, *contention* and *sensation* – referring to the observation that incumbent organisations’ response to disruptive innovations is usually one of trepidation, a reaction which leads to legal battles and subsequent contention between technology and media content companies yet simultaneously providing opportunity for inter- and intra-industry convergence and for new business models to be developed; (2) cross-boundary disruptors are those organisations which have the capability of influencing not only inter-industry organisations but also how business is conducted in entirely-different industries; (3) industry effects account for more than 60% of profit variance in the Entertainment and Lodging economic sector, justifying a study of entertainment companies from an industry perspective; and (4) because of digitalisation, the Internet, exponentially increasing computing power and the proliferation of networking capabilities, the media and entertainment industry is transitioning from a business model which is based on media-directed “push” relationships, fragmented audiences and the provision of passive consumption to one which provides

ubiquitous immersive experiences, multi-device operability and value-based content which may be customised to consumer requirements.

As Porter (2008b) suggests, a historical analysis may prove to be not only informative but also instructive. The synthesised knowledge base and deductions made from this historical examination of disruptive innovation management in the media and entertainment industry may consequently be used as a basis for future research, for which a few possibilities are offered.

Opsomming

“Ons sal nie ophou verken nie, en die einde van al ons verkenning sal wees om te arriveer waar ons begin het maar om dan die plek vir die eerste keer te verstaan.”

— *T. S. Eliot*

Die media- en vermaaklikheidsbedryf is onlangs deur die Departement van Handel en Nywerheid geïdentifiseer as 'n strategiese sektor in Suid-Afrika as gevolg van die groeiende bydrae wat hierdie industrie lewer tot ekonomiese ontwikkeling deur middel van plaaslike en buitelandse beleggings, uitvoergeleenthede en werkskeppingspotensiaal. Hierdie industrie beskik ook oor beduidende oorloopmoontlikhede in bedrywe soos toerisme en kleinhandel. Gebrekkige navorsing en ontwikkeling is egter geïdentifiseer as een van die vernaamste beperkings tot volhoubaarheid en mededingendheid van plaaslike kulturele industrieë, 'n bedryf waarin jaarlikse besteding reeds R100 biljoen beloop.

Die kombinasie van hierdie ontluikende aard van Suid-Afrika se kulturele industrieë, hul strategiese belangrikheid as deel van Suid-Afrika se Industriële Aksieplan en die gebrekkige akademiese literatuur met betrekking tot vermaaklikheidstechnologie het gelei tot 'n driedelige navorsingsdoelwit: Eerstens, om vas te stel of hierdie bedryf 'n legitieme akademiese onderwerp vir die ingenieursbestuur-dissipline is deur die aard en tegnologiese fondasie van die industrie te bestudeer; tweedens, om die impak wat tegnologiese verandering histories op die bedryf gehad het te ondersoek, met Meza (2007) en Burgelman en Grove (2007) se teorieë as fondasietekste; en derdens, om 'n analise te verskaf omtrent die wêreldwye mededinging en konvergensie tussen inhoudverskaffers en tegnologiese maatskappye. Geïntegreerd in een aflewerbare is die uiteindelige doel van hierdie studie om 'n saamgestelde kennisbasis aangaande die media- en die vermaaklikheidsbedryf vir die Departement Bedryfsingenieurswese te lewer, met spesifieke klem op die ontmoetingspunt tussen tegnologiese innovasie en die innovasie van besigheidsmodelle.

'n Hibriede meervoudige-gevalllestudie navorsingsbenadering is aangewend om uiteindelik agt navorsingsvrae te beantwoord. Hierdie vrae het gedien as riglyne om die doel van die tesis te bereik. Vier noemenswaardige insigte wat uit die beantwoording van hierdie vrae gekom het is (1) die vermaaklikheidsbedryf het histories op 'n besondere wyse gereageer op 'n tegnologiese verandering, een wat gereduseer kan word tot 'n vier-fase proses: *uitvinding*, *aanvaarding*, *mededinging* en *sensasie*. Hierdie proses verwys na die waarneming dat bestaande organisasies aanvanklik met angs reageer tot ontwrigtende innovasies, 'n reaksie wat lei tot wetlike gevegte en daaropvolgende twis tussen tegnologiese maatskappye en inhoudverskaffers, maar tegelykertyd geleentheid bied vir inter- en intra-industrie konvergensie sowel as vir die ontwikkeling van nuwe sake-modelle; (2) ontwrigtende innovasies bied geleentheid vir kruis-grens ontwrigters om die manier te beïnvloed wat ander organisasies, insluitende diegene in geheel-verskillende industrieë, besigheid doen (3) bedryfsfaktore is verantwoordelik vir meer as 60% van winsvariansie in die vermaaklikheidsbedryf, 'n waarneming wat 'n studie van vermaaklikheidsbedryf vanuit 'n industrie-perspektief regverdig, en (4) digitalisering, die Internet, eksponensieel-groeiende

berekeningspoed en die vermenigvuldiging van netwerke het veroorsaak dat die media- en vermaaklikheidsbedryf 'n besigheidsmodelaanpassing moes ondergaan vanaf een wat gebaseer is op media-gerigte "stoot" verhoudings, gefragmenteerde gehore en die verskaffing van passiewe verbruik na een waar aanpasbare, waarde-gebaseerde inhoud alomteenwoordig beskikbaar is en verbruik kan word op veelvuldige toestelle volgens verbruikers se behoeftes.

Porter (2008b) noem dat 'n maatskappy se geskiedenis nie slegs informatief is nie, maar selfs ook voorskriftelik. Gevolglik kan die afleidings wat gemaak is uit hierdie historiese ondersoek aangaande ontwrigtende innovasies in die media- en vermaaklikheidsindustrie gebruik word as 'n fondasie vir toekomstige navorsing – 'n paar aanbevelings hiervoor word in die gevolgtrekking van hierdie dokument gelys.

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Glossary

A&R	artist and repertoire
ABC	American Broadcasting Company
ACE	Africa Coast to Europe
AFM	American Federation of Musicians
AHRA	Audio Home Recording Act
AM	amplitude-modulation
AMPAS	Academy of Motion Picture Arts and Sciences
AOL	America On-Line
ASCAP	American Society of Composers, Authors and Publishers
AT&T	American Telephone & Telegraph
B2C	business to consumer marketing
BMI	Broadcast Music Incorporated
BMG	Bertelsmann Music Group
CAD	computer aided design
CAGR	compound annual growth rate
CBS	Columbia Broadcasting System
CD	compact disc
CGI	computer generated imagery
DBS	direct broadcast satellite
DMA	designated market areas
DMCA	Digital Millennium Copyright Act
DRM	digital rights management
DTT	digital terrestrial television
DVD	digital video disk
EMI	Electric and Musical Industries
FCC	Federal Communications Commission
FM	frequency-modulation
FOX	Fox Broadcasting
FTC	Federal Trade Commission
GE	General Electric
HUT	homes using television
IMDB	Internet Movie Database
ISP	Internet Service Provider

JV	joint venture
JVC	Victor Company of Japan
LPs	long-playing records
MCA	Music Corporation of America
MGM	Metro-Goldwyn-Mayer
MP3	MPEG-1, Level 3
MPAA	Motion Picture Association of America
MPPC	Motion Picture Patents Company
MSO	multiple system operator
NBC	National Broadcasting Corporation
P2P	peer-to-peer filesharing technology
PPV	pay-per-view
PUR	persons using radio
R&D	research and development
RCA	Radio Corporation of America
RIAA	Recording Industry Association of America
SABC	South African Broadcasting Corporation
SAex	South Atlantic Express
SAG	Screen Actors Guild
SCMS	serial copy management system
SDMI	Secure Digital Music Initiative
SESAC	Society of European Stage Authors and Composers
Tb/s	Terabits per second
UA	United Artists
UHF	ultra high frequency
UPT	United Paramount Theatres
VCR	videocassette recorder
VHF	very high frequency
VHS	video home system
VOD	video-on-demand
VTR	video tape recorder
WACS	West African Cable System
WGA	Writers Guild of America
XBD	cross-boundary disruptor

1. Introduction

“It is commonplace in most lines of economic endeavour that those who process raw materials, transform them and merchandise the finished product receive the lion’s share of economic rewards. The field of cultural endeavours is relatively unique in that we strongly desire to reward our creators, commune with their audiences, but avoid or ignore the organisational middlemen linking each to the other.”

– *Paul Hirsch*

The aim of this chapter is to highlight the reasons why this study has been undertaken, to state its objective and to explain the approach taken in the pursuit thereof.

1.1 Academic Justification

Few thoughtful academics in business science and industrious practitioners thereof would disagree that human resources, production, logistics, sales, marketing, operations and strategy should all be managed. Likewise is the case with technology and innovation.

The concept of technology and innovation management for the purpose of competitive advantage notably started gaining traction during the 1980s and has since been a popular topic in business and management science. Hamel (2007) observes that abstracts of academic articles have featured the terms “technical innovation” and “technology innovation” more than 52 000 discrete times in the last 70 years. When Germany, Japan, South Korea and other countries started obtaining significant market share in major industries traditionally monopolised by the United States of America during the 1970s and 1980s, the demise of America’s technological superiority became apparent. Initially challenged in established, capital-intensive industries such as Motor Manufacturing and Steel Production but later also in other industries such as Telecommunications and Consumer Electronics, American businesses started becoming attentive to the necessity of competent technological innovation management on both corporate and national levels (Hayes and Abernathy, 1980). Burgelman, Christensen and Wheelwright (2008) suggest that

it was exactly the USA's aspiration for competitive advantage which has led to the surge in academic research on the management of technology and innovation.

Yet one has to agree with Paul Hirsch that conscious academic efforts to study and drive technological innovation in industries like Manufacturing, Mining and Agriculture far outweigh those of the cultural industries, a global business in which total expenditure amounts to one trillion US dollars per year (Vogel, 2011). The deficiency of academic studies on the media and entertainment industry from a business or engineering perspective is also discernable in South Africa¹, and that while expenditure in the local industry currently equals R100 billion according to PricewaterhouseCoopers (2011). Offsetting the effect of the 2010 FIFA Soccer World Cup, which enabled real industry growth of 21.1% between 2009 and 2010, total expenditure is forecasted to increase to R140 billion by 2015 as demonstrated by Figure 1, adapted from PricewaterhouseCoopers (2011):

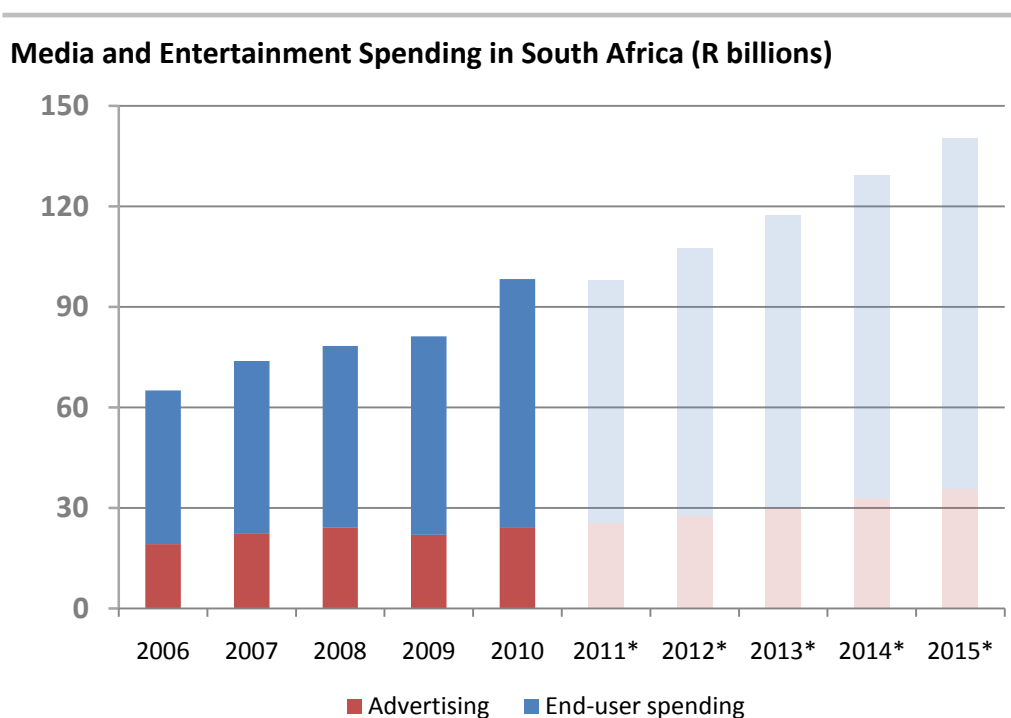


Figure 1: Spending in the South African Media and Entertainment Industry: 2006-2015 with forecasted 2011-2015 CAGR=7.4%

¹ A search for articles containing "entertainment industry" and "South Africa" in Engineering, Business, Management and Accounting, Econometrics and Finance and Economics subject areas return 44 results through ScienceDirect (<http://tinyurl.com/sciencedirect-entertainment>), while a similar search for scholarly articles containing "South Africa" AND "entertainment" on EBSCOhost yields only 9 results (<http://tinyurl.com/ebSCOhost-entertainment>).

South Africa's Department of Trade and Industry identifies the media and entertainment industry as a strategic sector in the country "not only because it has the potential to contribute directly to economic development in terms of employment, investment and export", but also because of its significant spill-over potential in industries like tourism and retail (Department of Trade and Industry, 2010). In his 2010 parliamentary address, South Africa's incumbent minister of Trade and Industry Rob Davies specifically listed cultural industries among the sectors which require focussed development and which will enjoy broadened intervention from the Department in terms of access to financing and enabling legislation (Davies, 2010).

It is this emergent nature of South Africa's cultural industries, their strategic importance as part of South Africa's growth path as dictated by the government and the current dearth of academic literature concerning entertainment technology innovations which form the context of this study.

1.2 Problem Description

Released by South Africa's Department of Trade and Industry in 2010, a proposed Industrial Policy Action Plan for 2010/11 - 2012/13 builds on the notion that the media and entertainment industry, as a strategic sector, exhibits enormous potential to improve South Africa's trade balance, provide employment and even promote foreign investment in several other sectors of the economy through its ambassadorial merits (Department of Trade and Industry, 2010). Noting that this industry is also a key growth driver in the global economy, the South African government acknowledges the need to expand the country's value offering both for local and international consumption and to shift the industry towards "a more sustainable competitive footing". Several constraints to achieving this have been identified, and provide opportunity for academia and industry to collaborate and decisively engage in development of this industry:

- a lack of skills development, both in terms of technical and business or entrepreneurial capability, and formalised processes which can promote and coordinate skills transfer from international to local productions;

- a diminished focus on technology innovation in the local industry and an over-reliance on technologies from other countries;
- a need for more content development and the development of strategies to expand production, marketing and distribution operations;
- lacking audience development, and plans to ensure that social and spatial inequalities are overcome through clever logistical solutions;
- a need for increased financing, financial models, domestic and international market development and marketing strategies; and
- a lack of research and development with regards to the media and entertainment industry as a whole.

The problem tackled by this study, then, is to address this last-mentioned constraint to the advancement of South Africa's media and entertainment industry by providing a historical analysis of disruptive innovations in various media sectors. As an introductory examination which highlights the intersection between technological innovation and business model innovation, it also addresses the question of how exactly technological change has propagated through these sectors through theory building. A third problem which this study addresses is the global trend of contention between content creators and technology companies through lessons learnt and a case for greater convergence.

Michael Porter is quoted as saying that "a company's history can also be instructive. What was the vision of the founder? What were the products and customers that made the company? Looking backward, one can re-examine the original strategy to see if it is still valid. Can the historical positioning be implemented in a modern way, one consistent with today's technologies and practices? This sort of thinking may lead to a commitment to renew the strategy and may challenge the organisation to recover its distinctiveness. Such a challenge can be galvanising and can instil the confidence to make the needed trade-offs (Porter, 2008b)." It is the author's belief that a historical investigation of technology management in the global media and entertainment industry may prove to be not only informative, but indeed also "instructive", as Porter suggests is possible.

1.3 Research Objective

This study endeavours to provide a convenient and useful knowledge base pertaining to the media and entertainment industry as studied from an economic and institutional perspective for the Department of Industrial Engineering at Stellenbosch University. Additionally, it serves as a case for further and increased research on this industry from an engineering management and industrial engineering viewpoint, on both strategic and operational levels.

This study limits itself to a predetermined number of industry segments, all of which will be studied from a strategic point of view as opposed to operationally. These include:

- Radio
- Recorded music
- Filmed entertainment
- Television
- Video recording
- The Internet, specifically pertaining to filesharing technology

1.4 Research Questions

Eight research questions were identified and explored by this study to facilitate the achievement of the research objective stated in section 1.3:

- Why is technology management an organisational necessity?
- What is a disruptive innovation, and how are organisations in the media and entertainment industry affected by technologies of such a nature?
- What is the origin of the modern-day media and entertainment industry and which sectors officially constitute it?
- Knowing that technology brings about change, in which ways has technological change impacted the media and entertainment industry historically?
- What structural changes have media markets undergone in terms of costs, profit, number of transactions and legal frameworks?
- Why did certain innovations succeed as entertainment offerings while other innovations, some even exhibiting superior capability, failed to gain adoption?

- What is industry convergence, which forces in entertainment organisations shape and contribute to this convergence and how has it affected this particular industry?
- What contribution does an academic study on entertainment history make to aid with technology management today and in the future?

1.5 Research Approach, Focus and Methodology

Mouton (2008) writes that research design types for a Masters or Doctoral degree may be categorised as either empirical or non-empirical, and describes these types of study as follows:

- Empirical studies are conducted by either using primary data (experiments, surveys and case studies), or existing data in the form of text data (content analyses, discourse analyses and historical studies) or numeric data (statistical modelling and secondary data analyses).
- Non-empirical studies, conversely, are done by way of literature reviews, philosophical analyses, conceptual analyses or theory building.

Trochim and Donnelly (2006) add another dimension to research methods by stating that research can be conducted either quantitatively or qualitatively:

- Quantitative research involves the systematic empirical examination of quantitative properties, observable phenomena and their relationships.
- Qualitative research involves the asking of a broad question and then accumulating word-type data which is subsequently analysed in the pursuit of themes and reasons for observed phenomena.

A third dimension to carrying out research, especially pertaining to studies which are conducted on an industry level or which refer to information systems and technology, has been presented by Crowston and Myers (2004). They suggest three distinct research perspectives which are beneficial in directing researchers as to which types of data should be acquired and analysed depending on the perspective employed for a particular study: an economic perspective, an institutional perspective and a socio-cultural perspective. Adapted

from Crowston and Myers, a summary of these three research perspectives are displayed in Table 1 (2004):

Table 1: Summary of the Three Research Perspectives Employed for Industry Analysis

Perspective	Key focus	Phenomenon of interest	Types of data	Characteristics of industry transformation
<i>Economic</i>	The relation between inputs and outputs of an industry	The structure of the market: the product, the firms supplying the product, the buyers, and the transactions	Economic data such as costs, profits, number of transactions	A change in the structure of a market
<i>Institutional</i>	The contextual issues that surround an industry	Legal and institutional arrangements: the regulatory framework governing an industry; organisations that regulate and constrain interactions	Legal documents, court decisions, interviews with key informants	A change in the regulatory framework and/or legal and institutional arrangements
<i>Social and cultural</i>	The processes and structures within an industry	Social relationships and networks, beliefs, norms and values	Notes from fieldwork and observations, interview data, documents	A change in social relations, social structure, social networks and culture

Molina Azorín and Cameron (2010) write that a mixed research approach, rather than a single “monomethod design” has gained popularity since 2003 in business, organisational and management research as evidenced by use in and acceptance by academic journals such as the *Strategic Management Journal*, *Organisational Research Methods* and the *Journal of Organisational Behaviour*. A mixed research approach has also become increasingly popular in academic disciplines such as sociology, psychology and health sciences, and Mearns (2008) notes that in the knowledge management and information management discipline especially it has become “the trend to use”. She writes that “it is generally accepted” that such a combined research approach can actually enrich a study and “improve validity” (Mearns, 2008). Molina Azorín and Cameron (2010) make a strong case that mixed methods “result in research which provides broader perspectives than those offered by monomethod designs”.

Best suited for an introductory study on disruptive entertainment technologies from an industry point of view, the approach for this study is, therefore, a hybrid multiple-case study

approach – a combination between an empirical and a non-empirical study which uses various case studies and historical analyses (empirical study) in conjunction with theory building (non-empirical study). The nature of this thesis is qualitative as opposed to quantitative, and from an industry analysis viewpoint it employs both an economic perspective and an institutional perspective, while observations of some social and cultural trends in entertainment companies as enabled by a socio-cultural perspective are also pointed out.

This approach is substantiated by the reality that engineering management, as a discipline, is highly-integrative in its very nature – an opinion which is shared by Bill Omurtag, who has founded and chaired the School of Engineering, Management and Science at Robert Morris University, the California State University-Sacramento School of Business and the Department of Industrial Engineering at the Middle East Technical University. In his article on the definition of engineering management, Omurtag (2009) writes that it is his “firm belief that engineering management is a new, broadly integrative and synthesis-focused enterprise engineering discipline. Functionally, [he believes] that managerial engineering is what these engineers do; that is, they do engineering in the managerial realm... of a technological enterprise. Anchored in science, mathematics, and engineering principles, and reaching into managerial areas, engineering management graduates can design and integrate the total enterprise system with its technical, financial, operational, organisational, marketing and human aspects within the global competitive environment... In summary they are enterprise engineers doing managerial work.” As a first step to designing and integrating total enterprise systems which incorporate all organisational functions in the media and entertainment industry, the research focus of this study is to understand the fundamental technologies and business models of the industry and how they have evolved over time. One cannot optimise a system not understood, and primary research in the pursuit of original data can only be conducted after researchers have acquired insight into problems by collecting secondary data.

Resulting from this research approach and focus, the methodology employed for this study can be described as follows:

1. Execute a thorough literature study to gain a good theoretical foundation in a range of subjects:
 - a. strategic management
 - b. information systems and knowledge management
 - c. marketing management
 - d. financial management
 - e. chaos theory and industry change theory
 - f. enterprise 2.0 technologies and organisational change theory
 - g. innovation management and disruptive innovation theory
2. Decide on case study research questions for the sectors and companies selected for this study:
 - a. Which companies or individuals were responsible for inventing the disruptive technology, and what were the circumstances which surrounded or enabled the commercialisation of these inventions?
 - b. What was/is the company's technology strategy?
 - c. How did/does the company's business model support or undermine new technologies?
 - d. How did/does the company relate to other organisations with regards to intra-industry and inter-industry collaboration?
3. Collect data by obtaining literature which describes the history and development of the media and entertainment sectors under discussion.
4. Analogous to gaining expert opinion, analyse trade journals, auditing reports, industry outlooks and published strategic insights from global consulting firms such as:
 - a. the IBM Institute for Business Value,
 - b. the Global Technology, Media and Telecommunications Group at Deloitte Touche Tohmatsu, and
 - c. PricewaterhouseCoopers' Entertainment and Media Industry Group.
5. Analyse and evaluate historical and expert data.
6. Synthesise findings in report form.
7. Develop hypotheses for the reasons why change propagates through the media and entertainment industry in a distinct manner (presented graphically in section 1.6), based on how companies respond to new technologies.
8. Make conclusions and suggestions for future research.

1.6 Document Roadmap

The layout of this thesis is based on the hypothesis that technological change transpires through the media and entertainment industry in a very distinct manner, derived from Meza's 'Road to Prosperity' (2007) and Burgelman and Grove's theory of cross-boundary disruption (2007), a theory which is expounded in section 2.2 of this document.

Figure 2 portrays this process graphically:

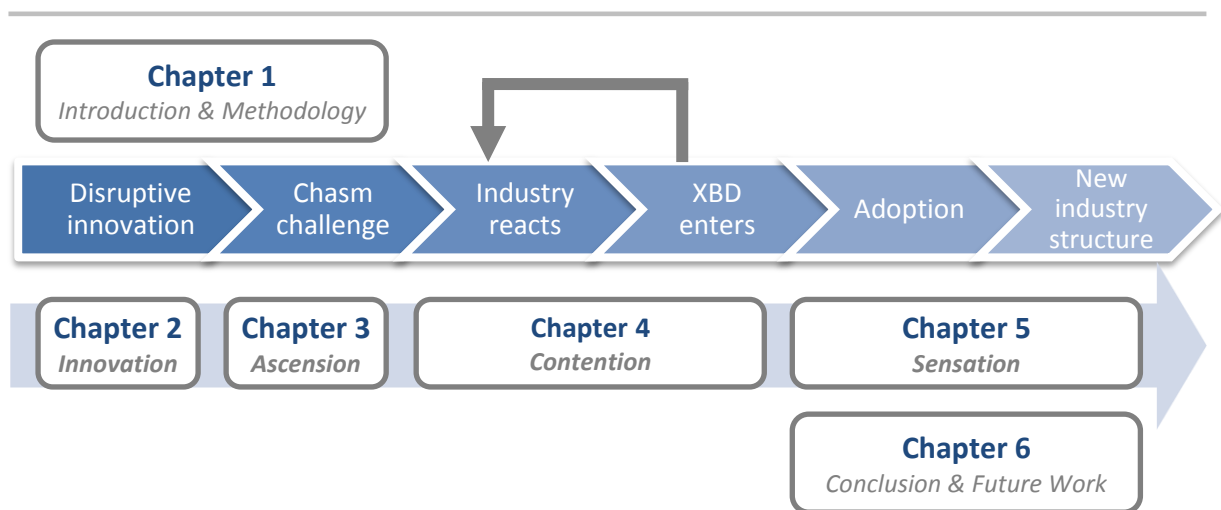


Figure 2: Thesis Outline and Roadmap

Chapter 1 introduces the reader to the motivation behind this study, provides academic justification thereof from an engineering management perspective and describes the research methodology utilised to establish a knowledge foundation for the Department of Industrial Engineering. Chapter 2 offers a concise context and literature study on disruptive innovation before it chronicles the invention of the major disruptive technologies which constitute the underpinnings of the media and entertainment industry. Chapter 3 records how the entertainment technologies discussed in the previous chapter underwent the innovation chasm challenge and examines the reasons why some organisations have ascended and others failed to achieve mass adoption. Chapter 4 argues that it is contention between technology and media content companies, resulting from a resistance to technological change and subsequent business model adaptation on top-level management level, which aggravate consumers and present opportunity for cross-boundary disruptors to

provide alternative products and services which are capable of disrupting entire sectors. Chapter 5 shows the economic benefit of convergence and close collaboration between entertainment and technology companies as well as the possibility of creating new markets when trepidation towards new innovations and strategies, which ostracize entertainment consumers, are relinquished and new business models developed. Chapter 6 provides a summarised overview of disruptive innovation management in the media and entertainment industry as documented by this study and makes some suggestions for future studies in the engineering management field which pertains to this particular industry.

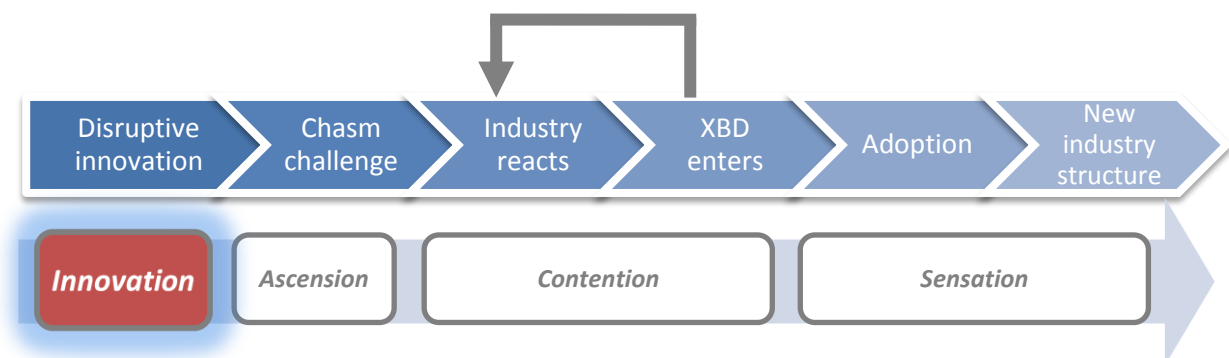
A quote by John Seely Brown, former Chief Scientist of Xerox Corporation and winner of Harvard Business Review's McKinsey Award, and Paul Duguid, adjunct professor at University of California's School of Information Management and Systems, makes for an apt conclusion to this introductory chapter: "University research... is at its most effective when it conducts research that the private sector is unable or unwilling to pursue. Much early Internet research falls into this category... Conversely, it is at its weakest when it merely duplicates research going on elsewhere..." (Brown and Duguid, 2000). As research on an industry which has traditionally not been a widely or formally studied one by either industry or academia, it is the author's desire to present a document which is effective in the pursuit of its objective.

2. The Innovation Phase

“Chance only favours the prepared mind...” – *Louis Pasteur*

“Television? The word is half Greek, half Latin. No good can come of it!”
– *CP Scott, editor of the Manchurian Guardian for 60 years*

This chapter offers key definitions and concepts relating to disruptive technologies, provides a brief overview of the history of innovation studies in academic literature and subsequently chronicles the invention of the major disruptive technologies which constitute the underpinnings of the media and entertainment industry.



2.1 Technology, Humans and the Enterprise

Many attempts to define the broad scope of technology exist in modern-day business literature, yet most seem to revolve around one core concept, i.e. the knowledge and practical application of scientific deductions. From a scientific point of view, technology can be seen as “systematic knowledge and action, usually of industrial processes but applicable to any recurrent activity (McGraw-Hill Encyclopedia of Science and Technology, 1982)”, therefore linking technology with engineering; while a business paradigm considers technology to be “developed applications for industry and the industrial arts... for example, desktop computers represent advanced electronic technology (Dictionary of Business Terms, 2007)”, linking technology with implementation and tools. Incorporating both scientific and business paradigms, Betz (2003) perceives technology to be “the knowledge of

the manipulation of nature for human purposes,” invariably utilised by means of goods and services (Gaimon, 2008). The formal definition of choice for this study, consequently, is one provided by Willem Barnard based on its clarity and specificity. According to Barnard (2008), technology refers to the “knowledge of processes and standards through which the result of the processes can be accurately predicted to a useful degree.” He furthermore insists that “technology is locked up in people, not books, laboratories, computers, plants or equipment – it is knowledge,” and that technology stems from exploration and innovation. Technology is a device not limited to physical apparatus but is actually a function of human knowledge, with ‘usability’ distinguishing it from science itself. Sauer and Willcocks (2004) go on to say that “when we think about the technology as enabling future possibilities, it only does so if people have the right skills and competencies, the right culture, approach to learning, and preparedness to innovate.” The technology can therefore never be separated from the human creating, yielding or experimenting with it – an important concept for this study.

If technology involves the human, and the technology-human combination drives change in an organisation, then naturally technology should be managed. In corporate terms, technology should be managed over a long term to generate enterprise profit (Schiling, 2008), however Firer *et al.* (2008) maintain that profitability alone is a deficient motivator for management, and that the rudimentary aim of any company should be to ultimately ensure value creation in the enterprise. Profitability and effective risk management are certainly factors which affect the creation of shareholder value in a firm; however, when it comes to the media and entertainment industry, these are not the only contributing factors to delivering products and services which add firm value. Product quality, critic favourability, artistic excellence, technical leadership and customer expectations (Simonton, 2009) all contribute to the value created in media firms and therefore serve as additional stimulus to industry-wide and organisational technology management, *yet all* with the ultimate goal of enterprise value creation. Enterprise value creation results in a competitive advantage over other players in the industry. Harrison and Samson (2002) further opine that not only has technology become a key aspect of competitiveness in the recent business context, but that it will probably become more pervasive in the future, boldly stating that “technology management is the ultimate battleground that will determine which companies and owners will be the winners and losers in the wealth creation game.” Managing technology in the

corporate context thus necessitates the integration of technology with a firm's overall strategy.

Following this logic of the inseparability of technology, humans and the enterprise, a formal definition of technology management is subsequently required. Gaimon (2008) describes technology management from a production and operations management perspective: "management of technology addresses how to develop, adapt, and exploit technological capabilities to create new or improved products or services to accomplish the strategic goals of an organisation." Manyika, Roberts and Sprague (2007) seem to agree with this definition by noting that "technology alone is rarely the key to unlocking economic value: companies create real wealth when they combine technology with new ways of doing business." Considered authorities in the field of strategic management of technology and innovation, Burgelman, Christensen and Wheelwright (2008) finally corroborate this notion by stating that technology management is actually a basic business function and that companies should develop technology strategies alongside human resource and financial strategies which speak to the commercialisation of technologies. They state six questions which a sufficient technology strategy should be able to answer:

- What are the technological competences and capabilities which may distinguish your organisation from competitors so as to establish and preserve competitive advantage?
- Which technologies should be utilised for the implementation of core product design concepts, and how will the products embody them?
- What is the organisation's investment threshold for technological innovation?
- What is the organisation's technology sourcing policy?
- When and how will new technologies be commercialised?
- How will the company be structured so as to enable effective innovation management?

Also acknowledging the importance of fit between an enterprise's business strategy, organisational structure, management systems and technology strategy, Grant (2008), however, emphasises organisational configuration and commercialisation approaches, the

subjects addressed by Burgelman, Christensen and Wheelwright’s fifth and sixth aforementioned concerns, as either vehicles or significant barriers to change and success in an enterprise. Grant states that a firm’s ability to adapt organisationally when confronted with technological change or innovation (and therefore also its ability to explore new business models) mostly depend on the implications of the new technology. He asserts that new technologies may either enhance an organisation’s existing capabilities, or that they are “competence destroying” on the other hand. The notion of new technologies affecting an organisation’s core assets and activities corresponds with Anita McGahan’s model of Trajectories of Industry change which is displayed in Figure 3, adapted from McGahan (2004):

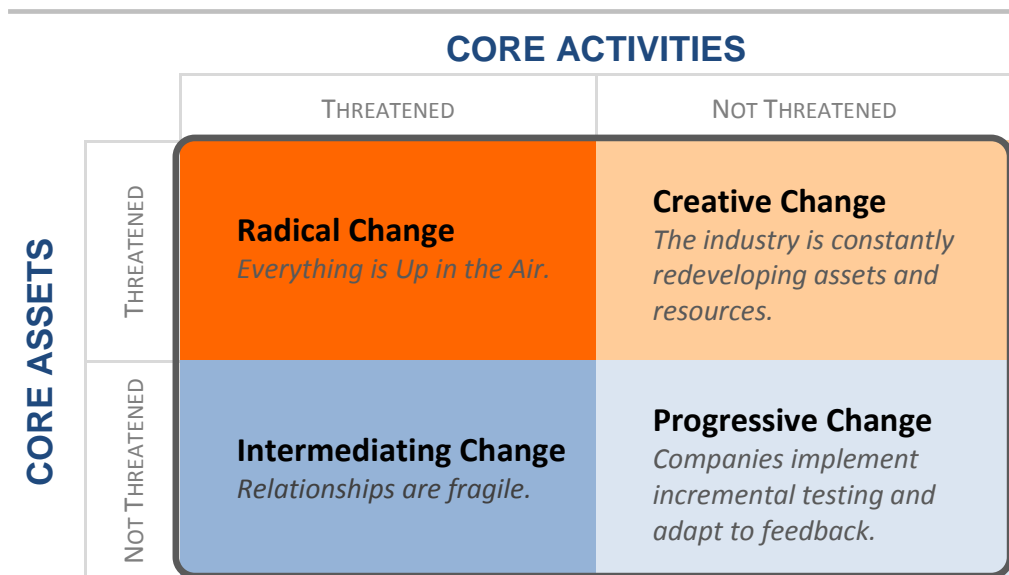


Figure 3: Four Trajectories of Industry Change

McGahan argues that intelligent investments within a company cannot be made unless top management understands in which manner its industry is undergoing change – technology being one of the chief drivers thereof. She lists four modes of industry change, differentiated by the effect of change on core assets (durable tangible and intangible resources which make companies unique) and core activities (recurring activities performed to maintain old and attract new buyers and suppliers, which make companies profitable):

- radical change, which usually occurs with the mass adoption of some new technology;
- creative change, which typically occurs when consumers or clients have new alternatives due to acquiring unprecedented access to information;
- intermediating change, which occurs when an industry is constantly redeveloping its assets and resources, but relationships between organisations, suppliers and customers remain stable;
- progressive change, which describes sustaining industries known for incremental innovations which do not threaten core assets or business models.

Debate has long existed as to whether industry effects actually influence individual firms' performance, in effect challenging Michael Porter's traditional "Five Forces" view that competitive interaction within a specific industry forms the basis of organisational strategy management (Porter, 1980 and 2008a). An alternative view on enterprise performance, one which Connor terms "a resource-based view" (1991), argues that it is not industry structure and competition which determine performance but rather "unique organisational processes" and "idiosyncratic historical factors". Presenting their results from an empirical study on American firm profitability using ANOVA techniques, McGahan and Porter found that, indeed, some economic sectors are less affected by industry effects than others. But whereas their results showed that industry effects affected profit variance among firms in the Manufacturing industry less significantly, it accounted for more than 60% of profit variance in the Entertainment and Lodging economic sector (McGahan and Porter, 1997), justifying industry analysis as a key determinant to strategy development at least in some industries.

Deduced from literature, then, the merit of studying technological change in the media and entertainment industry from a holistic perspective, as a significant aspect of technology management, becomes apparent.

Grant notes that where more extreme technological change necessitates adaptation of either an industry's architecture (core assets) or business models (core activities),

established organisations have difficulty adapting and new start-up companies tend to be more successful. However, he writes that not only radical but “even apparently modest technological changes associated with new product generations can give newcomers the ability to unseat established market leaders”, and that this ability to disrupt an industry becomes possible when companies “offer a very different package of attributes” from those of existing technologies (2008). Meza (2007) states that exactly these types of technologies, termed disruptive innovations, led to the creation and expansion of the media and entertainment industry as we know it today.

2.2 Defining Disruptive Innovations

Disruptive innovation theory, although expanded upon and popularised by Clayton Christensen’s writings from the mid-1990s onwards (Christensen and Bower, 1996; Christensen, 1997; Christensen and Raynor, 2003; Christensen, 2006), finds its origin much earlier in academic literature by such authors as Schumpeter (1942), Henderson and Clark(1990) and Moore (1991). Especially notable was Schumpeter’s entrepreneurial theory of how change propagates through an industry. Burgelman and Grove (2007) describe the Schumpeterian entrepreneur as one that is typically a start-up company which engages in “rule-changing strategic actions that create non-linear strategic industry dynamics”, providing opportunity for fast adopters to enjoy competitive advantage and a new industry configuration to be established. Figure 4 illustrates a series of studies on technological innovation which form the foundation of disruptive innovation theory:

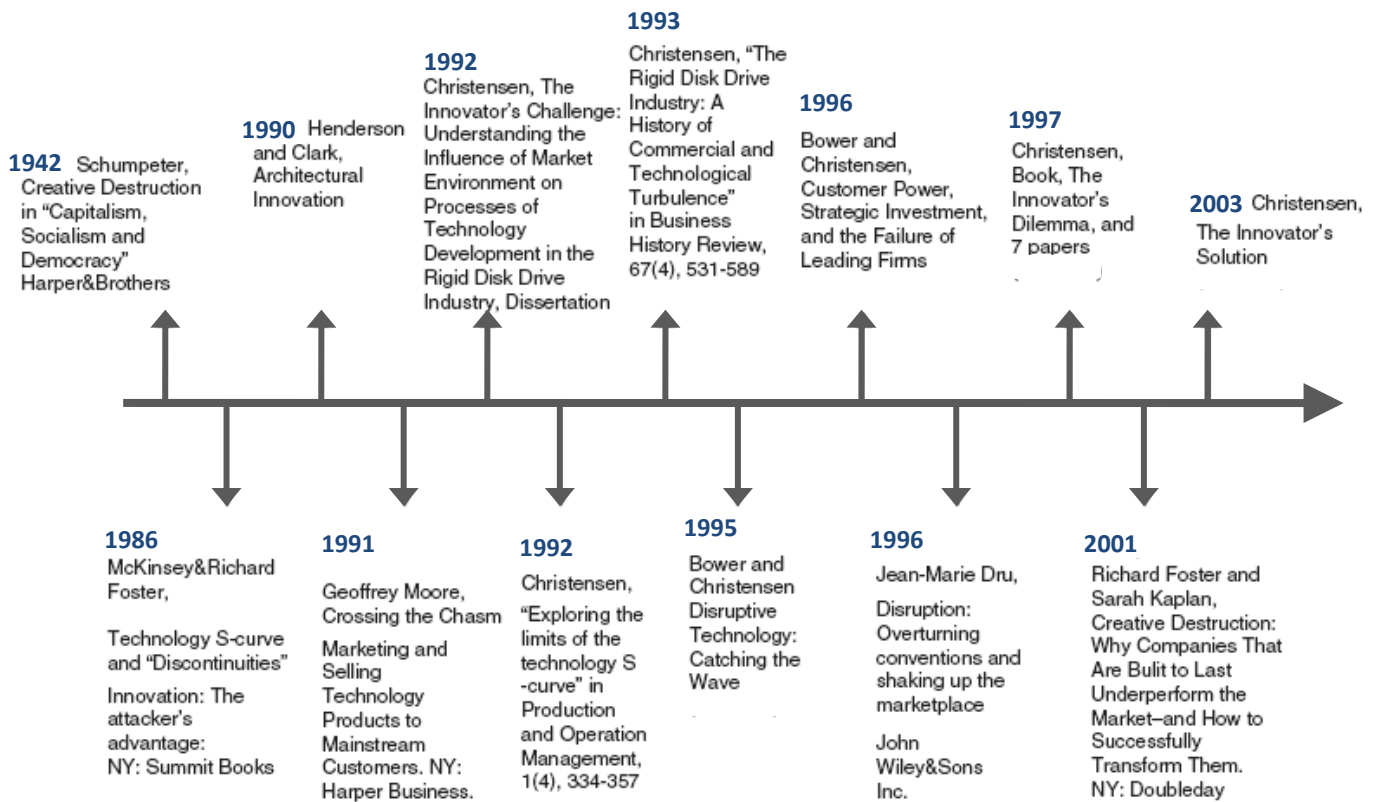


Figure 4: Timeline of the Evolution of Disruptive Innovation Theory, adapted from Yu and Hang(2010)

Yu and Hang (2010) observed that subsequent to Christensen’s initial writings, numerous other studies on the topic of disruptiveness have been conducted in the process of refining the theory and providing guidelines for start-ups and managers in industries which find their core assets or core activities threatened by new technologies. They noted, however, that as numerous as the studies are on this type of innovation, the literature often conflicts as to the actual definition of a disruptive innovation and that clarification on its attributes was required to prevent ambiguity in future research. Taking into account how Christensen’s theory has developed over the years, as well as the various reservations, challenges, critiques and suggestions of scholars such as Daneels (2004), Govindarajan and Kopalle (2004), Yu and Hang stated Christensen’s (1997) description of a disruptive innovation, along with some clarifications, in their 2010 paper: “disruptive innovation happens in a process” and may be defined as innovations “that provide different values from mainstream technologies and are initially inferior to mainstream technologies that are most important

to mainstream customers”, but later help to establish new markets or disrupt incumbent organisations by displacing existing technologies.

Raynor (2011) states that in its simplest sense “disruption... is a theory of innovation—of how particular types of new products and services, or ‘solutions,’ come to achieve success or dominance in markets, often at the expense of incumbent providers.” Having confidence in the predictive value of disruptive innovation theory, he compares disruptive innovations with sustaining innovations and endorses Thomas Thurston’s hypothesis that disruptive innovations which are launched autonomously and which “improve in ways that allow them to compete for mainstream markets from a position of structural advantage”, will be successful. The autonomy he refers to is possible if the ventures responsible for commercialising the technology are “able to design strategic planning processes and control systems and financial metrics, among other characteristics, independently of systems built for incumbent organisations (Raynor, 2011).” Figure 5 illustrates this hypothesis:

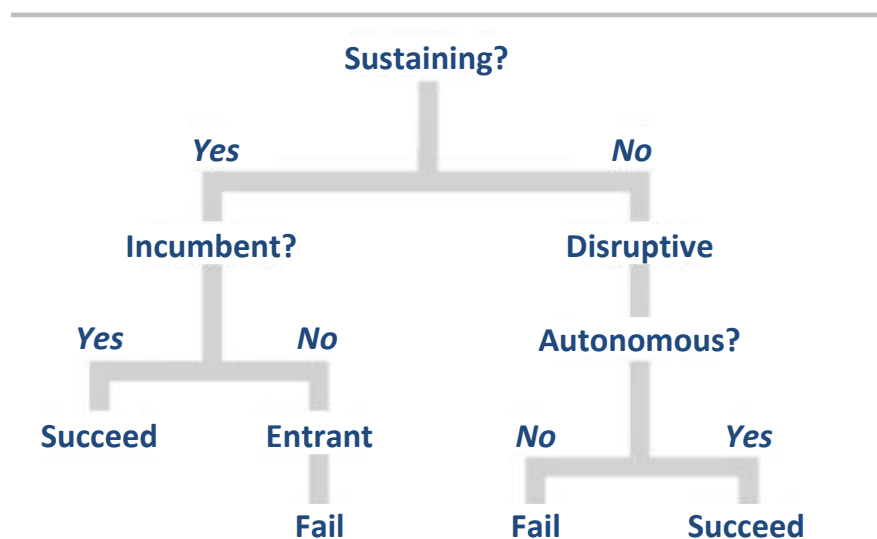


Figure 5: Disruption Theory as a Predictor of New Venture Success: Thurston's Hypothesis, adapted from Raynor (2011)

Yu and Hang (2010) make sure to dispel some misunderstandings pertaining to disruptiveness:

- disruptors are not necessarily start-up companies as incumbent companies can also disrupt industries if they have specific experience in entering new markets;

- disruptors innovations can impact existing markets significantly without necessarily displacing it if opportunities for niche markets desiring older products exist; and
- disruptive innovation does not necessarily correspond to destructive innovations, as competitors may react to the new technology by creating their own versions thereof.

Building on disruptive innovation theory and Schumpeter's (1942) idea that start-ups' activities can radically alter industry structures, Burgelman and Grove (2007) developed the concept of trans-industry disruption. Cross-boundary theory deviates from Schumpeterian theory in that it identifies an additional change agent which serves as a catalyst to industry transformation – one termed a cross-boundary disruptor (XBD). The cross-boundary disruptor has the capability of influencing not only inter-industry organisations but also how business is conducted in entirely-different industries.

An organisation is more prone to engage in XBD endeavours if:

- it has a strong but restricted product-market in its domestic industry;
 - it possesses wealth in terms of capital and human resources;
 - it has a growth-oriented strategy;
 - its core competencies and brand appeal are technology-related, increasing the potential of convergence with neighbouring industries;
 - it enjoys little downside due to an established customer-base in its domestic industry;
- or
- if it faces modest opportunity cost due to limited opportunities for growth in its domestic industry (Burgelman and Grove, 2007).

Some of the entertainment companies examined as case studies for this paper may be classified as cross-boundary disruptors, as they comprise some or all of the six attributes which Burgelman and Grove ascribe to this type of organisational entity. At this point however, a definition of the media and entertainment industry becomes necessary before the invention of these technologies is discussed.

2.3 Defining the Media and Entertainment Industry

According to Webster’s Third Unabridged International Dictionary (1967), entertainment is defined as “the act of diverting, amusing, or causing someone’s time to pass agreeably” or “something that diverts, amuses, or occupies the attention agreeably”. Vogel (2011) expands on this definition by stating that entertainment is more than just the act of diverting, but that it alludes to “a satisfied and happy psychological state” through either active or passive means, bringing the cause and effect of entertainment together. The media and entertainment industry, consequently, are those groups of companies which engage in commercial activities with that aim of providing consumers with contented psychological states. As stated in section 1.1 of this study, this is a growing industry in which spending currently amounts to over one trillion dollars a year.

Although the industry structure has been altered significantly through digitalisation, traditionally distinction can be made between various segments within media and entertainment which constitute the industry and contribute to the same aforementioned goal. In this study these segments are referred to as sectors. These sectors can be classified as either media-dependent entertainment or live entertainment, although also a traditional view, but Vogel (2011) chooses to allocate the sectors as follows in Table 2 anyway:

Table 2: Segmentation of the Media and Entertainment Industry

Media-dependent entertainment	Live entertainment
<ul style="list-style-type: none"> • Movies • Television broadcasting • Music • Radio broadcasting • Cable television • Publishing (books, periodicals and multimedia) • Toys, games and video games 	<ul style="list-style-type: none"> • Gaming and wagering • Sports • Performing arts and culture • Amusement parks and theme parks

In its trade articles and annual industry outlook reports, PricewaterhouseCoopers chooses to delineate the media and entertainment industry by using the following segments (2010a). Noticeable is fragmentation of the publishing sector into four divisions:

- Internet
- Television

- Filmed entertainment
- Radio
- Music
- Consumer magazine publishing
- Newspaper publishing
- Consumer and educational book publishing
- Business to business publishing
- Out-of-home advertising
- Video games
- Sports
- Gaming

Incorporating some aspects of both these views but excluding all forms of live entertainment, publishing, toys and gaming, this study focuses specifically on the following technology-centred media-dependent sectors with a distinct focus on video recording technology rather than combining it with filmed entertainment:

- Radio
- Recorded music
- Motion pictures
- Television
- Video recording
- The Internet, with a specific focus on filesharing technologies

The following section recounts how the discrete technologies which underpin these sectors were invented with specific focus on the individuals and corporations behind the innovations, and how these technologies navigated through the *innovation phase* before obtaining mass adoption.

2.4 *Inventing the Radio*

Although Reginald Fessenden first succeeded in transmitting audio content over radio in the form of a Handel aria and some violin music in 1906, it is Guglielmo Marconi from Italy who is credited with being the “Father of Radio” as we know it today (Harlow, 1936). The science behind radio broadcasting technology, however, is dated back as early as the 1860s when James Clerk Maxwell established electromagnetic radio wave theory and the 1880s when Heinrich Hertz produced and detected the waves described by Maxwellian theory. After

coming across an academic article which described the working of Hertzian waves in 1894, Guglielmo Marconi became convinced that the radio waves described by Hertz could be utilised for a purpose greater than just transmitting signals – two-way communication. After some experimentation, Marconi displayed an invention which could transmit Morse code over radio waves to the Italian government in an attempt to secure funding for further research, yet they were not interested in what he had to show them. The British government, conversely, issued Marconi with the world's patent on radio technology when they anticipated the usefulness of radio for its naval operations. Marconi had speculated that the technology which he had developed in the form of a wireless telegraph would be used primarily for military purposes. At a mere 23 years old, Marconi established the Wireless Telegraph and Signal Company as a vehicle for selling his wireless telegraph with the help of British investors, a company which he renamed Marconi's Wireless Telegraph Company in 1897. Apart from providing the government with his technology, Marconi started selling his wireless telegraph to shipping companies as a means of communication between ships and on-land receivers. His company signed its first significant contract with London-based naval insurance company Lloyds in 1901 (Barnouw, 1966).

Douglas (1988) writes that Marconi wanted to exercise complete control over the business of radio and did so through continuous innovation, attempting to increase the speed at which his telegraph could transmit Morse code, and by establishing noninterconnection with competitors who had started emulating his technology. Marconi argued that disintermediation was not possible between the devices he used and the transmission services which he offered. The result was that Marconi's Wireless Telegraph Company, through contractual agreements, refused to transmit and receive signals produced by their competitors, thereby cementing its policy of nonintercommunication. Marconi hoped to capture network externalities associated with his wireless technology, a phenomenon explained in Chapter 3 of this study, through his monopoly. In 1902 the company expanded its infrastructure by increasing its number of shore stations in both Britain and the USA. By that year Marconi's devices were capable of transmitting "marconigram" messages at 20 words per minute, and customers could send these marconigrams from England to America at a mere 12 cents per word, comparable to US\$3.10 in 2011, which was a fraction of the price of international telegraphs.

A problem eventually arose in that competitors' equipment could also communicate Morse code messages with that of Marconi's. Marconi attempted to counter this development by marketing his equipment as being more advanced than that produced by rival companies and depended on noninterconnection, knowing that his company was not financially secure enough at that time to fight patent-related legal battles. Marconi's company only broke even in 1911 due to its overoptimistic "Marconigram" message sales forecasts and the significant capital expenditure it incurred while setting up shore stations in the USA. Finally, Marconi was unable to exercise the control over the industry which he started, and Meza (2007) opines that his conservative view of the blossoming wireless communications industry and a stubborn commitment to an increasingly-dated business model eventually led to Marconi's failure to envision and allow technological development in the form of voice-over-radio.

Reginald A. Fessenden, Lee de Forest and Edwin H. Armstrong were innovators who not only experimented with wireless transmission technology because of the conviction that it could be used to broadcast speech and music, but they also possessed the business acumen to ensure that radio eventually achieved adoption outside of the military and naval markets at which Marconi initially aimed his wireless telegraph (Douglas, 1988).

Originally a member of Thomas Edison's staff and college lecturer, Fessenden became an employee of the American Weather Bureau in 1900 for the specific purpose of designing a wireless weather data transmission system. His agenda, however, was to develop a means of broadcasting audio content by means of wireless technology rather than discrete Morse Code messages. Fessenden alleged that Marconi's interrupted waves could be improved upon by using continuous waves, serving as a vehicle for voice or music as modulations. Fessenden proved his hypothesis in 1902 by combining voice with radio waves via a telephone microphone. Fearing that the American government would claim ownership of his technology while still an employee of the Weather Bureau, Fessenden started his own company with the help of private financiers and became the world's first disk jockey when he succeeded in broadcasting music on 25 December 1906 (Barnouw, 1966).

Lee de Forest was also an engineer who experimented with voice transmission technology while being employed by a corporation, being a researcher at Western Electric which was a division of American Telephone and Telegraph (AT&T) at the time. In 1901, the New York Herald hired both De Forest, who designed an improved Morse code transmitter based on Marconi's work, and Marconi himself to employ their newest technologies to report the results of America's Cup yacht races in New York. This venture connected de Forest with a financier who enabled him to establish the De Forest Wireless Telegraph Company in 1902, the first of his many enterprises which never existed for too long due to a combination of his "abrasive personality", which alienated him from his investors, and the dishonest business practices of his partners (Illinois Engineering Hall of Fame, 2006).

Made possible with financial backing, he developed an apparatus called the "grid audion" in 1905, a device which was instrumental in making radio feasible as an industry according to Barnouw (1966), as it formed the foundation of amplification technology. De Forest patented the audion in 1907 and founded the De Forest Radio Telephone Company as a vehicle for utilising his invention in the marketplace. He experimented by broadcasting records and live music over the airways, becoming obsessed with his technology by even attempting broadcasts from the Eiffel Tower while in Paris with his newly-wed bride at the time. De Forest partnered with the United States Navy by providing twenty six grid audion sets for their Great White Fleet which underwent a tour around the globe. Envisioning a day that radio technology would enjoy ubiquitous infiltration De Forest is quoted as saying: "I look forward to the day when opera may be brought into every home. Someday the news and even advertising will be sent out over the wireless telephone." Fewer than originally planned though, he built only eleven radio broadcast stations around the USA and even these were working erratically (Douglas, 1988).

In 1912, questionable and corrupt practices in De Forest's company were exposed when De Forest Radio Telephone Company shareholders launched legal action against de Forest and some of the other founders. Although found innocent by the courts, de Forest was bankrupt at the time and was forced to sell the patent rights of his grid audion to AT&T, which consequently caused patent wars between AT&T and the Marconi company because of its similarity to one of Marconi's patents (Coon, 1939).

De Forest could never scientifically explain why exactly his grid audion worked, but this was later determined through research by Edwin H. Armstrong, an independent undergraduate student at Columbia University (Illinois Engineering Hall of Fame, 2006). In 1914, Armstrong obtained a patent for his discovery of a regenerative electric circuit which made feedback to the audion possible, enabling it to both produce and receive radio waves, and also invented the superheterodyne, which enabled receivers to tune into various radio stations which operated on different frequencies for the first time (Douglas, 1990). This was a landmark achievement in commercialising broadcast radio, and Armstrong is consequently regarded as the inventor of FM radio.

2.5 The Origin of Recorded Music

Whereas incandescent light bulb inventor Thomas A. Edison is universally credited with being the innovator who founded the recorded music sector, a study by Rosen (2008) revealed that the invention of Edison's phonograph was preceded by Édouard-Léon Scott de Martinville's invention which consisted of a stylus which followed trail of spots which had been blackened by an oil lamp on paper and could play different notes in succession. According to a study by Duke University (2000), other engineers like Thomas Young, Charles Cros and Leon Scott also experimented with devices with the aim of reproducing sounds, and it was only 17 years after de Martinville's first invention that Edison developed the concept of a phonograph. Edison's first version of a phonograph consisted of a cylinder covered with tinfoil which could be rotated manually with a handle, as well as a metal stylus which was attached to a diaphragm. The diaphragm vibrated when sound waves made contact with it, enabling the stylus to cut grooves on the tinfoil cylinder while the handle was being cranked. Sound could be played back by reversing the procedure, which instigated the vibration of the diaphragm as the stylus made contact with the grooves on the cylinders.

When Edison developed the phonograph in 1877, he envisioned a great range of uses for his device, but suspected that it would mostly be used to pre-record messages which could be sent as telegraphs (Edison, 1878). An entrepreneur as much as an inventor, Edison formed

the Speaking Phonograph Company in 1878, replaced by the Edison Phonograph Company in 1887, as a platform for selling his enhanced phonograph. Elliot (1989) writes that audiences could pay a nickel to listen to songs or comedic speeches reproduced by a phonograph at their nearest parlour – the foundation of recorded music sector’s first business model. Edison also established a company which sold phonographs which played music when coins were inserted to the machines, thus creating the ancestor to the modern-day jukebox. He also released the Edison Spring Motor Phonograph to the slowly growing music consumer market in 1895, a device which could play music and could be bought in the form of record cylinders (Eliot, 1989). By 1899, Edison’s cylinders, accompanied by a repertoire of marches, hymns and comedic speeches could be bought for a mere 50 cents each (US\$13.33 in 2011).

Simultaneous to the commercialisation of Edison’s phonographs, German engineer Emile Berliner invented a method for etching audio onto flat metallic disks. It was proven that the metal disks invented by Berliner could produce much better sound quality than Edison’s cylinders, and that it offered greater capacity for storage than its cylindrical counterpart. Berliner’s device was also easier to produce and, along with his invention which enabled him to mass-produce metal disk copies from one original recording, he finally possessed a product which could contend with Edison’s in the music consumer market. Berliner and Eldridge R. Johnson established the Victor Talking Machine Company in 1901 as a vehicle for selling their improved device, which had undergone even more continuous innovation to become the gramophone, a device not too dissimilar to modern-day turntables used by disk jockeys. Johnson, who had invented the automation technology which replaced the gramophone’s manual crank thereby enabling a constant rotation speed for the turning table, was appointed as Victor Talking Machine Company’s first chief executive (Jones, 1985).

2.6 The Origin of Motion Pictures

Placing pictures on a ribbon of film which moved was by no means a new or unique idea for 19th century photographers. Margolies and Gwathmey (1991) write that it was already a well-known fact by the late-1800s that it is the human eye’s persistence of vision which retains an image slightly longer in the mind, thereby creating an optical illusion of continuity

when a series of pictures are seen, which enables viability of motion pictures as we know them today. Bakker (2005) lists a range of technologies which were all combined to produce motion pictures, all of them available from the late-1880s onwards:

- photography, invented in 1830;
- the ability to take negative pictures whilst printing the positives, invented in the 1880s;
- roll films, invented in the 1850s;
- celluloid, invented in 1868;
- high-sensitivity photographic emulsion, invented in the late-1880s; and
- image projection technology, invented by Athanasius Kircher in 1645 already.

But yet again it was the prolific Thomas Edison who synthesised science, physiology and technology in the form of his kinestoscope invention to officially initiate the motion picture sector in 1893. The kinestoscope, basically described, offered individual viewers the opportunity to watch a short film through a small peephole. These short films were recorded through a device which was co-invented by William Kennedy Laurie Dickson termed the kinetograph camera, a specialised camera which was capable of taking successive photographs of a moving object.

The world's first film studio, where motion pictures are filmed, was built by Edison in 1893 in New Jersey. Exhibition sites were opened first in New York and then across the rest of the USA where the films shot at Edison's studio were displayed to patrons on an individual basis. "Nickel Theaters", colloquially called nickelodeons referring to the cost per individual to watch a movie, were positioned as go-to movie houses in large US cities, and became the principal exhibition outlets in America by 1906. The Motion Picture Patents Company, nothing other than a corporate monopoly because of its desire to control the film industry, was formed in 1908 by a group which consisted of Thomas Edison and the other most prominent moving picture patent holders. This conglomerate, which cooperatively licensed the patents of its founders, was eventually classified as unlawful by the American legal system in 1915 and had to disband as a result of this ruling.

But similar to the cases of the invention of the wireless telegraph, the phonograph and the gramophone, innovations which contributed to cinema emerged in Europe at the same as it did in the USA. Frenchmen Jean Marey, Georges Demeny and the Lumière brothers filed patents for their versions of film cameras in 1888, 1893 and 1895 respectively, while Friese Green, an Englishman, managed to design his own film camera in 1890 (Bakker, 2005). Moreover, Putnam (1997) writes that it was Europeans like Charles Pathé, and not the Americans, who first regarded cinema as a legitimate art form. Yet, as mentioned previously, it was Edison who succeeded in establishing the first feasible business model for motion pictures, connecting audiences with a new form of entertainment first through nickelodeons up to 1896, thereafter through fixed cinemas for larger audiences.

2.7 Inventing the Television

Television broadcasting operations started as a mere laboratory curiosity in the early-20th century; today it represents a global industry generating almost US\$200 billion a year (PricewaterhouseCoopers, 2010a). Different experiments by several inventors in fields which range from electromagnetics to radio led to the invention of the television. Utilising some earlier scientific discoveries like Faraday's findings regarding electromagnetic fields, a young German engineer called Paul G. Nipkow designed and patented a spinning disk instrument and named it after himself. The Nipkow spinning disc was quite revolutionary in its working because it enabled the sequential sending of dissected images through wires when placed between a light sensitive selenium photocell and the scene which was to be broadcasted. Reiman (2004) writes that light passing through the pinholes (which were arranged on the Nipkow disc in a spiral shape) while the disc rotated produced a rectangular scanning pattern, which was used to either produce images from the signal at the receiver, or for generating electrical signals. Regardless of the fact that Paul Nipkow never further developed the invention which had patented in 1884, the working of his spinning disc formed the basis for most subsequent attempts at expanding the technology of the television.

John Logie Baird, a scientist from Scotland, and Charles Francis Jenkins, an engineer from USA, utilised Nipkow's spinning disc technology in their offerings of basic television systems,

making use of electromechanical equipment to receive simple broadcasted images. Nipkow's spinning disc technology, however, was inadequate to produce high-resolution moving pictures that did not flicker substantially, and both Baird and Jenkins's devices failed commercially due to poor quality (Reiman, 2004).

An all-electrical television was designed as a solution to the mechanical inadequacy offered by Nipkow's spinning disc technology by none other than a fifteen year old inventor from a rustic suburb in Idaho (Everson, 1974). Yet Philo T. Farnsworth experienced some harsh personal circumstances growing up before his ideas for television were finally realised. Farnsworth conceived of an idea of manufacturing an all-electrical television already when he was only 15 years old, but it was only in his 19th year that George Everson and Leslie Gorrell, two consultants who helped establish Salt Lake City's Community chest, saw some potential in Philo's invention (if not the enthusiasm about his ideas) and sponsored him financially to design the television technology he so ardently promoted. Still in the development phase and requiring more capital to perfect his initial technology, Farnsworth and Emerson approached additional investors, and with their help established the Television Laboratories, Inc. to commercialise the image dissector (a camera containing a vacuum tube) and oscillate (a picture tube) which then-30 year old Farnsworth had designed in his garage at home. With the technologies combined, Farnsworth's device successfully transmitted images of Mary Pickford, the well-known silent era actress, combing her hair, thereby incentivising his benefactors enough to start marketing the invention.

After a lengthy delay in the application process, Farnsworth obtained a patent in 1930 for his version of the television, the cathode ray picture tube, which by that time was designed to be both a transmitting and receiving device, unlike modern-day televisions which can only receive television signals. The Radio Corporation of America (RCA), a technology company which had substantial research and development (R&D) facilities at the time, appealed the patent that was rewarded to Farnsworth for his device by claiming that Vladimir Zworykin, one of RCA's employees, was actually the inventor of the television. RCA lost their legal battle against Television Laboratories, but nevertheless ended up winning commercially due to the ultimate superior performance of Zworykin's iconoscope (Abramson, 1995): Zworykin, a revered former scientist at the company Westinghouse, had

the inspiration to design an all-electrical television at the same time which Farnsworth had conducted his experiments, and released his version thereof through RCA soon after Farnsworth's television was introduced to the public. With the help of a significant marketing budget, a benefit which Television Laboratories certainly did not enjoy at their conception, RCA was swift to position Victor Zworykin as the actual "Inventor of Television" in the mind of the general public by the early-1930s, even though Farnsworth conceived of the idea while still only in high school.

In reality, Zworykin's device did offer a significant technological improvement over Farnsworth's: Zworykin's iconoscope had a specification which enabled memory storage, while Farnsworth's image dissector did not. Abramson (1995) writes that Zworykin's iconoscope technology finally formed the foundation of modern-day camera and picture tube technology. RCA, however, recognised the value in Farnsworth's invention and obtained the legal right to utilise his transmission and reception technologies in 1939, granting him licence to use comparable technologies developed by RCA in return.

2.8 Inventing the Video Recorder

Combining the first letters of his initials with "ex", representing 'excellence', engineer Alexander M. Poniatoff established the Ampex company in 1944 with the vision of designing the world's first audio recording technology (Rosenbloom and Freeze, 1985). Fulfilling this vision already in 1948 by producing a first prototype of a tape recorder, Ampex introduced this prototype to entertainer Bing Crosby, who was so impressed with the technology that he placed an order for twenty tape recorders which would enable him to prerecord programmes for his radio show. When television obtained consumer favour and television technology started surpassing the stage of early adoption on the technology life cycle, television networks were founded and strategic partnerships were formed with broadcasting companies across the USA. Poniatoff's company, competing with the well-established RCA company, pursued the development of a technology which could not only record audio, but video as well. RCA's iconoscope technology was deemed too expensive at that stage and a more efficient technology was required. Both RCA and Ampex realised that a solution could be found by recording video on magnetised tape, but, according to

Rosenbloom and Freeze (1985), it was Poniatoff's engineers who first successfully developed a vehicle for this technology in the form of the Mark IV video tape recorder (VTR). According to Lemelson-MIT (2002), Charles P. Ginsburg led the team of Ampex-researchers who was responsible for developing the technology which enabled the recording of televised content on tape – a process which necessitates a high-frequency response from recording devices, because television waves are broadcast at a very high frequency (VHF). The VTR enabled videotape to run at slow speed while its recording heads rotated at high speed. Ampex's first VTR models sold for US\$50 000 apiece when it was commercialised in 1956, which is equivalent to \$409 000 per recorder in 2011.

Ampex exhibited the capability of its Mark IV to 200 delegates of the CBS broadcasting company in 1956 to great success. After recording a presentation in front of a live audience and playing it back to them directly afterwards, Ampex sold more than 100 VTRs, establishing itself among the top three technology companies in Silicon Valley at the time (Fernandes, 1999). Their market at that time, however, was limited to corporate clients and not yet public consumers. Ampex identified this opportunity and developed a B2C marketing strategy and mass production infrastructure to target the consumer market.

After enjoying a period of VTR market leadership with their Mark IV, Ampex started attracting substantial competition from technology-orientated companies like Philips, Matsushita and Sony. Advances in solid state circuit electronics in Japan especially posed a solution to size, portability, cost and reliability problems. Following a failed corporate partnership with Sony in the early 1960s, Ampex agreed to a joint venture (JV) with Toshiba in Japan, but due to the continuous innovations yielded by its Japanese competitors, it never again regained market leadership in the video recording market. Fernandes (1999) writes that in 1971, product innovation initiatives at Sony led to the development of video cassette technology which replaced bulky reel-to-reel magnetic tapes which had to be used in conjunction with the large VTR machines. They named their product the U-Matic, which used $\frac{3}{4}$ inch tapes similar to that which could be found in VHS and Beta versions of the video cassette by the mid-1970s (Park, 2004).

2.9 The Origin of Filesharing Technology and Peer-to-Peer Computing

Filesharing technology finds its origin in space exploration academia, as opposed to technology developers or entertainment content companies. In 1998, programmers at Berkeley Space Sciences Lab developed computer software which enabled scientists to transfer data from the Arecibo radio telescope in Puerto Rico to thousands of personal computers worldwide. Intricate incoming signals from space could be divided into smaller 250kB data packages, distributed and transmitted to screensaver programmes on inactive computers across the globe via the Internet for processing. Analysed data would be transmitted back to a central database in Puerto Rico. Berkley reports that over two million Internet-users volunteered their personal computers for signal analysis within the first two years of this project, termed SETI@home, and that their combined network offered processing capability of ten trillion calculations per second, amassing data which would've taken 345 000 years to analyse had the distributed computing technology not been developed (Burgelman and Meza, 2000).

Yet what started as a technology which contributed positively to Berkeley's space program has become the disruptive technology of scorn for the media and entertainment industry, instigating "hundreds of lawsuits, thousands of takedown notices, and [the expenditure of] millions of dollars" to constrain illegal filesharing as first popularised by Napster, the world's first peer-to-peer (P2P) filesharing program (Bridy, 2009).

While still a first-year student at the US-based Northeastern University in 1999, Shawn Fanning coded a software program supported by P2P technology which could facilitate the sharing of MP3 music files with other people over the Internet. The easily-downloadable software program was called Napster, and started gaining traction among his fellow university students. Recognising the significant potential influence of this technology on the status quo of distribution in the recorded music sector, Shawn Fanning incorporated a company in partnership with his uncle John later in 1999. Funding through his company enabled Parker to distribute his software to an audience wider than just the local university over the Internet, and Bhattacharjee, Gopal, Lertwachara, Marsden and Telang (2007) write

that entertainment consumers rapidly adopted the new technology which enabled them to download their favourite music “for free”. They add that “the entertainment industry, in particular the music business, has been profoundly impacted by [the] recent technological advances... [as embodied by] audio-compression technologies [and] P2P filesharing networks (Bhattacharjee *et al.*, 2007).”

Napster offered its proprietary filesharing technology to Internet users in the form of downloadable software free of charge, yet Fanning never registered Napster as a non-profit organisation – his plan was always to monetise its user-base once it reached a critical mass. Yet no clear plan to achieve this existed, and before this ideal ever realised Napster was forced to cease its filesharing services because of its illegitimacy through a ruling from the District Court in California (*A&M Records, Inc., et al. v. Napster, Inc.*, 114 F. Supp. 2d 896 - District Court, ND California, 2000).

Both Napster and the aforementioned SETI@home project founded their basic business processes on distributed computing technology, more recently referred to as P2P technology. Distributed computing technology denotes the instantaneous transferral of data, resources or services between a network or networks of dispersed computers (referred to as clients), servers, routers and hubs as administered by commands processed by a central server. Oberholzer-Gee and Strumpf (2007) list three different P2P network topologies as defined by their composition: centralised P2P, decentralised P2P and hybrid P2P. Currah (2007) writes that centralised P2P architectures such as those pioneered by Napster have gradually been replaced with topologies that are decentralised, eliminating the file sharers’ dependency on dedicated web servers. Services like Gnutella, BitTorrent, DC++ and eDonkey have utilised alternative topologies to centralised P2P, which has made it more difficult for law enforcers to find the true sources of illegal content. For explanatory purposes, the architecture of these three topologies is illustrated in Figure 6 on page 48, adapted from Oberholzer-Gee and Strumpf (2007). Note that in a hybrid P2P topology, clients connect to supernodes which act like central servers, as is the case with a centralised P2P topology. However, rather than downloading files directly from these supernodes, clients download the required content from other client computers after supernode indexes have been

searched, search requests passed on from supernode to supernode and ideal client sources identified.

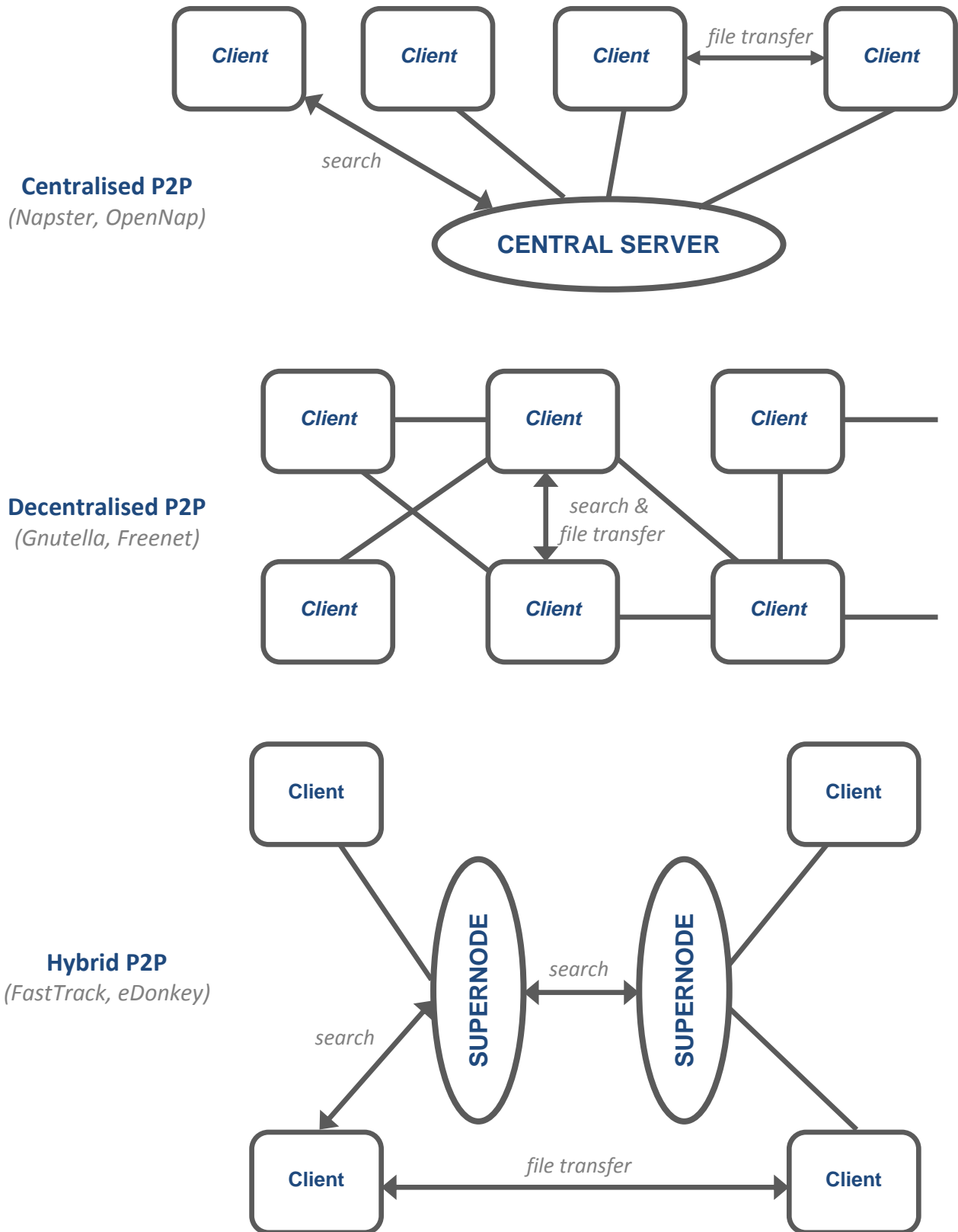


Figure 6: Peer-to-Peer Filesharing Topologies

2.10 Chapter Conclusion

Several deductions can be made through this chapter's historical analysis of sector-starting inventions in the media and entertainment industry. First, it should be noted that the radio, the phonograph, the gramophone, the image dissector, the iconoscope, the television, the VTR and Napster were all technologies which disrupted old ways in which consumers enjoyed entertainment. New markets were created and old approaches to entertainment consumption were forever impacted with the invention of each of these technologies – attributive of disruptive innovations. It should also be observed that all of these innovations occurred through a combination of existing technologies, and that the innovation process for each of them was truly a global one, as collaboration between inventors from various countries as opposed to just one ensured successful operation of these technologies. Thirdly, it is interesting to note that each of these technologies enjoyed quicker adoption than the steam engine, railroad and the steamship; a feat which, Bakker (2005) says, permits a technology to be termed a "major innovation".

The most noteworthy observation from this historical analysis, however, is that the *innovation phase* (as the first phase of industry change) occurs in a myriad of ways as opposed to simply one. Different inventions in this industry transpire through different means. Analogous to innovation attempts at modern-day R&D departments in large enterprises, some discrete innovations were conceived in a corporate context, exemplified by the host of practical technologies invented by Thomas Edison and the engineers he employed at his company. Other innovations in the entertainment industry took place when talented inventors partnered with individual businessmen who could provide necessary capital for the patenting and manufacturing of their technological devices, as evident in the cases of Lee de Forest and Philo T. Farnsworth. However, similar to Guglielmo Marconi inventing basic radio technology in his basement, Shawn Fanning creating Napster while still at university or even successes shown by recent internet upstarts initiated by entrepreneurs like Mark Zuckerberg etc., some inventions simply do not find their origin through the utilisation of structured innovation frameworks in large enterprises. Disruptive innovation does not occur in one specific way or in one specific environment only. The hypothesis deduced from this analysis, however, is that regardless of its origin, entrepreneurial

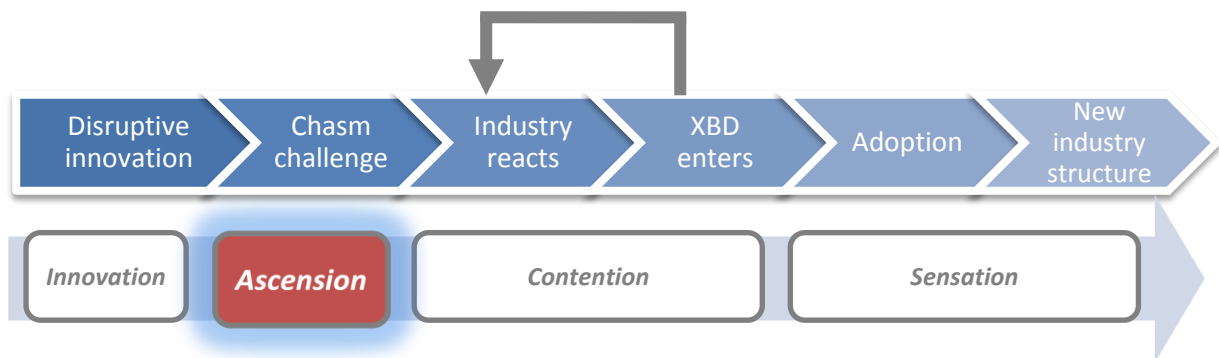
involvement and financial investment are always requirements for success of disruptive innovations in the entertainment industry; legitimate entrepreneurs, moreover, ensure that that success is sustainable. The ability of disruptive innovations to attain mass adoption is further discussed in Chapter 3.

3. The Ascension Phase

“Cinema is not art. It’s an industry that has changed the idea of art.”

– *André Malraux, former French Minister of Culture*

This chapter argues that all of the technologies discussed in Chapter 2 undertook the innovation chasm challenge – some ascended as a technology and evolved into an industry, while others failed to achieve mass adoption – and contends that it is the presence or absence of positive network externalities which makes the difference.



Even though Napster's operations as a company never emanated from a profit-generating business model, and even though Fanning's plans to eventually monetise its offering never came to fruition due to being pronounced illegal, Napster is regarded as a corporate success story in at least one aspect - it attracted more than 80 million users worldwide with its filesharing technology in its lifetime as a company (Kim and Mauborgne, 2009), and positioned P2P technology over the Internet as a viable alternative to physical devices for the delivery of entertainment-related content to consumers. Companies like Apple, Netflix and Hulu offering filesharing technology-based services after Napster's collapse have researched technology and business strategy alignment and fashioned business models that can generate profit from the use of its technology, and proved that network externalities achieved with filesharing technology can be canalised to create value for the enterprise.

Network externalities, an element observed in the Napster case study, denote one of the chief phenomena which can be observed in the *ascension phase* of industry change. Grant (2008) describe network externalities as those standards which exist “whenever the value of a product to an individual customer depends on the number of other users of that product.” Positive network externalities, specifically, are those advantages which occur as a result of increased technology adoption of a particular technological device among consumers. For example, when Alexander Graham Bell invented the first telephone, it could not be truly useful unless there were other adopters of the technology. However, as the telephone became more ubiquitous, its expediency increased and users of the technology benefitted thereby.

Radio broadcasting, television, the recorded music sector and the film industry each grew significantly as sectors of the media and entertainment industry by way of distinctive business models, and popularised entertainment even more by supplying technology for the delivery of audio, video and digital content, surpassing initial applications of the respective technologies. For instance, Guglielmo Marconi initially designed radio technology to transmit messages in Morse code over great distances, but radio became truly popular when its list of applications was broadened to include the broadcast of audio content, especially music, to entertainment consumers. Parties in the music recording sector were paid for their content by radio broadcasters, who in turn received income from advertising agencies. Furthermore, radio technology enabled a fresh avenue for marketing new content released by the music artists. A relationship of corporate symbiosis was established between these two entertainment sectors through new applications of radio technology. Similar strategic partnerships can also be observed between filesharing companies and the information industries, especially prevalent between the Apple's iTunes Store and content companies Sony, BMG, Warner Brothers Records, EMI Group and Universal Music Group (Kim and Mauborgne, 2009). Corporate symbiosis is also prevalent in the form of joint ventures between motion picture production companies and the television networks which

broadcast their content (Scott, 2004). To substantiate the occurrence of the *ascension phase* when observing how industries respond to radical technological change, further examination follows on the discrete innovations in the media and entertainment industry mentioned in the previous chapter and the network externalities which helped them achieve mass consumer adoption.

3.1 Radio

After the invention of basic radio technology in the early 1900s, early adopters thereof started experimenting and fiddling with the technology, to the detriment of corporate developers and users of radio. Instructions from the military were simulated and counterfeit messages were sent to the Navy at sea, compelling the US government to authorise licensing laws which would regulate the use of radio technology in 1912. This law allowed the US government to seize radio equipment from civilians if improperly used, and also necessitated the acquisition of a broadcasting licence for corporations wishing to transmit audio content over the airwaves. Regulation, however, did not deter radio from attracting early majority adopters. University students and private home users were fascinated by the radio and the number of users increased, incentivising entrepreneurs to develop a proper business model for entertaining and conveying information to listeners. Broadcasters would make use of advertisers' money to conduct broadcasts over the airways in exchange for marketing to consumers via an exciting marketing channel never before utilised. An indication that radio had entered the *ascension phase* was "the battle involving commercial radio that took place in the early 1920s between amateur enthusiasts and 'the interests', to use the phrase of the day, such as technology patent holders including RCA, Westinghouse, and AT&T" (Meza, 2007).

David Sarnoff, a young man from Russia working for the American branch of the Marconi Company, was the first to suggest some practical applications of the radio as a commercial

product. He suggested that radio was to be marketed towards the home user. Archer writes that Sarnoff prophetically proposed the possibility of radio becoming... "a 'household utility' in the same sense as the piano or phonograph. The idea is to bring music into the house by wireless... The receiver can be designed in the form of a simple 'Radio Music Box' and arranged for several different wave lengths, which would be changeable with the throwing of a single switch or pressing of a single button. The 'Radio Music Box' can be supplied with amplifying tunes and a loud-speaking telephone, all of which can be neatly mounted in one box. The box can be placed in the parlour or living room, the switch set accordingly and the transmitted music received... The same principle can be extended to numerous other fields, as for example, receiving lectures at home which can be made perfectly audible, also events of national importance can be simultaneously announced and received. Baseball scores can be transmitted in the air... This proposition would be especially interesting to farmers and others living in outlying districts removed from cities. By the purchase of a 'Radio Music Box' they could enjoy concerts, lectures, music, recitals, etc., which may be going on in the nearest city within their radius..." (1938).

Executing this vision by commercialising the radio, however, would have to wait. With the advent of the first World War, then-President of the USA Woodrow Wilson issued a command for the seizure of equipment of all unlicensed broadcasters. Patents founded on radio, telephone and other technologies were taken over by the American government during the War period, and two men were assigned specific responsibility for stewarding the mix of radio patents: Josephus Daniel, secretary of the U.S. Navy, and a certain young man serving as Daniel's deputy called Franklin Delano Roosevelt, who would later become the 32nd President of the United States of America.

World War I caused the expansion of radio's military market and consequently became a catalyst of its technological development. Communication between different countries before the War took place by means of undersea telegraphy cables, and the United

Kingdom mostly acted as a central hub of communication due to the fact that most cables were physically connected with Britain. The United Kingdom also monopolised the market for commercial telegraphy, in that British companies owned right of usage of critical elements and parts needed to construct undersea wires during that time. Being able to cut off Germany of all undersea communication with the advent of the War, Britain in effect ignited a greater reliance on the burgeoning radio technology among their opponents in war. Moreover, the German telecommunications corporation Telefunken was the first enterprise to pay royalties to Edwin Armstrong, who received a patent in 1914 for the apparatus he developed which could detect and generate radio waves, the foundation of FM radio technology as it is utilised today.

Thus wireless technology for communication purposes gained traction internationally due to the susceptibility of undersea telegraphy cables, and the American government felt obliged to exercise greater control over the wireless technologies in its own country. In fact, the nationalisation of radio property became such a popular notion among congressmen and advocates like Josephus Daniel, that Guglielmo Marconi was persuaded to sell his radio company to General Electric rather than aim to compete with their then-superior technology, spawning a merger called RCA - the Radio Corporation of America. The merged company was officially incorporated as an all-American company in 1919, which had to be managed with United States interests in mind, as revealed by the compulsory attendance of a U.S. Navy delegate at all RCA board meetings. Former General Electric vice-president Owen Young was appointed as RCA's chairperson, while former American Marconi vice-president Edward Nally took on the role of RCA president - corporate competitors-become-colleagues. The post of RCA commercial manager came to the young Russian David Sarnoff, mentioned earlier as the American Marconi technology manager who envisioned the potential of Armstrong's audion feedback technology integrated with the radio (Lehman Brothers Collection, Baker Library, Harvard Business School, 2010).

However, with the conclusion of World War I, the Radio Corporation of America was well-positioned technologically to realise Sarnoff's ideal of producing a "Radio Music Box" for every household and broadcasting music and a myriad of other audio programmes to it. The combination of Marconi experience and market acumen with General Electric's Alexanderson alternators providing electrical power to the devices, made for a product superior to its competitors'. When presenting his business plan to chairperson Nally, Sarnoff made the following sales forecasts of RCA's first radio. Each Radio Music Box was to be priced at US\$75 (Beninger, 1986):

Table 3: Three-year Forecasted Sales for RCA's Radio Music Boxes

Year of operation	Projected Sales	Projected Revenue
1 st : 1922	100 000 Radio Music Boxes	\$7.5 million (\$95.0 million in 2011)
2 nd : 1923	300 000 Radio Music Boxes	\$22.5 million (\$291.8 million in 2011)
3 rd : 1924	600 000 Radio Music Boxes	\$45.0 million (\$570.1 million in 2011)
	TOTAL:	\$75.0 million (\$956.9 million in 2011)

At that time, AT&T not only monopolised telecommunications in the USA, but also held the patent of another piece of radio equipment - the grid audion originally designed by Lee de Forest in 1905. Although RCA (which defined its industry as 'wireless telegraphy') and AT&T (which termed its industry the 'telephone business') were not in direct competition at the time, RCA anticipated that voice transmission via radio could instigate future conflict between the companies. In an attempt to reach a compromise between the desire to establish itself as radio technology pacesetter and the potential antagonism with AT&T due to its ownership of a key radio patent, RCA entered into a strategic partnership with their future rival in July 1920 (Lehman Brothers Collection, Baker Library, Harvard Business School, 2010). The terms to this partnership stated that AT&T would agree to the cross-licensing of patents on de Forest's audion in exchange for 10% ownership of RCA. Additionally, Sarnoff insisted that AT&T would legally permit RCA to build and operate wireless transmitting

stations from which they could later broadcast radio programmes. With a diminished risk of radio patent battles after the establishment of a JV with AT&T, RCA consequently possessed both the Alexanderson alternator, developed by General Electric engineers, and de Forest's audion, including improvements successively made to both technologies and licence to establish radio broadcast stations. RCA also continued with rigorous in-house research and development operations to continuously enhance the technologies in their possession.

Westinghouse, aiming to contend with General Electric and the Radio Corporation of America for the market of radio listeners, started establishing radio broadcast stations in 1920. Moreover, Westinghouse owned the patent to Reginald Fessenden's technology through which one could send continuous audio signals wirelessly, as well patents on Edwin Armstrong's feedback technology and superheterodyne. Because the patents to these technologies had been taken over by the American government during World War I, the efficiency of these technologies had already been demonstrated and highly regarded. In the same year that the agreement between RCA and AT&T was signed, Westinghouse transformed its factory rooftop in Pittsburgh into their very first radio broadcast station. In a tactical bid to appeal to as broad a base of listeners as possible, the first programmed schedule involved the airing of music tracks, news bulletins, boxing matches and even Christian church services. This led to an increased demand of Westinghouse's own radio devices. Deficient in the Westinghouse Electric Corporation, however, were capabilities and infrastructure to further develop the radio technologies for which they owned the patents, in spite of their burgeoning broadcasting operations. In a similar attempt to avoid arduous competition with RCA as was the case with AT&T, Westinghouse agreed to a partnership with RCA: for 20% of its stock and a subcontracting agreement to manufacture radio sets and other equipment for them, RCA would receive total patent ownership of Westinghouse transmission technologies. Thus, after General Electric, Westinghouse subsequently became the largest shareholder of the Radio Corporation of America (Lewis, 1991).

Another seemingly-unrelated company, in terms of classified industry, joined the list of RCA shareholders shortly afterwards - the United Fruit Company. The UFC, which may be classified as an early radio technology adopter (having used wireless technology as communication means between fruit plantation managers and exporting ships) received 4% of RCA's stock in exchange for its interest in another enterprise which possessed patents on antennas which could efficiently detect radio signals.

Thus due to multiple mergers, strategic manufacturing partnerships, technology acquisitions and prolific R&D operations, the Radio Corporation of America was well-poised to expand the radio broadcasting sector of the early 1920s- both in terms of core technology and business.

Many other companies started establishing radio broadcasting networks during this time and, aiming to sell more of its radio sets, RCA also considered the development of its own radio network. Whereas RCA shareholders Westinghouse, General Electric and United Fruit Company benefited respectively from agreements to assemble radio sets, manufacture parts and provide capital, AT&T also continued to manufacture equipment for radio transmission, but realised that its share in this market and subsequently its contribution to the radio broadcasting sector were steadily declining. Radio broadcast stations simply preferred using unlicensed transmission equipment produced by other suppliers to buying their expensive AT&T counterparts – even if many of these pieces of equipment directly contravened patent rights owned by AT&T. To increase its footprint in the industry, AT&T decided to also enter the radio broadcasting arena by establishing the WEAf station in New York City and the WCAP station in Washington, D.C. through which it could do toll broadcasts. This entailed an alternative application of AT&T's telephone call transmission equipment. However, instead of simply supplying the technology to customers and obligating them to provide the content themselves as its business model for telephony dictated, AT&T was now compelled to provide the audio content as well. "With no content,

you [have] no listeners, and therefore a station [has] little value (Meza, 2007).” Executing AT&T’s new business plan, WEAf started broadcasting content in August 1922, of which a 10-minute advertisement for apartments in New York by Queensboro Corporation was its very first presentation. According to Barnouw, this broadcast proved successful for AT&T, as many other businesses followed suit to advertise over radio (1966).

By the mid-1920s, the radio broadcasting sector had become a lucrative industry – another indication that radio broadcasting had entered the *ascension phase* as a technology (Hettinger, 1939). American consumers purchased \$60 million worth of radio receiving sets in 1922 alone, equivalent to \$760.2 million in 2011. When RCA finally started selling their radios in 1922, commercial manager Sarnoff’s forecasts proved to be remarkably accurate, as demonstrated in Figure 7:

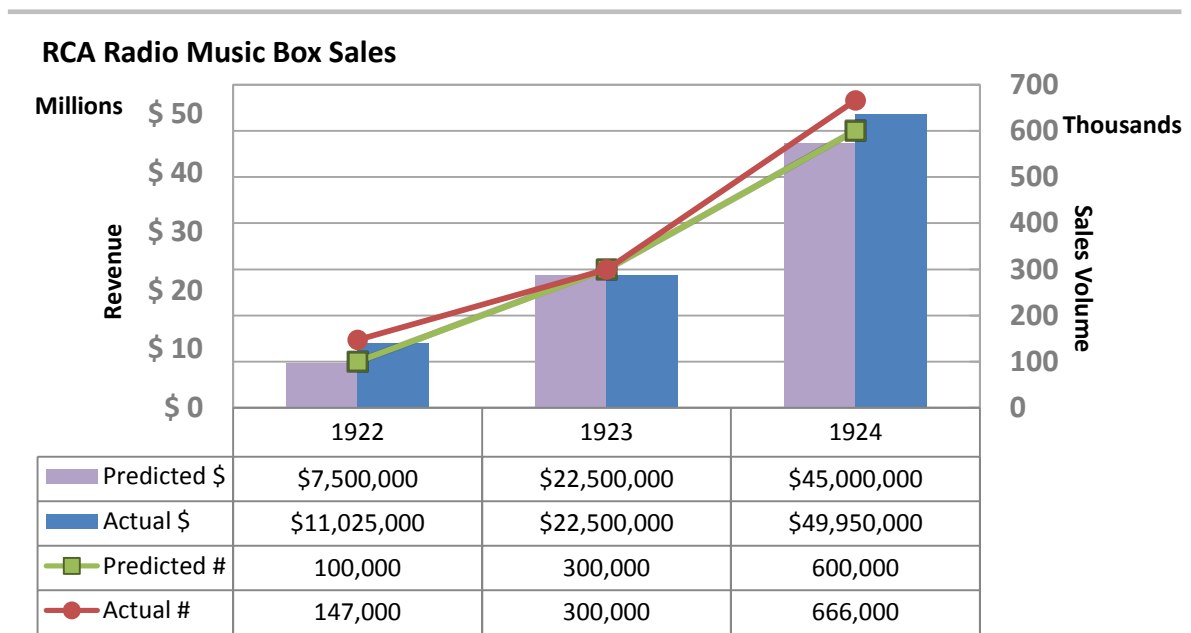


Figure 7: Forecasted vs. Actual RCA Radio Music Box Sales and Revenues: 1922-1924

By the third year of operation, RCA had cumulatively sold nearly 1.2 million radios and accrued a yearly income of US\$50 million (comparable to US\$633.5 million in 2011). With its significant market and product adoption rate, radio broadcasts had become RCA’s star

product and biggest source of revenue, its income surpassing that which was generated through transoceanic and nautical communications deals.

As radio increased in popularity, AT&T decided to employ a greater diversification strategy and compete aggressively with RCA for the radio broadcasting and device sales market share, initiating this move by selling all its RCA shares. Careful not to violate any of the RCA patents, AT&T commissioned Western Electric, its manufacturing subsidiary, to develop radio receiver devices which could compete with RCA's radio sets while AT&T itself focused on the establishment of broadcast stations WEA and WCAP. Because AT&T controlled most of America's telephone lines at the time, it also had a distinct advantage over its competitor: because telephone lines were the only way by which radio networks could transmit audio content between different radio stations, AT&T maintained the right to deny requests for new telephone connections from their competitors (Coon, 1939). RCA eluded the use of AT&T telephone lines by connecting its stations with wires supplied by Postal Telegraph and Western Union.

1926 marked the year in which RCA officially introduced its first radio network that would broadcast audio content on a national level, adequately termed the National Broadcasting Company (NBC). Two months after its debut in November 1926, NBC was partitioned into two separate networks called NBC-Blue and NBC-Red. The business model for radio proved to be profitable and sustainable when more advertisers realised the marketing potential of the medium and companies signed on to connect their names to specific radio programs by means of sponsorships (Barnouw, 1966).

In contrast with minor independent radio stations which mostly targeted regional markets, the only other radio network which offered significant competition to RCA's National Broadcasting Company was CBS, the Columbia Broadcasting System, which was bought as a small radio network but cultivated into a formidable contender for national broadcasting by

William Paley during the mid-1920s. These networks employed two fairly divergent business models to increase its market share, both of which would later be discarded on demand of the Federal Communication Commission in 1941 (Lehman Brothers Collection, Baker Library, Harvard Business School, 2010): NBC charged the stations which were affiliated with its network \$90 per hour for evening programmes which were unsponsored and produced by NBC itself, while affiliates received \$30 per hour from NBC for airing programs which were sponsored by outside companies. However, the responsibility rested on these stations to determine their own broadcasting line-ups, and many affiliates declined broadcasting NBC's programs in favour of their own programs or those sponsored by local companies. CBS, on the other hand, decided on a different strategy for generating income. The network's revenue would come solely from companies sponsoring specific programs, while CBS affiliates could broadcast any of the network's unsponsored programs at no cost whatsoever. Unsponsored programs were also referred to as *sustaining programs* at the time. In return for this 'benevolence' displayed by CBS, affiliates had to allocate a specific duration of broadcasting time to CBS during which sponsored programs from the main network could be aired. Apart from this time, individual radio stations exercised absolute freedom as to the audio content they wanted to broadcast - they could use some or all of the free resources provided by CBS or absolutely none at all by using only locally produced content. This arrangement secured CBS and gave assurance to companies which sponsored specific radio shows that these would be aired from CBS stations, unlike the uncertainty whether NBC sponsors' programs would be purchased via its affiliates. CBS charged companies a predetermined rate for sponsoring programs, depending on the individual station airing them, and split this income 70/30 between CBS itself and the specific radio station involved. CBS was responsible for covering all costs for producing and transmitting the programs to its affiliates. When the American economy entered the Great Depression in the 1930s, this customisable approach to programming became exceptionally popular, according to Barnouw (1968).

Unable to compete with the network structures which were developed by RCA and CBS, AT&T yet again entered into a partnership with RCA in 1926 by signing a business deal which constituted three parts:

1. All of AT&T's (fledgling) radio stations would be amalgamated under a new company, the Broadcasting Company of America, of which ownership had to be exercised by RCA. RCA would acquire this network of stations, of which WEAJ in New York was the greatest, for \$1 million;
2. Both companies had to agree to the cross-licensing of their radio patents; and
3. AT&T had to retract their 1921-decision and agree to RCA using their telephone lines for broadcast transmission purposes.

Consequentially, in exchange for all of RCA's telephone transmission business, AT&T had effectively retired from the radio broadcasting sector, leaving RCA's National Broadcasting Company and Paley's Columbia Broadcasting System as the only major competitors for market share in the radio broadcasting sector of the entertainment industry.

3.2 Recorded Music

Advances in the radio broadcasting sector of the entertainment industry not only coincided with but also spurred development and contention in the recorded music sector.

By the end of the 19th century, Eldridge Johnson and Emile Berliner had developed the automatic gramophone, a significant improvement on the phonograph invented by Thomas Edison some 20 years earlier. The company which Johnson and Berliner established in 1901, the Victor Talking Machine Company, was the driving force of technological development in the recorded music sector to the extent that any record player produced at the time irrespective of manufacturer was referred to as a "Victrola" (Jones, 1985). Recorded music in the early 1900s was synonymous with the image of a captivated fox terrier eager to hear

"his master's voice" through a gramophone – the trademark of the Victor Talking Machine Company. Berliner and Johnson's diversified company not only manufactured the gramophones it sold, but also managed an in-house orchestra and signed contracts with popular musicians of the time to secure exclusive recordings under Victor's label. However, as the radio broadcasting sector experienced mass technology adoption and radio became an alternative competitor for the entertainment consumer market, the recorded music sector and the Victor Talking Machine Company as its market leader started experiencing difficulty to maintain the high profitability it once did. Victor record player profits declined from \$7 million in 1921, derived from \$47 million's worth of revenues and equivalent to \$531 million in 2011, to \$6.6 million in 1922 and \$1.2 million in 1923. By 1924, record player sales had decreased so drastically that the Victor Talking Machine Company recorded a loss of \$140 000 for the first time after it started dominating the recorded music sector (Sobel, 1986). A decline in record sales accompanied the decline in gramophone and phonograph sales. Berliner and Johnson tried to counter the slump in music sales by decreasing the price of their records. According to Sobel, this strategy proved to be unsuccessful, as record sales continued to drop afterwards (1986). The Universal Music Group attempted a similar pricing strategy in 2003 when CD sales declined notably in the early 2000s, with a similar ineffective outcome (Meza, 2007).

The Victor Talking Machine Company acknowledged that it had to utilise a different corporate strategy to ensure survival as radio gained traction in the entertainment industry. In 1925 the company decided against merging with another company, but entered into a JV with General Electric, which enabled it to manufacture devices which could both play records and receive radio signals. Apart from the emergence of radio as an exciting new competitor to the record player, a lack in product quality was another reason why entertainment consumers were replacing their phonographs with radios. AT&T recognised the phonograph's deficiency and developed the technology to reduce audio distortions caused by the record player, licensing it to most American record companies. AT&T's

improved technology was included in the devices manufactured by the JV with GE, and in 1925 the Victor Talking Machine Company introduced their improved record players to the market to great success (Sobel, 1986). With profits exceeding \$7 million again in 1926 but admitting that it was unsustainable due to R&D limitations, Berliner and Johnson reconsidered a merging strategy, and turned to the Radio Corporation of America as the corporate partner of choice. RCA, already manufacturing phonographs of their own, agreed to the merger. Consequently, the New York Stock Exchange displayed remarkable market efficiency when someone revealed news of the merger to the media and share prices of both companies tripled within a day (Meza, 2007).

When the merging endeavour with the Victor Talking Machine Company was concluded in 1929, RCA even further expanded their involvement in the entertainment industry by acquiring two sizeable music publishing companies. This successful merger inspired the Columbia Broadcasting System to diversify in 1938 by acquiring both a recording company and a phonograph manufacturing company, thereby establishing Columbia Records and the Columbia Phonograph Company. This strategy failed to enable CBS to dethrone RCA as market leader in the recorded music sector. However, when CBS invented its long-playing record (LP) in 1948 it proved to be a disruptive technology which would force RCA and other recording companies to adopt CBS's standard. LP technology made it possible to record 23 minutes of music on both sides of a vinyl record and played at 33 1/3 rpm, and was considered to be a popular improvement over older record technologies by consumers in the 1950s.

3.3 *Filmed Entertainment*

With the invention of Edison's iconoscope and the kinetograph at the inception of the 20th century, traditional theatre business waned and entertainment consumers flocked to see short films at the nearest nickelodeon. Film had become a disruptive technology to

traditional forms of entertainment such as vaudeville and cabaret theatres. However, observable characteristics associated with the *ascension phase* only became evident when the motion picture sector's business model changed from charging patrons one nickel to watch a short film individually to movie theatres which allowed groups of people to enjoy films together. Film technology transcended the early adoption stage and many traditional cabaret theatres were converted into movie houses. By 1905, the motion picture business had developed into an entertainment sector in its own right, entailing the same six phases which are still prevalent in the filmmaking process today: (1) development, (2) pre-production, (3) production, (4) post-production, (5) marketing and distribution, and (6) exhibition (Young, Gong and Van der Stede, 2008).

As the industry progressed through the *ascension phase*, the motion picture sector developed from a horizontal industry into a vertical industry in a manner contrary to how other industries generally develop. Vertical industries are predominantly marked by companies who have to supply all of the constituents of a product, manufacture, market and distribute it instead of outsourcing activities along the value chain to other companies (Burgelman, Christensen and Wheelwright, 2008). After shooting a movie, filmmakers would initially sell it directly to exhibition companies who had to justify a \$10 - \$25 purchase by showing a film for a nickel per patron until its prints wore out. Fast-declining consumer demand for a particular film at a local theatre, however, made this practice unprofitable for exhibitors, which led to an illegal practice called "bicycling": one exhibitor would buy a film, rent it out and literally bicycle it to other exhibition companies in an attempt to divide expenses. Not even the institution of distributors as third-party film exchangers could reduce the occurrence of bicycling. Several organisations were inspired to reinvent the way in which movies were first distributed:

- Edison and his partners attempted to formally organise the motion picture sector with the establishment of the Motion Picture Patents Company (MPPC) in 1908. According to Stanley (1978), this organisation owned patents for a myriad of films,

cameras and projectors, as well as many major distribution companies, essentially becoming a natural monopoly in the film industry. The MPCC employed two distribution models simultaneously in a bid to reach two different movie-going markets. The road show distribution model was used in upmarket metropolitan areas, also referred to as “A” theatres, while the states' rights distribution model was utilised in secondary markets or “B” theatres. In a bid to retain profits through doing road show exhibitions, movie producers rented theatres directly rather than selling their films to regional exhibitors, as was the case with the states' right model through which exhibitors earned more money than producers.

- W.W. Hodkinson, a former employee of the MPCC, founded the Progressive Company in 1911 through which he employed an alternative distribution method: For 65% of final box office revenues, filmmakers could sell exclusive rights to their films to distributors, who in turn had to distribute and market the films. This distribution model was originally targeted at independent filmmakers, as it was rejected by the MPCC. Hodkinson later changed the name of his company to Paramount Pictures Corporation.
- Other independent film producers decided to produce longer, more artistic films featuring well-known actors (also referred to as "stars"), which were generally considered superior to short films produced by the MPCC using unknown actors to keep down costs. This quality differentiation strategy proved to be successful by the mid-1910s as more viewers were attracted to independent movies than to short MPCC films exhibited at nickelodeons.

Some of the successful independent filmmakers who supported Hodkinson's distribution model and subsequently signed contracts with his company were revered director-producer Cecil B. DeMille (creator of such films as *The Ten Commandments*, *Cleopatra* and *The Greatest Show on Earth*), Adolph Zukor (founder of the Famous Players Company), Jesse Lasky (founder of the Jessy L. Lasky Feature Play Company) and Samuel Goldwyn (who

would later co-establish Metro-Goldwyn-Mayer) (Cecil B. DeMille's Filmography, 2004). However, after expanding his company to America's East Coast and undertaking the name-change to Paramount in 1914, Hodkinson's relations with these filmmakers took some strain as it was perceived that he tried to enforce his will upon the filmmakers he partnered with. After a failed extrication attempt from Zukor because of Hodkinson's refusal to terminate his contract, Paramount Pictures Corporation was subjected to a hostile takeover by Zukor and Lasky in 1915. Zukor and Lasky obtained a majority share in Paramount and expelled Hodkinson from the company. In 1916 Zukor and Lasky horizontally merged their companies to form a major motion picture studio which could both produce and distribute films. The merged company was called the Famous Players-Lasky Corporation, and gaining from Paramount's capabilities it caused a significant shift in the balance of power in Hollywood at the time, albeit often with unscrupulous business practices.

In conjunction with rapid technology development, industry formation and inter-industry collaboration, another network externality is observable when a technology moves through its *ascension phase* in the entertainment industry: constructive legislation which regulates the industry in an attempt to protect free enterprise. This feature is perceptible in the case study of anticompetitive practices in the Famous Players-Lasky Corporation, and particularly in the numerous times the United States government had to file federal lawsuits and enforce regulatory measures upon the motion picture industry between 1920 and 1950, some of which are mentioned in Table 4 on page 70.

Two of the anticompetitive practices employed by Famous Players-Lasky and Paramount before the Federal Trade Commission (FTC) filed a complaint against the companies for restraining trade in 1921 were "blind bidding" and "block booking" (Orbach and Einav, 2007):

- Blind bidding refers to a practice whereby distributors coerce exhibitors into bidding and receiving licences for movies which they had to display in their theatres, but

without providing adequate information regarding the film or screening the film for exhibitors beforehand.

- Block booking, which the FTC officially declared an anticompetitive approach to business in 1927, is a practice whereby producers oblige exhibitors to accept a block of films rather than just one at a time according to exhibitors' requirements. Most of the other films in a block at the time were usually of a lesser quality than desired as by exhibitors, but this practice guaranteed the selling of a studio's inventory in its entirety, thereby increasing profitability. The FTC ordered Famous Players-Lasky to cease and desist with block booking, and when Adolph Zukor and Jesse Lasky disputed FTC's findings in 1928, the commission ultimately rejected the studio's compliance report. The FTC subsequently mandated itself to regulate the entire motion picture sector so as to eradicate unfair trade.

On 27 April 1928, two antitrust cases were filed collectively against 10 companies in the motion picture sector by the US Department of Justice. Two of these companies were Famous Players-Lasky and Paramount. The government's accusation against these companies was that they monopolised 98% of distribution activities in the United States, deemed an unfair trade practice. When neither the government nor the accused were satisfied with the outcome of the New York District Court's judgement in 1929, both parties decided to appeal to the US Supreme Court. All ten defendants were found guilty by this court in 1930. The 1930s, however, were marked by the Great Depression and the motion picture sector was not excluded from the economic adversity of the time. Then-president Roosevelt responded to a plea by motion picture studios to not implement the restructurings imposed upon the industry by the Supreme Court until the sector's general financial situation improved. An agreement was signed which allowed the film companies to maintain the practices which they were prosecuted for, including block booking.

The US Department of Justice decided to sue the big movie studios again in 1938, but reached a consent decree with the companies in 1940, which prohibited blind bidding but again allowed them to continue with block booking until 1943, albeit under new terms. Blocks had to be limited to 5 films, and the practice of trade shows was implemented which allowed potential buyers to see films and accordingly decide whether they wanted to exhibit the films. Additionally, studios would have had to obtain consent from the federal government if they wanted to increase their share in exhibition companies. The government, however, refused a second extension of the consent decree after its expiry in 1943, and decided to legally address studios' dubious exhibition activities through *United States vs. Paramount Pictures, Inc.*, 334 US 131 (1948), or *Paramount 2*, a case which proceeded from the District Court in New York to the US Supreme Court in 1948. The Supreme Court's assessment was that block booking was indeed illegal, and judged vertical integration in the form of theatre ownership as monopolising. Major motion picture studios were subsequently ordered to fully divest the exhibition arms of their companies, and Paramount finally complied with this order by divesting its theatre operations in 1949. Noteworthy antitrust actions and regulations of the motion picture sector from 1900 to 2000 are summarised in Table 4:

Table 4: Significant antitrust actions and the regulation of the motion picture sector: 1900-2000, adapted from Vogel (2011)

Year	Antitrust action
1908	<ul style="list-style-type: none"> • The Motion Picture Patents Company is instituted • Ten big film companies, which between them holds most of the filmmaking patents in the motion picture industry, are integrated • Cross-licensing agreements become popular
1910	<ul style="list-style-type: none"> • Acquisition of 68 local distribution companies by the General Film Company (vertical integration)
1914	<ul style="list-style-type: none"> • Five film distribution companies merge as Paramount Pictures Corporation (vertical integration)
1916	<ul style="list-style-type: none"> • The Famous Players-Lasky Corporation is formed as a result of a hostile takeover and becomes a major film studio (horizontal integration)
1917	<ul style="list-style-type: none"> • Paramount and 12 small producers are acquired by Famous Players-Lasky (both horizontal and vertical integration) • The US government decides that both the MPCC and its distribution department, the General Film Company, must dissolve because of innovations by independents and anticompetitive operations • The First National Exhibitors Circuit is formed by 3 500 exhibitors, which enables financing for independent filmmakers (both horizontal and vertical integration)
1921	<ul style="list-style-type: none"> • US Federal Trade Commission files a complaint against Famous-Players Lasky for block booking
1925	<ul style="list-style-type: none"> • Multiple federal lawsuits are filed against exhibitor partnerships because of coercion of distributors
1927	<ul style="list-style-type: none"> • The US government orders Paramount to cease and desist all anticompetitive operations
1929	<ul style="list-style-type: none"> • A proposed standard exhibition contract is rejected because it would restrict open trade • Sound manufacturers win the lawsuit against exhibitor and the sanction against film sound technology is lifted, paving the way for the first film to feature sound (talkies)
1930	<ul style="list-style-type: none"> • Complete vertical integration along the motion picture value chain is established as the standard in filmmaking • Film studios give preferential treatment to big exhibitor circuits • Film studios own specific actors as 'natural resources'
1938	<ul style="list-style-type: none"> • The US Justice Department brings Paramount case 1, its first antitrust lawsuit against Paramount and other players in the motion picture industry, before the District Court
1940	<ul style="list-style-type: none"> • Major motion picture studios enter into a succession of consent decrees
1944	<ul style="list-style-type: none"> • The US Justice Department files Paramount 2 and asks for the divestiture of the segment in studios responsible for film exhibition • The US District Court orders this practice in major studios to cease, but does not order the divestiture of exhibition arms • Both parties in the case appeal this decision by the District Court
1948 – 1949	<ul style="list-style-type: none"> • The US Supreme Court orders the full divestiture of exhibition arms of major studios • Major motion picture studios make alternative consent decrees
1950 – 2000	<ul style="list-style-type: none"> • A range of anticompetitive operations, including price fixing and violations of consent decrees between studios occur • Multiple federal and private antitrust lawsuits are filed against several players in the film sector

According to Balio (1990), the US government's attempts to regulate the motion picture sector were not the only problems threatening profitability in film companies and forcing industry transformation at the time, but that another threat had appeared which would challenge the sustainability of the sector as a whole: the popularisation of television in the late 1940s. With the closure of four thousand theatres and movie audiences shrinking by 50% in America by 1950, television had become a legitimate competitor for the entertainment audience and therefore a disruptive technology in the eyes of motion picture studios.

3.4 Television

Even though Victor Zworykin is generally attributed with a reputation for pioneering the television broadcasting sector (Abramson, 1995), numerous parties are actually responsible for inventing and developing television as a technology utilised for entertainment purposes. Paul Nipkow's 'spinning disc', Philo T. Farnsworth's cathode ray picture tube and Zworykin's iconoscope are just some of the multiple technological innovations from the early 1930s, but contrary to the way in which radio technology was developed during World War I, the development of television broadcasting technology was stalled with the advent of World War II and ordinary television broadcasts would only resume after the war ended.

RCA-owned NBC and its competitor CBS were the first two companies to broadcast television content to the American public, benefitting from years of management, marketing, programming, sales and technology development experience in the radio broadcasting sector. Both NBC and RCA had been broadcasting content to television sets since 1939, albeit only sporadically, and it was only in 1941 that these two companies commenced with regular broadcasting programmes. Allen B. DuMont was the only entrepreneur who could successfully produce a new entrant to the television broadcasting sector before the War. Allen B. DuMont Laboratories, a company which possessed valuable R&D facilities, legally exercised ownership over the newly-established DuMont network.

Wanting to capitalise on these facilities, DuMont decided to employ a vertical integration strategy to challenge the incumbents in this sector: the company would manufacture and sell its own television sets, as well as produce and broadcast its own content to its own stations.

The Federal Communications Commission (FCC), an independent USA government agency already formed in 1934, was responsible for determining technical specifications for television technology and apportioning the broadcast spectrum between broadcasters. Stations could either operate in the very high frequency (VHF) range (30 to 300 MHz), superior at the time, or in the experimental ultra high frequency (UHF) range (300 to 3000 MHz), which required additional antennas to receive a signal. The FCC agency, who "is charged with regulating [American] interstate and international communications by radio, television, wire, satellite and cable (Federal Communications Commission, 2010)", was accused of partiality towards NBC and CBS because of the large ranges of VHF and UHF frequencies which were allocated to them for broadcasting purposes. This decision positioned these two companies as strong incumbents in the television broadcasting sector and created a seemingly-insurmountable barrier to entry for companies wishing to compete in this industry.

A fourth company entered the television broadcasting sector in 1943 in the form of the American Broadcasting Company (ABC), a company which mainly consisted of a divested partition of NBC's radio network. Film exhibition chain United Paramount Theatres (UPT), another divested company which was previously owned by Paramount but separated due to the 1940s consent decrees, subsequently merged with ABC into a new public company. The merger positioned ABC to outperform the DuMont network, which was eventually liquidated in 1955, and compete with CBS and NBC to become one of the "big three" television broadcasting companies as they are still commonly referred to, according to Meza

(2007). In a short amount of time ABC had become a legitimate proportionate competitor for the television broadcasting market.

Although two hundred television sets were already sold in and around New York City after RCA obtained Farnsworth's patent on his cathode ray picture tube in 1939, 1945 is generally accepted as the actual baseline year for the introduction of television technology to the general public (Hannemyr, 2003). With the culmination of the World War II, technology adoption took place rapidly and the number of sets sold in the United States rose to 14 000 in 1947, to 172 000 in 1948 and to its first million in 1949. 80 million people, 50% of American households at the time, owned a television set only ten years after the introduction of TV to the public (Winston, 1998). By 1960, 142 million Americans representing 80% of the total population owned a television, and nine out of ten users were viewing content broadcasted either by ABC, CBS or NBC – the makings of an oligopoly.

Television adoption in the United States between 1945 and 1970 is displayed in Figure 8:

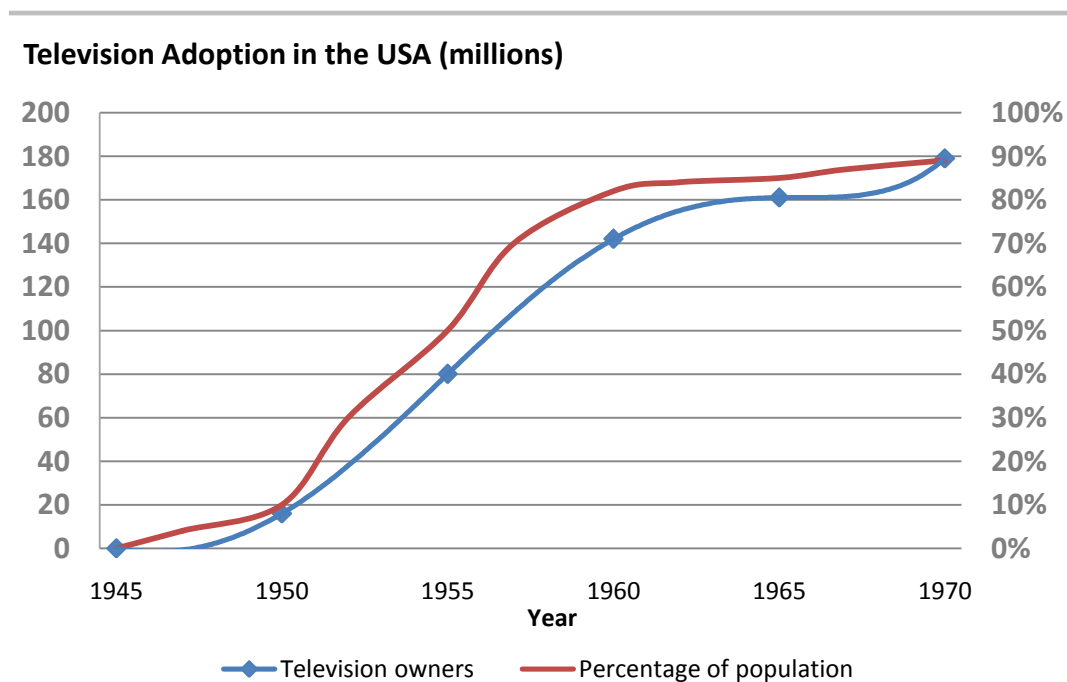


Figure 8: Number of television set owners and percentage adoption in the USA: 1945-1970

3.5 Video Recorders

Some inventions are not as fortunate as the radio, the camera, the television and the CD to cross the chasm between early adopters (enthusiasts) and early majority adopters (pragmatists) among entertainment consumers (Moore, 1991). Enhanced technology from competitors is one such a cause of failed adoption, while a lack of capital also hinders many technologies to transcend the *innovation phase* to successful commercialisation even if they boast superior technology (Moore, 1999). Three such technologies that could not obtain mass consumer adoption were the Betamax video standard, the DiscoVision and the Selectavision system.

Subsequent to the invention of the U-Matic video tape recorder (VTR) in 1971, a group of technology companies in Japan agreed to share VTR patents by signing a cross-licensing agreement in order to further video recording technology. The group constituted Sony, JVC and Matsushita. However, this cross-licensing agreement did not last long due to a conflict of interests between Matsushita and Sony. Going in separate directions, Sony decided to commercialise a video recording device it had been developing prior to its agreement with the other Japanese companies, while Matsushita explored the possibility of launching its own device. As a result, the Betamax-standard videocassette recorder (VCR) was released in 1975 while the Video Home System (VHS) VCR was launched in 1976 by the Sony Corporation and Matsushita respectively.

Although both Betamax and VHS standards were based on Sony's original U-Matic technology, opinion varies as to whether Betamax technology was actually superior to VHS (Borés, Saurina and Torres, 2003), or whether both standards were equal competitors in terms of recording technology (Park, 2004). However, in terms of platform specifications and business practices employed by the companies who produced these devices, it is apparent that Matsushita's VHS standard did initially offer three advantages over Sony's Betamax standard:

- The Betamax standard only provided two hours of recording time, while VHS tapes could record up to four hours of content, a significant benefit from consumers' perspective as the VCR was mostly used for recording television shows at the time, according to Park (2004). Popular programs required a recording time of more than two hours. Sony developed a Betamax tape which could record 5 hours of content in 1979, but was countered by the following launch of Matsushita's improved 6-hour-recording-time VHS tape.
- According to Klopfenstein (1985), the initial price of US\$995 for a VHS VCR was cheaper than the \$1 265 Sony charged for its Betamax-standard VCR. The price of a Betamax VCR was dropped to \$1 095 after the launch of the VHS device in 1976.
- Additionally, Sony was reluctant to directly build VCRs for its licensees, according to Cusumano, Mylonadis and Rosenbloom (1992).

Sony enjoyed majority market share with its Betamax from 1975 to 1977 as a first mover in the video recording industry, but in the second year of the release of the VHS standard, adoption of Matsushita's product surpassed that of its competitor with VHS VCR sales of approximately 190 000 compared to only 140 000 Betamax sales (Cusumano, Mylonadis and Rosenbloom, 1992). Sony would trail Matsushita in both production and market share until ultimate technology rejection in the late 1980s when VHS sales outnumber Betamax sales by a factor of 40, as displayed in Figure 9:

VHS Sales and Installed Base Relative to Betamax

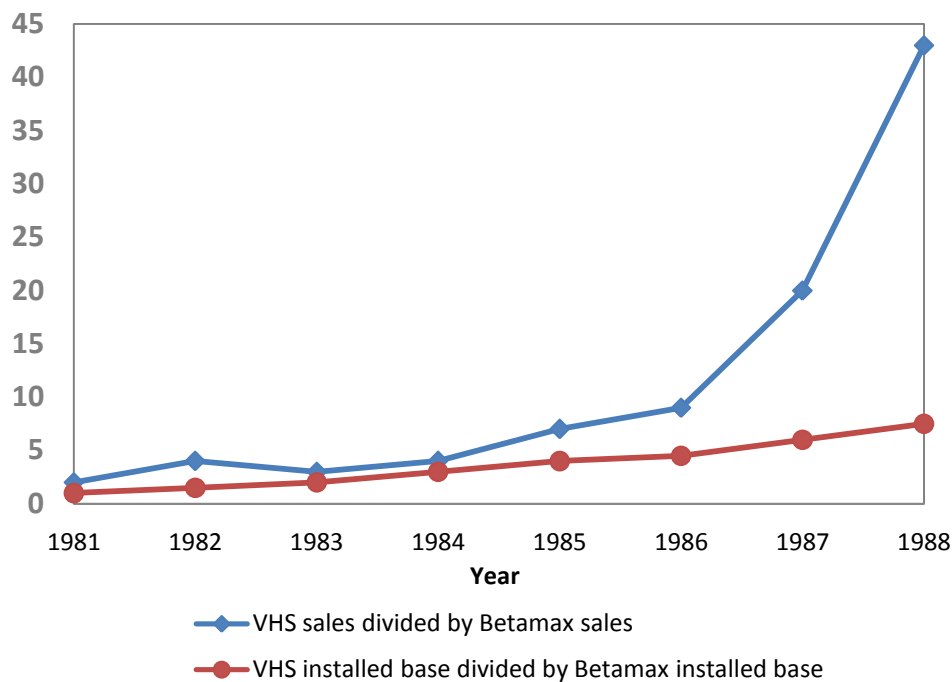


Figure 9: Relative Sales and Relative Installed Base Size: Matsushita VHS vs. Sony Betamax: 1981-1988, adapted from Park (2004)

Above and beyond its mutual foundation, specification disparities and Sony's first-mover advantage over Matsushita, the two standards were incompatible with one other, in that videotapes recorded in one format couldn't be played with VCRs designed for the opposite standard. Consumers were made to choose between the two formats, and history shows that Matsushita's VHS emerged as the format which would not only have a 1.3% household penetration rate just four years after its introduction (Park, 2004), but also ultimately enjoy the majority market share in the video recording business until the invention of the DVD.

Another technology, in the form of two videodisc applications, aimed to compete with the VCR in the late 1970s. Both these applications were developed by the Music Corporation of America (MCA), but through strategic partnerships with two competing enterprises. The DiscoVision was developed by MCA through a joint venture with Philips, while the Selectavision system was developed in partnership with RCA, the company which was

responsible for the commercialisation of the radio. The DiscoVision made use of a laser which could read plastic discs on which content was loaded, similar to Compact Disc (CD) player technology today, whereas the Selectavision utilised needle-in-groove technology comparable to the device used to play LP records. Both these videodisc devices offer additional examples of entertainment platforms that never reached mass technology adoption, albeit for different reasons than was the case with Betamax. First, discs played on MCA platforms were read-only, contradictory to VHS and Betamax tapes which could be used for recording content from television by users themselves. This product specification proved to be an order winner for VHS VCRs over the videodisc platforms. Second, and the more important reason for failure, was that MCA's release strategy was perhaps not thoroughly thought through: videodisc platforms were sold without enough initial content available for consumers to play through these devices. Agreements with content providers should have been signed for the development of enough videodiscs before the commercialisation of the DiscoVision and Selectavision. Without enough movies on videodisc to incentivise buying a videodisc player over a VHS VCR, combined with the devices' inability to record content from television, early videodisc technology failed to secure consumer adoption. According to Rohlfs (2001), Philips gained valuable experience with its DiscoVision-misfire when it commercialised the CD player by employing a vertical integration strategy. The record label Polygram, which was 50%-owned by Philips, was used to create an array of music content discs which were released concurrently with the Philips CD player.

An interesting fact is that MCA acquired Universal Studios in 1962, and Meza (2007) notes that, ironically, this company together with Disney would later try to illegalise video recording technology because of the supposed copyright infringement threat it initially posed for content producers, a frequent occurrence when disruptive technologies gain widespread adoption.

3.6 Filesharing and Uploading

The Internet is one of the innovations which has exhibited rapid technology adoption globally, and similar to the television, had 80 million users in the USA alone only 10 years after its introduction to the public in 1989 (Hannemyr, 2003). The significance of the Internet for media and entertainment enterprises, according to Currah (2007) and Benkler (2006), is that it forms the foundation of digitally networked social and economic networks: simultaneously the enabler of filesharing technology but also a disruptor of traditional entertainment technologies.

With the incorporation of Napster in 1999, Internet users could search for specific music files by title or artist on computers of other users connected to the Internet, facilitated by software written by Fanning. For this process to be successful, users had to be logged in to Napster.com and run a program downloaded from this website. Music files, converted to MP3 format, could be downloaded effortlessly and played offline on users' personal computers by using any of the ubiquitous freeware programs available on the Internet at the time, some of which were provided by Nullsoft-Winamp or Microsoft. MP3s could also subsequently be burnt onto CDs and freely distributed, a phenomenon which Elberse says has negatively affected the sales of recorded music on physical media ever since (2010). According to Cha and Rajgopal (2004), Napster had become one of the first significant "infomediaries" on the Internet: the company facilitated a filesharing network between millions of individuals around the world without actually owning the content which was distributed between its users, neither the format (MP3) in which the files were coded, nor the programs which were used to play or burn the downloaded files afterwards.

An additional strength contributed to Napster's success in ultimately attracting 80 million registered users (Kim and Mauborgne, 2009): Napster was completely community-oriented, benefiting from the need for niche social communities long before the social media boom of the mid-2000s. Not only could users trade music files, but a platform was created for them

to talk about their likes and dislikes with likeminded enthusiasts, similar to the Internet Movie Database's (IMDB) offering to film enthusiasts since the early 1990s. Enthusiasm among Internet users and entertainment consumers, however, did not translate to enthusiasm among recording companies or the United States government.

According to Kim and Mauborgne (2009), recording companies did initially approach Napster with a revenue-sharing proposition which could have benefited both Napster and the labels, but this offer was rejected when Napster failed to realise "that it needed a people proposition aimed at this critical constituency" and was idealistic with regards to the confounding growth of its user-base. In 2001, Napster was taken to court by the Recording Industry Association of America (RIAA), representing itself as an institutional player as well as the five major recording companies at the time (Crowston and Myers, 2004). The complaint against Napster was that it was promoting music piracy and thus engaging in unfair and illegal competition, a charge which Napster denied by stating that it was unfairly suffering attack from recording companies because it challenged traditional business models and therefore recording companies' strongholds on distribution (Cha and Rajgopal, 2004). Ironically, Napster failed to ever financially exploit this alternative to the staunch business models of music distribution at the time, regardless of the hundreds of millions of files which were available for download through its platform, its tremendous user-base, the huge amount of press it received and the fact that the company was valued to be worth more than \$60 million in 2000 (Bhatia, Gay and Honey, 2003). A professor of statistics at Stanford University, Dr. Ingram Olkin, determined that 87.1% of files shared on Napster indeed belonged to copyright holders and were therefore distributed without permission (A&M Records, Inc., et al. v. Napster, Inc., 114 F. Supp. 2d 896 - District Court, ND California, 2000). The RIAA finally won a court injunction and Napster was ordered to implement preventative measures which could impede users from downloading copyrighted files via its network servers (Crowston and Myers, 2004).

Bhattacharjee *et al.* (2007) remark that it did not take long for the so-called sons of Napster to emerge and produce alternative filesharing services to the millions of individuals worldwide who became accustomed to downloading copyrighted files from the Internet on a routine basis. According to Rupp and Smith (2004), an observable anthropological phenomenon of the 21st century is that it has become morally acceptable to upload and download content to and from the Internet without compensating the producers thereof, and Internet users have generally shown to be apathetic towards legislation attempting to counter piracy. Companies who have subsequently released P2P filesharing services are Freenet, WinMX, eDonkey, Morpheus, KaZaA, LimeWire, Grokster, Gnutella and BitTorrent (Cook and Wang, 2004). Diverging from Napster's centralised P2P architecture, these companies have largely been able to avoid legal prosecution by deploying hybrid or decentralised P2P architectures which enable dynamic indexing of audio and video files (Oberholzer-Gee and Strumpf, 2007). An architectural layout of these topographies is displayed in Figure 6 on page 48.

BitTorrent, in particular, is attracting similar frustration and pressure from recording companies and motion picture studios as was the case with Napster in 2000. BitTorrent's underlying technology, developed by programmer Bram Cohen, enables users to share large content files, including movies, over the Internet by partitioning requested files into smaller packages and directing users to BitTorrent peers who offer optimal network connections for downloading these particular partitions of a file. Piracy watchdog institutions have difficulty in prosecuting companies like BitTorrent and the other aforementioned filesharing platforms, because they are mostly located outside of the United States and do not operate through one central server. Institutions like the RIAA have subsequently altered its legal strategy by targeting individual fileswappers through seeking sanctions against them in addition to investigating the filesharing companies (Bhattacharjee *et al.*, 2007). Nevertheless, within two years of the closure Napster, more Internet users were

downloading files illegally through these new platforms than the highest number of users that ever registered on Napster's website (Benkler, 2006).

3.7 Chapter Conclusion

As an innovation finding itself in the *ascension phase*, radio broadcasting exhibited particular observable network externalities:

- Continuous technology development: Progress in radio technology occurred rapidly after Heinrich Hertz's first experimentation with Maxwellian radio waves. Apart from discrete developments by other corporate and individual role-players, RCA secured a myriad of patents from other companies, acquired experienced human capital from their competitors and mandated continuous in-house research and development of radio technology.
- The availability of complementary services: The same radio signals could be received by any radio regardless of its manufacturer. Even when the American Department of Commerce established formal protocols for broadcasting, dictated 833 and 619 kHz as standard wavelengths for new broadcasting stations and tried to ban transmissions by amateur broadcasters after World War I, radio increased in popularity as an entertainment medium and commercial radio stations increased in number. As radios became more ubiquitous, commercial radio broadcast stations also started giving listeners more entertainment options, leading to an increase in radio sales again in return. As complementary radio services, in the form of commercial radio stations, increased so did adoption of the radio device itself.
- Inter-industry attraction: General Electric, AT&T and the United Fruit Company are all examples of companies in neighbouring industries which became interested in how Westinghouse and RCA were developing radio technology. Similar to how Apple is currently attracting interest from major record labels and filmed content companies because of its iTunes software, and strategic partnerships are consequently formed

between these companies, RCA also attracted attention from adjacent-industry companies and partnered with them to develop and promote radio technology. Moreover, businesses from every other industry became interested in radio as marketing tool after the success of WEAFF's first advertisement for the Queensboro Corporation.

- The ability to economise on switching costs: From academic science experiment to wireless telegraphs being used exclusively for military purposes to the novel transmission of audio messages to the ubiquitous broadcast of audio programmes for millions of listeners, radio broadcasting transcended the *innovation phase* and progressed through the *ascension phase* through social identification. When users became linked to a network through social identification, the probability of switching entertainment devices started to decrease, enabling radio broadcasting to become a legitimate sector in the media and entertainment industry in the early 1920s.

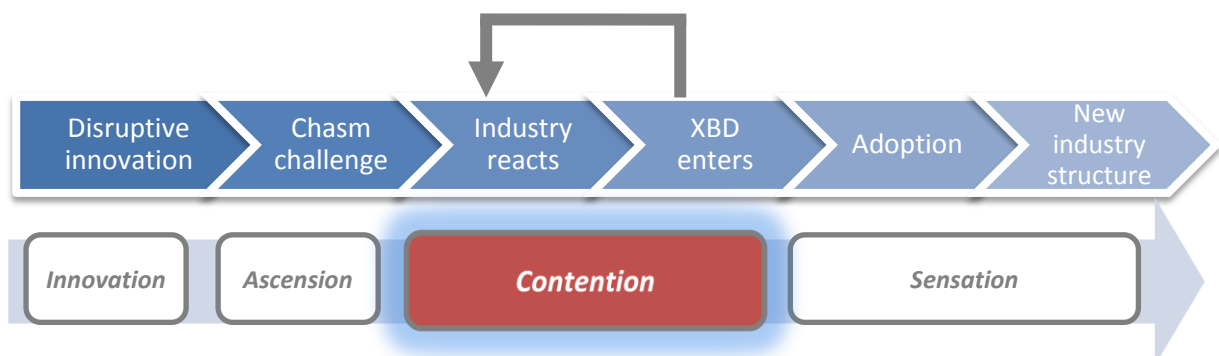
Exactly the same network externalities were observed as the LP record, cinema, the television, the VHS VCR and P2P services transcended the *innovation phase* and progressed through the *ascension phase*. The aforementioned positive network externalities enabled these initially-inferior technologies to evolve from mere inventions with high switching costs into legitimate industries with significant user-bases. Yet, as new technologies gain mass adoption, the first reaction of companies whose business models revolve around previous innovations is often one of trepidation rather than one of possible collaboration – a reaction which has historically led to obvious contention in the entertainment industry. Contention between companies which develop technology platforms and companies which develop the media content to be accessed by these devices has been especially notable when examining case studies from the past. This phenomenon, as well as the effect of cross-boundary disruptors in such situations, will be investigated in Chapter 4.

4. The Contention Phase

“Lawsuits against new technologies provide opportunities for little minds to usurp the gains of genuine inventors, and under the smug protest of righteousness, work a hold-up game in the most approved fashion.”

– Henry Ford

This chapter makes a case that it is contention between technology and media content companies, resulting from a resistance to technological change and subsequent business model adaptation among top-level management in entertainment companies, which aggravate consumers and present lush opportunity for cross-boundary disruptors to provide alternative products and services more aligned to consumer needs. Cross-boundary disruptors are capable of altering entire industry structures and may render incumbent companies superfluous.



1976 marks a significant year for this study, in that it represents a common occurrence among incumbent companies in the media and entertainment industry when confronted with new technologies which can potentially disrupt established business models. Led by Universal, several motion picture studios initiated a process in that year through which it attempted to illegalise the videocassette recorder, due to concerns that the VCR would instigate "a tidal wave of piracy, which would cripple the industry" (Currah, 2007). Observable from the VCR and other specific case studies is a particular reaction incumbents and even entire sectors of the media and entertainment industry have exhibited toward

disruptive technologies, one which Meza straightforwardly classifies as "fear" (2007). This fear often results in attempts to eradicate threatening technologies through regulation and leaves incumbents oblivious to the possibility of these threats being complements to their business and enablers of new revenue streams. The motion picture studios ultimately lost the legal battle they launched in 1976 against Sony, the manufacturer of the Betamax VCR (Universal City Studios, Inc., et al. v. Sony Corp. of America, Inc. et al., 480 F. Supp. 429, 1979), when the Supreme Court ruled in 1984 that VCR manufacturers were not committing "contributory copyright infringement" in view of the fact that users could utilise the device for non-violating purposes (Sony Corp. of America, Inc. et al. v. Universal City Studios, Inc. et al., 464 US 417, 104 S. Ct 774, 1984). It is interesting to note that Sony won its case before the US Supreme Court with only a single vote and, ironically, recorded video content subsequently accounted for 52.2% and 57.6% of total film studio revenue globally (Datamonitor, 2009) and in the United States (Datamonitor, 2010) respectively in 2009. Should fear, or the initial reactive conservatism and overprotective inclination of motion picture studios displayed in 1976 have prevailed, then today the film industry would've been devoid of a source of income responsible for more than twice the revenue which is garnered through traditional film exhibitions.

Many companies in various sectors of the media and entertainment industry have historically failed to take advantage of revenue opportunities presented by disruptive innovations due to short-sightedness or a traditionalist mindset. Moreover, contention between different entertainment sectors or between media and technology companies has often culminated in legal battles and unconstructive regulations which have fundamentally altered the way business is done in the entertainment industry from business models prior to the emergence of disruptive technologies. This phenomenon of intra-industry conflict will now be further explored and substantiated.

4.1 Radio vs. Recorded Music

Conflict between radio broadcasters and incumbents in the music industry has existed long before NBC and CBS were officially established as America's two major national radio networks in the late-1920s. Some of the first manifestations of tension between

broadcasters and music copyright owners occurred with the formation and subsequent exploits of the American Society of Composers, Authors and Publishers (ASCAP) of which composers Victor Herbert and Irving Berlin were founding members in 1914. According to Allen (1940), ASCAP first established itself as formidable representative of musicians when it won a lawsuit against live performers of copyrighted music in 1917 (*Herbert v. Shanley Co.*, 242 U.S. 591, 1917), the Supreme Court's ruling being that recitals of music in public are illegal in light of the Copyright Act of 1909, if royalties are not paid accordingly to copyright owners. The judge's decision was also applicable to live performances in restaurants and hotels.

Encouraged by its legal victory in 1917, ASCAP focused its efforts on eliminating and sometimes capitalising on copyright infringement in the radio broadcast sector. ASCAP filed a lawsuit against radio technology patent holder AT&T in 1923, accusing the AT&T-owned broadcast station WEAJ of neglecting to pay royalties to ASCAP-affiliated musicians yet broadcasting other musicians performing their music. Settling for what would become an industry standard, AT&T accepted responsibility and obtained a license to broadcast all ASCAP-licensed songs for \$500 per year.

Allen (1940) mentions that the American Society of Composers, Authors and Publishers continued to take legal action against broadcasters and to increase its license fees until 67% of a radio broadcaster's yearly income (typically \$4.3 million, equivalent to \$67.3 million in 2011) finally went to ASCAP by 1939. Whereas license fees collected from radio broadcasters accounted for only two thirds of ASCAP's total income, broadcasters were dependent on ASCAP for providing nearly all of its content music-wise by the end of the 1930s. Although broadcasters persistently objected to unreasonable increases in ASCAP license fees, station managers ultimately had no other choice but to withdraw their protestations due to a lack of alternative content providers. Meza (2007) opines that ASCAP and the radio broadcasting sector were actually complements that could have benefited from a positive working relationship with one another, but that ASCAP's "greed" and "a fear-mindset" negatively affected broadcasters' perception of the organisation. ASCAP had become a monopoly, and instead of partnering with broadcasters under reasonable terms

and thereby develop new audiences for musicians through the newly-invented medium of radio, it polarised the main source of its income.

Frustration among broadcasters led to the establishment of another rights management agency, named Broadcast Music Incorporated (BMI), with the aim of substituting ASCAP. CBS attorney Sidney M. Kaye founded BMI in 1939 and broadcasters agreed to capitalise the new organisation by donating the equivalent of 50% of the license fees which had been made to ASCAP in 1937, raising more than \$1 million in only one year. Contributing broadcasters received non-dividend-paying shares in BMI in return (Broadcast Music, Inc., 2010). ASCAP, however, seemed undeterred by the formation of its new competitor and increased the yearly fee broadcasters had to pay for playing ASCAP-licensed music with 100% in 1941. Orlik (2003) alludes to ASCAP's severe fee increase as the motivation for 650 broadcasters choosing to sign with BMI rather than with ASCAP at the end of 1940. Only two radio stations remained willing to pay the excessively-high fee for broadcasting ASCAP-licensed music.

For all practical purposes, ASCAP had been boycotted by broadcasters in 1941 (Orlik, 2003). Allen (1940) goes on to say that not only the radio sector experienced conflict with ASCAP, but the motion picture sector as well. However, whereas film studios like Warner Brothers had failed in earlier attempts to supplant ASCAP by establishing their own rights management agencies, Kaye had succeeded in instituting an alternative agency by launching BMI. After its formation, broadcasters preferred signing with BMI even though the number BMI-licensed songs was initially dwarfed by ASCAP's catalogue. Sanjek and Sanjek (1991) write that 97% of the most-played titles on radio had been ASCAP-affiliated songs in 1940, but that in 1941 hardly any songs on the top-played list were ASCAP-licensed.

Radio technology also presented another threat to ASCAP's business. Although musicians were provided with a new platform for releasing their music to wider audiences more promptly which aided in popularising certain songs, radio also shortened the time a hit song spent on popular music charts from sixteen weeks to approximately eight between 1925 and 1940. Sheet music and record sales also dropped 90% and 75% respectively during the same period (Allen, 1940).

Ryan (1985) notes that ASCAP eventually regained credibility as a rights management agency, but not before it suffered a "blackout" during which its share in the sector had decreased to almost zero. By the 1950s, an equal number of BMI and ASCAP-licensed songs were played over the radio. Vogel (2011) writes that royalty streams remain a major source of income for musicians, and that ASCAP and BMI are still the two largest rights management agencies today. Due to its large catalogues of songs, BMI recorded an income of \$779 million and ASCAP an income of \$749 million for the year 2005. These two agencies collectively accumulate more than 95% of all performance royalties in the United States, regardless of whether the music is performed informally by university bands, by professional orchestras, at nightclubs, set to movies or broadcast over radio. Flick (1988) records that there are several legislative changes that have been implemented due to disputes over the size of license fees between the agencies and broadcasters over the years.

Interesting to note is that while radio technology elicited fear leading to short-sightedness in music industry incumbents when the radio set crossed the chasm of early adoption, the recorded music sector had the same effect on the radio broadcast sector when the LP started gaining traction.

When major radio broadcasting networks NBC and CBS first started airing content over America's airwaves, archaic business principles of the industry dictated that prerecorded programming was "lazy" and that, apart from sound effects, all programs therefore had to be performed live and transmitted in real-time to the nation's listeners. Affiliates to the respective networks would receive the live-produced content via AT&T telephone lines and broadcast it directly to local listeners. Due to significant time zone differences in different parts of the USA, programming had to be produced and transmitted to affiliate stations several times a day, an operational inefficiency which finally persuaded networks to reconsider their stance on prerecorded programming, according to Barnouw (1968). Indeed, recordings (usually taped on sixteen-inch disks) became such an integral element of the radio broadcasting business model that live performances were reduced significantly by the networks who chose to sign agreements with only a small number of musicians. This decision elicited a certain reluctance among musicians to allowing the broadcast of their

recorded work over airwaves, although these sentiments were overruled in 1941 when the Federal Court declared it lawful for radio stations to transmit recordings which they had purchased over airways and with the US Supreme Court's subsequent refusal to reassess the case (Barnouw, 1968). Meza notes that 40 years after Reginald Fessenden succeeded in broadcasting music for the first time on Christmas Eve of 1900, recorded music would henceforth enjoy an ever-increasing share of broadcast time as "the age of the disk jockey [had been] born" (2007).

Bruck (2003) points to the invention of the jukebox, the establishment of disk jockeys and the declining employment of live performers by radio stations, as well as the influence of the burgeoning motion picture industry, as the rationale behind a strike organised by the American Federation of Musicians (AFM) in 1942 against the skyrocketing unemployment rate of musicians. Notwithstanding the objection of recording companies, AFM president James C. Pertillo demanded that musician employers compensate performers by contributing towards a welfare fund for musicians, a claim which was advocated for two years by the union before recording companies finally conceded and the strike was cancelled.

The cases which have been discussed in this section are only a few examples of contention between the radio broadcasting sector and different role-players in the music sector up to the mid-20th century, and Vogel (2011) remarks that companies in these sectors have been subject to conflict and legislative changes frequently afterwards. Not even recently-launched online radio stations have been exempt of this phenomenon. Attempts at capitalising on the growing phenomenon of online community-forming have proven to be unsuccessful as yet for online radio stations. The radio sector was inadvertently affected by the Digital Millennium Copyright Act (DMCA) when record labels demanded online radio stations to pay them royalties after the announcement of the new legislation. Boslet and Fleetwood opine that the entire concept of online radio had consequently been marred as a result of the DMCA, as it could possibly have provided a lucrative channel for broadcasting music in conjunction with traditional means (2006). Broadcasting music over the Internet has yet to demonstrate sustainable profitability.

4.2 *The Motion Picture sector vs. Television Broadcasting*

After its invention, motion picture studio heads perceived television to be a new technology with disruptive capabilities and therefore a major threat to profitability enjoyed by the sector between the 1920s and 1940s. Even though this period is characterised with war and economic recession, the lucrative film business seemed unaffected during that time. Nardone (1982) has shown that the film sector displays a contracyclical performance when compared to the state of the international economy. Box office revenues commonly tend to increase during times of depression regardless of financial difficulty. Psychological factors such as escapism generally answer for this phenomenon (Datamonitor, 2010). Contracyclical trends in the film sector occurs 87.5% of the time during peaks and 69.3% of the time during troughs (Nardone, 1982). However, Scott (2004) goes on to say that Hollywood motion picture studios justifiably displayed an attitude of hostility towards the fast-growing television broadcasting sector as the number of adopters of television in America increased from a mere 200 in 1945 to 80 million in 1955. Figure 8 on page 73 graphically demonstrates the adoption of television in the USA since 1945, as the commercialisation of television only commenced at the end of World War II. The immediate post-war decades are marked with competitive battles between the motion picture sector and the television broadcasting sector as a growing number of entertainment consumers exchanged the movie theatre experience for the comfort of their living rooms (Epstein, 2005b). Vogel (2011) notes that movie ticket sales peaked in 1946 and from then on decreased until 1971 due to the influence of television, yet never reached 1946-record levels again. Gomery (1994) states that this phenomenon caused an intense crisis in the film sector, although Burgelman and Meza (2003) comment that several other factors also contributed to the ultimate business model adaptation for the film sector halfway through the 20th century:

- the divestiture of exhibition departments as dictated by the Paramount Consent Decree of 1948,
- a shift in buyer needs due to consumer dissatisfaction with the quality of content delivered by studios at the time,
- the post-war migration of Americans from cities (where movie theatres were situated) to the suburbs (where theatres were not), and

- the transformation of actors' and directors' contract systems from multiyear studio-specific fixed wage contracts to uncoupled profit-sharing contracts.

Besides the transmission of video content via UHF and VHF signals to television set antennae for 'free', largely enabled by advertising dollars, three alternative business models for television broadcasting were tested in the first few years after the commercialisation of television (Conly, 1944):

- Metered television: The idea of connecting a metering device to a home television and then charging audiences a predetermined price for watching a particular show was conceived by the DuMont Television Company, a vertically integrated company. The DuMont network was introduced in section 3.4 on page 71 as a new entrant to the television broadcasting sector in the early-1940s which aimed at competing with incumbents NBC and CBS by both manufacturing television sets and broadcasting its own content, albeit unsuccessfully at the end of the day. Two methods for accessing content were tested: throwing coins into a coin box and using celluloid key cards. The coin-box method was tested in California by Paramount, a former investor in DuMont, in the early 1950s. To watch a particular football game or movie, consumers had to deposit \$1.00 or \$1.35 respectively, enabling a built-in 'telemeter' to descramble scrambled content signals which were sent to television sets via telephone connections.
- Theatre television: The concept of transmitting television content directly to movie theatres was tested before World War II, yet failed to gain traction afterwards because of the limited range of frequencies offered by the FCC for this purpose, rendering the business model unfeasible. In addition, film studios were ambivalent as to how theatre television would be standardised, and with the separation between production houses and theatres, the idea of theatre television was finally abandoned (Balio, 1990).
- Wired television: According to Young, Gong and Van der Stede (2010) cable television allows a subscriber to directly order movies through a JV which licenses content from all major film studios, offering an alternative to signal reception. Wired television was a business model envisioned by MacDonald already in 1944 (Conly, 1944). Cable, also commonly referred to as Pay-Per-View television, has since

become an extremely successful business model with 4 135 million subscriptions worldwide by 2007 (PricewaterhouseCoopers, 2010a). 61.4% of Americans (Motion Picture Association of America, 2007) and 163 million Chinese subscribers (Jingchen and Zhongping, 2010) contributed to the success of this business model in that year.

Even though some of these business models were never implemented successfully, creative industry change in the television broadcasting sector, multiple incremental innovations such as colour TV, thriving television set sales and general excitement among advertisers over the potential of the new medium add to the aforementioned reasons cited by Burgelman and Meza (2003) which contributed to the antagonism between film studios and television networks. Film studios even prohibited the movie stars which signed contracts with them from starring in television shows. Regardless of fearful responses such as these, television became a popular medium among entertainment consumers in the years following its invention and commercialisation. Declining movie theatre revenues are contrasted with increasing television revenues for the global market in Table 5 with equivalent values in 2011 for comparative purposes (Epstein, 2005a):

Table 5: Sources of Revenue for the Global Film Sector, Theatres vs. Television: selected years between 1948-2004

Year	Movie theatre revenue, in US\$ billions	Film industry revenue from TV², in US\$ billions
1948	\$7.80 (\$73.06 in 2011)	0
1980	\$4.50 (\$12.86 in 2011)	\$3.74 (\$10.69 in 2011)
1985	\$3.04 (\$6.33 in 2011)	\$6.81 (\$14.17 in 2011)
1990	\$5.28 (\$9.18 in 2011)	\$9.26 (\$16.10 in 2011)
1995	\$5.72 (\$8.37 in 2011)	\$10.53 (\$15.42 in 2011)
2000	\$6.02 (\$7.84 in 2011)	\$14.23 (\$18.53 in 2011)
2004	\$7.40 (\$8.80 in 2011)	\$16.60 (\$19.74 in 2011)

² Figures for television include PPV, subscription pay TV, local stations, network TV and cable TV.

4.3 The Motion Picture and Television Sectors vs. the VCR

Although Ampex failed to commercialise its first VTR prototype, this company did succeed in recognising the potential for capitalising even more on the nascent television business with its recording technology (Rosenbloom and Freeze, 1985). Other companies made an effort to exploit this opportunity spotted by Ampex. Possessing large pools of talented human resources without a shortage of capital, Sony, Matsushita and JVC were established technology companies with reputable brands in the consumer electronics industry which meet Burgelman and Grove's (Burgelman and Grove, 2007) requisites for being classified as cross-boundary disruptors. The fact that these companies did not actually invent the disruptive technology of the VCR yet only utilised and developed it confirms the context in which Burgelman and Grove identify the XBD.

Companies commonly resort to litigation as a means for conflict resolution when new technologies threaten to disrupt customary revenues and existing industry structures. As mentioned in the introduction to this section of the study, film companies Universal Studios and Walt Disney Productions sued Sony Corporation, as well as Sonam and DDBI (the advertising agencies responsible for marketing Sony's Betamax) in 1976 because the Betamax VCR was perceived to be a device which chief purpose was to violate copyrights on producers' content. The film studios claimed injunctive relief, declaratory relief, damages and profits from the technology and advertising companies. Meza (2007) suggests that Universal Studios might have had a hidden agenda with the lawsuit against Sony, as it was planning to release a VTR through MCA, the company which owned Universal, and did not want to concede home video market share to the Betamax. Although an appeals court initially ruled in favour of the plaintiffs that VCRs indeed encourage copyright infringement, the Supreme Court reversed that decision in 1979, albeit by a narrow margin of five votes to four in favour of the defendants. After three years of litigation and a five-week long trial the Supreme Court's findings were finally issued as follows (Universal City Studios, Inc., et al. v. Sony Corp. of America, Inc. et al., 480 F. Supp. 429, 1979):

- a. "Neither the Copyright Act of 1909 ("Old Act") nor the revised Act of 1976 ("New Act") gave copyright holders monopoly over an individual's off-the-air copying in his

home for private, non-commercial use. This court is not deciding whether tape duplication or copying from pay television is prohibited. Nor is this court ruling on off-the air recording by individuals or groups for use outside the home.

- b. Even if the Copyright Act did prohibit home-use copying, Sony, Sonam, DDBI and the retail stores would not be liable under any of the theories of direct or contributory infringement of vicarious liability.
- c. The retail defendants have not infringed plaintiffs' copyrights.
- d. Even if home-use copying was infringement and defendants were deemed liable therefore, this court could not grant the injunctive relief requested by plaintiffs.
- e. None of the defendants has unfairly competed with plaintiffs or interfered with their advantageous business relations."

The "time-shifting" specification of the video recording technology was one of the factors which contributed most to the Supreme Court's favourable decision not to illegalise the VCR, as it is considered a non-violating use for the device (Cook and Wang, 2004). Time-shifting enables users to watch a television show on one channel while simultaneously recording a program on another. Along with product characteristics such as high picture quality, on-screen display, multi-channel TV sound decoding and stereo sound, consumers rapidly adopted VTR technology after its introduction to the American public (Park, 2004). As noted in the section 3.5 from page 74 onwards, consumers favoured the VHS video recording format invented by Matsushita over Sony's Betamax. Many Betamax-producing companies ceased operations while many other technology companies in the consumer electronics industry entered the market as VHS-manufacturers. RCA also started manufacturing VHS machines and each purchase of an RCA VCR was accompanied with two free videos. The Video Club of America opened the first shop from which videos could be purchased, while George Atkinson launched the first shop from which videos could be rented. Klopfenstein (1985) notes that both videotape sales and movie rentals grew exponentially from then on, nearly doubling yearly between 1982 and 1986. The stacked area chart in Figure 10 displays the revenues generated from the sales and rentals of VHS videos in the USA from 1981 to 1996, the year before the DVD format was commercialised (Currah, 2007). Equivalent to \$21.7 billion in 2011, cumulative revenues amounted to \$15.2 billion in that year.

US VHS Tape Revenues from Rentals and Sales (US\$ billions)

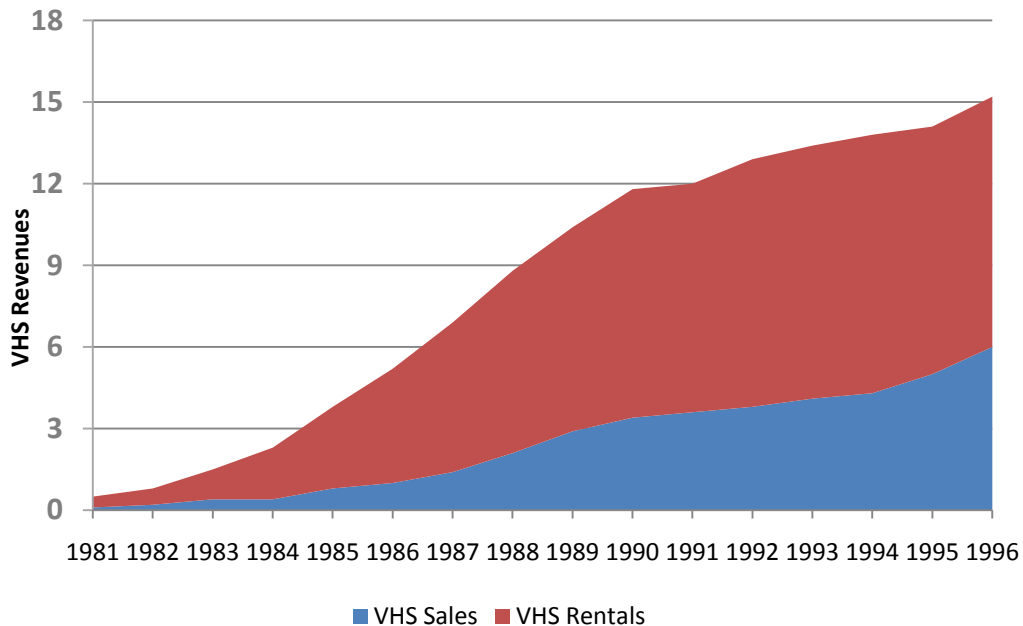


Figure 10: Increase in Total VHS tape revenues in American homes: 1981-1996

Video recording technology influenced the motion picture companies in a similar fashion as television had since the 1940s. It may be regarded as an additional factor contributing to the decrease in movie theatre ticket admissions. As producers of a cross-boundary disruptor technology, VCR manufacturers had effectively disturbed the equilibrium of the filmed entertainment sector.

4.4 Entertainment companies vs. Technology companies

A historical study of media and entertainment industry reveals that not only did several sectors and companies in this industry enter into a phase of trepidation due to consumer adoption of new technological innovations, but a great deal of contention also transpired between entertainment organisations, or content creators, and companies specialising in consumer electronics or technological devices for exhibiting or playing that content. Sometimes the dealings between companies associated with different industries have even positively resulted in cross-industry convergence (Chon et al., 2003), a phenomenon which Chapter 5 discusses in more detail. According to Currah (2006), the Internet especially has enabled new models for the economic reproduction of intellectual property, bolstering

creativity in entertainment companies. Nevertheless, several incidences of legal action still ensued as a result of entertainment companies' fear and failure to recognise the potential of new technological innovations. In particular, technologies which enable filesharing of digitised content over the Internet have provoked intra-industry conflict, lawsuits and regulations (Schwender and Leet, 2008). Yet not all litigation which has proceeded from periods of contention has been entirely unconstructive. A law passed in 1992 is one such an example.

In 1992, the United States Congress passed a law which became a noteworthy catalyst to the overall convergence and conflict between technology companies and the recorded music sector specifically. As an amendment to the American federal copyright law of 1976, the Audio Home Recording Act (AHRA) was passed to enforce the integration of a serial copy management system (SCMS) with the manufacturing of every digital recording device. An SCMS enables first-generation copying of digitally recorded discs, yet forbids additional copies to be made from already-copied disks. Moreover, the AHRA states that up to \$8 per newly produced recording machine should be paid by the manufacturer thereof, as well as 3% of the cost per copied disk, to song copyright owners as royalty tax. In return, owners of copyrighted music give up the right to accuse users of digital recording devices of copyright infringement when disks are copied for non-commercial purposes under the fair use limitation of the copyright law. Computers, however, are not subject to AHRA requirements as these are not regarded as digital audio recording devices (Gaffney, 2000).

Although the AHRA was considered a welcome contribution from the United States government in an attempt to address digitalisation-related concerns by incumbents in the recorded music sector at the time, Bridy comments that digital rights management measures like AHRA have only served to encourage piracy: "content controls have been received by ordinary consumers as a frustrating impediment to lawful use and by hackers as both an affront to digital freedom and an opportunity to prove their mettle (2009)."

As a matter of fact, piracy has only escalated since 1992 with the popularity of digitalisation and the ubiquity of digitised content in spite of efforts to counter illegal filesharing through technological means (Rupp and Smith, 2004). In addition to suing technology companies like

Napster in a bid to protect copyrighted content, entertainment companies started employing digital rights management (DRM) technologies as another tactic for countering copyright infringement, albeit unsuccessfully to a large extent still, according to Bridy (2009). Hackers have indeed been able to circumvent most DRM measures embedded in content disks up to now. Fears displayed by recorded music companies in the early 1990s surrounding the digitalisation of content were confirmed after Napster's demise in 2001: as piracy increased, music sales dropped.

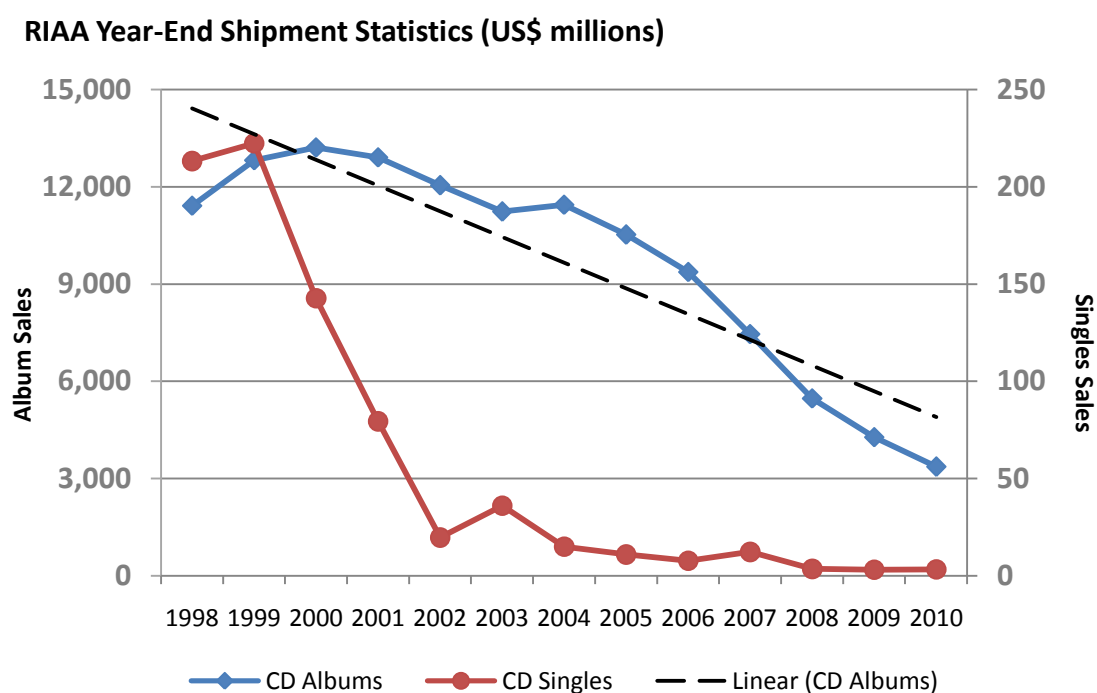


Figure 11: Decrease in Album and Singles Sales: 1998-2010

Figure 11 shows the decline in retail dollar value of singles and full album shipments from 1998 to 2009 as tracked by the Recording Industry Association of America (2011a) and (2009). Vaccaro and Cohn (2004) note a correlation between these declining record sales and the increase of illegal filesharing: physical music sales worldwide decreased by approximately US\$2 billion between 1999 and 2002 and have shown to regress ever since; the number of content files being shared illegally over the Internet has, on the other hand, increased from 500 million in 2002 to an estimated 1 billion just one year later in 2003. In that year, filesharing company KaZaA registered 230 million downloads compared to

Napster's biggest user base of 80 million in 2001. A Pew Internet survey reveals that by 2008, 15% of adult Internet users were sharing or downloading files illegally via P2P applications (2009). BigChampagne Media Measurement also states that the number of personal computers globally on which P2P applications were installed has been growing steadily in the 2000s, as demonstrated by Figure 12 (Pew Internet & American Life Project, 2009). As a convincing indication of how much piracy has escalated, most-recent studies by the Digital Music Research Group reveal that front-running P2P application LimeWire can now be found on 36.4% of all personal computers worldwide compared to only 18.3% of PCs in 2007 (Resnikoff, 2010).

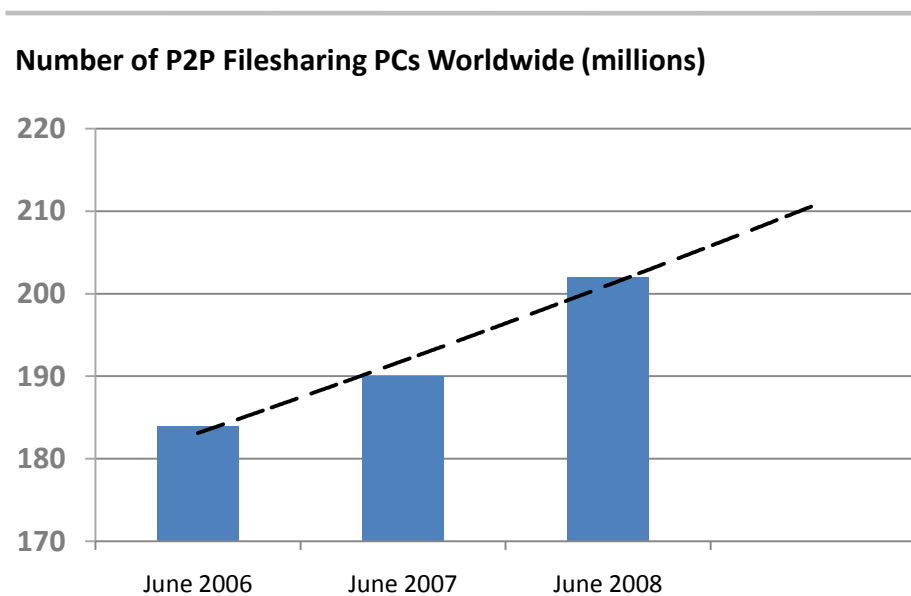


Figure 12: Number of Personal Computers Worldwide on which One or More P2P Applications are Installed: 2006-2008

Although Oberholzer-Glee and Strumpf (2007) concluded from statistical studies that digital filesharing has no significant effect on CD purchases, citing poor macroeconomic conditions, fewer album releases, a smaller variety of records and competition with other forms of entertainment as reasons for declining record sales, most other academics have subsequently differed in their deductions by stating that exactly the opposite is true. Liebowitz (2008) especially has strongly opposed their conclusions, stating that "Oberholzer-Glee and Strumpf's is... the only paper to find a benign impact of file sharing" and that "there are important problems with that paper." Conducting his own study, Liebowitz

empirically investigated the extent to which P2P filesharing has caused a decline in recorded music sales in the USA between 1998 and 2003. To eliminate the Internet penetration coefficient (the impact that the Internet has had on recorded music sales in general), he examined the effect of the Internet on other entertainment activities such as television and radio and subtracted it from recorded music sales. From his analysis, the conclusion was that P2P filesharing is responsible for not only some but the entire decline in recorded music sales during that period (Liebowitz, 2008). Bhattacharjee *et al.* (2007) examined the impact of filesharing on the performance of specific albums on Billboard charts and came to the conclusion that, except for work by "cream of the crop" musicians, music albums display significantly reduced chart survival in the post-P2P age. Quantifying the effect of filesharing technology on the recorded music sector, Elberse (2010) found that every 1% increase in illegal music downloading has led to a 6% decrease in album sales.

Diminishing profits were initially blamed solely on the technology companies which enabled users to download files illegally, attracting numerous P2P-focused lawsuits from the RIAA after Napster's demise. The recorded music sector, however, diverged somewhat from its strategy of suing Internet-based filesharing companies like Napster to prosecuting individual pirates when a recorded music sector trade group took legal action against Verizon Communications before the District Court of Columbia in 2003. Under the DMCA, Verizon Communications was ordered to disclose the identity of a fileswapper who shared numerous copies of copyrighted songs over the Internet using a Verizon-provided connection (*Recording Industry of America v. Verizon Internet*, 351 F. 3d 1229, Court of Appeals, District of Columbia, 2003). Verizon, however, won the appeal launched against the District Court's decision and when the plaintiffs wanted to further their case, the US Supreme Court conclusively declined to hear it (Stern, 2003).

The RIAA continued suing individual fileswappers for five years after the Verizon case, accusing more than 35 000 individuals of sharing audio content files illegally over the Internet during this period. Apart from acting as regular representative for recording companies in these suits, the RIAA has assumed a role of industry watchdog since 2003 by educating entertainment consumers and campaigning aggressively against piracy. Many companies and universities received warning letters from the RIAA stating that their

networks and resources were being used for the distribution of copyrighted music and that they had to resolve this problem to avoid legal action. The RIAA also encouraged the development of technology-based digital rights management systems and at one stage even suggested that Internet Service Providers (ISPs) pay a levy to labels for providing the infrastructure which enable consumers to freely access online filesharing services. This endeavour to eliminate piracy through individual-directed lawsuits proved to be costly for record labels in many more ways than only financially. Chiefly, the entire recorded music sector suffered a loss in reputation as the tactic of suing individuals who "shared even one song" attracted tremendous ill will from entertainment consumers. Intellectual Property expert Alan Hartnick (2009) criticises and rates this tactic as highly unsuccessful, as not only did post-Verizon record sales reflect consumers' negativity towards the industry, but illegal filesharing of music has not been entirely eradicated to this day.

Video files are generally much larger than audio files, making it more difficult to exchange movies or clips on the Internet as more time and capacity are required to upload or download a video file onto or from a P2P network server. An increase in Internet bandwidth and connection speed along with the advancement of video compression technology over the last 10 years, however, has allowed for larger content files to be distributed over the worldwide web, thereby enabling piracy of not only music but video files as well (Cook and Wang, 2004). According to Das (2008), additional technological advantages like larger hard drives and better open-source filesharing software programs have aided in the reduction of both the temporal and monetary cost of downloading files over the Internet. This occurrence has given television broadcasting and filmed entertainment companies a similar headache as record labels have been experiencing since the inception of filesharing technology as popularised by Napster at the turn of the 21st century. The piracy of motion pictures over the Internet and the legal battles which occur thereafter provides another case in point of contention between the entertainment industry and technology companies with the mass adoption of a disruptive technology.

4.5 Chapter Conclusion

Burgelman and Grove's cross-boundary disruptor (XBD) theory (Burgelman and Grove, 2007) identifies a change agent which serves as a catalyst to industry transformation. As mentioned in section 2.2 of this document, an XBD has the capability of influencing not only organisations in the same sector or industry as itself, but also how business is conducted in industries which are characteristically quite dissimilar. The case studies discussed in this chapter revealed general trepidation and protectionism regarding new technologies among entertainment companies rather than an enthusiasm to explore potential new business models. Yet as organisations contended with each other in either broad or narrow industry sectors, new opportunities for business creation emerged, some even leading to cross-boundary disruption.

Adhering to Burgelman and Grove's list of XBD characteristics, CBS already had a strong product market in the radio broadcasting sector, possessed capital and human resources and had technology-related brand appeal when Sidney M. Kaye founded BMI in 1939. Kaye was therefore ideally positioned to introduce BMI as an XBD while ASCAP was busy exploiting radio broadcasters and film studios due to deteriorating sheet music sales caused by radio technology. Regardless of movie studios' fear of the effects of television on theatre attendance, the invention, commercialisation and use of television as an alternative distribution channel has led to an entire new sector in the media and entertainment industry. Resource-rich companies Matsushita and RCA also became XBDs when they manufactured VHS-standard VCRs amidst film studios' legal contention with Sony over the "industry-crippling" potential of its Betamax video recorder. Amidst a myriad of legal battles, some of which were described in this chapter, conflict between entertainment companies and technology companies over the development of P2P-files sharing technology gave opportunity for companies like Apple, Redbox, Hulu, Netflix and Google (which owns YouTube) to also present XBD offerings to entertainment consumers in the 2000s, leading to the transformation of the recorded music and filmed entertainment sectors as they existed in the 1990s.

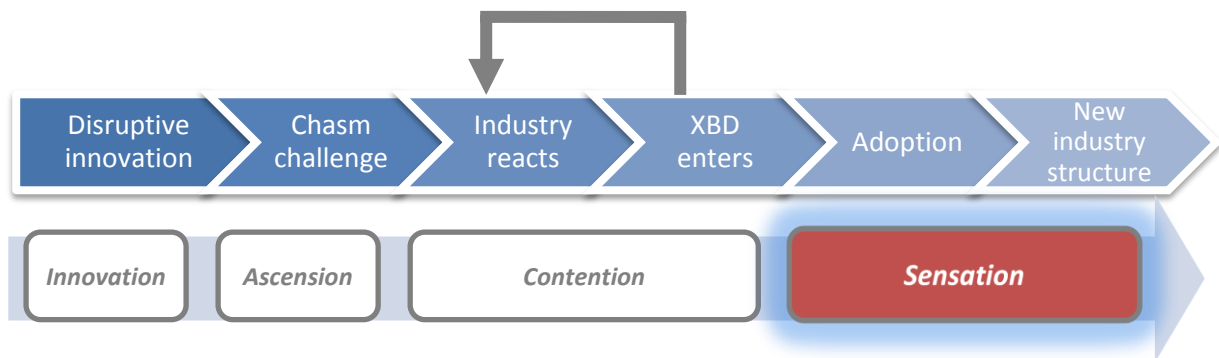
The new business models, markets and channels which were created by disruptive innovations that endured the *contention phase*, as well as the consequential industry structures and financial performance of the sectors they disrupted, will be discussed in Chapter 5.

5. The Sensation Phase

“To use technology to create magic is what appeals to me”

– *Francis Ford Coppola*

This chapter shows the economic benefit of convergence and close collaboration between technology companies and organisations in the media and entertainment sector, as well as the possibility of creating new markets when trepidation towards new innovations and strategies which ostracize consumers are relinquished and new business models developed.



When The Walt Disney Company released their latest animated film *The Lion King* in 1994, the film earned a company-record \$250 million in the USA alone and even twice as much in the rest of the world in the first two months of screening. Within the next two years following its theatrical release a staggering \$1.5 billion was added to that total through the sale of almost \$600 million worth of videos as well as retail merchandise, provoking Hawkins (1995) to proclaim that "*The Lion King* isn't [just] a movie. It's an industry!" (Reavis, 1998). Although re-releases of the film on IMAX screens in 2002 and 3D screens in 2011 added another \$15.7 million and \$93.1 million to the film's total revenue respectively, VHS tape and DVD sales of 4.5 million and 2 million on only its first day of release respectively just enforces Hawkins's sentiments (Box Office Mojo, 2011). As soon as film studios started relinquishing their fears and contention with technology companies over the video cassette recorder, they started benefiting from the adoption of the nascent technology in a new market space.

In spite of qualms that the entertainment industry would be "crippled" by the VCR, as a cross-boundary disruptor technology it has spawned an entirely new sector of the media and entertainment industry since Sony's legal victory over Universal City Studios in 1979. Video recording technology has furthermore revolutionised both the filmed entertainment and television broadcasting sectors and necessitated new business models for companies in both these sectors as incumbents started capitalising on the potential of video rentals as an additional source of revenue. Weinberg (2005) states that the subsequent invention of DVD technology and studios' interest in sell-through rather than only renting videos even enhanced this effect, leading to a significant decrease in the contribution of theatrical sources to movie industry revenues from 100% in 1948 to 20.5% in 2007 due to the 0% to 41.7% contribution of videos/DVDs alone for the same years (Epstein, 2010).

Periods of *sensation*, however, do not last particularly long as newer technologies constantly threaten to disrupt existing business models and industry structures. The digitalisation of media files and the ubiquity of Internet-connected PCs have again prompted contention between filmed entertainment and technology companies with the popularisation of YouTube, Hulu and other online video-sharing websites. ReadWriteWeb (2008) reports on a study by Ipsos MediaCT which shows that in just a year, television as dominant video consumption mode in the USA has decreased from 75% overall watching time in 2007 to 70% in 2008, while watching time on a PC has increased to 19% in 2008 from 11% in 2007. More telling might be statistics for the influential 12-17 age group which watched 24% of video content on PC in comparison to 55% on TV in 2008. In the same year, 80% of Chinese teenagers cited the Internet as their preferred source of entertainment over television while the Korean Film Council revealed that domestic DVD and film sectors are adversely affected by the 33% of South Koreans who now primarily watch movies online. Revenue opportunities abound in these countries, as online advertising in these two countries along with Japan have been forecasted to increase from US\$10.3 billion to US\$15.1 billion from 2009 to 2012 (Walsh, 2009). Television broadcasting and motion picture production companies are again forced to assess the effectiveness of traditional business models should they want to benefit from emerging digital aggregators.

This chapter explores a *sensation phase* of prosperity which entertainment companies have entered or failed to reach due to their response to technological change and their willingness to embrace new business models or alter existing value chains across traditional boundaries of industry. The resulting structures of the different sectors of the media and entertainment industry as they are currently organised globally and in South Africa are also examined.

5.1 Radio and Recorded Music

Music composers and artists initially encountered considerable opposition when trying to collect royalties for the broadcasting of their performances over radio. With confidence gained from the rising demand for radio sets throughout the 1920s, radio station owners argued that once they had purchased recordings, these could be used without further obligation to compensate artists for their material. Radio stations, of course, had to revise this policy with the popularisation of LP vinyl records and the establishment of royalty associations ASCAP and BMI. After its near-boycott due to severe exploitation of radio broadcasters in 1941, ASCAP was forced to match BMI's royalty formula based on 2.75% of stations' yearly advertising revenue.

Following the contention between broadcasters, recording companies and rights management agencies, radio remained the primary medium used to expose latest and popular records to the public until the popularisation of digital media. Sanjek and Sanjek (1991) write that by 1953 ASCAP licensed more than 19 million performances to radio stations, for which song writers and publishers received 8 cents (66 cents in 2011) and 24 cents (US\$1.97 in 2011) per airplay respectively. As mentioned previously, sheet music sales dropped drastically with the newly-established synergy between radio broadcasters and record labels (Allen, 1940). For the sale of every sheet music copy of a popular song between 50 and 75 records containing hit songs were sold in comparison due to the affect of radio and television, resulting in the growth of the recorded music sector from a \$100 million to \$6 billion industry between the 1940s and 1980s (Sanjek and Sanjek, 1991).

Vogel (2011), however, notes that FM radio with its wide-range "high-fidelity stereo-signal capability" only became financially viable during the late 1960s. Broadcasters obtained profitability by successfully marketing album-oriented popular music to the fast-growing group of affluent teenagers and young adults of the time. AM radio, on the other hand, gained traction in the 1970s by becoming a local service rather than a national one, giving marketers the opportunity to advertise to narrowly-defined segments of radio audiences.

The radio broadcasting sector and the recorded music sector effectively entered into a state of corporate symbiosis as radio became a significant catalyst for selling music albums. Although broadcasters receive some public funding from government, Barnouw (1966) mentions that the sustainability of radio's business model relies heavily on advertisers' recognition of the medium's marketing potential. Companies will always want their advertisements to reach audiences that would be most interested in buying their products or services. In view of that, advertising agencies endeavour to identify radio stations or programs which attract their target markets in terms of demographics, personal income and ethnicity. This practice of radio advertising gained popularity as more listeners tuned into radio stations to listen to shows playing latest hit songs. The success of a radio broadcaster in drawing audiences is measured by a gauge called *rating points*. Rating points refer to the percentage of all households in a particular area which own radios (or televisions) and are tuned to a particular program at a particular moment. For example, radio is currently the most ubiquitous medium in South Africa with approximately 10 million households who own a radio set. If 1.2 million households are listening to a soccer game on a particular radio station, that station's national rating is said to be 12.0 (1.2m / 10m = 12.0%). A particular radio station's *share*, however, refers to the percentage of switched-on radio sets which are tuned to a specific show. For example, if South Africa has 10 million households which own radio sets but only 6 million of these are switched on and 1 million listeners are tuned to Station X, then Station X's share can be said to be 16.67 (1m / 6m = 16.67%). The combined ratings of all radio stations during a specific time period consequently provide an estimate of the number of persons using radio (PUR). A station's share, then, can be expressed arithmetically as follows: $share = 100 \times rating / PUR$ (Vogel, 2011). The AC Nielsen Company has historically been the most prolific company offering regular measurements of shares and ratings over specific designated market areas (DMAs).

The network with the most popular programs consequently attracts the largest audiences, earning higher ratings. Marketers are interested in advertising during shows which have high ratings because these programs provide consistency and *reach* - a large percentage of targeted households are exposed to an advertisement at least once over a predetermined period. The relative cost and efficiency of message delivery via different media are measured by marketers on the basis of cost per thousand households (CPM), which can be obtained from stations' rate cards. Rate cards indicate advertising cost per half-minute for specific periods during a day, week or season. The station who is the ratings leader for a specific time period can therefore command higher-than-average CPMs due to the fact that advertising time on more-popular shows are in short supply when compared to advertiser demand.

Distinction can be made between three different types of advertisements broadcasted over the airwaves: national advertisements, national spot advertisements and local advertisements. Television advertisements can be similarly differentiated (Vogel, 2011):

- National advertisements, sometimes termed network ads, refer to those advertisements released by large brand-name organisations (typically those who distribute their products nation-wide) which are aired by purchasing national-network time via agencies. On average, these agencies receive fees in the area of 15% of companies' gross billings. This type of advertising is usually costly, but the least expensive if measured on a cost-per-viewer basis.
- National spot advertisements are also utilised by companies who distribute their products nationally, although spot ads target specific local audiences more effectively through consulting regional station representatives who are familiar with program research demographics and rates. Firm representatives typically charge an average commission of 7% or 8% of net billings (Rand paid for advertising minus advertisement agency commissions).
- Local advertisements are those utilised by smaller businesses that purchase broadcasting time directly from local radio stations. Local advertising rates are ordinarily not published but determined on a one-on-one basis.

The radio broadcasting sector entered its *sensation phase* in the 1960s due to its success as distribution channel for latest songs as well as efficient marketing medium. Advertising expenditures, as a reflection of the growth of the sector, have climbed steadily from the 1970s to the year 2000, with growth levels decreasing in the new millennium as indicated in Figure 13 (Vogel, 2011):

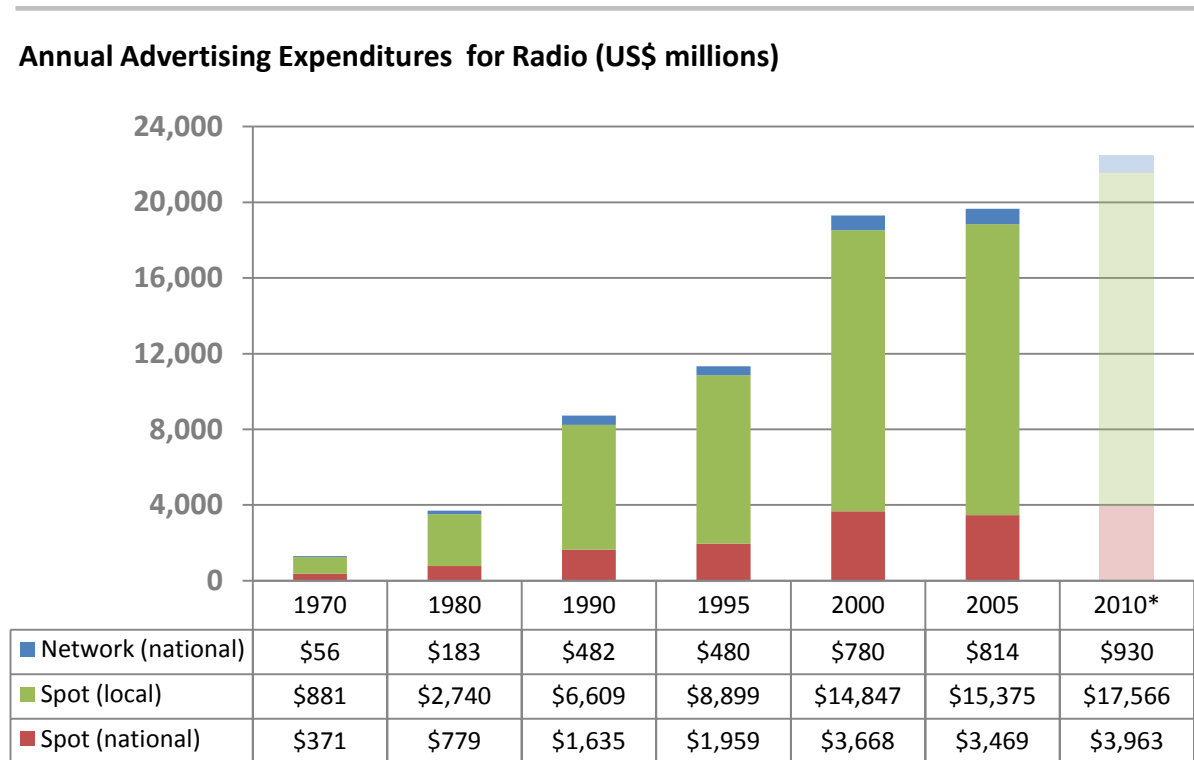


Figure 13: Annual Radio Advertising Expenditures in the USA per Category: 1970-2005 with 2010 forecast

The success of radio as advertising medium and means of cultivating a demand for new music, coinciding with the popularisation of television, had a positive effect on music album retailing with annual record sales exceeding US\$500 million by the late-1950s (Sanjek and Sanjek, 1991). With the help of radio, the music recording industry subsequently grew into a \$40 billion industry in 1998 - a record year before filesharing and piracy started challenging the prosperity of the recorded music sector significantly. Radio broadcasting, today, is a multi-faceted, heavily-regulated sector in the media and entertainment industry which has entered a period of maturity. With the exception of the introduction of online radio, which according to Boslet and Fleetwood (2006) has yet to become a profitable enterprise,

expansion in this sector has slowed down since its peak in the 1960s. The contribution of radio as marketing medium towards total advertising in the USA, for example, has remained steadily around a share of 7% from 1960 until 2005, in comparison with television which has grown in popularity as marketing medium from a 14% share of total advertising in 1960 to 25% in 2005. Even so, radio broadcasting remains a sector in which profit margins are significantly higher than other media and entertainment sectors, and broadcasters have consistently been able to maintain high cash generation. Recovering from the 2008/2009 recession, the radio market both globally (PricewaterhouseCoopers, 2010a) and in South Africa (PricewaterhouseCoopers, 2011) is forecasted to grow positively between 2011 and 2015 as demonstrated in Figure 14 and Figure 15.

Global Radio Market (US\$ billions)

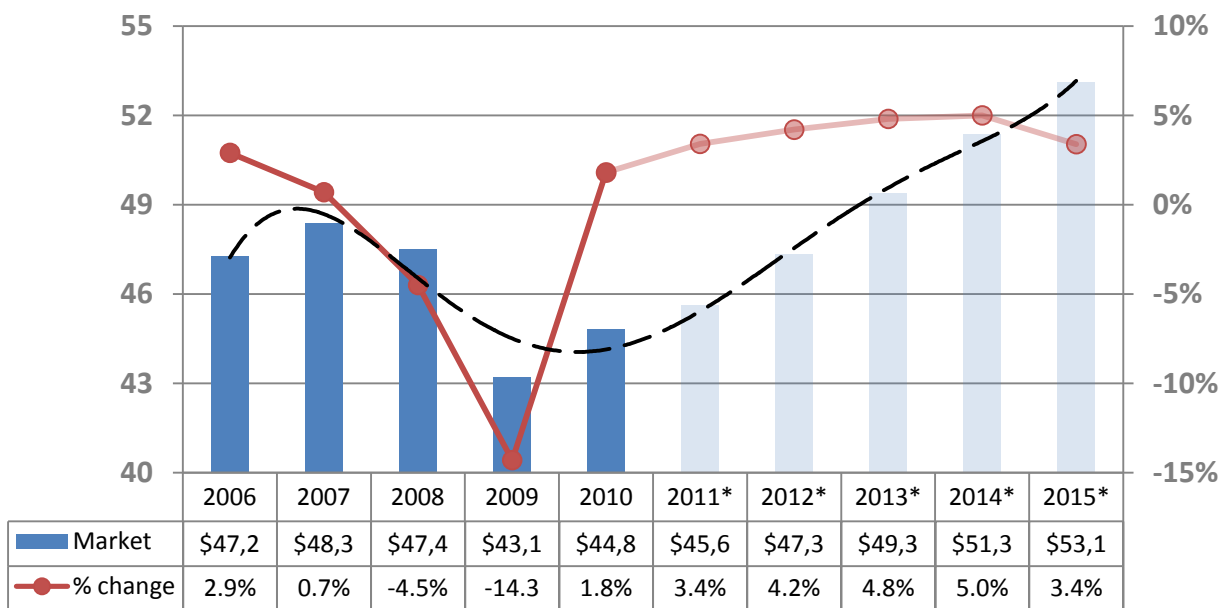


Figure 14: Global Radio Market: 2006-2015 with forecasted 2011-15 CAGR = 3.5%

South African Radio Market (R billions)

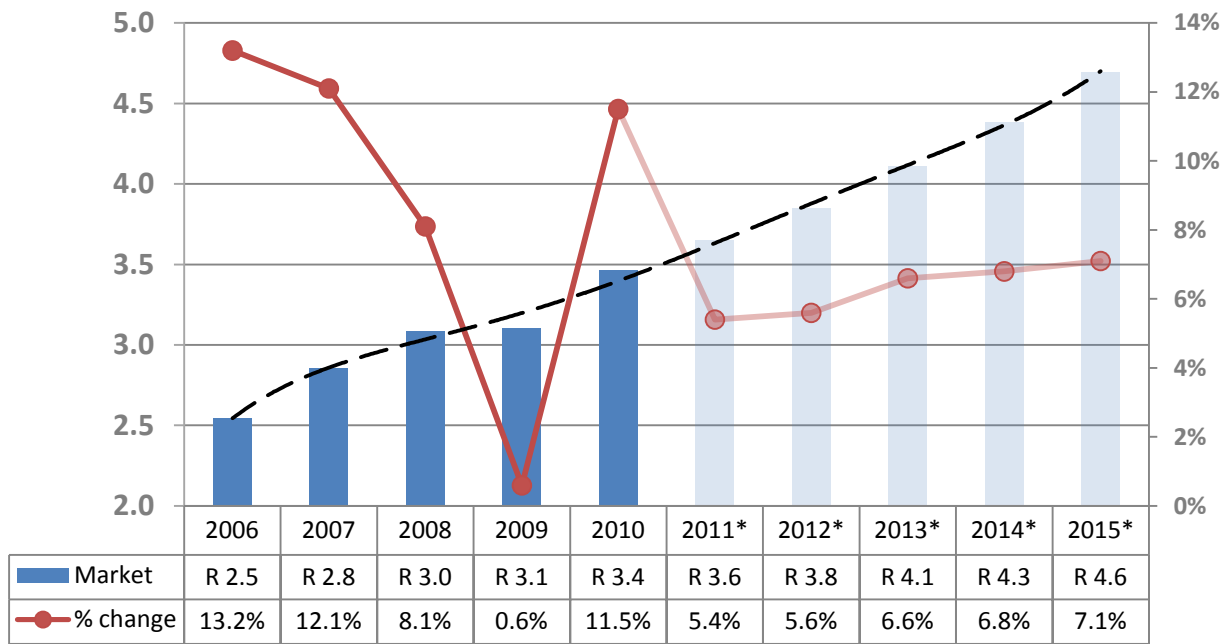


Figure 15: South African Radio Market: 2006-2015 with forecasted 2011-15 CAGR = 6.3%

Apart from the profitability of radio due to its continued success as an advertising medium, some other arguments why this particular entertainment medium remains so lucrative may be the following:

- Only one sense in the human body is utilised with radio broadcasts, a characteristic of this medium which enables listeners to concentrate on other tasks such as driving or doing work during transmissions. Television and P2P filesharing are mediums which require users' full attention for specific periods of time, rendering engagement with these forms of entertainment exclusive. Radio, then, becomes one of the main forms of media which entertainment consumers may engage with if they spend the greater percentage of their time at work or in traffic.
- Breaking news and talk shows enjoy a noteworthy platform in radio, and a perception exists that a greater measure of credibility and morality is retained in broadcast opinion because of radio's accountability to broadcasting and complaints commissions, as opposed to Internet forums which are generally unmoderated considered as unreliable.

- Talk-show radio provides a real-time opportunity for social networking without requiring Internet usage – listeners can phone in and provide opinions on either relevant or frivolous topics and thereby form part of a virtual community.
- Radio remains one of the most significant distribution channels for new popular music and is based on disk jockeys' "expert" opinion, not requiring intensive individualised Internet search attempts.

At least for the foreseeable future, radio broadcasters will continue to be a considerable force in the media and entertainment industry and will remain so should incumbents increase their experimentation of new technologies like web radio which may very well render traditional radio sets obsolete one day.

5.2 Filmed Entertainment and Television

Buying a 65-cent movie ticket back in 1920 would not only ensure admission to the week's latest film but guarantee a complete experience constituting big comfortable seats, formal wear, complimentary coffee and the ambience which can only be sensed in a gilded theatre palace with marble floors. 65 cents back then is worth \$7.54 in 2010, comparable to an average of \$7.50 paid for a movie ticket today for a less exclusive cinema experience (Motion Picture Association of America, 2009). Fielding (1967) suggests that constantly-developing technology has been one of the major driving forces which have aided in positioning cinema as successful entertainment medium and art form, ultimately changing the way in which movies are enjoyed today in comparison with the 1920-experience:

- Joseph Tykochiner invented the variable-density sound track which is (still today) placed on the side of image frames of moving pictures, producing the audio technology which has revolutionised film production. The first feature film with sound, commonly referred to as "talkies" at the time, was released by Warner Brothers in the form of *The Jazz Singer* in 1927 (Anderson, 2002). Sanjek (1988) notes that with the commercial success of *The Jazz Singer* and 1939-Best Picture Oscar-winner *Gone with the Wind* "talking pictures had become the principal means for plugging popular music." Theatre admissions were favourably affected with the addition of sound to pictures, allowing film studio heads to declare a general

consensus in 1935 that "a successful film song added significantly to box office returns."

- Although *Steamboat Willy* featuring the as-yet-unknown cartoon character Mickey Mouse was the first animated story created in 1928, *Snow White and the Seven Dwarves* was the world's first animated feature film (Downes, Russ and Ryan, 2007), a film which also proved popular with audiences thus indicating the financial feasibility of hand-drawn films. Since the success of *Snow White and the Seven Dwarves*, movies featuring animation technology have been contributing significantly to overall profits for film studios: adjusted for inflation, 14 of the 100 highest-grossing films in the USA of all time are animated films, with *Snow White* earning US\$870 million on its own (Box Office Mojo, 2010).
- Special effects created by means of advanced computer aided design (CAD) programs and electronic editing and composition software demonstrate another way in which technology has changed filmmaking operations, developed the art of cinematography and spurred profitability in the filmed entertainment sector. A particularly influential innovation in special effects is the development of computer generated imagery (CGI) technology, which enables filmmakers to create detailed digital models or simulate completely-lifelike characters and digitally integrate these into a film during post-production. Since the 1970s, CGI- or visual effects-driven films like 1977's *Star Wars*, 1993's *Jurassic Park*, 1995's *Toy Story*, 1999's *The Matrix*, 2001-2003's *The Lord of the Rings* Trilogy and 2009's *Avatar* have dominated the global box office. Statistics on boxofficemojo.com (2010) reveal that special effects-driven films represent at least 34 of the 100 highest-grossing movies in the USA of all time.

No other disruptive technology, however, has been as important in altering the film sector's economic and physical structure as the ready availability and mass adoption of television. Figure 8 on page 73 revealed that 90% of American households already owned television sets by 1970. Television penetration in the USA has since increased to more than 98% of households (Motion Picture Association of America, 2009). Films broadcasted over television have not only become competitive with theatrical exhibitions, traditionally the core business of the filmed entertainment sector, but global revenues from this mode of

exhibition have eclipsed that which is earned at the box office since the mid-1980s (Epstein, 2005a). Progress in TV program distribution as well as recording capability enabled entertainment consumers to watch a myriad of films according to their preferences in the comfort of their own homes - an advantage over specific release windows and scheduled shows at movie theatres. As mentioned in the previous chapter of this study, the popularisation of television along with videocassettes initially caused a fear that theatres would become redundant and consequently instigated great contention between film studios and television broadcasters. Moreover, the promise of multiple system operators (MSOs) using direct broadcast satellite (DBS) technology or cable networks to distribute content, rather than with wireless sets, sat well with entertainment consumers. According to Parsons and Frieden (1998), cable television was originally utilised as a means of transmitting broadcast television to areas in the United States which could not receive signals due to geographical obstructions like mountains, yet today offer content on a pay-per-view basis to more than 65% of American households.

The unprecedented access to old and new movies plus the consumer benefit of being able to dictate the time and place of viewing, conversely, opened the way for new revenue streams for film companies and adjusted the economic power of film studios. By broadcasting a film via a television network studios could earn \$150 000 per movie in the early-1960s, a figure which grew to approximately \$400 000 per film by the end of that decade (Balio, 1990). Revenue generated by transmitting films over television airwaves and pay cable systems only increased from then on. Although the standard variation for this figure is moderately high, Vogel (2011) shows that the estimated average revenue attained through ancillary markets for a "typical" MPAA-member movie increased to US\$30 million by 2010. This figure is expounded in Table 6. Noticeable is that the approximate income generated per person for these ancillary markets is lower than for film distributors, who earn anything between \$3.00 and \$5.50 per person per film.

Table 6: Estimated average income generated by ancillary revenue streams for a "typical" MPAA-member movie in 2010

Ancillary market	Estimated cost of movie viewing per person-hour	Standard license fees or revenues per movie
Pay cable	\$0.50	\$10 million
Network television licenses	\$0.06	\$2.5 million
Television syndication		\$1.5 million
Foreign television		\$3.0 million
Home video (cassettes and DVDs)	\$0.60	\$13.0 million
TOTAL:		\$30.0 million

Young *et al.* (2008) go as far as to state that, even though film executives attach great significance to the opening weekend box office performance and closely monitor the theatrical run of a film, only 20% of a film's revenue comes from cinema exhibitions and that as much as 80% of revenues are accrued from the ancillary markets of television and recorded media for a film released in today's economic context. Adapted from Eliashberg, Elberse and Leenders, (2006), Figure 16 graphically portrays the motion picture sector value chain as it exists today in conjunction with ancillary markets:

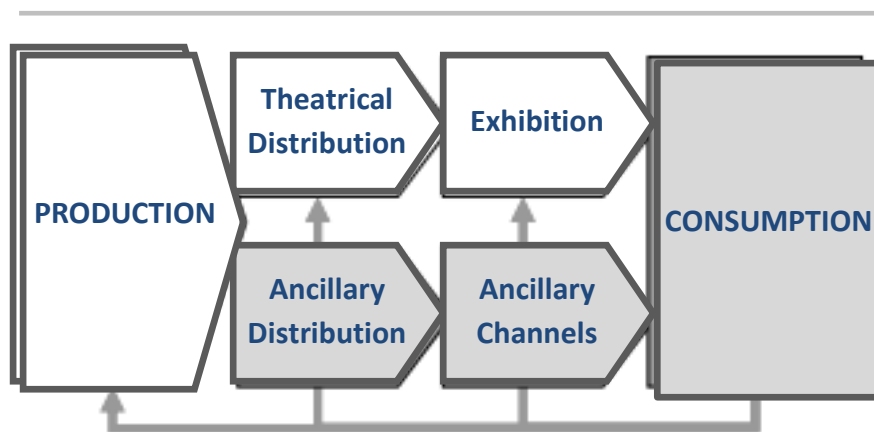


Figure 16: The Motion Picture Sector Value Chain

One catalyst for the radical industry change experienced by the filmed entertainment sector and the switch of opinion regarding television's collaborative potential and was the Paramount antitrust consent decree of 1948. That legislation rendered it illegal for film production and distribution companies to exhibit movies themselves and to exercise ownership over retail theatres in any way. Studios' reaction to declining theatre admissions and the divestiture of theatre chains was to first reduce the number of films being produced (having initially thought it necessary to produce a new film every week), and secondly to establish specialised television-programming divisions themselves (Balio, 1985).

According to Bruck (2003), Lee Wasserman was the first executive to pragmatically act on his belief that television could be of commercial benefit to the film industry. Wasserman headed up Hollywood talent agency MCA and in the early-1950s succeeded in convincing the Los Angeles actors' union named Screen Actors Guild (SAG) that actors would benefit with regards to employment opportunities should MCA be allowed to produce pre-recorded television programs without relinquishing its talent agency endeavours. Prior to SAG's consent for MCA to produce television shows, talent agencies were prohibited from producing movies, as the actors' unions considered such operations to be a conflict of interest. MCA commenced with television production soon afterwards. Before producing their own shows, motion picture studios merely leased old films to television broadcasters - earning pure profits due to the fact that these movies had already been fully amortized in the past. Newer films cost broadcasters more, as SAG and the Writers Guild of America (WGA) demanded a cut of these profits through residual compensation schemes (Balio, 1990). MCA also decided to purchase all of Paramount's old films (made prior to the Paramount consent decree of 1948) for \$50 million in 1957 (equal to \$397.1 million in 2011), considered to be a good deal for Paramount at the time, and impressively made an estimated \$1 billion off it as consumers developed a taste for old films via television. MCA expanded its entertainment interests when it acquired Decca Records for an inexpensive \$11.25 million in 1959 (\$85.3 million in 2011), a company which seemed to be nearing liquidation. But Decca Records owned Universal Pictures Company, a motion picture studio which enabled Wasserman to now also produce new motion pictures. This acquisition saw Wasserman's company expand into the world's first entertainment conglomerate consisting of a talent agency, a television production department, an old-movie library and a motion

picture studio. Bruck (2003) writes that Wasserman's foresight into the success of television and his belief in collaboration between different sectors in the entertainment industry enabled MCA to become the dominant producer and distributor of television content in the world by 1960.

While the hub of television production as dominated by NBC, ABC and CBS found itself in New York by the end of the 1950s, this centre of influence gradually started migrating to Hollywood in Los Angeles as film studios started utilising television as a distribution channel for their own products. Scott (2004) writes that a so-called "New Hollywood" organisational structure developed over the 1950s and 1960s as a result of the marriage between television-program production and the motion picture production - an industry structure far different to the autocratic mass production studio system of the "Golden Age". Deregulatory measures implemented in 1991 opened the door for networks of every type to not only broadcast television programs but also to produce them in-house rather than purchase them from auxiliary production companies - an example of how legislation can enable industry growth rather than inhibit it due to a fear-motivation (Cantor and Cantor, 1992).

Emulating MCA's example of the 1960s, most Hollywood studios now form part of what Currah (2007) terms a "concentrated oligopolistic structure", an industry configuration demonstrated in Table 7, adapted from Young, Gong and Van der Stede(2008) and Scott (2004). The Hollywood production hierarchy has since the 1960s been governed by a handful of major media and entertainment companies which constitute various different specialised divisions including motion picture and television show production. Even though the filmed entertainment sector's economic geography has shifted over the past fifty years, the chief corporations involved in film production have essentially remained the same, albeit with numerous changes in title and ownership as well as the expansion of their entertainment portfolios. Six large motion picture studios, colloquially termed 'majors', comprise the core of the filmed entertainment sector today: Walt Disney Pictures, 20th Century Fox Film Production, Warner Bros. Pictures, Columbia Pictures, Paramount Pictures and Universal Pictures. Large, vertically integrated global companies, who each boast a broad portfolio of media and entertainment businesses, own these film studios, who

account for about 90% of revenues in the United States (Young, Gong and Van der Stede, 2008). The majors are gradually being integrated into even bigger and more complex multinational media conglomerates as evidenced by Sony's acquisition of MGM in 2004, Paramount Pictures' acquisition of DreamWorks in 2005 and Walt Disney Pictures' acquisition of Pixar Animation in 2006 (Currah, 2006). Each of these major motion picture studios has subsidiary studios which produce small- and medium-budget movies. The film and television production landscape is completed with a myriad of smaller independent companies, colloquially called 'independents', who sometimes partner with the majors with regards to financing or creative collaboration.

Table 7: The Major MPAA Motion Picture Studios, Major Subsidiary Studios, Distributors and Television Production Facilities for Media Conglomerates

Major Studios	Major Subsidiary Studios	Distributors	Television Broadcasters	Parent Corporations
Walt Disney Pictures	<ul style="list-style-type: none"> ● Miramax Films ● Pixar Animation ● Touchstone Pictures 	Buena Vista International, Inc.	<ul style="list-style-type: none"> ● ABC Productions ● Touchstone Television Productions ● Walt Disney Television Network 	The Walt Disney Company
20 th Century Fox Film Corporation	<ul style="list-style-type: none"> ● Fox Searchlight 	20 th Century Fox International Corporation	<ul style="list-style-type: none"> ● 20th Century Fox Television 	News Corporation
Warner Bros. Pictures	<ul style="list-style-type: none"> ● New Line Cinema 	Warner Bros. Pictures International Theatrical Distribution	<ul style="list-style-type: none"> ● HBO Downtown Productions ● Warner Bros. Television ● TBS Productions 	Time Warner
Columbia Pictures MGM United Artists	<ul style="list-style-type: none"> ● Screen Gems ● Sony Pictures Classics 	Columbia TriStar Motion Picture Group	<ul style="list-style-type: none"> ● Columbia TriStar Television 	Sony Corporation
Paramount Pictures	<ul style="list-style-type: none"> ● DreamWorks Pictures ● Paramount Vantage 	Paramount Pictures Corporation	<ul style="list-style-type: none"> ● CBS Productions ● BET Television Productions 	Viacom, Inc.
Universal Pictures	<ul style="list-style-type: none"> ● Focus Features 	Universal International Films, Inc.	<ul style="list-style-type: none"> ● NBC Studios ● Universal Television 	General Electric Company

Film studios obtain revenue from television stations for content leased or sold to them. Television stations' revenues, conversely, are largely modelled on the radio broadcasting sector's business model as it also depends on advertisers buying programming time. As with

radio, television broadcasters sell programming time to advertisers by utilising the concepts of gross rating points, reach and frequency. These terms were defined in section 5.1 of this chapter. The percentage of switched on television sets tuned to one particular show is reflected in the following formula: $share = 100 \times rating/HUT$, where HUT refers to the number of homes using television during a certain part of day (Vogel, 2011). For example, in South Africa the three SABC channels command a 90% share on average (PricewaterhouseCoopers, 2011). The greater the share a television program has while airing, the more attractive the proposition for marketers to advertise during the broadcast of that show. Therefore the television networks with the most popular programs attract the biggest audiences, enabling them to put a premium on advertising spots during the broadcasting of these programs. As is the case with radio broadcasters, measurement companies like the AC Nielsen Company determine ratings for prime-time shows from a statistically selected sample of 10 000 American homes by means of meters connected to their television sets, VCRs, satellite dishes and cable boxes. Marketers wanting to advertise via television are interested in shows which either have high ratings according to the Nielsen television index, or those which provide reach among a specific target market with regards to demographics. For example, beer companies typically advertise during sports-events programs, while toy manufacturers might typically prefer to buy advertising time on children's programs. Local news broadcasts and daytime television shows with their large viewer bases command the highest premium on advertising time, and consequently represent the largest source of revenue for television stations (Steinberg, 2005). Advertising dollars, as well as constructive US government regulations, enabled UHF television to become financially viable and the three major television networks to earn profits during the 1970s, finally ushering them into a *sensation phase* of prosperity. Figure 17 illustrates how advertising expenditure via the medium of television has increased from the 1970s to the mid-2000s. Interestingly, while radio advertising has consistently controlled an average share of 7% of total advertising dollars spent in the USA since the 1960s until now, television's share has increased from 14% up to 25% while newspaper advertising's share has decreased from 32% to about 17% of total advertising dollars spent for the same period (Vogel, 2011).

Annual Advertising Expenditures for Television (US\$ millions)

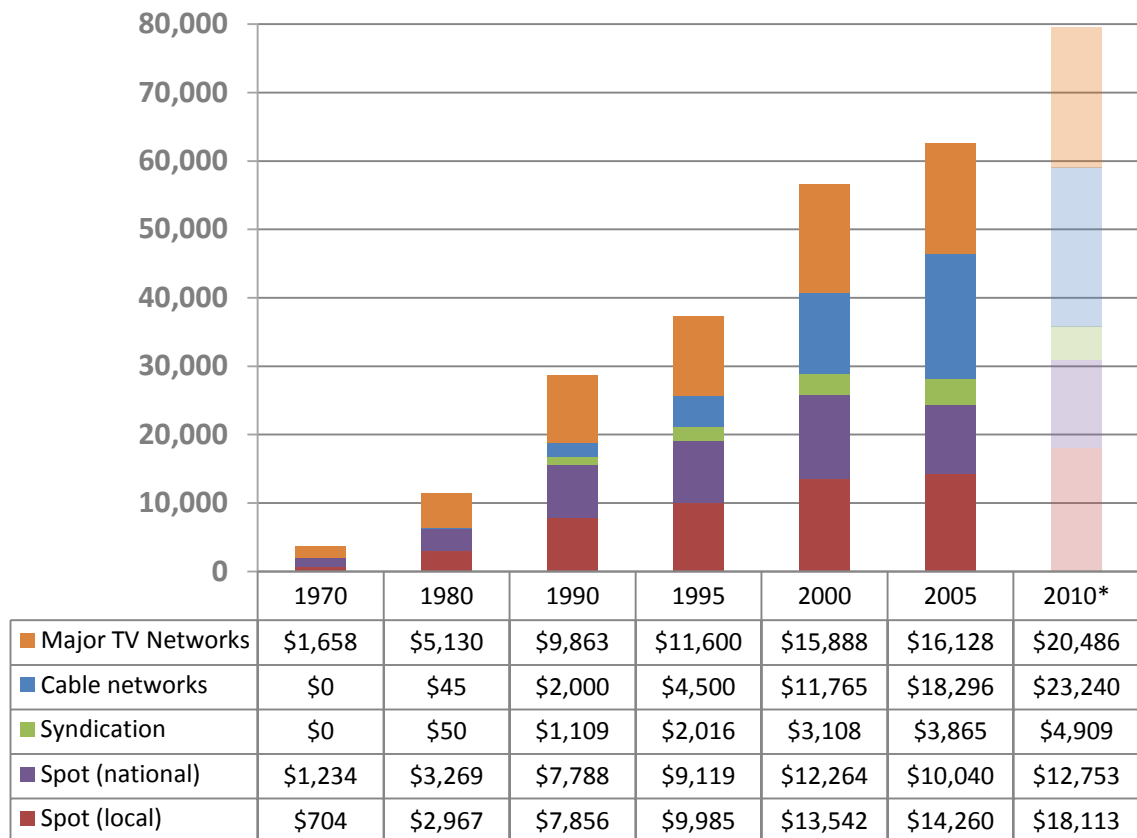


Figure 17: Annual Television Advertising Expenditures in the USA per Category: 1970-2005 with 2010 forecast

Although national and local advertisements represent the greatest source of revenue for television stations, stations also receive some compensation from the networks with whom they are affiliated. Each of the major television networks has nearly 200 affiliate stations who for the most part broadcast regularly scheduled shows produced by their parent-network along with content produced by outside contractors. The affiliate stations receive compensation to broadcast scheduled national programming which is provided by their parent network free of charge. Conventional income and expense category proportions for a typical television station are displayed in Table 8 (Vogel, 2011):

Table 8: Typical Television Station Income and Expenses in Percent, by Major Categories

Total Time Sales (Income)		Expenses	
Network compensation	7.5%	Engineering	11.5%
National and regional advertisements	47.5%	Program and Production	25.5%
Local advertisements	<u>45.5%</u>	News	13.5%
		Sales	12.5%
		Advertisements and promotions	4.0%
		General and administrative	<u>33.0%</u>
	100.0%		100.0%

Along with its smaller affiliates, NBC, CBS and ABC today each own and operate at least ten sizeable television stations in the foremost cities in the USA - New York, Los Angeles and Chicago. When the number of affiliates it licensed content to reached 25 in more than 10 states in the late 1990s, News Corporation-owned Fox Broadcasting Company (FOX) joined these networks to become the fourth major network in the USA. The organisation of and interaction between the different role-players of the television broadcasting sector is exhibited in Figure 18, adapted from Owen, Beebe and Manning (1974):

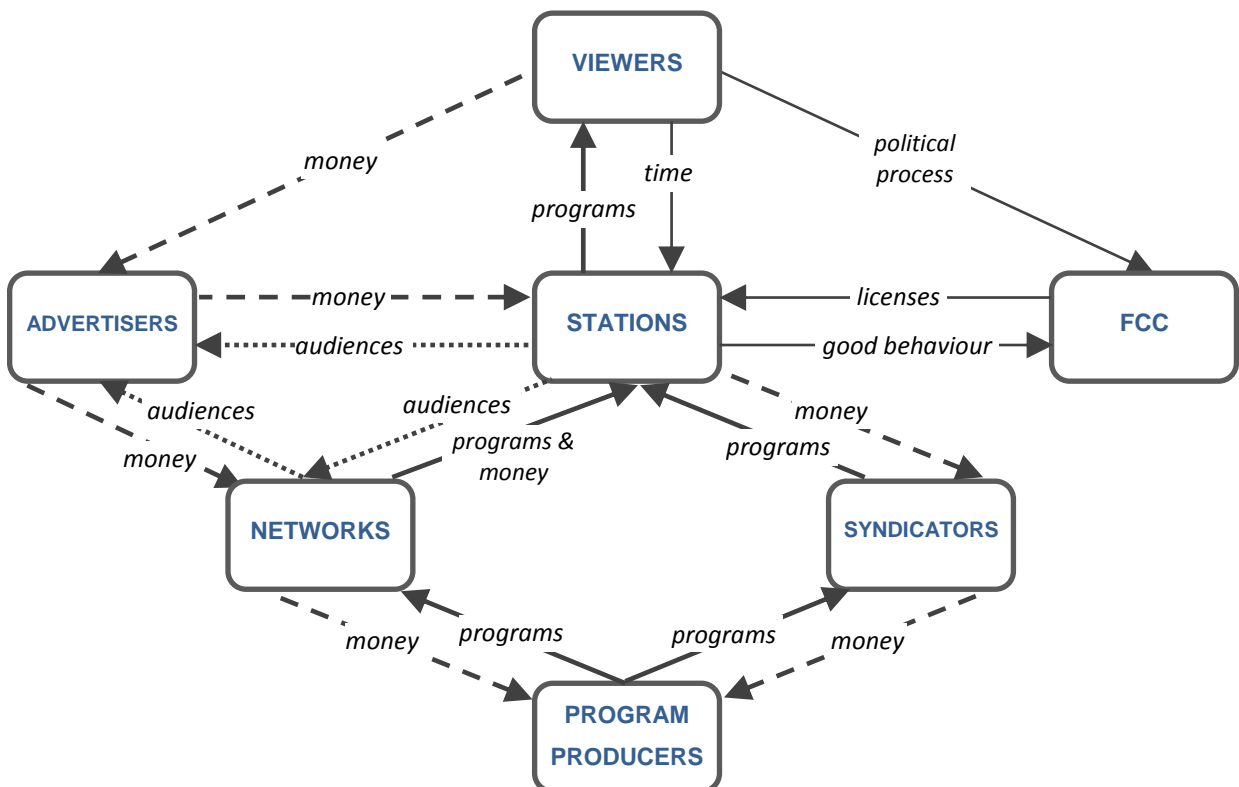


Figure 18: Organisation of the Television Broadcasting Sector

In summary, the film industry entered a *phase of sensation* when it ultimately recognised that entertainment consumers were fond of the notion of watching films at home rather than just at theatres, and growth of the television broadcasting sector only escalated when the studios altered their business models and started capitalising on this trend in the mid-1900s. By using similar resources and expertise needed to create feature films, the movie studios' business model centred on pre-recording television programs which could be aired at a later stage, while broadcasters in New York specialised in the production of shows that were aired in real-time in front of live audiences. Whereas 60% of network programming was still produced by the principal television networks in New York in the 1960s, the filmed entertainment sector in Southern California today oversees the production of over 90% of network programming as a result of film studios' embracing of the disruptive technology called television (Scott, 2004). By embracing a new business model which included the production of original television programmes in conjunction with the broadcast of previously-produced motion pictures, Hollywood conquered its antagonism towards television broadcasting and did so profitably: Hollywood conglomerates today control the major share of filmed content of all consumers worldwide (Datamonitor, 2010). Scott (2004) mentions that the success of Hollywood's amendments to its value chain and the resultant system is "under-girded by webs of associates, institutions and social networks that help to consolidate the powerful streams of agglomeration economies that emanate from it." Supported by these established collaborative partnerships among different companies along the television broadcasting value chain with their immense experience and vast inventories of programs, the global television subscription market is forecasted to be a \$258.2 billion industry by 2015, as illustrated in Figure 19 (PricewaterhouseCoopers, 2010a). The South African television market, estimated to grow at CAGR of 9.9%, will be a R30.9 billion industry by 2015 with satellite television penetration expected to rise to 66% of HUT for the same year (PricewaterhouseCoopers, 2011) as demonstrated in Figure 20 and Table 9.

Global Television Market (US\$ billions)

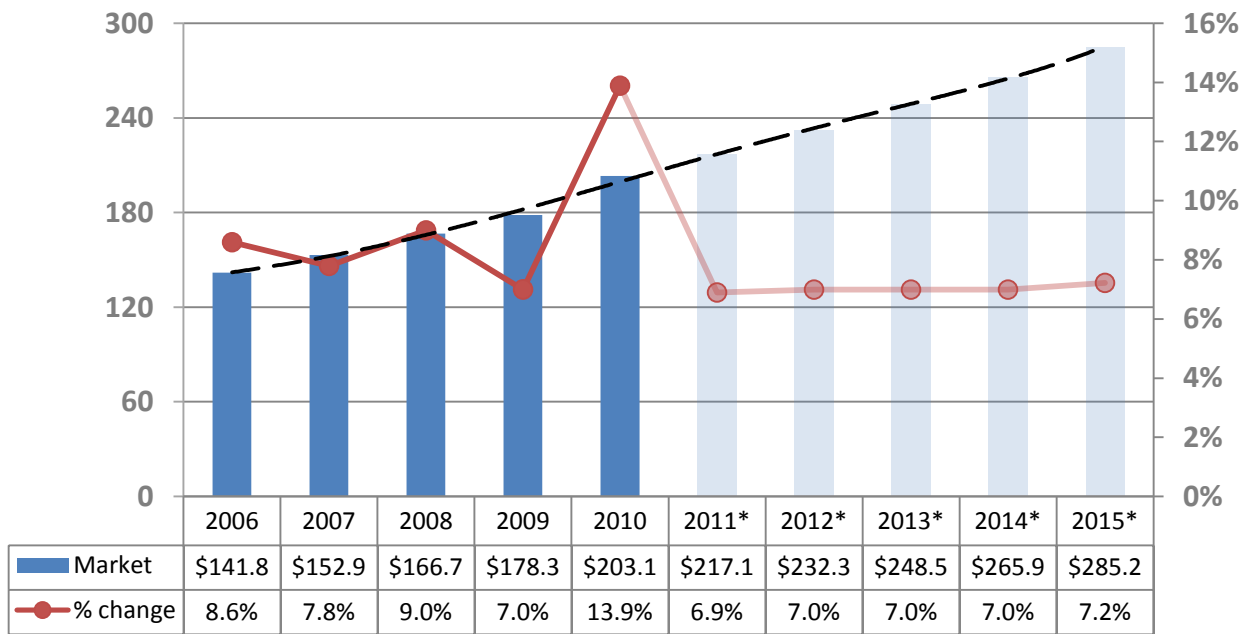


Figure 19: Global Television Market: 2006-2015 with forecasted 2011-15 CAGR = 7.0%

South African Television Market (R billions)

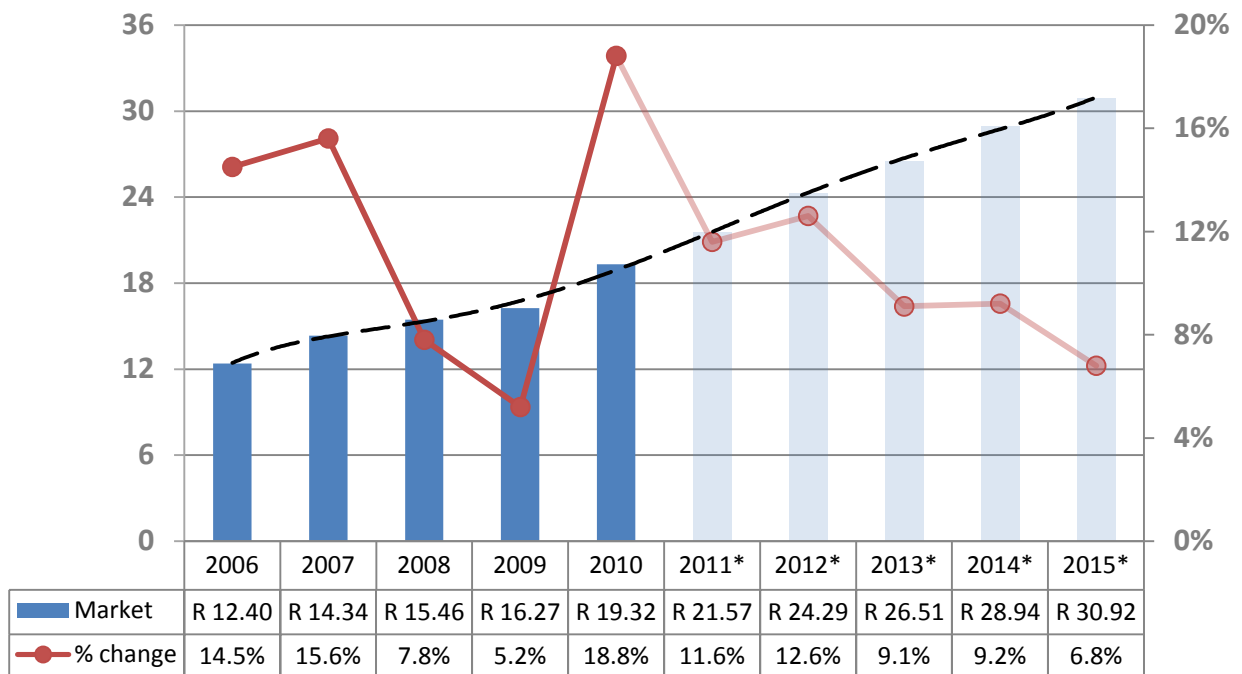


Figure 20: South African Television Market: 2006-2015 with forecasted 2011-15 CAGR = 9.9%

Table 9: South African Subscription Television Growth: 2006-2015

Subscription Television Households											
	2006	2007	2008	2009	2010	2011*	2012*	2013*	2014*	2015*	CAGR
Subscription households (in millions)	1.67	1.80	1.95	2.40	3.00	3.55	4.00	4.30	4.55	4.75	
% change	9.9%	7.8%	8.3%	23.1%	25.0%	18.3%	12.7%	7.5%	5.8%	4.4%	9.6%
Subscription penetration of HUT (%)	24.9%	26.5%	28.5%	34.8%	43.2%	50.7%	56.7%	60.6%	63.6%	66.0%	

Television audiences continue embracing programming as scheduled by the networks and 90% of American households already owned television sets by 1970. Television penetration in the USA has since increased to more than 98% of households (Motion Picture Association of America, 2009), pushing TV to the end of its technology life cycle. Yet regardless of the continued growth of the global television broadcasting sector, content producers have yet again been forced to reassess the sustainability of their business model as technology enabling the digitalisation of video files have gained user adoption since the mid-2000s. The *sensation phase* during which television broadcasters and film studios have been enjoying prosperity is being challenged as consumer behaviour changes from taking pleasure in standardised one-to-many programming via TV sets, to enjoying more focused, niche content via MSOs and cable, to preferring an individualised video-on-demand (VOD) viewing experience via more than just one particular device. According to Berman, Duffy and Shipnuch (2006), the filmed entertainment sector is confronted with unparalleled levels of complexity as telecommunications firms and Internet companies like YouTube and Hulu recognised the change in entertainment consumer behaviour and started addressing viewers' needs. As mentioned in the introduction to this chapter, *sensation phases* for a technology only last as long as incumbent companies remain unprejudiced towards technologies which may potentially disrupt their industries. Content producers would do well to again choose to make provision for consumer preferences as film studios did when they altered their business model with the invention of television as just discussed in this section.

5.3 Filmed Entertainment and VCR/DVD

The Lion King, the movie mentioned as an example in the introduction to this chapter, is just one of numerous films which have enabled film studios to profit from video recording technology and their decision to finally adopt the VCR rather than contend with manufacturers thereof out of fear. Compiled from the seven most-recent Pixar-produced films, Table 10 and Figure 21 show the extent to which this studio has benefitted financially from having VCR and DVD as distribution channels supplementary to cinema screens (The Numbers, 2011a).

Table 10: Box Office and Home Video Revenue for Disney-Pixar Movies: 2003-2011

Release Date	Movie Name	Budget	US Gross	Worldwide Gross	Home Video Revenue in USA
2003	Finding Nemo	\$94.0 million	\$339.7 million	\$867.9 million	\$300.0 million
2004	The Incredibles	\$92.0 million	\$261.4 million	\$632.9 million	<i>Not Available</i>
2006	Cars	\$70.0 million	\$244.1 million	\$461.9 million	\$247.2 million
2007	Ratatouille	\$150.0 million	\$205.5 million	\$620.5 million	\$189.2 million
2008	Wall-E	\$180.0 million	\$223.8 million	\$532.7 million	\$142.7 million
2009	UP	\$175.0 million	\$293.0 million	\$731.3 million	\$182.0 million
2010	Toy Story 3	\$200.0 million	\$415.0 million	\$1.064 billion	\$184.9 million

US Revenue of Pixar Films

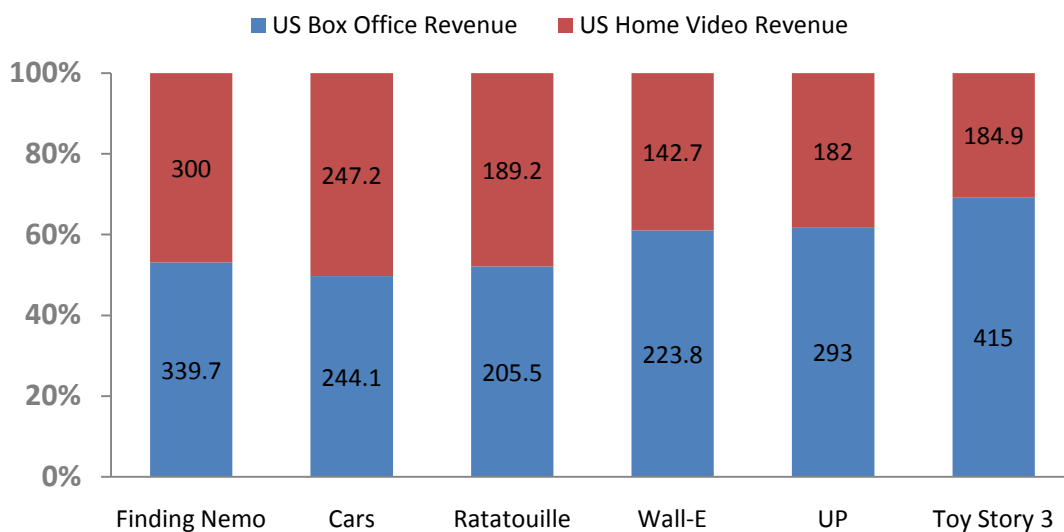


Figure 21: Stacked Chart Illustrating Significant Contribution of Revenue from Video/DVD/Blue-Ray Sales for Pixar Films

While studios carry all production and advertising costs themselves yet share profits gained through film admissions with a whole range of role-players, illustrated by Figure 22, DVD profits go directly to studios themselves (Elberse and Anand, 2006).

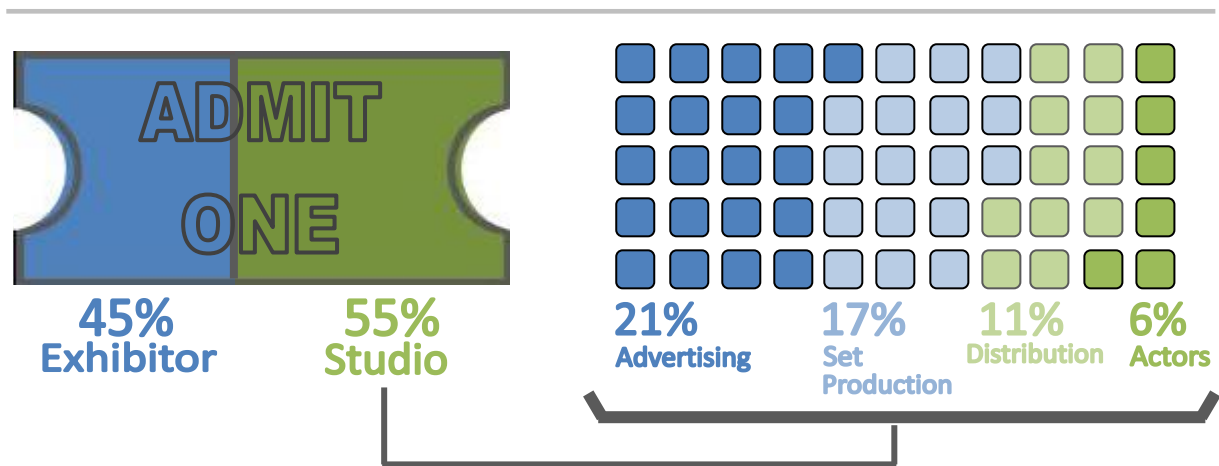


Figure 22: Division of Income Earned per Movie Ticket with Studio Breakdown

As a matter of fact, video recording technology does not merely represent a lucrative distribution channel for studios, but has sometimes even prevented great losses for studios when neither American nor international box office receipts could cover production expenditure at the end of a theatrical run. For example, 2002's *Treasure Planet* is undisputedly regarded as a box office failure when assessing its theatrical performance on The Numbers website (2011b). *Treasure Planet* cost The Walt Disney Company \$100 million to produce and a further \$30 million to market, while only earning \$38 million in the United States and \$54 million at the global box office during its run, indicating a substantial loss of approximately \$38 million for the studio in 2002 - a damaging anomaly for big-budget animated films. Revenue equalling \$64 million from home videos in the United States, however, ensured that Disney could at least cover its expenses and make a small profit from *Treasure Planet* after all despite its disappointing performance at the box office, albeit negligible when compared to what can be earned by animated films such as Pixar's.

Yet many years before VCRs and DVD players became the main ancillary platform for filmed content it had not occurred to film studio executives that they could capture this distribution channel for themselves rather than just allow technology companies to sell VCRs to the public and expect consumers to buy blank videotapes from retailers on the

periphery. External entrepreneurs and not studios themselves, Meza (2007) notes, came up with the ideas which later formed the foundation of video rental market which disrupted the filmed entertainment sector. A video-equipment entrepreneur called Andre Blay from Farmington Hills in Michigan established the first start-up which rented videos to the public, thus becoming another XBD in the narrative of how the VCR has altered the film industry. According to Lardner (1987), Blay recognised the opportunity of a market for renting movies on pre-recorded tapes when technology companies achieved incremental innovation enabling videotapes to record content longer than two hours. In 1976, concurrent to the time when the lawsuit between Universal and Sony was contracting great controversy, Blay pitched his idea in what Lardner terms a "cold call letter" to the CEO of every major Hollywood studio (other than Universal), requesting the studios to award him the rights to sell their films on videotape (1987). Only two of the studios replied, of which just one was a positive response. Metro-Goldwyn-Mayer declined to sell the rights to their movies to Blay as MGM contemplated on selling videos as well in the future, but having already tested the market, FOX agreed to sell their rights to Blay, albeit only of films more than four years old and which have already been licensed to television networks. Signed in 1977, the FOX deal required that Blay pay the studio an advance of \$300 000 in addition to the minimum of \$500 000 payable per year against a royalty on each tape sold to him for \$7.50. Financing his new company with a bank loan, Blay acquired fifty titles such as *The French Connection* and *Butch Cassidy and the Sundance Kid* and started selling them in the name of the Video Club of America - the very first video store ever opened (Young, Gong and Van der Stede, 2010). Andre Blay's idea of selling FOX's videotapes proved to be an immediate success. After placing an advertisement in the *TV Guide* magazine, Blay's pre-recorded videotape production equipment had to run at full capacity for 24 hours a day in order to meet consumer demand, reaching a maximum throughput of 24 000 VHS and Betamax videotapes a month. Consumers seemed unfazed by the high selling price of \$50 per videocassette at the time. Lardner (1987) writes that more than 250 000 videotapes had been sold by the Video Club of America by the end of 1978.

The popularity of video sales led the way for another entrepreneur XBD to start the video rental business in the USA. George Atkinson conceived of this business initiative while reading about Blay's success in the newspaper. Atkinson already possessed some business

acumen as to how a rental concern works as his Los Angeles-based business focused on renting old projectors, screens and classic films to consumers for \$25 an evening. Atkinson tested his idea by placing a "Video for Rent" advertisement in the *Los Angeles Times*, giving readers the opportunity to send him requests for specific films. Meza (2007) writes that although Atkinson did not actually have any stock at the time, he was flooded by responses from his advertisement in the *LA Times* just a week after its placement. With a mere capital investment of \$10 000, George Atkinson officially opened the very first video rental store (Young, Gong and Van der Stede, 2010), buying Andre Blay's videos as consumers requested specific titles.

With the MPAA unable to provide clarity as to whether it was actually legal to rent out videos originally sold for private viewing exclusively and the non-existence of substantial barriers to entry, many opportunists followed in Atkinson's footsteps and established rental businesses in the USA and UK. The business model of choice for these rental concerns centred on membership contracts, a tactic which both provided up-front capital for buying new cassettes and reduced the risk of patrons stealing them. Only after the popularity of video rentals became apparent and selling prices of video players themselves decreased following Matsushita's success over Sony's Betamax (as described in Chapter 3) did studios follow suit (Lardner, 1987). Their first attempt to enter the new market was unsuccessful as film studios failed to entice video rental entrepreneurs to first lease videos from them for a season before renting it out to the public as an alternative to buying cassettes permanently. Klopfenstein (1985) writes that film studios decided to adopt a different business model in their attempt to profit from the nascent video rental sector: a two-tiered pricing system. With this approach older films were sold to entertainment consumers at discount prices (sell-through) while sales of newer titles were specifically aimed at the rental market, at a premium. Hollywood Video and Blockbuster started opening franchised stores and their video rental chains eventually outnumbered the independent rental concerns in the USA.

The popularisation of revenue sharing contracts between film studios and the major video chains in 1998 led to the establishment of a new business model in an attempt to further maximise profits from this ancillary market. Mortimer (2008) writes that while the traditional method of distributing movies to value chain store operators involved the

procurement of videocassettes at a fixed linear price from film studios regardless of the popularity of the title, they could buy movies for a tenth of the rental market price under a revenue sharing plan on condition of sharing a percentage of rental revenues with film studios. These percentages were dependent on how well the particular film performed at the box office. Video chains were also allowed to sell older titles to consumers to recover capital expenditure under this agreement.

The introduction of the DVD format to the media and entertainment industry has greatly impacted the profitability of the home video market for studios. Mortimer (2008) states that producing, packaging and distributing a pre-recorded videocassette tape cost approximately US\$2, and film studios could expect to sell movies on VHS tapes for US\$9 apiece Vogel (2011). Adding marketing costs of about US\$4 a profit of US\$3 on videocassette sell-through could be obtained. When one compares the cost breakdown and selling price of a movie on DVD, as displayed in Table 11, with that of a movie on VHS, it is observable that twice as much profit could be made from selling DVDs than videocassettes (Currah, 2006). The profitability of digitalised films sold over P2P networks is also displayed in Table 11:

Table 11: Typical economics of DVD sales and digital sales for a “typical” feature film

Cost and profit	DVD Sale, in US\$	Digital Sale, in US\$	
		Centralised Model	Decentralised Model
Reproduction	1	0	0
Distribution	1	0.75	0.25
Marketing	4	4	2
Guild payments	0.75	0.75	0.75
Total costs	6.75	5.50	3
Price (sold by studio)	16	12-15	12-15
Profit	8.25	6.50-9.50	9-12
Profit margin	55%	54%-63%	75%-80%

DVD's profitability coupled with significant consumer adoption provided an incentive for film studios to exchange the revenue sharing contract model for an ordinary consumer purchase model again allowing video chains to buy DVDs at US\$15 wholesale. Even though revenue sharing was lucrative for both film studios and the rental chains for more than 20 years, Vogel (2011) states that the decision of studios to focus on the sell-through market with the advent of DVD provided to a profitability structure more favourable to studios in the long run. As a continuation of Figure 10 on page 94, Figure 23 shows the effect of DVD on VHS sales after its introduction to the home video market in 1997 but before the commercialisation of Blue-Ray disks in 2006, with DVD sale and rental revenues finally overtaking that of VHS in 2002:

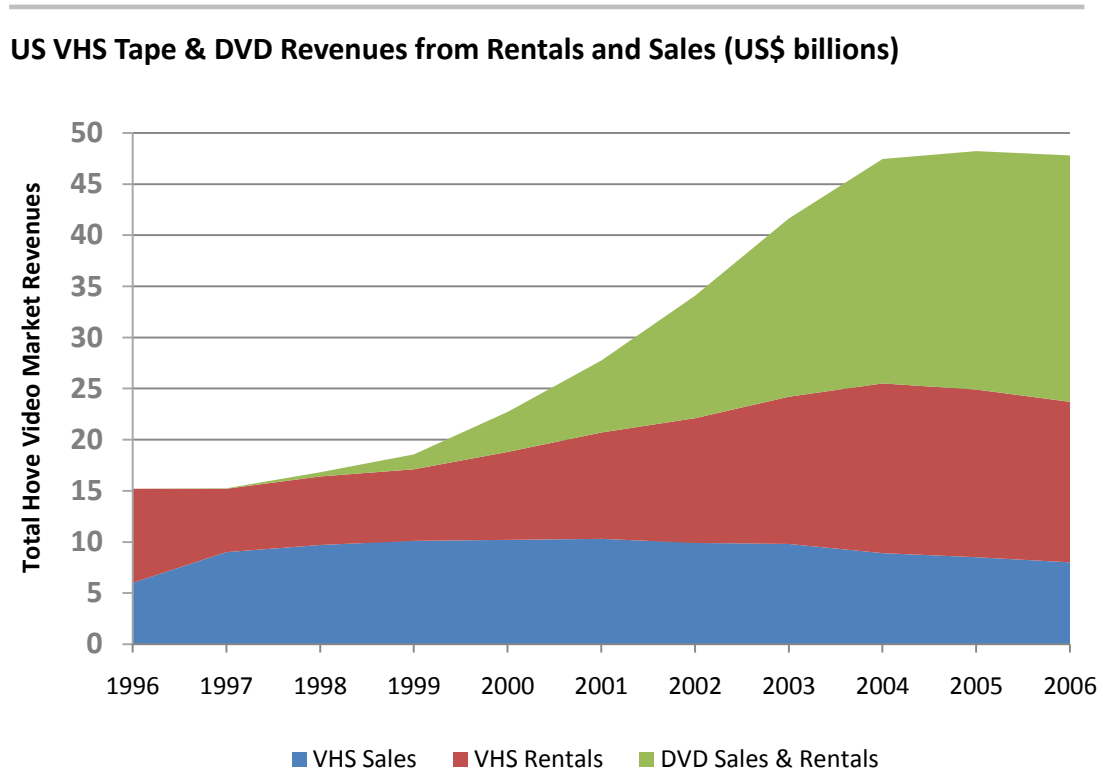


Figure 23: Increase in Total VHS tape & DVD revenues in American homes: 1996-2006

Observable from Figure 23 is that revenues from home video market have slightly decreased from 2005 onwards. In subsequent years it has become even clearer that the DVD market has approached maturity with the emergence of home entertainment modes centred on digital sales and rentals (Currah, 2007).

Table 11 shows that profit margins for studios are potentially much higher for electronic distribution of videos because packaging and distribution costs are now negligible. The Entertainment Merchants Association (2011) reports that spending in the American home video market totalled US\$18.8 billion in 2010 while PricewaterhouseCoopers (2010a) writes that total spending in the home video market globally reached US\$51.1 billion for the same year as displayed in Figure 24:

Global Home Video Market (US\$ millions)

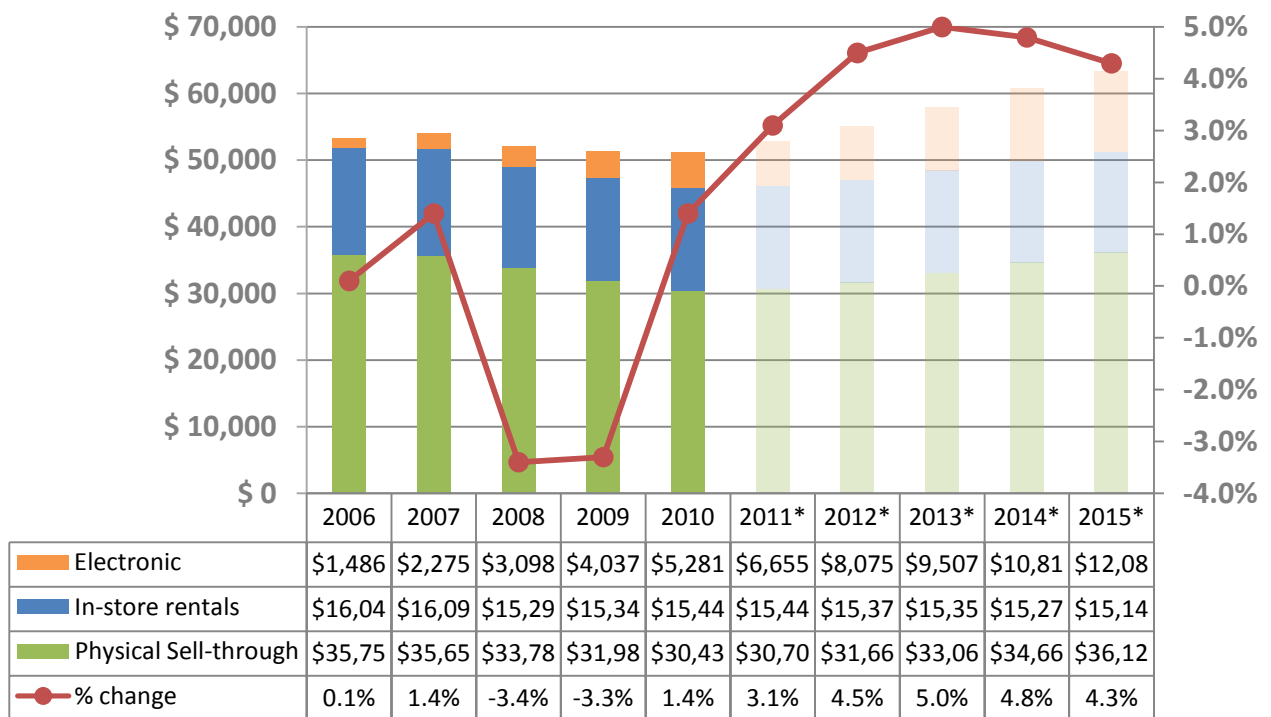


Figure 24: Global Total Home Video Market: 2006-2015 with forecasted 2011-15 CAGR = 4.3%

Even though a slight decline in American expenditure in the home video market has been noticed since the mid-2000s and the importance of video chain retailers somewhat reduced with PPV and VOD becoming more viable internationally, there is no doubt that the ancillary market created through video recording technology has forever altered the income structure of the entire filmed entertainment sector at large, with the home video market

continuing to represent a significantly greater portion of profits for this sector than its primary theatrical market.

Excluding the anticipated positive effect of PPV and VOD technologies from the likes of MultiChoice’s DStv and TopTV in the future, the filmed entertainment sector in South Africa is expected to be a R3 billion industry by 2012 as illustrated in Figure 25, with the home video market contributing well over R1.7 billion to this figure according to the South African division of PricewaterhouseCoopers (2010b and 2011).

South African Filmed Entertainment Sector (R million)

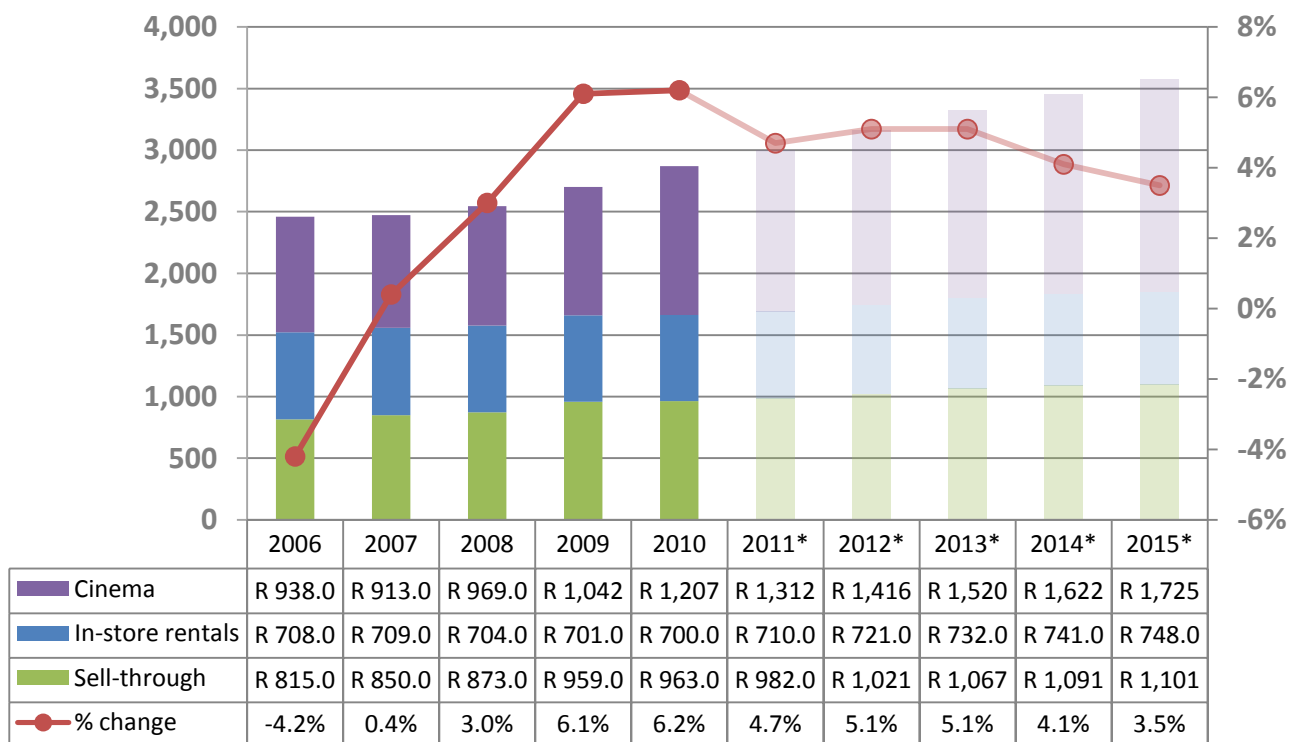


Figure 25: South African Filmed Entertainment Sector: 2006-2015 with forecasted 2011-15 CAGR = 4.5%

5.4 Recorded Music and Filesharing Technology

The 1950s to the 1970s marks a time period during which the recorded music sector saw noteworthy technological innovation. By that time performance rights management agencies like ASCAP and BMI in the USA and SESAC (Society of European Stage Authors and Composers) in Europe had become more stabilised and settled on similar royalty formulae

as each other and 33 1/3 rpm-LPs, invented by CBS during the previous decade, had become popular as an alternative to slower configurations and even radio. Many independent companies joined major recording companies CBS, RCA and Decca as the cost of recording equipment decreased, only to be acquired in the 1960s by these majors then joined by PolyGram and Warner Communication. The smaller independent labels had been instrumental to the introduction of new music genres to mainstream America. Not only did the major recording companies become more powerful by acquiring the small independents but, as was the case with the motion picture sector in the 1930s, they also underwent vertical integration as they became consolidated with record distribution companies. By readily embracing innovations such hi-fi stereo sound recording technology and the portable tape cassette player, the recorded music sector had entered a time of prosperity by the late 1970s. Vogel (2011) notes that industry sales had grown to \$4 billion industry at that time (\$14 billion in 2011) from \$75 million before World War I (\$1 billion in 2011) and \$109 million in 1945 (\$1.3 billion in 2011). When record sales suffered a definite dip in the early-1980s due to scanty quality control of vinyl pressings and an aging population base disinterested in new recordings, it was again the acceptance of a technological invention which reversed the negative trend and inspired entertainment consumers to purchase music: the CD, invented by Philips in 1983 (Rohlf, 2001). These digitally encoded disks provided listeners with a sound which was completely free of distortion and instigated a growth in sales which reached an all-time high of about \$14 billion again in the late-1990s, which translates to approximately \$19 billion in 2011 (Recording Industry Association of America, 2009). However, as mentioned in section 4.4, recording companies became increasingly apprehensive that the controlled yet lucrative business model they employed was being threatened by increasing access to low-cost computers and the digitalisation of music files.

Adapted from Cha and Rajgopal (2004) and CPS (2007), Figure 26 shows how the recorded music sector has traditionally been organised with the entire value chain dependent on the involvement of record labels. Record labels, according to Cha and Rajgopal, maintain extensive Artist and Repertoire (A&R) departments which are tasked with scouting for new musicians and developing their music to production quality. Garage bands are as likely to be signed on as are university graduates in music and, should this happen, record companies

will typically provide artists with a cash advance on performance royalties ranging from \$150 000 to \$1 million depending on how sellable the artist is. In addition to an A&R department, major record labels typically also employ their own manufacturing and distribution functions. CD production equipment and distribution infrastructure, although involving enormous capital expenditure at first, are advantageous for large production runs because of significant economies of scale (2004).

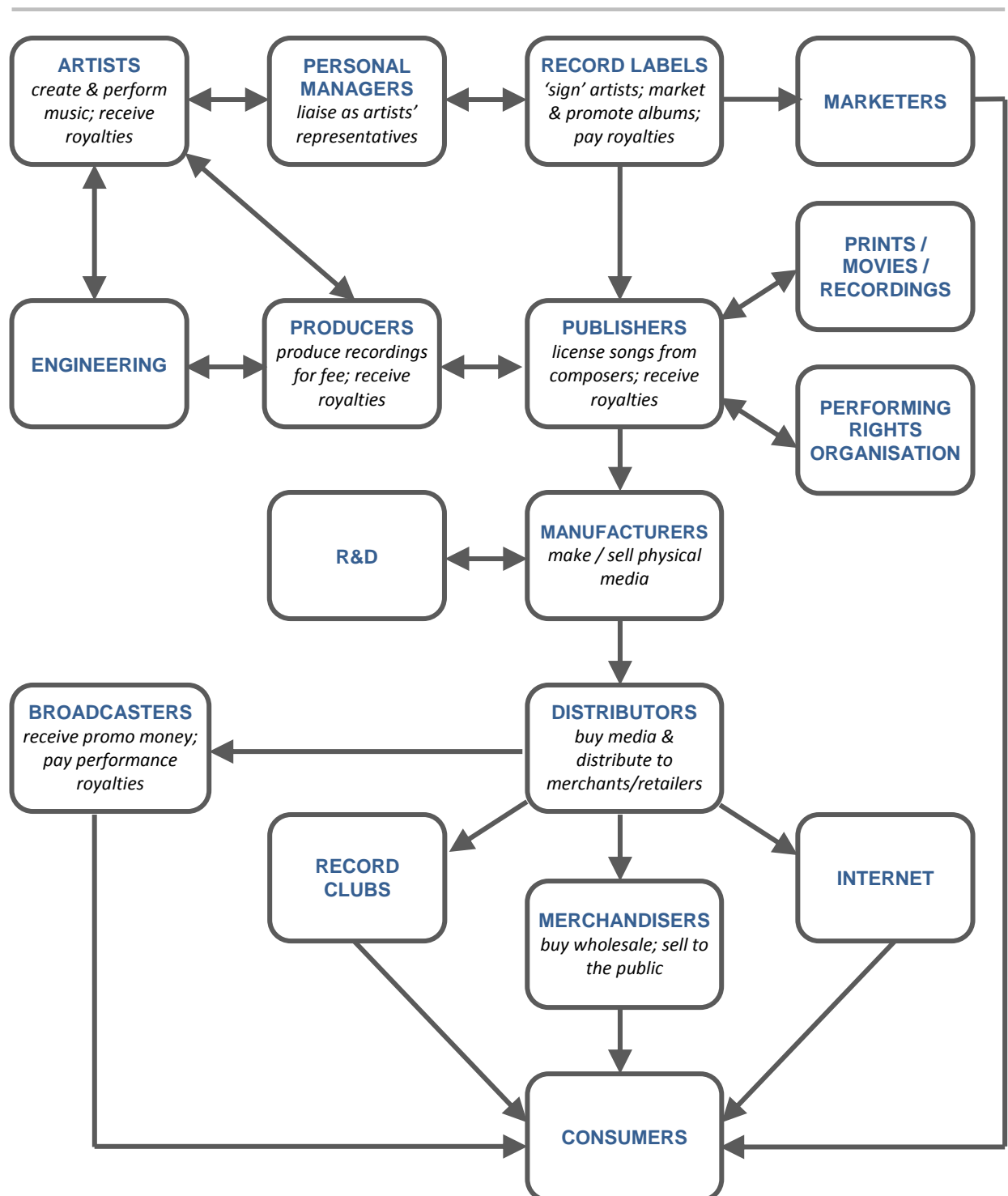


Figure 26: The Traditional Recorded Music Sector Value Chain

Vaccaro and Cohn (2004) summarise the traditional business model of the recorded music industry by stating that it is completely centred on the manufacturing of physical goods (CDs and DVDs) and the distribution thereof via brick-and-mortar stores, record clubs, on-line retailers and at live concerts. The estimated cost breakdown of a “typical” CD as released by a major recording company is displayed in Table 12, adapted from Vogel (2011):

Table 12: Typical economics of a “standard” major record label CD sold for \$15.99, circa 2010

Cost category	US\$	Percentage of Total
Musician’ unions	0.16	1%
Packaging / manufacturing	0.80	5%
Distribution	0.96	6%
Publishing royalties	0.80	5%
Artists’ royalties	1.60	10%
Marketing / promotion	2.40	15%
Label overhead	2.88	18%
Label profit	1.76	11%
Retail overhead	3.84	24%
Retail profit	0.80	5%
Total	15.99	100%

Four chief recording companies, all owned by international conglomerates, currently dominate the recorded music sector, and according to Bhattacharjee *et al.* (2007) these “majors” collectively account for more than 70% of the world music market. They are Universal Music Group, the world’s biggest recording company with a global market share of 25.5% in 2005, Sony Music Entertainment with a 21.5% share, followed by the Electric and Musical Industries (EMI) Group at 13.4% and the Warner Music Group at 11.3% (International Federation of the Phonographic Industry, 2005). Bhattacharjee *et al.* ascribe their influence to the fact that they don’t only exert considerable control when it comes to the recording of music albums but also with the distribution and promotion thereof, having access to strong financial support from their holding companies (2007).

An intricate series of mergers, acquisitions, joint ventures and name changes characterises the global recorded music sector as it transformed into the four majors-dominated industry which it is today, one which the RIAA says “is part of a creative community that collectively exports more than \$125 billion each year” (2011b). Notable shifts in the music industry which led to the establishment of the four major recording companies have been:

- MCA’s acquisition of Decca Records in 1962, and with it, Universal Pictures,
- Decca Records’s name change to MCA Music Entertainment Group in 1990 and then to Universal Music Group in 1996,
- the acquisition of PolyGram by Seagram, Decca Records’s holding company, and its merger with Universal Music Group in 1998,
- the establishment of Vivendi business unit Vivendi Universal Entertainment after the French conglomerate’s acquisition of Universal Studios from Seagram in 2000,
- General Electric’s acquisition of an 80%-share of Vivendi Universal Entertainment in 2004 (excluding its music recording division), leading to the formation of NBC Universal after GE merged its NBC unit with Vivendi Universal Entertainment, with Universal Music Group remaining a subsidiary of Vivendi itself,
- the formation of CBS/Sony Records, a Japanese business JV between CBS and Sony in 1968,
- Sony Corporation of America’s acquisition of CBS Records in 1987 and the resulting name change to Sony Music Entertainment in 1991,
- the establishment of a 50-50 JV between Sony and Bertelsmann Music Group (BMG) in 2004 and Sony’s subsequent acquisition of BMG’s 50% share in Sony BMG in 2008,
- UK-based record label EMI’s acquisition by CitiGroup, an American financial services company, in 2011,
- the 1990-merger between Warner Communications (originally called Warner Bros. Records) and Time Inc. which led to the formation of Time Warner,
- Time Warner’s merger with American ISP AOL in 2000, which led to the establishment of AOL Time Warner, a conglomerate which failed to acquire EMI in the early 2000s,
- the sale of the music division of AOL Time Warner, Warner Music Group, to a group of independent investors in 2004, and

- the acquisition of Warner Music Group by international conglomerate Access Industries in 2011 (NBC Universal, 2011), (Christman, 2011), (The New York Times, 1982).

With the capability of converting audio files into MP3 format and personal computers becoming more ubiquitous to entertainment consumers a new business model in the recorded music sector emerged in the early 2000s with Napster as the first company to utilise it – one which Vaccaro and Cuhn term “the renegade business model” (2004). Based on the illegal sharing of content files over P2P networks, this business model incorporates two kinds of “native Internet” models: freeware and information barter or exchange. Lechner and Hummel (2002) opine that the offering of renegade content services by organisations like Napster, KaZaA and Limewire can legitimately be considered as business models “because of their contribution to economic value in the form of knowledge and content provided by the participants.” As mentioned in Chapter 3, the renegade business model was unsuccessful in ensuring profitability for Napster regardless of its 80-million strong user-base. Offering their content free of charge, other companies which utilise this business model support their endeavours through allowing unwanted advertisements, spam and pop-ups to be linked to their websites. A strong intention usually exists among companies utilising this business model to generate income from users themselves through premium services at a later stage (Vaccaro and Cohn, 2004).

A business model dearth was caused by consumers’ frustration with limitations of the recorded music sector’s traditional business model and the fact that the renegade business model, centred on the development of filesharing technology, mostly operated illegally and prevented the sector from profiting from the creative content it produced. As discussed in detail in Chapter 4, music companies’ reaction to P2P filesharing technology and the renegade business model it operated on was one of protectionist fear, but Choi and Perez (2007) confirm that illegal filesharing has both “directly and indirectly” led to the recorded music sector’s realisation that it requires an improved business model should it satisfy consumers’ entertainment needs. But instead of developing just one ascendant business model which can replace the traditional and renegade business models of the past, Osterwalder (2010) suggests that success for the recorded music sector lies in a

combination of different business models: “While in the past the music industry was characterized by one dominant business model design (the one of the major recording companies), the future will be characterized by multiple competing business models.” Three such propositions may currently be observed:

- An artist-centred business model, in which record labels, agents, A&R departments and expensive manufacturing companies are largely side-stepped because artists promote or manage themselves through their websites or social network profiles, having direct contact with entertainment consumers and possibly choosing to sell their music directly to consumers on-line.
- An application- or platform-based business model, in which music may be purchased in a digital format from specific websites, music applications on smartphones or tablet computers or via platform-specific software.
- A subscription-based business model, which enables entertainment consumers to stream music for a monthly fee without having to actually buy songs – similar to internet radio, except that consumers have the ability to choose playlists themselves and without interruptions by radio presenters.

The popularity and economic success of artist Justin Bieber serves as a case in point which illustrates the viability of the artist-centred business model as opposed to the traditional business model. Bieber gained a massive following in 2008 by posting performances of himself on YouTube and personally connecting with fans, without the consultation and financial aid of a record label or A&R department. He was only signed to a record company in mid-2009 and has since been labelled as “the king of the internet” due to garnering the most celebrity searches on search engines and the most plays of all YouTube videos of all time – 631 million views versus professional artist Lady Gaga’s 417 million as calculated in October 2011 (ReadWriteWeb, 2011b). Even much-derided artist Rebecca Black has managed to benefit from this business model after a YouTube video of hers went viral in early-2011, allowing her to earn at least \$25 000 per week through digital sales (Forbes, 2011). Without agent representation, Black manages herself through her titular website. In conjunction with social network profiles such as those on the abovementioned YouTube, websites like myspace.com/music, iLike.com, last.fm and OurStage.com enable burgeoning artists to connect with and distribute their content to entertainment consumers themselves,

thereby utilising an artist-centred business model. OurStage.com in particular describes itself as an integrative “community for artists hungry for exposure, music lovers with insatiable appetites and industry professionals committed to bringing incredible talent to the people – a digital platform where musicians get discovered (Ourstage, 2011).” As was the case with Justin Bieber, Scheibel (2011) mentions that major record labels now typically explore user generated content for potentially-successful talent, also making the artist-centred business model a beneficial intermediary to the traditional record music business model.

The subscription-based model was the first alternative business model which recording companies started experimenting with in December 2001 after the successful lawsuit against Napster, a tactic which Burgelman and Grove (2007) declare “an inertial strategic response on the part of music companies.” Choi and Perez(2007) substantiate this claim by stating that both PressPlay and MusicNet, the first two subscription offerings presented to entertainment consumers, were flawed due to high initial subscription fees, software not being user-friendly, very limited catalogues of songs and the fact that neither service offered content from all the major record companies, requiring consumers to register for both services if they wanted access to songs from all their favourite artists. However, the predominant reason for the initial failure of this business model was that PressPlay and MusicNet offered their registered members content in file formats which rendered it impossible to be written onto CDs, sent between PCs or even transferred to portable MP3 players.

A business model which has gained traction with recording companies, as it is largely responsible for the 1000% increase in digital music revenues from 2004 to 2010 (International Federation of the Phonographic Industry, 2011), is the application- or platform-based model. Regardless of the fact that it wasn't the very first online digital music store, this business model has been popularised by Apple's iTunes software – the chief motivation behind Burgelman and Grove's branding of Apple as an XBD (2007). According to The Berkman Center for Internet and Society at Harvard Law School, Apple succeed in presenting iTunes to entertainment consumers in 2003 as a sensible alternative to PressPlay and MusicNet because it was the first service which offered content from all the major record labels à la

carte and because no subscription fees were charged (2004). With content priced at \$0.99 per song, speedy access to content via a user-friendly interface which resembles P2P filesharing websites, the convenience of not visiting brick-and-mortar stores to buy CDs and the easy integration between the iTunes Store and a user's iPod, Apple had become the "the pacesetter in the digital music marketplace" with more than 70 million downloads in its first year of operation (The Berkman Center for Internet and Society at Harvard Law School, 2004).

Apple has since 2004 extended its product line by introducing entertainment consumers to its iPhone (smartphone) and iPad (tablet computer) ranges, which also utilise iTunes as a portal for purchasing multimedia content. Adapted from Osterwalder (2010), the platform-based business model which Apple employs to sell its products and grant users access to multimedia content is illustrated in Figure 27:

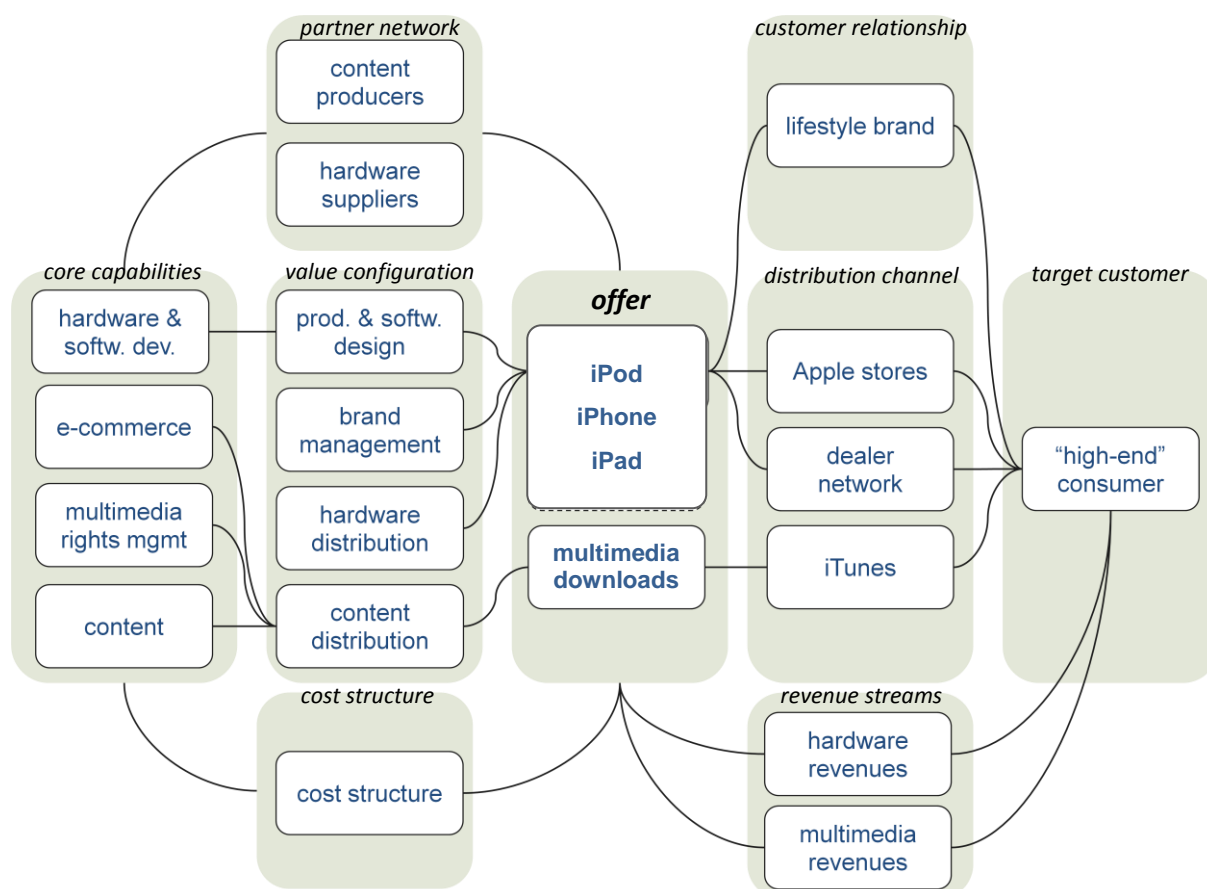


Figure 27: The Apple iTunes Business Model

Apple had invested heavily in R&D, utilised its core competency in software development and ultimately succeeded in entering a *sensation phase* with its iPod and iTunes software whereas offerings by traditional recording companies failed because of its heavy focus on eradicating piracy rather than providing a customer-centred solution to a need for ubiquitous access to content. Choi and Perez (2007) agree that technology companies like Apple have presented legitimate business models which changed the equilibrium of the recorded music sector because they had dared to relinquish industrial silo thinking and converged with other markets and industries. They opine that “companies who understand [the pattern of piracy pioneering new technologies, new market insight and market communities] and take advantage of the innovation offered by piracy have created substantial economic value.” Burgelman and Grove (2007) motivate Apple as a strong substantiation of cross-boundary theory exactly because of these reasons:

- Through studying the underlying reasons why consumers responded frantically to filesharing technology, Steve Jobs, former chief executive of Apple, recognised that the key competence in the recorded music and consumer electronics sectors had shifted to software, whereas hardware like CD players, tape decks and LP players had determined how music would be enjoyed before mass-adoption of the PC. While Sony possessed industrial design and mechanical engineering acumen, Apple was well-acquainted with software design and developed its iPod around iTunes store (and subsequently is iPad around software applications and the iTunes store).
- Apple recognised that for convergence between consumer electronics, computing and the recorded music sector to take place, it had to develop its hardware and software under one roof and ensure that royalties were paid to recording companies. Hardware companies had previously outsourced its software development to other companies, and little collaboration between technology companies and content-delivering companies in the entertainment industry existed.
- Apple focussed heavily on design, ease of use and brand appeal with its products, employing a customer-centric approach to which entertainment consumers have responded well – most of Apple’s products now begin with the letter “i” and have subsequently become commodities in the consumer electronics industry.

In 2011, Apple and its contemporary competitor, Amazon, both rolled out cloud computing services in the form of iCloud and Cloud Drive which enable consumers' content to be stored on virtual servers rather than locally on hard drives, and wirelessly pushes it to all registered devices (Apple Inc., 2011). Cloud computing makes consumers' content ubiquitous on all their devices and eliminates the necessity of uploading one content file multiple times on different platforms as was required in the past, a feat which has led to an increase in MP3 sales, according to ReadWriteWeb (2011a). Along with subscription-based business models, which have since regained popularity in the form of Spotify and Grooveshark – which stream content for a set monthly fee rather than selling downloadable songs one-by-one – digital channels accounted for 29% of total global revenues in the recorded music in 2010 to the equivalent of \$4.6 billion (International Federation of the Phonographic Industry, 2011). As displayed in Figure 28, PricewaterhouseCoopers (2010a) rates the contribution of digital channels even higher at \$7.1 billion or 30.7% of total global revenues:

Global Recorded Music Sector (US\$ million)

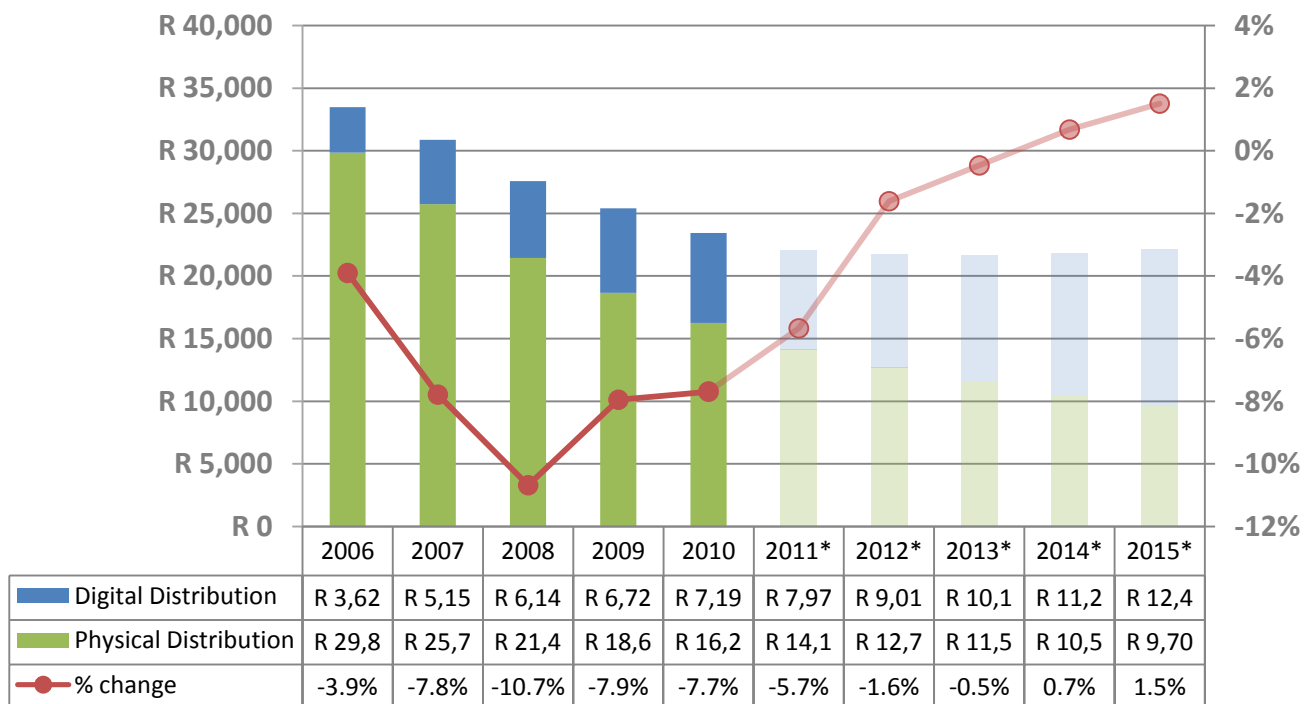


Figure 28: Global Recorded Music Sector: 2006-2015 with forecasted 2011-15 CAGR = -1.1%

A study of the South African recorded music sector reveal a similar trend of decreasing record sales as is the case worldwide, but with a 187% growth of digital sales from 2006 to 2010 and a further forecasted growth of 25.4% between 2011 and 2015, PricewaterhouseCoopers (2011) predicts that the sale of digital albums will offset the decline in physical spending by 2015. Figure 29 exhibits the decline and projected growth of the South African recorded music sector from 2006 to 2015:

South African Recorded Music Sector (R million)

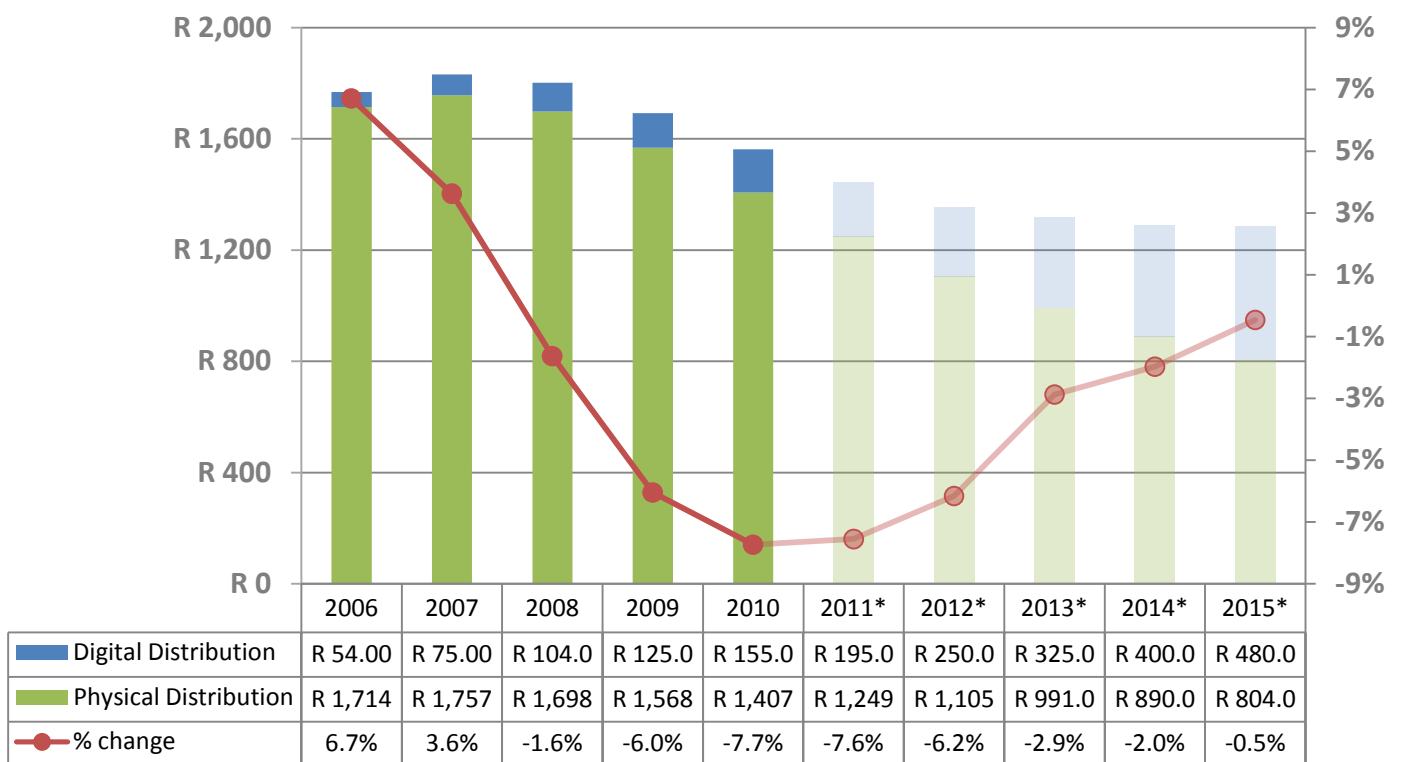


Figure 29: South African Recorded Music Sector: 2006-2015 with forecasted 2011-15 CAGR = 0.1%

5.5 Internet Penetration in South Africa

Technology adoption of the Internet in South Africa, as the vehicle for digital distribution, has taken place at a much slower pace than elsewhere due to infrastructure constraints and the socio-economic profile of the country. Figure 30 displays the estimated Internet usage in South Africa from 2000 to 2010, including a forecast for 2011, according to Internet World Stats (2009), World Wide Worx (2010) and PricewaterhouseCoopers (2011):

Internet Adoption in South Africa (millions)

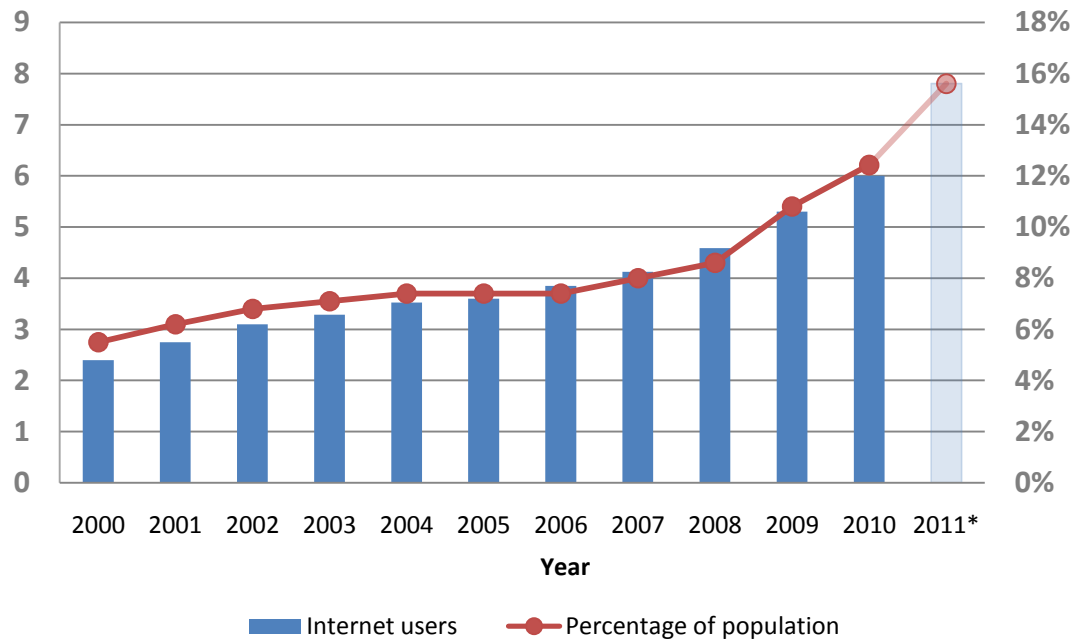


Figure 30: The Internet in South Africa: Absolute Number of Users and Household Penetration: 2000-2011

World Wide Worx (2010) states that the following factors elicited growth in Internet adoption in South Africa between 2007 and 2010:

- The installation of the Seacom major undersea cable along South Africa’s coastline in 2009: Fibre-optic capacity in South Africa is almost 300 times greater post-Seacom.
- License grants: More than 400 South African enterprises have been granted licenses from the Electronic Communications Network Service in this time, enabling Internet service providers to construct their own networks and to choose between a range of providers and rather than being dependent on acquiring network access from just one of the major telecommunications companies. Services provided by telecommunication companies are now customised and repackaged by smaller service providers according to individual specifications, prompting traditional providers to reduce prices on their services thus creating a more competitive.
- Broadband penetration: Many small and medium enterprises are exchanging outdated dial-up modems for internet connections via broadband. In South Africa, a

broadband connection is officially defined as “an always available, multimedia connection with a download speed of at least 256kbps (Vermeulen, 2011).” Internet access is being extended to more employees than just managers and in the process the Internet user base increases with 20 people for every one migration from a dial-up connection.

An additional four factors will contribute to exponential Internet penetration in South Africa in the coming years, enabling not only greater access to media and entertainment content, but also giving consumers the opportunity to connect with each other via social networks and providing them with the technology to share local content:

- 100% Broadband penetration in South Africa: South Africa’s Department of Communication has recently promised to provide access to broadband Internet for all South Africans by 2020, an ambitious endeavour which will lead to the creation of 1 million ICT jobs, according to the Department’s roll-out plan, and broadband coverage for the entire South African population (Vermeulen, 2011).
- The ubiquity and accessibility of cellular telephones which have the Internet connectivity: There are currently 47.5 million mobile telephone subscribers in South Africa. Spending on mobile Internet access will increase from R7.8 billion in 2010 to R22.5 billion in 2015, with 17.5 million South Africans expected to have mobile broadband Internet access, according to forecasts from PricewaterhouseCoopers (2011). Users with Internet access via their cellular telephones will represent 77% of total Internet users in South Africa by 2015.
- Convergence between technology companies and television content companies in South Africa: The South African government plans to switch from analogue to digital terrestrial television (DTT) by 2013, an act which will enable television audiences to access VOD services more easily and to connect to social network sites like Facebook and YouTube via their televisions through offerings from SouthTel, DStv, TopTV and the SABC itself, according to PricewaterhouseCoopers (2011) and Beach (2011).

- Increasing connection speeds and broadband capacity in South Africa as well as the rest of Africa: As displayed in Figure 31, the average connection speed in South Africa has nearly doubled between 2007 and 2011 (Muller, 2011). The abovementioned 1.28 Terabits per second (Tb/s) Seacom cable, along with other planned undersea cables which will be installed around Africa in the future, are displayed in Figure 32. The thickness of the lines in Figure 32 represents the capacities of these different cables which enable Internet Access to Africa, relative to one another. The West Africa Cable System (WACS) specifically, installed in 2011 but ready for commercial use only in 2012, has a capacity of 5.2 Tb/s, and will supply more broadband capacity to South Africa than the capacity of all currently-installed undersea fibre-optic cables combined. According to Song (2011), the Africa Coast to Europe (ACE) cable system will enhance broadband capacity in South Africa with the same capacity as WACS by the end of 2012, and that the planned installation of South Atlantic Express (SAex) cable system between South Africa, Angola and Brazil could enhance capacity with an additional 12.8 Tb/s.

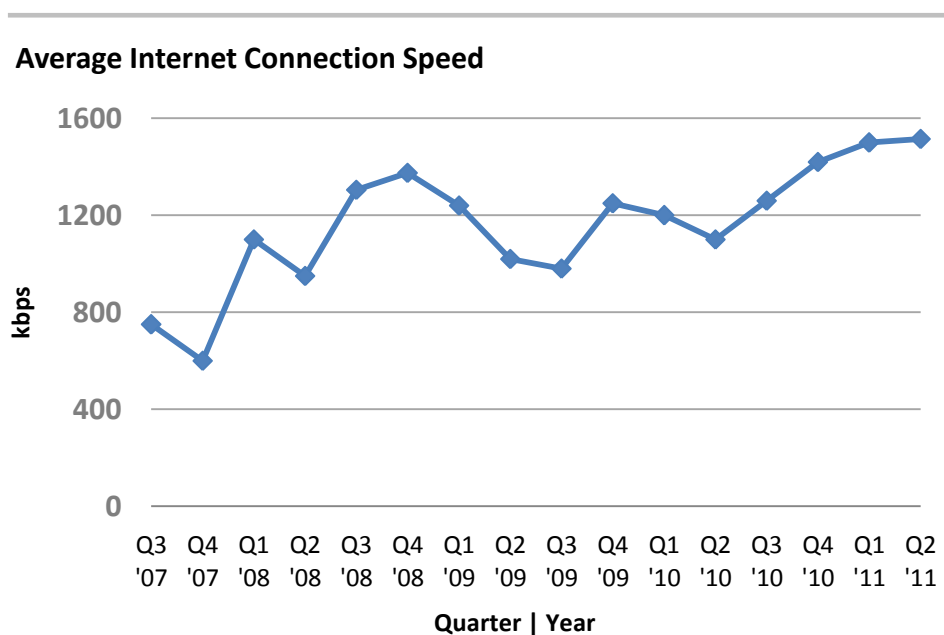


Figure 31: Increase in South African Internet Connection Speed: 2007-2011

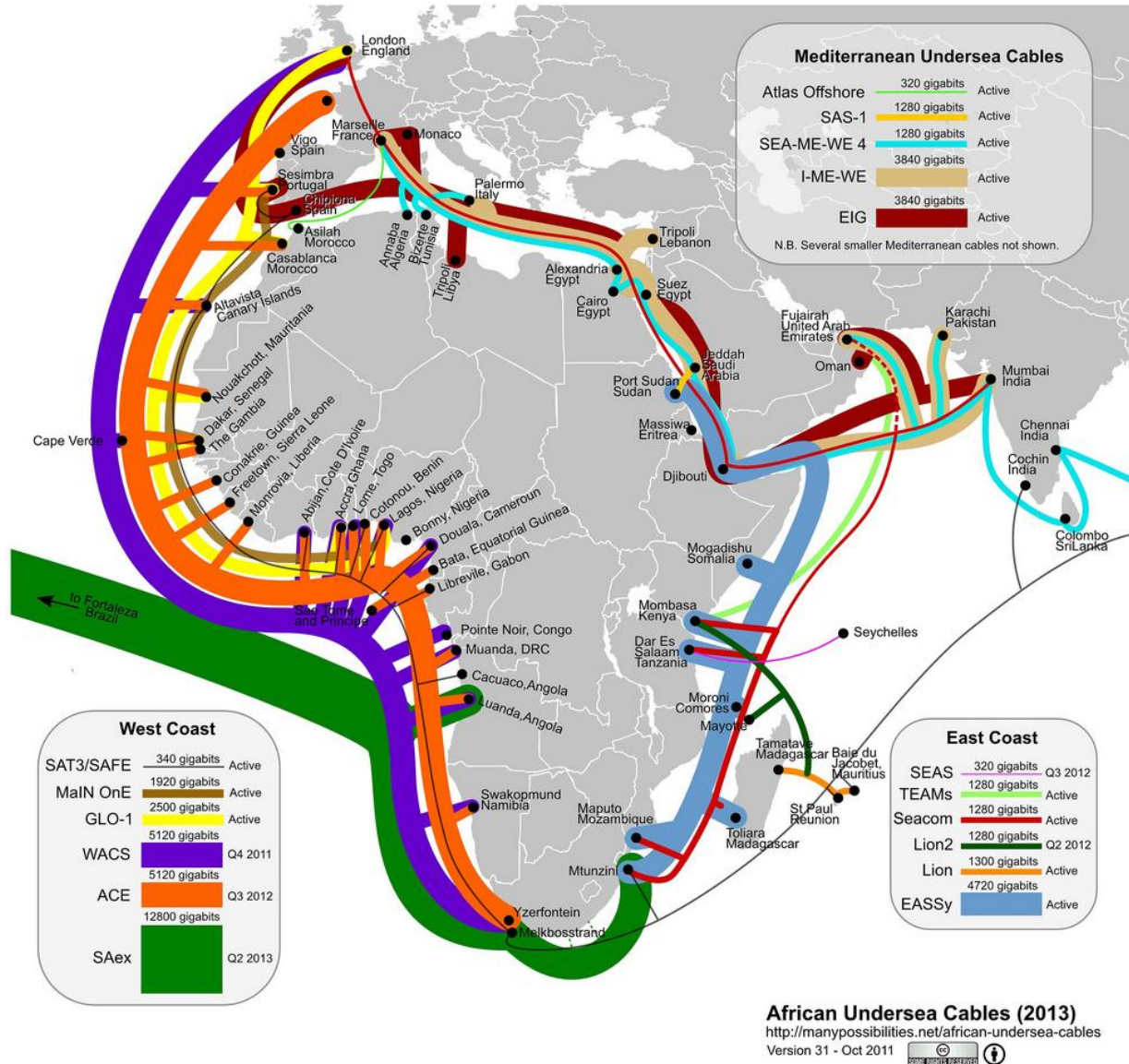


Figure 32: Undersea Fibre-Optic Cables Providing Internet Access to Africa, adapted from Song (2011)

5.6 Chapter Conclusion

Although piracy has not been completely eradicated yet, it is clear that collaboration, rather than contention, between technology companies and entertainment companies have yielded economic value and innovative ways of distributing media content which would otherwise not have been feasible. As a discernable period in the process of technological change in the media and entertainment industry, the *sensation phase* described in this chapter occurred whenever organisations embraced disruptive innovations as complements and adopted new business models to incorporate these new technologies, rather than trying to outlaw their use through the legal system – which was often the case, as described

in previous chapters. Explored by this chapter, specific factors have contributed to continued organisational prosperity whenever new technologies have threatened the sustainability of incumbent companies and entertainment sectors:

- A definite customer-focus: Radio, television, the VCR and the Internet all enjoyed speedy adoption by entertainment consumers regardless of musicians' representative ASCAP's aversion towards radio, movie studios' fear that television and Sony's Betamax VCR would destroy adversely affect their profitability and entertainment companies' attempts to render filesharing technology illegal. Entertainment consumers have always dictated the way in which they wanted to enjoy content, whether it was through legal or illegal means, and the companies discussed in this chapter which achieved success were those who adapted their business models according to the requirements of their customers. Burgeoning social media sites have even increased the ability for content creators to engage with their consumers, and have led to success of such artists as Justin Bieber and television talent show winners.
- Good or quality content: Even with more media options available, incumbent firms have almost always enjoyed success with their traditional business models when they offered quality content. Excluding ancillary markets, *The Lion King* and *Finding Nemo* still made \$930.9 million and \$867.9 million respectively through theatre ticket sales alone. Live performances continue to make money even after the inception of radio broadcasting, and the radio broadcasting sector has survived the introduction of physical music devices – still the sector with the highest profit margin due to its effectiveness as advertising medium. Artists Eminem and Lady Gaga still sold 2.5 million and 1.2 million copies of their newest CDs respectively in 2010, in contrast with full album sales of 852 000 and 884 000 copies of the same albums in digital format for the same year and excluding individual song downloads. Especially utilised by independent musicians, vinyl LP sales have actually increased to 2.8 million between 2008 and 2010 as a niche market of music consumers realised certain content plays better in that format than on digital devices (Nielsen SoundScan, 2011). Even with the threat of piracy, TV shows like *American Idol* and *Two and a Half Men* still drew 25 million and 14.8 million viewers per episode in

2009/10, enabling the shows to make \$32.4 million per 2-hour episode and \$3.1 million per 30-minute episode respectively (Forbes, 2010).

- A willingness to alter organisational structures and business models: Some radio broadcasters, one of which is South Africa's RSG, have adapted their business models to include the Internet as an additional distribution channel. As Currah (2007) writes, the entire filmed entertainment sector has been altered with the acknowledgement of television and video disk as enablers of viable ancillary markets. The increased conglomeration of this sector since the inception of these two innovations testifies of, among other things, film studios' willingness to alter their organisational structures after they had recognised the possibility of new revenue streams in TV and the VCR.
- Entrepreneurial ingenuity: BMI, Matsushita, RCA, Apple, Netflix and Redbox may all be described as cross-boundary disruptors in that it was their entrepreneurial ingenuity which not only created new entertainment markets or altered sector structures, but also led the way for incumbent companies to eventually adopt the new technologies and alter their business models to ensure sustained success along with them.
- Convergence between media content and technology companies: Straubhaar, Larose and Davenport (2011) describe convergence in the context of entertainment as the "integration of mass media, computers, and telecommunications". Collaboration between musicians, advertising agencies and radio broadcasters, and recently the Internet, has led to the creation of new markets and additional distribution channels for music. Farnsworth's cathode ray picture tube technology has made way for LCD television screens originally designed for personal computers and MP3 players utilise hard drives, computer software and on-line stores to enhance the portable enjoyment of music. Partnerships between record labels, film studios and technology companies like Apple, Google and Netflix have enabled digital audio and video content to be sold over the Internet and played on PCs, tablets, MP3/MP4 players, cellular telephones and television screens from one file, whereas content was previously restricted to particular platforms such as tape decks, CD players or television. Digitalisation from the 2000s onwards has especially enabled different

formats of content to be converted from analogue signals or film format into one which can be enjoyed on multiple platforms.

A definite focus on entertainment consumers' preferred ways of enjoying content, a sustained commitment to delivering quality content regardless of distribution channels, adaptability of organisational structures and business models, entrepreneurial ingenuity and a willingness to collaborate outside of enterprise and industry structures are all markings of the disruptive innovations which have transpired through a *sensation phase* of technological change. Growing Internet penetration and subsequent connectedness with the rest of the world especially through the ubiquity of cellular phones will enable South Africa and Africa to not only access digital content but also opportunity to employ the success factors identified in this phase of technological change. As a growing driver of spending in the media and entertainment industry as well as an enabler of inter-industry and intra-industry collaboration, the Internet will continue to affect business models in every sector in the media and entertainment industry as well as the way in which entertainment consumers and content producers engage with each other.

6. Conclusion

“If the artistic and historical development of film and television are to be understood, then so must the peculiar marriage of art and technology which prevails in their operation. It is the involvement of twentieth-century technology which renders these media so unlike the other, older arts.”

– *Raymond Fielding, Society of Motion Picture and Television Engineers*

This chapter provides a summarised overview of disruptive innovation management in the media and entertainment industry as documented by this study and suggests some possibilities for future research pertaining to this industry in the engineering management field.

6.1 Document Overview

In its Industrial Policy Action Plan composed for the period of 2010/11 to 2012/13, the South African Department of Trade and Industry (2010) identified the media and entertainment industry as a strategic sector in our country because of its growing contribution to economic development through both local and foreign investments, export opportunities and job creation potential, as well as the significant spill-over possibilities in industries like tourism and retail usually associated with emergent industries. Although listed as one of the sectors which can expect focussed development and broadened intervention from the government in the future, a lack of research and development is one of the notable constraints to ensuring the sustainability and competitiveness of local cultural industries. It is this deficiency and opportunity which this study seeks to address directly by means of a historical examination of disruptive innovations in the global media and entertainment industry, from a strategic and industry-level point of view, thereby providing a preparatory foundation for future research which will hopefully ensure a sustainable and competitive local industry. Justifying analysis on an industry-level, empirical research by McGahan and Porter (1997) revealed that industry effects account for more than 60% of profit variance in the Entertainment and Lodging economic sector.

As Crowston and Myers (2004) suggest, industry analyses may be conducted from three research perspectives: *economic*, *institutional* and *social/cultural*. By focusing on the structure of entertainment markets, products sold or services rendered by organisations in this industry, industry configuration, consumers and transactions between consumers and media firms, an economic research perspective was adopted by this study and economic data such as number of transactions, costs and profits utilised to execute this. Legal documents, court decisions and interpretations in academic journals were used to also study the media and entertainment industry from an institutional research perspective with the aim of providing insight on the regulatory frameworks which govern this industry and the organisations which regulate or constrain interactions with consumers and each other. This study also alluded to the organisational norms, beliefs and networks among entertainment companies resulting from technological change by utilising industry outlooks and expert opinions. These research approaches enabled the author to study several characteristics of industry transformation: structural changes in entertainment markets, changes in regulatory frameworks, changes in institutional arrangements and processes, as well as changes in social cultures and relations.

Several research questions were employed and answered throughout this document to achieve the objective of this study:

- **Why is technology management an organisational necessity?**

In their book *Technology Management: Text and International Cases*, Harrison and Samson (2002) write that technology has become the chief attribute of competitiveness in the recent business context and predicted that it will probably become even more pervasive in the future, stating that “technology management is the ultimate battleground that will determine which companies and owners will be the winners and losers in the wealth creation game.” In this pursuit of creating value in the enterprise, Grant (2008) points to the vital importance of strategy implementation and organisations’ ability to provide an answer to one fundamental question pertaining to technology management: “How can a company create the conditions for nurturing innovation while planning the course of its development?” Based on a review of academic literature focusing on technological innovation as well as a range of case studies of organisations in a technology-based industry,

then, it has become clear that technology management has become an organisational necessity because of its vital role in firm competitiveness, and that it has to be integrated with a firm's overall strategy, its organisational structure and the business models employed to sell its products and services to ensure value creation. Successful technology strategies require responsiveness towards changing market conditions as well clear direction from top-level management as to how new technologies will be commercialised, as well as how a company's structure will enable effective innovation management rather than inhibit it (Burgelman, Christensen and Wheelwright, 2008). This answer was expounded in this document in section 2.1.

- **What is a disruptive innovation, and how are organisations in the media and entertainment industry affected by technologies of such a nature?**

Discussed in detail and in context in section 2.2, a disruptive innovation may be defined as an innovation which helps to create a new value network, industry structure or consumer market, and eventually alters current markets or disrupts incumbent organisations by displacing existing technologies, although not necessarily rendering them extinct. In its simplest sense "disruption... is a theory of innovation—of how particular types of new products and services, or 'solutions,' come to achieve success or dominance in markets, often at the expense of incumbent providers", albeit initially designed for a different set of consumers or perceived as technologically inferior (Raynor, 2011). Disruptive innovations are contrasted with sustaining innovations, which evolve existing markets with better value through continuous or discontinuous product and process improvements, but are unable to create entirely new markets (Christensen, 1997). Chapter 4 in this thesis argued that incumbent organisations' response to disruptive innovations is usually one of trepidation, a reaction which has led to legal battles and subsequent contention between technology and media content companies in the past. This contention, resulting from a resistance to technological change and subsequent business model adaptation among top-level management in entertainment companies, aggravates consumers and present lush opportunity for cross-boundary disruptors to provide alternative products and services more aligned to consumer needs. Cross-boundary disruptors are capable of altering entire industry structures and may render incumbent companies superfluous, a phenomenon which was described in greater detail in sections 2.2 and 4.5.

- **What is the origin of the modern-day media and entertainment industry and which sectors officially constitute it?**

The modern-day global media and entertainment industry is founded on products and services which divert, amuse or cause consumers' time to pass agreeably, possibly even on a mass scale. Vogel (2011) added that, more than just amusing or diverting one's attention from work, offerings from the media and entertainment industry ultimately lead to "a satisfied and happy psychological state" through either active or passive means. The media and entertainment industry, consequently, are those groups of companies which engage in commercial activities with that aim of providing consumers with contented psychological states. Excluding printed media, modern-day mass media, then, finds its origin in Guglielmo Marconi's use of wireless telegraphy technology in the late-1890s and the Wireless Telegraph and Signal Company which he established while still only 23 years old. Although not the first to transmit audio content over the airwaves, the wireless telegraph was the foundational technology of radio as we enjoy it today. Reginald A. Fessenden was the first inventor which succeeded in transmitting audio content over radio in the form of a Handel aria and some violin music in 1906. The origin of radio, recorded music, cinema, television, video recorders and filesharing technology are recounted in sections 2.4, 2.5, 2.6, 2.7, 2.8 and 2.9 respectively. Mentioned in section 2.3 of this document, the sectors which constitute the media and entertainment industry today can be grouped into two segments: media-dependent entertainment (movies, television broadcasting, music, radio broadcasting, cable television, publishing, toys, games and video games) and live entertainment (gaming and wagering, sports, performing arts and culture, amusement parks and theme parks), although the different forms of live entertainment now often include media-dependent entertainment as part of their offerings.

- **Knowing that technology brings about change, in which ways has technological change impacted the media and entertainment industry historically?**

Examined during the course of chapters 2, 3, 4 and 5, technological change has profoundly affected the media and entertainment industry. The commercialisation of new technologies since the late 1800s have made it easier and less expensive to manufacture, distribute, exhibit and exchange entertainment products and services. Some new innovations not only

impacted the manner in which incumbent companies conducted business and produced their offerings, but also led to the establishment of entirely new sectors or ancillary markets, as was the case with radio, recorded music, cinema, television, the VTR and filesharing technologies. Although disrupted, older sectors have rarely been rendered completely extinct by new platforms due to their popularity, the adoption of new business models and because of their inherent benefits, as was described of radio in section 5.1. Expounded in section 5.3, ancillary markets have, subsequent to their acceptance as legitimate media sectors, often provided disproportionately large returns or ensured profitability of entertainment products, as seen in the case of *The Lion King* in the introduction to chapter 5. The oligopolistic structures of the film entertainment and recorded music sectors and their constitutive conglomerates listed in sections 5.2 and 5.4 point to the significant cost of capital as a barrier to entry for companies wanting to enter entertainment markets, an observation attributed to the constant necessity of technological development – *Jurassic Park* is one example of an entertainment product mentioned in sections 5.2 which could not be produced without the most up-to-date technology in 1993, while the use of 1993's production technologies would seem laughable today. The spatial and temporal structures of film and music release windows have also been affected by technological change and the tidal wave of piracy enabled by electronic copying devices and digitalisation. Enabled by new technologies, piracy has been discussed in detail in sections 2.9, 3.6 and 4.4, while Figure 33 illustrates the effect of digitalisation on movie release windows – technology has enabled entertainment offerings to be more readily available to consumers than before as reflected by the fact that release windows for films on specific platforms are shorter and occur earlier than in the past. Specific forces like digitalisation, the Internet, exponentially increasing computing power and the proliferation of networking capabilities have made two other phenomena possible: the ability to watch standardised digital content on various devices, not requiring the use of file conversion software, and the ability for entertainment consumers to participate in content creation, blurring the lines between 'producer' and 'consumer' as they are traditionally defined. The success of reality television talent shows, offerings by Hulu and Netflix and the availability of Apple's iCloud service for the iPod, iPad and Macbook portable computer are some of the examples which were referred to in sections 4.5 and 5.4 as substantiation of this last-mentioned observation.

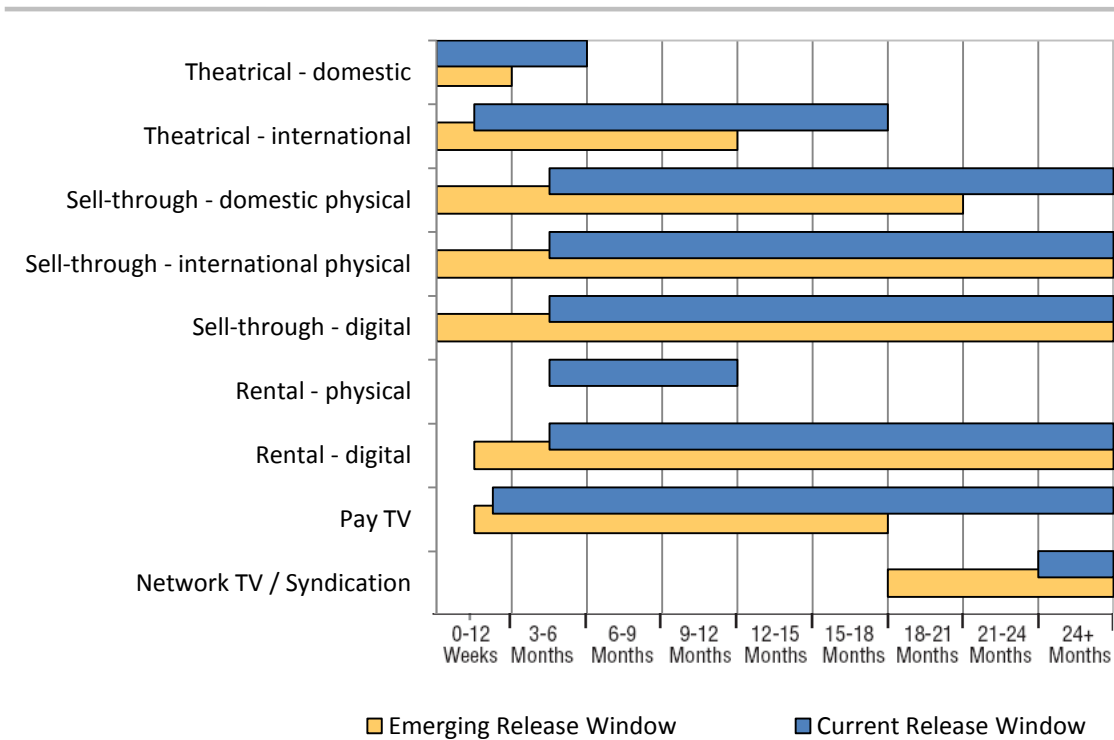


Figure 33: The Effect of Digital Platforms on Movie Release Windows, adapted from IBM Business Consulting Services (2005)

- **What structural changes have media markets undergone in terms of costs, profit, number of transactions and legal frameworks as the result of disruptive innovations?**

Combining Meza's concept of the 'Road to Prosperity' (2007) and Burgelman and Grove's theory of the cross-boundary disruptor's effect on incumbent industries (2007), this study showed that disruptive innovations have impacted the different sectors in the media and entertainment industry in a very distinct manner, as simplistically illustrated by the process flow diagram in Figure 34. Hypotheses on media companies' reaction to disruptive innovations were stated in the opening arguments of each chapter as deduced from various case studies on organisations in multiple entertainment sectors: Following the invention of the disruptive technologies described in Chapter 2, a chasm challenge as identified by Moore (1991) had to be undertaken by each of the organisations that wanted to commercialise those technologies. The leveraging of positive network externalities ultimately determined organisations' success or failure at commercialising their entertainment offerings and their ability to excel beyond the *innovation phase* into an

ascension phase, as discussed in Chapter 3. However, as new technologies emerged, incumbent organisations and even entire entertainment sectors displayed a reaction of fear, especially of piracy and revenue-loss, resulting in a *contention phase* as expounded in Chapter 4. The protectionist fear and misdirected tactics employed by incumbents when confronted with potentially-disruptive technologies often allows opportunity for organisations which exhibit some of the cross-boundary disruptor characteristics mentioned in section 2.2 (Burgelman and Grove, 2007) to realise the opportunities actually presented by these new technologies and eventually alter the industry structure of existing entertainment sectors. Several incidences of legal action ensued as a result of entertainment companies' fear and failure to recognise the potential of new technological innovations, with entertainment consumers' needs often ignored during times of intra-industry and inter-industry conflict. Significant antitrust regulations, legal frameworks and market changes in terms of costs and profit have been examined in section 3.3, Chapter 4 and Chapter 5 respectively, and it was observed that the laws which have impacted the industry most notably are the Copyright Acts of 1909 and 1976, the Sonny Bono Copyright Term Extension Act of 1998, the Digital Millennium Copyright Act of 1998 and the Consumer Broadband and Television Act of 2002. Organisations which recognised the benefit of close collaboration and convergence between companies in different media sectors as well as with technology companies were able to transcend the *contention phase* and enter a *sensation phase* through the adaptation of old business models which cater to entertainment consumer requirements.

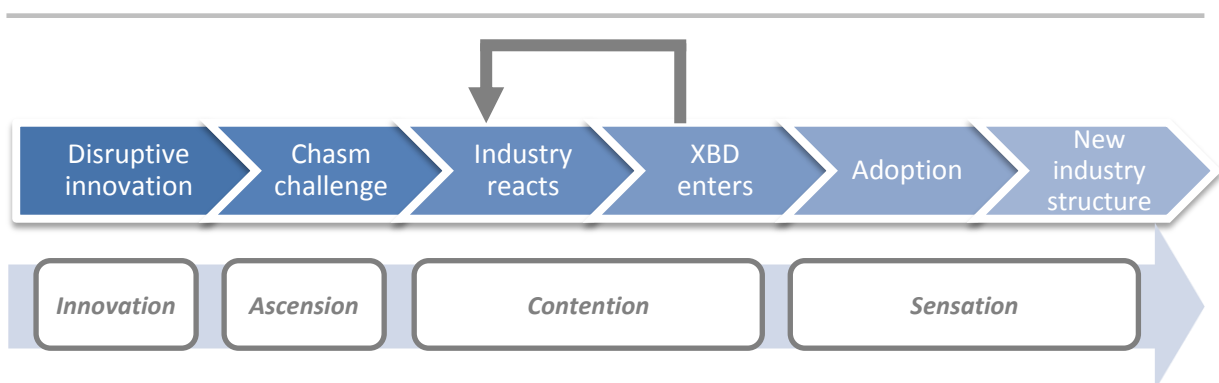


Figure 34: How Technological Change Propagates Through an Industry

- **Why did certain innovations succeed as entertainment offerings while other innovations, some even exhibiting superior capability, failed to gain adoption?**

Specific success factors were hypothesised and stated in the concluding paragraphs of each chapter of this document, as deduced from various case studies on organisations such as Marconi's companies, Westinghouse and GE in radio broadcasting, AT&T, the Victor Talking Machine Company and MCA in recorded music, Famous Players-Lasky, Paramount Pictures and Pixar in film, RCA, NBC and CBS in radio, recorded music and television and Napster, BitTorrent and Apple as Internet-based companies which utilise filesharing technology. Some of the insights gained through studying companies which failed to gain adoption, or conversely, successfully navigated through each of the phases of technological change as illustrated in Figure 34 are: disruptive innovations do not necessarily originate from clever start-ups, but also from existing organisations with prolific R&D departments or flat organisational structures, as well as from academia; successful disruptive innovations were not necessarily superior or even entirely-new technologies, but materialised through a combination of existing technologies offering new features; collaboration between different inventors increased the possibility of success of a disruptive innovation; continuous technology development was prevalent in the companies which commercialised disruptive innovations; an increase in complementary services and inter-industry attraction favourably affected technology adoption; companies which exhibited Burgelman and Grove's XBD characteristics (2007), such as having a growth-oriented strategy or possessing an established customer-base in its domestic industry, were more prone to commercialising innovations which disrupted existing entertainment sectors; fighting new innovations through litigation and regulation has historically only had one effect: aggravation and alienation of existing consumer markets; a definite focus on entertainment consumers' preferred ways of enjoying content and a sustained commitment to delivering quality content regardless of distribution channels marked companies which successfully commercialised disruptive innovations; companies which were willing to adapt their organisational structures and business models and collaborate outside of enterprise and industry structures followed XBDs to success, even after initial trepidation towards new technologies.

- **What is industry convergence, which forces in entertainment organisations shape and contribute to this convergence, and how has it affected this particular industry?**

Defined in section 5.6 but investigated throughout chapter 5 in its entirety, convergence between media content and technology companies may be described simplistically as the “integration of mass media, computers, and telecommunications” (Straubhaar, Larose and Davenport, 2011). Another type of convergence observed in this industry is one between content producers and consumers, as examined in the YouTube and American Idols case studies and successfully exploited by video game companies (Arakji and Lang, 2007). Some forces which contribute to convergence are inter-industry and intra-industry partnerships, continuous technological innovation, open content reserves, transparent production processes, customer interaction and adaptable sales strategies and business models, as observed in the Apple case study in section 5.4. Collaboration between musicians, advertising agencies and radio broadcasters, and recently the Internet, has led to the creation of new markets and additional distribution channels for music. Farnsworth’s cathode ray picture tube technology has made way for LCD television screens originally designed for personal computers and MP3 players utilise hard drives, computer software and on-line stores to enhance the portable enjoyment of music. Partnerships between record labels, film studios and technology companies like Apple, Google and Netflix have enabled digital audio and video content to be sold over the Internet and played on PCs, tablets, MP3/MP4 players, cellular telephones and television screens from one file, whereas content was previously restricted to particular platforms such as tape decks, CD players or television. Digitalisation has especially enabled different formats of content to be converted from analogue signals or film format into one which can be enjoyed on multiple platforms. Adapted from IBM Business Consulting Services (2005), Figure 35 illustrates the effect which convergence between media content companies and technology companies, as well as convergence between content producers and consumers, has had on the nature of media and entertainment industry as a whole:

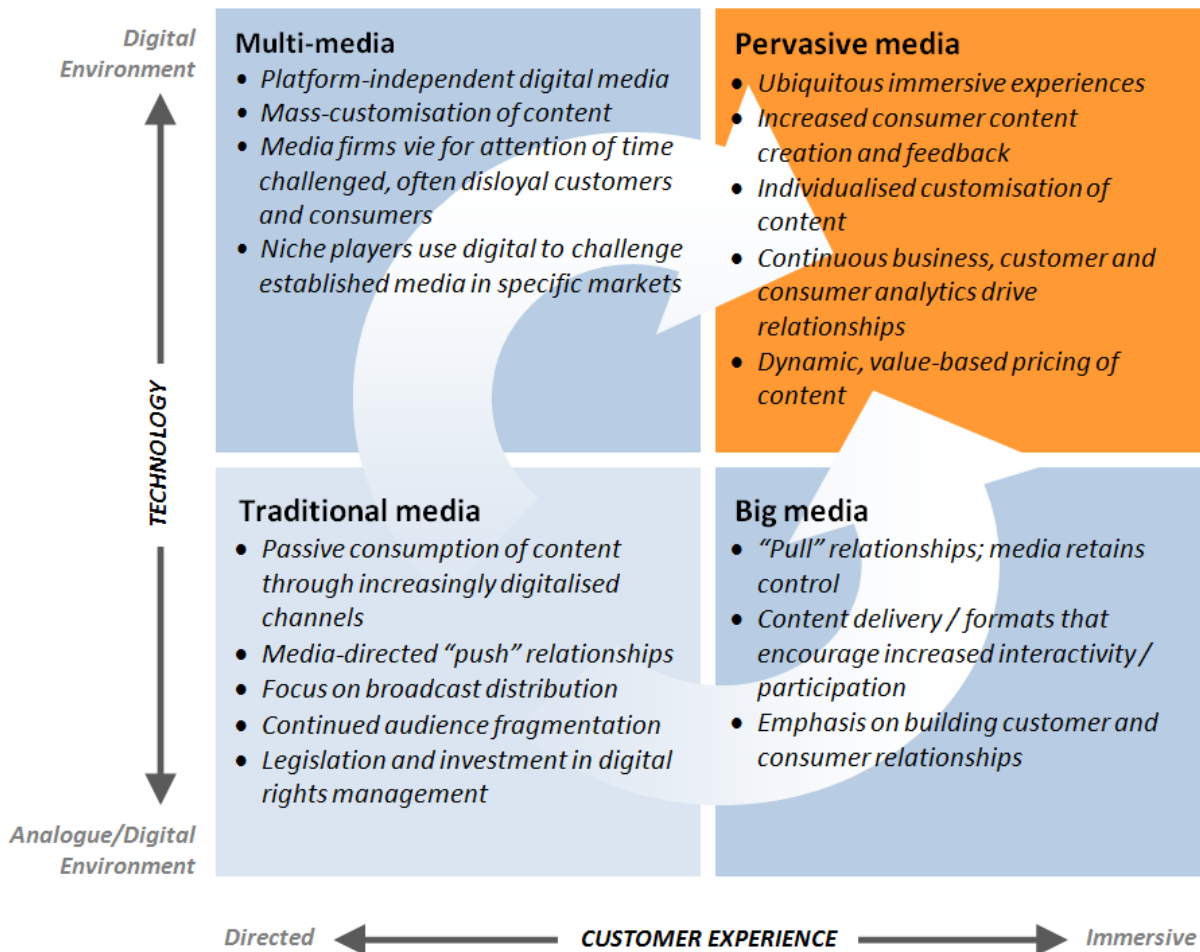


Figure 35: The Transition of Traditional Media to Pervasive Media as a Result of Industry Convergence

- **What contribution does an academic study on entertainment history make to aid with technology management today and in the future?**

Amidst the ubiquity of academic literature and research studies on the topic of technological innovation and technology management since the mid-1930s, organisations in the media and entertainment industry have enjoyed comparatively less academic scrutiny than their counterparts in the Manufacturing industry, Mining, Agriculture and Services sectors, in spite of the fact that they collectively constitute an industry which boasts global expenditure of one trillion US dollars annually (Vogel, 2011). The media and entertainment industry in South Africa boasts consumer spending of R100 billion per annum and is predicted to grow steadily at 7.4% per year for the next 5 years according to PricewaterhouseCoopers (2011). Yet regardless of the notable size of the South African and global industries, and as hypothesised by this thesis, history has indeed repeated itself

pertaining to entertainment companies' reaction to the development of disruptive innovations. Porter (2008b) claims that an organisation's history can be instructive with regards to its future, as opposed to merely informative, and that by studying past organisational decision-making and industry trends "this sort of commitment may lead to [renewal of a company's] strategy and may challenge the organisation to recover its distinctiveness." Argued in sections 1.1 and 1.2 of this thesis, an increase in academic studies on this industry from an industry-level perspective may ultimately contribute to economic development in terms of employment, investment and export of entertainment offerings, as "a lack of research and development on cultural industries" has directly been attributed as one of the main constraints to further progress in this industry, which has been identified as a strategic sector in South Africa's Industrial Policy Action Plan (Department of Trade and Industry, 2010).

6.2 *Suggestions for Future Research*

Employing Brown and Duguid's (2000) opinion that "university research... is at its most effective when it conducts research that the private sector is unable or unwilling to pursue" as an underlying philosophy, a couple of possibilities for future studies are suggested as a next step to conducting research on the media and entertainment industry from an engineering management perspective:

- The development of a strategic innovation management framework for the media and entertainment industry on the African content or for South Africa specifically – an endeavour which would include the mapping of the landscape of media firms on the continent, how they are connected, the nature of their relationships and existing technologies and the development of an industry growth plan. Such a growth plan could include the conceptual design of platforms which would enhance technological development and collaboration between content and technology companies, the co-ordination of industry events such as the AfricaCast conference and suggestions to create markets for African entertainment outside of the continent itself. Case studies which could be utilised for such a project would include successes of Bollywood (the Indian entertainment industry) and Chinawood (the Chinese entertainment industry) in terms of their cross-over appeal to Western markets. Due to the immense scope

of such a project, the research domain might be limited to the motion picture sector and its ancillary markets.

- Employing a more pragmatic approach, a specific media firm might be identified and approached for the development of a technology strategy and especially the enhancement of content development and production technologies with the aim of ensuring quality offerings for the international market. One such a company might be the SABC. Benchmark studies could be done on news channels which extended their offerings to international markets by offering specialised or local content but on an international standard, of which Qatar's *Al Jazeera*, *Russia Today* and India's *IBN* are examples. Insights might be gained from the Caribbean recorded music sector as to the successful marketing of cultural music to international audiences.
- In the line of research done by such academics as Anita Elberse and Joshua Eliashberg on the determinants of success in the motion picture sector, determine the factors, as well as the extent of their interrelatedness, which positively contribute to revenues of entertainment offerings such as movies, music, video games and television shows on the African continent. Empirical methodologies such as regression analysis, probability modelling or event studies are suggested for such an endeavour. Elberse (2005) opined on the challenge yet feasibility of such studies by stating that "the complex, one-off nature of motion pictures [specifically] makes it extremely difficult to test hypotheses about the factors that drive success" but that through applying research approaches which address "methodological limitations", significant determinants of success may ultimately be "uncovered". Results from such a study may be used for artist hiring or casting guidelines or for talent compensation schemes, as the effect of 'star power' and artist remuneration rationale have traditionally been more subjective than scientifically motivated.
- A possibility for future research exists on the economic and accounting structures, business models and the financial viability of entertainment offerings, in lieu of work done by Young, Gong and Van der Stede (2008, 2010). Many times only having a once-off opportunity for releasing audio or video content to consumers, entertainment companies often employ strong project-type organisational structures with the aim of successfully commercialising each product individually. Research by Vogel (2011) revealed that only 10% of films released account for about

50% of box office revenue and he opined that box office failure is congenital: “No matter how large ancillary markets grow, they [mostly] cannot a golden goose of a turkey make.” Financially speaking, the odds are skewed against profitability in the motion picture sector and most films, which are just once-off projects in reality, fail to ever make money. This provides lush opportunity for engineers with project management skills and knowledge of project management methodologies to add real value to entertainment companies. A suggestion for research in this subject field may be to co-develop a stage-gate project management model for entertainment companies to aid them in determining which projects (radio shows, music, films, video games or television shows) to discard and which to allow commencement with production.

- With the proliferation of cellular telephones as the technology which will connect many Africans to the Internet and subsequently to the world for the first time, how can the use of cellular telephones be used to enhance paid-for entertainment consumption as an African middle-class arises, which opportunities exist for creating a market for tablet computers as portable and wirelessly-connect devices for media consumption and how will local content development be influenced by exposure to international media? These questions can be researched in addition to exploring the possibilities for utilising wireless media platforms in other spheres of society such as education systems and small business ventures on the African continent.
- In accordance with the subject of this thesis, a research study may be conducted to determine how firms in the South African media and entertainment industry can capitalise on open innovation models and digital consumer networks such as those suggested by Arakji and Lang (2007) to identify or even develop potentially-disruptive innovations in both content creation and technology platform design spheres. Research by Arakji and Lang showed how organisations in the video game sector have recently engaged with entertainment consumers by successfully outsourcing parts of its video game design and development process to digital consumer networks (2007).
- Partnerships between the University and certain media firms could be established with the aim of collaborating on specific projects or longer-term programmes, with graduate students possibly assisting with R&D initiatives, conducting market

research, suggesting and implementing entertainment product and process improvements, or establishing innovation frameworks. Progressing from mere “pay-for-research” initiatives, two suggestions for university-industry collaboration offered by Richard B. Dasher are *sponsored projects* and *research centres* (2004). Dasher serves as Director of the US-Asia Technology Management Centre and Executive Director of the Centre for Integrated Systems at Stanford University, and is a member of Tohoku University’s Board of Directors in Japan. By means of a bilateral contractual relationship, sponsored projects are appropriate when specific outcomes or deliverables are desired, while research centres are established via multi-lateral partnerships with the goal of exploratory research in multiple academic disciplines (Dasher, 2004). Considering the projected growth in expenditure in the South African media and entertainment industry as displayed in Figure 1 on page 15, as well as the existing size of its counterpart-industries globally, greater university-industry collaboration merits further investigation.

Raymond Fielding’s quote in the introductory paragraph of this chapter states that a very particular yet “peculiar marriage” exists between art and technology. Consequently, a true appreciation of entertainment content and an attempt at achieving progress in content creation require an understanding of production hardware and software, distribution devices, exhibition platforms and the business models which connect entertainment consumers with content creators. This study, then, specifically highlighted the intersection between technological innovation and business model innovation in the media and entertainment industry as a case for increased involvement from academia in an industry for which research studies have not been readily pursued traditionally. As graduates in a “new, broadly integrative and synthesis-focused enterprise engineering discipline” with the ability to “design and integrate the total enterprise system with its technical, financial, operational, organisational, marketing and human aspects within the global competitive environment”, engineering managers may find an extremely challenging yet intellectually rewarding subject of study in the media and entertainment industry. As Engineering Management authority Omurtag (2009) opines: “in the real world problems seldom appear

as simply a technical problem requiring an engineering degree or a management problem requiring a management education.” The challenges and opportunities highlighted by this historical analysis of disruptive innovations in the global media and entertainment industry, consequently, merit academic vigour which engineering management graduates are most apt at applying.

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